



**INCOME INEQUALITY AND HOUSEHOLD WELFARE IN KOTO PANJANG DAM AREA**

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**A B S T R A C T**

*Displacement due to the construction of the Koto Panjang dam has an impact on household welfare. The displaced households experienced a very poor economic condition at the beginning of the displacement period. This study seeks answers to two questions: how the current welfare of the households is and how the relationship between welfare and income inequality of those households is. The study was conducted on 12 villages which are the locations of involuntary resettlement programs with a total sample of 360 households. The study used Gini index to measure income inequality and Subjective Welfare Indicator to compare household welfare. The results showed that in general, the average household income in Koto Panjang was higher than the Provincial Minimum Wage, but it was not evenly distributed in all villages. The result also showed a negative relationship between welfare and income inequality, but it cannot be used for further analysis because the correlation value is very low.*

**A. INTRODUCTION**

Construction of dams to address future energy needs has an impact on people's lives. Households in the dam construction site were forced to move. This transfer is a form of sacrifice because they have to move from their hometown. The government compensates for this sacrifice by making the involuntary resettlement program. However, not all households that moved lives better than before (Syapsan, 2010; Karimi dan Taifur, 2013). In general, the resettlement program implemented by the national government through international assistance has increased a lot, but the failure of resettlement programs is still found in several regions in Indonesia, including Koto Panjang. This fact shows that the government must be more intensive in monitoring and evaluating the programs that have been carried out.

Many studies before discovering the occurrence of impoverishment experienced by

households moved in Koto Panjang. However, Karimi and Taifur, 2013 also found that not all households who moved lives worse found that there had been an increase in the welfare of displaced households. Increased income will reduce the level of inequality. Therefore a study is needed to see whether an increase in household welfare has an impact on reducing inequality or not.

Research on Involuntary resettlement in Koto Panjang has been widely carried out. The results of the study generally show that households that are moved in general experience difficult conditions during the initial period of migration. This condition is expected to occur as noted by<sup>7</sup> that households with involuntary resettlement have the potential to experience impoverishment. It is clear that the results of previous studies which show that households moved to experience poverty can be seen in Table 1.

**Table 1. Research Summary on Impoverishments in Koto Panjang**

Year	Researcher	Result
1998	Yasuyuki	Impoverishment occurred in one village Koto Panjang, in District Lima Puluh, West Sumatra Province
2004	Akbar	Decrease of revenue and agricultural production in 6 Villages of Koto Panjang in Kampar District, Riau.
2005	Karimi, et al	Impoverishment in 2 Villages in Kabupaten Lima Puluh Kota, West Sumatera
2007	Saleh	There is an impoverishment in Koto Panjang
2015	Uslaini et al	There is an impoverishment in Koto Panjang
2010	Syapsyan et al	Lowering educational level and changes the social capital in Koto Panjang

Source: (Andrianus, 2017).

Table 1 shows that researchers found impoverishment occurred after households were moved from their original location to a new location. However, research conducted by Andrianus (2017) showed that not all households moved experienced impoverished, some households experienced an increase in welfare. This result supported by Karimi and Taifur (2013), who also shows that displaced households experience an increase in welfare. Furthermore, Ridwan et. el. (2018) found that household that was moved experienced an increase in income compared to households that were not moved in the same location. Moved households have a greater level of land ownership than households that are not moved. However, moved households have a high level of inequality compared to households that do not move.

**B. THE MATERIAL AND METHODS**

This study will examine two hypotheses: first, whether the welfare of households being moved at this time is better than before they

moved. Second, whether the household's welfare is negatively related to inequality. Both hypotheses will be answered by using income data obtained from field surveys either quantitative or qualitative data. Second, to analyze inequality we used Gini Coefficient and analysis of Correlation to prove the connection between Inequality and Welfare.

The study was conducted from October to December of 2016 in two provinces: Tanjung Pauh village and Tanjung Balik village in West Sumatera Province and 10 separate villages in Riau province. Samples were taken from the total population of households in these 12 villages that have been moved because of dam construction in Koto Panjang. The total sample size was selected by using the Slovin's formula. From a total population of 4868, this research uses a sample size of around 300 households (5% error). This number was achieved by random sampling of 30 respondent households per village.

**Table 2. Research Location and Respondents**

No	Villages	Households	Province
1	Pulau Gadang	30	
2	Koto Masjid	30	
3	Tanjung Alai	30	
4	Batu Bersurat	30	
5	Pongkai Istiqomah	30	Riau
6	Koto Tuo	30	
7	Muara Takus	30	
8	Gunung Bungsu	30	
9	Mayang Pongkai	30	
10	Muara Mahat Baru	30	
11	Nagari Tanjung Balik	30	West Sumatera
12	Nagari Tanjung Pauh	30	
<b>Total</b>		<b>360</b>	

**C. RESULT AND DISCUSSION**

**1. Income Indicator**

To explain whether households that have moved their lives better or not, this study compares household income with provincial

minimum wages, because income is one of the main indicators of financial assets from welfare determinants (Parmawati et.al, 2018). If the average household income per month is higher than the minimum wage for the province in that year then the household is welfare. Research results from the field can be seen in Table 3.

**Table. 3 Monthly Household Income (IDR)**

Villages	Income
Tanjung Balik	1,555,172
Tanjung Pauh	1,535,714
Koto Masjid	3,177,656
Pulau Gadang	1,888,462
Tanjung Alai	1,483,333
Batu Basurek	1,703,333
Koto Tuo	2,415,000
Pongkai Istiqomah	1,959,355
Muara Takus	2,025,862
Gunung Bungsu	1,863,333
Mayang Pongkai	3,975,000
Muaro Mahat Baru	5,339,286
Average	2,410,126

Source: Data processed by authors

Table 3 shows that the average household income of Koto Panjang amounted to 2.4 million rupiahs per month. This figure is above the Provincial Minimum Wage (PMW) of the two provinces in 2016, where the figures for each PMW are IDR 1,800,725 for West Sumatra and IDR 2,138,570 for Riau province. These results indicate that in general the households that were moved in 2016 were welfare improved. However, if seen in more detail, it turns out that only 5 villages out of 10 villages are above the PMW. A total of 7 more villages are still under PMW. Especially for West Sumatra, the two villages that entered the study area were under the PMW.

The village with the lowest household income per month is Tanjung Alai Village, XIII District, Koto Kampar. The average income level of households in this village is 1.4 million rupiahs per month. Other villages in Riau Province which have relatively low monthly household income are Batu Basurek, Gunung Bungsu, and Pulau Gadang. The village of Batu Basurek is a combination of several districts which later turned into a village. Batu Basurek is the only area as a sample in this study. Batu Basurek district is the entrance area if you are going to the Muara Takus Temple area in sub

district XIII Koto Kampar. The average income per month in the Batu Bersurat district is 1.7 million rupiahs per month.

Information and facts about the income of respondents are the income of respondents in November 2016. The results of the survey in the field indicate that the village of Tanjung Alai categorizes into the village that is less successful or not prosperous after being transferred. The reasons include the unavailability of adequate employment opportunities to meet household needs in a new place after the household has been displaced. The promised compensation in the form of a rubber plantation was unsuccessful. Rubber land promised by the government cannot be harvested at the appointed time, even many fail and die. This condition occurred due to a failure in giving rubber seeds by the government. The seeds are not superior seeds. The same conditions also occurred in the other two villages, namely Gunung Bungsu and Tanjung Gadang.

Infertile soil conditions are also one of the causes of disruption of the growth of rubber plants in addition to seeds that are not good. In addition, the location of plantations that are far from their homes is also the reason why households are

reluctant to cultivate plantation land, even though according to the initial agreement the location of the plantation is only about 2 km from the residence. As a result of the failure of this rubber plantation, many residents worked as rubber gum cutting laborers in other villages that had sufficiently fertile rubber land or looked for other jobs located not far from their homes, namely as seasonal fishermen on the Kampar River.

The condition of household income in Nagari Tanjung Balik and Nagari Tanjung Pauh in Pangkalan Koto Baru District is also no better than Tanjung Alai Village. The average household income per month in the two villages is 1.5 million rupiah. This fact is similar to the results of previous studies, where the condition of household/village income in West Sumatra, in general, was relatively lower than household income in villages in Riau province (Karimi and Taifur, 2013).

Based on the results of the household income survey in Koto Panjang, the villages that rank in the top three are villages in Kampar Regency, Riau Province. The villages are Koto Masjid village, Mayang Pongkai village, and Muaro Mahat Baru village. Household income per month in these three villages are 3.2 million rupiah, 3.9 million rupiah and 5.3 million rupiah respectively. Koto Masjid village has an area that is relatively flat compared to other villages, which is why residents in this village make the catfish farming business as the prima donna for increasing family income in addition to the rubber plantations and crops that they have.

Difference the Koto Masjid village, Mayang Pongkai Village and Muaro Mahat Baru village are examples of villages that have succeeded in increasing community welfare by processing oil palm plantations. Households in these villages have oil palm plantations with the PIR (Perkebunan Inti Rakyat) pattern. Households that follow the PIR pattern, in general, are able to care for and cultivate oil palm plants as the family's main source of income. PIR plantations combine the gardens of the company with those of the people in one production unit through mutually needed and mutually beneficial partnership mechanisms. Partnerships built by households and oil palm companies in processing oil palm plantations and marketing of production are going well. Transparent production and palm oil prices from

the company motivate households to increase oil palm plantation production.

Households already know the price of oil palm before harvesting is done online so that households do not need to worry about being deceived by the company when selling garden goods. Any amount of household oil palm plantation production will be purchased by the company at the prevailing market price. So that this condition has an impact on improving overall household welfare in the villages of Mayang Pongkai and Muaro Mahat Baru.

In general, the results of the survey of involuntary resettlement households in Koto Panjang this time do not reach poverty. This fact also answers that the 8 impoverishment risks described by Cernea in the current IRR model do not occur in Koto Panjang. Research at the same time shows that in general poverty does not occur in 12 research locations surveyed using 14 measures of poverty owned by BPS. According to BPS, if 9 out of 14 categories are met, households including poor or not prosperous, while in this study 9 these indicators were not met.

## 2. Analysis of Household Welfare Based on Welfare Indicators

Subjective indicators that are used to analyze household welfare are 10 welfare indicators consist of health, education, employment, household income, and family harmony, availability of leisure time, social relations, housing conditions and assets, environmental conditions, security conditions. Perceptions of respondents' satisfaction with each indicator serve as a reference for analyzing the overall well-being of the household. Perception data was obtained from questionnaire data filled in by respondents. Information or questions in the questionnaire, in general, are questions related to the perception of respondents' satisfaction with the 10 indicators of happiness. Respondent satisfaction with each indicator is divided into three categories of satisfaction, namely Dissatisfaction, Ordinary, and Satisfied. While the numbers or percentage values included in the table are presentations of the number of respondents who answered Satisfied with each indicator. This is done to facilitate the analysis of the recipes' satisfaction.

**Table 4. Household Satisfaction Levels on Welfare Indicators in Koto Panjang (in percent)**

Villages	Indicator									
	A	B	C	D	E	F	G	H	I	J
Tanjung Balik	60	7	23	13	63	70	70	57	53	77
Tanjung Pauh	47	20	20	7	63	60	77	40	70	83
Koto Masjid	66	41	50	50	94	63	97	72	88	75
Pulau Gadang	34	34	52	38	66	52	76	69	83	79
Tanjung Alai	37	20	17	17	57	47	50	37	63	67
Batu Basurek	29	23	39	23	77	77	65	45	97	71
Koto Tuo	43	27	40	30	77	47	90	40	77	90
Pongkai	52	26	39	19	68	61	77	45	71	81
Istiqomah										
Muara Takus	53	13	23	13	77	73	60	47	80	73
Gunung Bungsu	47	20	20	20	70	50	63	33	70	63
Mayang Pongkai	34	17	45	45	69	52	79	69	76	52
Muaro Mahat Baru	58	32	35	39	61	58	61	65	65	61
<b>Rata-rata</b>	<b>47</b>	<b>23</b>	<b>34</b>	<b>26</b>	<b>70</b>	<b>59</b>	<b>72</b>	<b>52</b>	<b>74</b>	<b>73</b>

Source: Data processed by authors

Table 4. Shows that respondents' satisfaction with education is very low, with only 23 percent of household respondents satisfied with the level of education. This also shows that respondents are relatively unsatisfied with the current state of education. This relatively low condition of respondent's education is in accordance with the education profile where in general the education level of the respondents (more than 60%) did not graduate from elementary school. This result would be even worse if all those who did not go to school were combined, did not finish elementary school and graduated from elementary school reaching 68 percent or almost 2/3 of household respondents. This condition shows that in general, the quality of human resources in Koto Panjang is still very low, which has an impact on opportunities to get jobs and better livelihoods. Low education is an obstacle for households to get jobs. Jobs that can be obtained are very limited. Low education tends to only work as laborers or coarse farmers who receive wages, of course, the results obtained are not enough to meet their daily needs

Table 4. also shows that respondents' satisfaction with their income is in the second lowest position, which is an average of 26 percent of respondents in 12 research locations answered satisfied. This condition shows that respondents' satisfaction with income is still low. The general public considers their income still low, even though the average household income in the 12 research locations is 2.4 million rupiah per month or around 80 thousand rupiah a day. This can be an opportunity for the government to encourage community activities for productive activities to increase income. Households that have not been

satisfied with their income conditions can be trained or fostered to develop themselves through training or coaching carried out by the government through empowerment programs of the relevant community in accordance with their wishes and expertise. Training and education provided by the government to empower the community should be directed towards activities that do not require specific abilities or high education, because household education, in Koto Panjang is relatively very low.

The results of the study also showed that household satisfaction was dominated by 4 indicators of happiness, namely harmony, social relations, security conditions, and environmental conditions. Each of these four indicators shows household satisfaction of, 70, 72, 73, 74 percent while the other six indicators of happiness are household satisfaction values below the 60 percent figure. This condition also explains that household welfare is not only determined by income (material) but is more determined by non-material things such as harmony, social relations, security conditions, and environmental conditions.

High satisfaction with non-material indicators also shows that the community feels prosperous not only determined by the material but also determined by non-material. This fact also proves the statement<sup>11</sup>, welfare is not only determined by the material but more than that is also determined by other indicators such as harmony in the family, relations with neighbors or society. This condition also shows that social capital such as intimacy, social relations, friendliness and help among involuntary resettlement households has provided comfort and pleasure to the household or in other

words the household feels happiness that cannot be judged by the material after experiencing times difficult at the time at the old location and at the beginning of the transfer to the current settlement location.

Although there is a tendency for some researchers to assume that the welfare shown by an increase in assets and income is clearer and more valid to describe the improvement of individual welfare, it cannot be denied that non-material welfare is more influential in one's life. This concludes that the material approach alone cannot declare someone to be happier; it needs a non-material approach such as a psychological approach (Layard, 2006).

Respondent's satisfaction with work, housing conditions and assets show variation, where respondents' satisfaction with work is still low at 34 percent. This fact shows that more than 60 percent of the respondents considered that the work they currently have is still not in accordance with what they want so that it does not make a maximum contribution to improving their welfare.

Household satisfaction with their homes and assets they currently have is also relatively low at 52 percent. This is consistent with the facts on the ground, where there are still houses that are not semi-permanent as promised even though many have changed to become better or permanent. Household disappointment with the condition of the house building and assets received were seen in discussions in the field. Many households, who feel cheated by the government's promise of the condition of the house and the assets to be given, are not in reality.

The respondents' satisfaction with their health conditions was shown by 47 percent of respondents answering satisfied. This fact shows that most households assess that their health conditions are not satisfactory. This condition is inseparable from the household's understanding of the quality of their health. Education cannot be ignored in this health care. Because of a better level of education will make people able to understand how behavior and actions to maintain

and improve health quality such as maintaining cleanliness, health, and other healthy behaviors.

The indicator of free time shows that nearly 60 percent of respondents stated that they were satisfied with the availability of their free time to interact with their families and neighbors. This condition will create a good atmosphere in people's lives so that existing social values can be built properly. The values of social capital such as mutual cooperation, mutual trust, and help develop well in the midst of society.

### 3. Qualitative Analysis of Household Welfare Before and After Transfer

The results of the analysis using the previous PMW indicator showed that only 5 villages in Koto Panjang experience a welfare improvement, while 7 other villages were not welfare improved, although the average household income was above PMW. To complete the results of the analysis quantitatively using income indicators, this study also uses qualitative analysis by asking how household's satisfaction compared with the previous welfare conditions, namely in the old village and the beginning of the transfer compared to the current condition (in 2016). See table 5.

Table 5 shows that 78 percent of respondents answered their current condition of welfare (when interviewed) better than the initial conditions they moved to a new settlement. This fact shows that there has been a significant change in household conditions both economically and non-economically. Households have been able to rationally assess that their current condition is far better than at the time of the initial transfer.

The results of discussions and interviews indicate that households experience suffering or distress for several years starting from the beginning of transfer (approximately 3-6 years). This condition occurs, among others, the people who moved did not find conditions in the field as promised beforehand, semi-permanent houses that were ready to live, electricity, clean water, and livelihoods (Purwanto, 2015).

**Table 5. Satisfaction of Respondents against Previous Conditions (percent)**

Villages	Indicators								
	A			B			C		
	H	S	L	H	S	L	H	S	L
Tanjung Pauh	70	17	13	50	17	33	47	30	23
Tanjung Balik	60	13	27	70	23	7	53	33	13
Koto Masjid	94	3	3	94	3	3	94	3	3
Pulau Gadang	96	4	0	93	7	0	89	11	0
Tanjung Alai	67	7	27	83	3	13	73	3	23
Batu Basurek	68	16	16	55	35	10	48	42	10
Koto Tuo	53	20	27	53	23	23	43	20	37
Pongkai Istiqomah	74	19	6	71	23	6	55	35	10
Muara Takus	80	7	13	83	0	17	83	7	10
Gunung Bungsu	80	17	3	73	27	0	80	17	3
Mayang Pongakai	100	0	0	93	7	0	100	0	0
Muaro Mahat Baru	97	3	0	97	3	0	97	3	0
<b>Average</b>	<b>78</b>	<b>11</b>	<b>11</b>	<b>76</b>	<b>14</b>	<b>9</b>	<b>72</b>	<b>17</b>	<b>11</b>

Source: data processed by authors

H = happier, S = same, L = less

A). The present situation is compared to the initial conditions in this village

B). The present situation is compared to the old village

C). What are the conditions now?

Respondents stated that their welfare was better than when they lived in the old villages. This condition also shows that in general the involuntary resettlement program at Koto Panjang has a positive impact on people's welfare. This statement is evidenced by 76 percent of respondents answering that their welfare increased or better than before they moved. This condition is in line with the research of Karimi and Taifur (2013) who found the fact that 70 percent of household respondents stated that their welfare was better than before. This also indicates that the risk of impoverishment that occurs relatively successfully is overcome or minimized, thus creating a better or more prosperous society.

The increase in household welfare was also strengthened by the results of a questionnaire that asked about the current condition of household

welfare. Respondents' answers are that their condition of welfare is better now as many as 72 percents of respondents. This fact shows that currently, more than 70 percent of households respond to their welfare conditions better. This statement supports two previous statements by comparing conditions at the beginning of the move and conditions before moving. Thus the results of this study support the results of previous studies which stated that households were more prosperous than in their previous regions. Furthermore, if it further examined and turns out that respondents who stated that the current welfare condition is better than the previous condition were dominated by respondents who had an income of 1.5 to 3 million rupiah. More clearly can be seen in Table 6.

**Tabel 6. Respondent Satisfaction with Previous Conditions Based on Income Groups**

current situation is compared to the initial conditions in this village							
Satisfaction Level	Income (thousand rupiah)						
(%)	<500	500-1000	1000-1500	1500-3000	3000-4500	>4500	Total
Less	2	2	3	3	0	0	10
Same	2	3	3	4	0	0	12
More prosperous	5	14	15	25	8	11	78
<b>Total</b>	<b>9</b>	<b>19</b>	<b>21</b>	<b>32</b>	<b>8</b>	<b>11</b>	<b>100</b>

Current situation compared to the old village							
Satisfaction Level	Income (thousand rupiah)						Total
(%)	<500	500-1000	1000-1500	1500-3000	3000-4500	>4500	
Less	2	3	3	3	0	0	11
Same	1	3	3	4	1	0	12
More prosperous	5	13	15	25	8	11	77
<b>Total</b>	<b>8</b>	<b>19</b>	<b>21</b>	<b>32</b>	<b>9</b>	<b>11</b>	<b>100</b>

Current conditions							
Satisfaction Level	Income (thousand rupiah)						Total
(%)	<500	500-1000	1000-1500	1500-3000	3000-4500	>4500	
Less	2	3	3	2	0	0	10
Same	1	3	4	5	1	1	15
More prosperous	3	13	15	25	8	11	77
<b>Total</b>	<b>6</b>	<b>19</b>	<b>22</b>	<b>32</b>	<b>9</b>	<b>12</b>	<b>100</b>

Source: data processed by authors

Data from Table 6 show that from the questions asked to respondents about how their current welfare conditions compare to welfare conditions at the beginning of their time to move, the respondents answered generally more prosperous now. This answer is dominated by respondents who have an income of 1.5 to 3 million rupiah. This is in accordance with the previous analysis where respondents in this study were generally dominated by those who had revenues of 1.5 to 3 million rupiah.

#### 4. Income Inequality Analysis

This study calculated how large the income inequality of settler households after the construction of dams. The measurement of inequality in household income is based on measuring the imbalance of the coefficients Gini. The inequality of household income after the relocation is using the coefficients Gini. The results of data processing using household income that indicate the level of household inequality can be seen in Table 7.

**Table 7. Gini Index Involuntary Resettlement**

No	Villages	Gini Index
1	Tanjung Balik	0,36
2	Tanjung Pauh	0,31
3	Koto Masjid	0,44
4	Pulau Gadang	0,39
5	Tanjung Alai	0,28
6	Batu Basurek	0,28
7	Koto Tuo	0,29
8	Pongkai Istiqomah	0,37
9	Muara Takus	0,35
10	Gunung Bungsu	0,25
11	Mayang Pongkai	0,29
12	Muaro Mahat Baru	0,26
Average		0,32
<b>All</b>		<b>0,40</b>

Source: data processed by authors

Table 7 above is the result of data processing of household income after relocation where the coefficients gini is obtained at 0.40 which indicates that the inequality of household income after relocation is included in the category of moderate inequality, using a measure according to the index

value of Gini which only ranges from 0.4 to 0.5, which means the level of inequality of household income is still uneven. The village that has the lowest inequality is the new Muaro mahat Village, where this village also occupies the highest average household income level IDR 5,339,286

rupiah. However, contrasting results occurred in Tanjung Alai village where the Gini value was relatively low at 0.28 whereas the lowest household income level. Thus, in this study, the relationship between welfare and inequality cannot be explained. The results of the correlation between income and inequality show the figure of -0.36. Although the relationship between inequality and income is in accordance with the theory that is negative, the correlation number of 0.34 shows a very low.

The results of the Coefficient Gini analysis in this study are not much different from the research conducted by <sup>9</sup> using the 2014 Indonesian Survey of Farming Household Income data set published by Indonesian Bureau of Statistics (BPS). The Gini results indicate that income inequality that occurs in the area that is the location of Involuntary Resettlement is 0.36, while in this study Gini Index is flat The average is 0.32 and the total is 0.40.

#### D. CONCLUSION

The results showed that the welfare of the displaced households was better than in the old villages and that at the beginning of the displacement. Households have been able to adjust themselves so that they are able to get out

of the conditions of impoverishment that occurred during the initial transfer period. The average household income is above the Provincial Minimum Wage, but this condition does not show a good spread because only 5 villages from 12 research villages have an average income above the PMW. To complete the household welfare analysis with income indicators, a qualitative analysis is carried out by comparing the current home welfare with the previous one. The results showed that in general households stated that the current welfare condition was better than before, both at the beginning of the move and in the old village (before moving). There is no strong relationship (strong correlation) between income inequality and welfare because the correlation value obtained in this study is so low that it is not enough to prove the relationship between inequality and welfare for the case of Involuntary Resettlement Koto Panjang.

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