

AN IMPACT ANALYSIS OF JATIGEDE DAM PROJECT AFFECTED PEOPLE (PAPS) ON ECONOMIC, SOCIAL, AND CULTURE

Kartib Bayu¹,

³Lecture of School of Architecture,
Planning and Policy Development

Deni Nugraha²,

³Lecture of School of Architecture,
Planning and Policy Development

Edi Kusniadi³,

³Lecture of School of Architecture,
Planning and Policy Development

Ari Nurfadilah⁴,

⁵Research Assistant of School of Architecture,
Planning and Policy Development,
Bandung Institute of Technology
aridila@gmail.com

Andhy Widodo⁵

⁵Research Assistant of School of Architecture,
Planning and Policy Development,
Bandung Institute of Technology
giga_enka@yahoo.com

ABSTRACT

The development of infrastructure and the involvement of PAPS in the management of the Jatigede dam is an important factor in addressing the social, cultural and economic problems of people affected by Jatigede development. The displacement of 10,924 households as a result of the construction of the Jatigede dam to the relocation site needs to be addressed by preparing infrastructure and efforts to address social, cultural and economic problems thereafter. This study aims to obtain the results of an analysis of the impact of Jatigede development on the socio-cultural and economic of the affected people as material for policy-making in the context of handling and empowerment of people affected by the Jatigede dam construction. The methods used in this research is descriptive and verificative research. The unit samples is the Jatigede Project Affected Peoples (PAPS). The sample location determined by cluster random sampling, and analyzed with stratified random sampling from 125 respondents. Analysis technique applied is descriptive statistical analysis and SEM analysis. The type of data collected consists of Primary and Secondary data. The study was conducted in 2017. The result reveals that (1) the PAPS job field after flooding of Jatigede dam has changed. The employment is 54.40%, the unemployed 39.20%, and the 6.40% has odd jobs. The rate income after flooding has drastically decreased. (2) The availability of infrastructure and management of Jatigede dam both simultaneously and partially significant affects the socio-cultural condition of the community in relocation sites and (3) The availability of infrastructure and management of Jatigede dam are directly or indirectly affect the socio-cultural conditions of the community. The conditions has significant influence towards economic condition of the PAPS. This research can be used as a reference to mobilize initiatives to improve the welfare of affected people.

Keywords: dam, infrastructure, management, socio-culture, economy.

I. INTRODUCTION

1.1 Background

Construction of Jatigede Reservoir is a national strategic project aimed at fulfilling the needs of irrigation area of 90,000 Ha for national food supply, 110 MW of power plant for Java Bali System Electricity and Flood Control of 14,000 Ha, Provision of Raw Water Supply 3,500 liter / second for Sumedang Regency, Indramayu Regency, Majalengka Regency, Cirebon Regency and Cirebon City. The Jatigede Reservoir is located in Sumedang Regency, West Java Province which drowned 28 villages in 5 sub-districts of 4,946 hectares, 1,382 hectares of forest and cultural heritage, and 10,924 heads of household were moved to relocation sites (West Java BPS, 2015).

Construction of Jatigede Reservoir was first initiated by the government of President Soekarno in 1967. However, in 1979 government delayed the construction due to lack of funds. There was a riot as the Presidents refused to build Jatigede Reservoir. The riot was not only about compensation but also about to lose their productive land. In October 2005, the Chinese government was willing to disburse funds of 199.8 USD or about Rp 2.04 trillion to finance the construction of reservoirs. After getting

approval from the Government of Susilo Bambang Yudhoyono, this project ran again because President Susilo Bambang Yudhoyono included it in the Masterplan of Acceleration and Expansion of Economic Development of Indonesia or MP3EI. Through the MP3EI mechanism, the government cut all of local regulations. The local government also has the mandate to guard the construction of Jatigede dam that acts on behalf of the national interest. Recently, under the reign of Joko Widodo the reservoir has got priority program. Jatigede Reservoir began to be inundated with water flow from Cimanuk's river on 31 August 2015, (Bapedda Sumedang District 2016).

The displacement of the population affected by the Jatigede Reservoir construction project has two patterns that is the transfer of their own choice and government regulation. People who choose to move on their own, choose around the puddle area. They are the upper middle class who still have some land that is not inundated and the people who can afford to buy land in the area. While the movement ruled by the government is to follow transmigration program out of Java and placed in the relocation area built by the government.

Besides the relocation problem, the construction of Jatigede Reservoir is also causing another impact in flooding of natural sites in Darmaraja subdistrict. The number of flooded sites are 34 sites with 77 objects. The number of sites that are not inundated but directly affected by the Jatigede dam construction have 8 sites with 17 objects. Some were cemetery of Islamic propagators in the 16th century. Another site is trusted by the community as the tomb of King Tembong Agung named Prabu Gagah Agung. The king was expected to reign in Sumedang in the 15th century. Cipeut site in the form of punden grave terraces are located in the Village Cipaku, District Darmaraja certainly lost and drowned.

The purpose of the Jatigede reservoir is not only for irrigation of paddy fields and hydro power plants but also to a number of tourism potentials. In the surrounding of Jatigede Reservoir will be made waterboom, hotel, fishing zone, agro and others. In order to make Jatigede as a tourism area required feasible planning in the purpose of attract not only domestic but also foreign tourists. The condition is supported by the construction of West Java International Airport in Kertajati of Majalengka which is relatively close to the location of Jatigede dam. The airport will make it easier to access to the Jatigede tourism site. To support the Jatigede tourism is required sufficient supporting infrastructure. Therefore, to build the area required investment both government investment and private investment (Disnakertrans West Java Province, 2013)

Basically the area around the reservoir is promising potential for economic activity that will provide better economic impact for the surrounding community. Therefore, there needs to be a partnership and collaboration between the reservoir manager and the farmers who live around the reservoir. The economy activities that will be built must be adjusted to the reservoir zoning that becomes the tourist destination. There should be provided a specific destination that gives the opportunity to the citizens to sell agricultural product or processed as Jatigede community characteristic to create many new SMEs around the dam.

Development of Jatigede Reservoir certainly required a considerable cost to expand into tourism activities. In this case, the role of the private sector is needed and also must empower the community nearby. There should be a space and chance for society to be involved. In the context of decentralization, basically the development of tourism is expected to involve various stakeholders but give priority to the local community and focused on to encourage the community participation in order to succeed the development planning established by government. The active participation of the community is carried out by means of a social engineering, changing the habits and activities of the economic activities of the community from the condition before there is a Jatigede Reservoir into the customs and economic activities associated with the Jatigede Reservoir. Community participation will be successful if the development plan is able to provide sufficient incentives to both community either PAPs or not through partnership with various parties in tourism management of Jatigede Reservoir.

Subadra (2009) explains that the level of community involvement in tourism is very different and it depends on the type of potential, experience, knowledge and expertise owned by the each persons or communities. If farmers and farm labors do not change their way of living, then there was a large unemployment. It occurred almost 1.5 years since the inundation. Farmers and farm workers who lost their livelihoods and agricultural land can not be described as objective conditions. They could only be analyzed by how the social and economic situation should be built under limited conditions. This condition affects the future of the children of the PAPs. Related to land ownership, farmers who lived near Jatigede reservoir owned a small amount of land.

Mulyani research (2016) found that to support community activities in the relocation area the government has issued a policy of providing public facilities and social facilities in place of relocation of communities affected by Jatigede Reservoir construction. Some public and social facilities that have been or will be built in relocation sites include: 1) Education; 2) Health; 3) Land Mapping and Construction of TPT; 4) Construction of Road and Water Pipe access; 5) Clean Water Supply of Inland Wells and Electricity; and 6) Construction of Neighbourhood Roads and Mosques.

Reservoir is also attempted to give impact on the economy of surrounding communities, especially for communities affected by evictions. In order to divert the livelihoods of the people around the reservoir, the people who were once farmers should be given access to work and earn a living to keep decent life. Jatigede Reservoir as a means of tourism and recreation must also be carefully calculated in order to avoid conflict. Access obtained by the neighbourhood community who owned land for generations to be the basis of consideration of land and space management which are development for investors and for society.

Considering the magnitude of the problems and the impacts, dam building must be included in the framework of sustainable dam development, placed into the development objectives of sustainable natural resources utilization and the increase of people's welfare. This should be ensured in order to avoid unemployment and poverty. Sustainability also means the continuous output of the function.

1.2 Problem Identification and Formulation

Involuntary resettlement affected by the Jatigede dam construction into their newly confronted areas with new social and cultural

conditions so that they must adapt to these conditions. The displaced population must be better than the previous condition. However, if the conditions are the same as before, then this will have a negative impact on the existence of Jatigede dam. In addition to the social, cultural, environmental and economic benefits that will be gained from the construction of this Jatigede dam, the various social, cultural and economic issues that occur around Jatigede Reservoir development activities are:

1. Social situation which includes harmony of social communication relationship between individual and family also public community. Social communication requires a psychological social situation built with experience, and experiences coexist with time or duration of interaction. For the new community there will be a sufficient period of adjustment requiring new experiences, this has an impact on the sociological situation in the community.
2. Primary livelihood derived from the carrying capacity or natural resources. Communities around Jatigede reservoirs are mostly farmers with dry land, moorland and a small fraction of wetland / irrigation, in which they have recently lost their livelihoods as their productive land has lost.
3. About the livestock resources, the area around Jatigede is an area with a large population of sheeps, goats, poultry and beef cattle that scatter and become part of the community ecosystem. The submergence of agricultural areas, settlements and forests has a direct impact on the loss of carrying capacity of the region in fulfill the animal feed. This condition have a direct impact on the sporadic loss of livestock populations.
4. The lost of the long built of social systems, economic institutions, and upstream agricultural market chains and processing of agricultural raw materials.
5. The cultural and social safety of society in a stable community has faded as they have to occupy a new situation with different characteristics.
6. Lack of infrastructure for education, religious and economic in relocation sites.
7. Social communication both vertically and horizontally becomes problem for people who have new neighbors.
8. Social psychology caused by the loss of home, public facilities including schools can stir the phenomenon of the ambivalensis society.
9. Loss economic resources and make a living in a new place for the majority of the population such as farmers and small business.

Based on the results of the identification of the above problems, it can be formulated this research problem as follows:

1. How are the conditions of the social, cultural and economic of affected people (PAPS) before and after the construction of the Jatigede dam?
2. How are the influence of infrastructure availability and reservoir management on the social culture of people affected by the construction of the Jatigede dam?
3. How are the influences of the availability of infrastructure and the management of reservoirs on the economic condition of the people affected by the construction of the Jatigede dam?

1.3 Research Objectives

This study aims to:

1. Understand the conditions of the social, cultural and economic of affected people (PAPS) before and after the construction of the Jatigede dam.
2. Figure out the influence of infrastructure availability and reservoir management on the social culture of people affected by the construction of the Jatigede dam.
3. Figure out the influences of the availability of infrastructure and the management of reservoirs on the economic condition of the people affected by the construction of the Jatigede dam.

II. LITERATURE REVIEW

The objectives of the construction of the Jatigede Reservoir are: (i) the fulfillment of social needs (health, education, employment and freedom), (ii) environmental protection (conservation of biodiversity) and (iii) the fulfillment of physical needs (water, food, energy and home). Some experts have provided insight into the construction of dams in various related disciplines. They gave an overview of the economic, technical, socio-cultural and environmental aspects of dam building.

The World Bank (2004), states that resettlement issues are the most serious problem in dam construction projects. Moreover, the Jatigede dam project has been planned since 1963. It was only followed up in 1986 by SMEC Consultant, Australia (SNVT Pembangunan Damungan). Since the beginning of the implementation, at least there have been twice of the citizen relocation process which faced many problems.

Thayer Scudder (2005) suggests that adverse social, cultural and economic impacts of dam construction, whether short or long term, have been considered mild. Large scale water resources projects have reduced the standard of living of millions local people. Scudder argues that the goal of resettlement should be for those who move and the people whose move they benefit for the project. The income and living standards of most people should increase as much as possible. In addition, people in the downstream area of the dam should also be concerned, they are often overlooked in the initial planning as it is assumed to benefit from dam projects when they are often adversely affected by downstream dam conditions. Furthermore, Scudder (2015) suggests ways in which everyone is affected by dam construction can be better. This includes increasing local participation, improving the design and implementation of irrigation schemes, training and technical assistance to use reservoir fisheries and flood disposal from reservoirs that benefit the downstream dam users. Assistance from various parties is essential to ensure local people benefit from the construction of dams.

Engelbertus Oud (1997), Head of the Division of Water, Power and Land Development for Lahmeyer International, a German Engineering Company and partner Terence Muir, summarizes the technical and economic aspects of planning and design for large dam projects. An important trend in large dam projects is the increasing role of the private sector in financing.

The concept of sustainability in dam planning generally elaborated by Goodland (1995) and Goodland and Daly (1996) is that if the affected involuntary resettlement is zero or small, the displaced population is better off. But if the conditions are the same as before, then this can not be called sustainable. Brazil and China allocate some of the dam benefits to the displaced persons. The Chinese policy is to ensure that displaced persons are better off, so the impact on people affected by AIDS should be acceptable.

According to Kluckhohn in Basrowi (2005), there are at least four main issues of human life in every culture: (a) the question of the nature of life, (b) the nature of work, (c) the essence of time, (d) human relations with others. For these four main issues, each cultural group responds differently, depending on the orientation of their cultural system. Patterns of cultural value orientation the progressive (modern) is the oriented that life should be repaired, work it for achievement, oriented to the future, strives master of nature, and independent. Furthermore, Basrowi said that in sociological studies, the values of a person or group can directly affect all activities, especially in order to adapt the norms that exist in the community around them. In addition, social values can determine the size of a small or high level of status and the role of a person in the midst of community life.

The actor pursues the goal of achieving a situation in which norms direct him in choosing alternative ways and means to achieve goals. The choice of tools and means is determined by the ability of actors to choose, this ability is called Voluntarism. Here the actor has the freedom to choose and evaluate alternative actions even though here he is also limited by the objectives to be achieved, the conditions and other important norms and situations (Ritzer 1985: 57). Furthermore Golubev, (1988) states that the management of reservoirs in many countries should be considered as a component of sustainable development.

According Jorgensen and Vollenweider (1988) reservoir is an open system in which there exchanges energy and mass with the environment. The state of this reservoir is very dependent on this exchange condition, known as the "forcing function" that pressure on the reservoir as a function of time. Pressure functions exist that can be controlled and some can not be controlled. What can not be controlled is weather and other climate, while the controlled factor is the management aspect of the reservoir itself.

Efforts to improve the existence of reservoirs and humans through the proper management of the reservoir system and to ensure sustainable resource utilization are necessary. Golubev (1988) states that the management of reservoirs in many countries should be considered as a component of sustainable development. This effort has become part of UN (United Nations Environment Program) activities in managing reservoirs / lakes and watersheds that are environmentally sound.

Jorgensen and Vollenweider (1988), stated that the core of reservoir management is to obtain a relationship between external variables and internal variables, and by using the knowledge of these relationships, the desired reservoir conditions can be achieved by changing and controlling those variables. Research Results Rizal Pahlefi. 2012 the results of his research concluded that the construction of Koto Panjang hydroelectric dam has had an impact on the socio-economic life of the community, this is shown from changes in the types of livelihoods and changes effects from changes in livelihood.

III. RESEARCH METHOD

This research is descriptive research and verificative research. The analysis unit is the affected person (PAPS) of the Jatigede dam construction. The data analyzed is the Time Series data. This Research Analysis was conducted in Jatigede Reservoir Area of Sumedang Regency of West Java and in the Area of Relocation of the Affected People of Jatigede Dam Reservoir in Darmaraja Subdistrict, Wado Sub-district, Jatigede Sub-District, Cisitu Sub-District and Jatinunggal Sub-District.

3.1 Operationalization of Variables

The variables in this study consist of four variables, namely infrastructure availability (X1), Jatigede Reservoir Management (X2), Socio-Culture (Y1) and Economic Condition of PAPS (Y2). Availability of infrastructure and management of Jatigede reservoir is independent variable or exogenous variable, Social culture variable is intervening variable and economic condition of PAPS is dependent variable or endogenous variable. In details the operationalization of research variables are presented in Table 1.

Table 1. Operationalization of Research Variabels

No.	Variables	Dimension	Indicator
1.	Infrastructure Availability (X1)	Relocation (KI1)	Level of Infrastructure availability at relocation site
		Socio-culture (KI2)	Level of socio-cultural infrastructure availability
		Economy (KI3)	Level of economic infrastructure availability
2.	Management of Jatigede Dam (X2)	Private Involvement (PW1)	Level of private involvement in the management of the Jatigede dam
		Government Involvement (PW2)	Level of government involvement in the management of the Jatigede dam
		PAPs Involvement (PW3)	Level of PAPs involvement in the management of the Jatigede dam
3.	Socio Culture (Y1)	Customs (SB1)	Conditions of custom in relocation sites.
		Local culture (SB2)	Conditions of local culture in relocation sites.
		Social Process (SB3)	Social process occurring between resettlers and local communities.
		Social conflict (SB4)	Conflicts in relocation sites.
		Social changes (SB5)	Social changes in relocation sites.
4.	Economy (Y2)	Job opportunity (KE1)	Level of ease getting a job
		Entrepreneur opportunity	Level of ease to start a business

No.	Variables	Dimension	Indicator
		(KE2)	
		Income (KE3)	Level of income earned in relocation sites

3.2 Source Type and Data Collection Method

The type of data collected for analysis consists of Primary and Secondary data. Primary data sources were obtained from direct interviews with respondents which used questionnaires and conducted field observations. Sources of secondary data are obtained from literature studies, documentary reviews, and data from agencies, bodies and bureaus related to this study.

A. Primary Data

Primary data collected by two ways that was survey and interview by using questioner and direct observation as well.

1. Interview Method

Interviews were conducted to respondents of affected people (PAPS) of Jatigede dam construction, informant of community (community leaders), and officials from related institutions. The interview was conducted based on the prepared questionnaire.

2. Observation Methods

Direct observations are made on the basis of identification points including activities of Person Affected by Jatigede development, socio-economic conditions in the study area, socio-economic condition of people affected by Jatigede development, condition of Jatigede reservoir infrastructure and surrounding relocation area, management of Jatigede Reservoir, and the environment condition of Jatigede Reservoir.

B. Secondary Data

Secondary data are collected to obtain the theoretical basis and supplemented the primary data by studying textbooks, journals, prior research, other scientific papers related to this research, documentary, website reviews and information from the offices / agencies related.

3.3 Sample Determination Techniques

The technique of determining the sample location using Cluster Random Sampling (CRS). To determine the sample size of Respondents People affected by Jatigede Dam impacts was conducted by simple random sampling technique. The sample size taken according to Schumacker and Lomax (2004: 49) is about 100-150 subjects for the minimum sample size. According to Kelloway (1998: 20) that in general the sample size of 100-200 observations which is an adequate minimum limit. Based on that opinion is a reference to the minimum sample requirements used, then the sample size chosen as much as 125 respondents PAPS.

3.4 Technical Analysis and Data Processing

The collected data is then tabulated followed by the compilation and selection of data in the purpose of getting relevant data to be used for analysis process. Analysis and data processing will be used:

1. To analyze the social, cultural and economic conditions of people affected by the Jatigede dam dan it will be analyzed in quantitative and qualitative descriptive.
2. To analyze the influence of Jatigede Reservoir infrastructure and management on socio-cultural and economy of people affected by Jatigede dam using Structural Equation Model (SEM) analysis. SEM is a multivariate technique combination of aspect of multiple regression and factor analysis to estimate a series of related dependence relationships continuously (Hair, et al.1998 : 583).

IV. RESULT AND ANALYSIS

4.1 Condition of Socio Economic of PAPS

Occupation is very important to support people’s life. Employment is closely related to the person work place. In prior to dam drowing, the PAPS consisted of 45.60 percent worked as farmer, 17.60 percent labors, 24.80 percent traders, 4.00 percent employee and 8 percent worked in workshops (handyman, mechanic, etc). The PAPS occupations before dam drowing is presented in Figure 1.



Figure 1. Occupation of PAPS before Dam Development

Figure 1 shows that the occupation of PAPs before the construction of Jatigede dam was mostly farmers and farm laborers. This indicates that the main of their livelihood is from agriculture. Meanwhile, the occupation after the construction of Jatigede dam is presented in Figure 2.

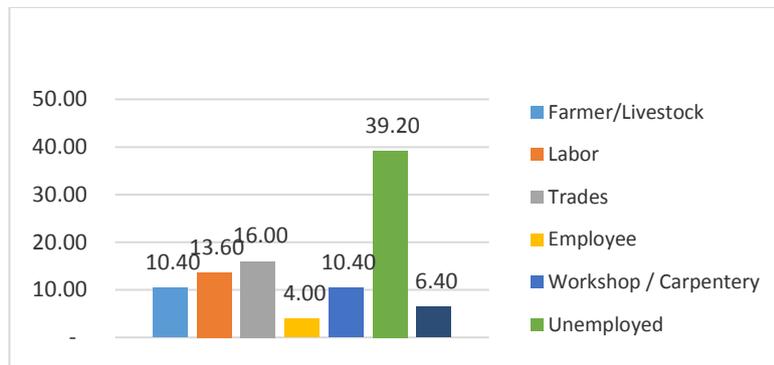


Figure 2. Occupation of PAPs after Dam Development

Based on Figure 2, there is changing in the work field of the PAPs now after the construction of the dam. Farmers and farm labors decreases to 24 percent, trader 16.00 percent, employees 4 percent, services as much as 10.14 percent. Meanwhile, unemployed raise to 39.20 percent and odd job become 6.40 percent. It is clear that after the construction of Jatigede dam, most of the PAPs (39.20 percent) unemployed and as much as 6.40 percent worked odd jobs. The changes in occupation has a major impact on their income. The level of income before the dam construction is presented in Figure 3.

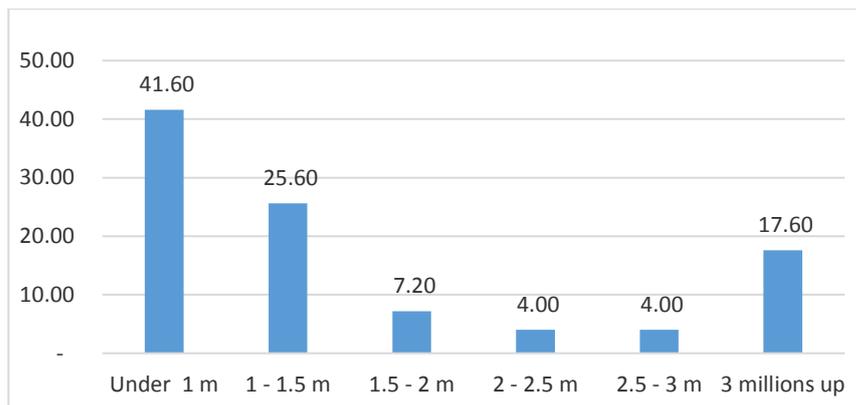


Figure 3. Income of PAPs before the Dam Development

According to Figure 3 that prior to the Jatigede dam 41.60 per cent of PAPs has income less than 1 million per month, 25.60 per cent earned about 1 to 1.5 millions per month, 7.20 per cent earned 1.5 to 2 millions per month and there were only 8 per cent earned 2 to 3 millions per month. Meanwhile, there were 17.60 percent whose income above 3 million. Before the Jataigede dam, most of the PAPs earned income was less that 1 million per month. While the income above 3 million as much as 17.60 percent. This suggests that before Jatigede reservoirs their income was still low, although there were 17.60 percent who earned over 3 million per month. The income of the PAPs after the relocation is presented in Figure 4.

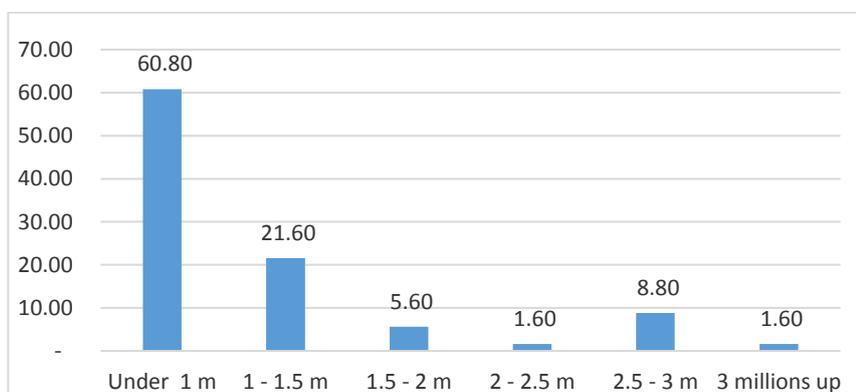


Figure 4. Income of PAPs after the Dam Development

Figure 4 reveals that 60.80 percent of PAPs earn income is less than 1,000,000 a month after relocation. Meanwhile 21.60 percent and 7.20 percent of them earned between 1.5 – 2 millions and 2 - 3 millions respectively. There are only 1.6 percent whom earned above 3 millions a month. This indicates that the development of Jatigede dam have not benefited significantly to those PAPs. The dam even give negative impact on PAPs particularly in terms of their occupation. It reveals that 45.60 persen experience occupation change but not in the better direction since they now become unemployed. Those who change their occupation into trader dan service sector is found only in certain areas and occurs only in a small proportion of PAPs.

Because some affected people do not get new jobs automatically will also affect the income. 88.60 percent of respondents stated that after the existence of Jatigede Reservoir their income decreased. Those who have a new job claim that the job does not provide a better income than the previous income. There are a number of reasons why the community has to say that up until now some of them have no new jobs and low income from current jobs:

1. Most of the people affected by Jatigede Dam construction work as farmers and farm laborers. After the relocation, most of them have no land for farming. Limited land and compensation provided for land compensation is not enough to buy new agricultural land. In addition, most residents are still confused about land zoning. So do not know which land is intended for agriculture and for settlement.
2. Although there are new job opportunities such as trading, boat rental services, and fishing, those all are very dependent on external parties or visitors of the dam resulting in high dependence on others. In addition, the jobs can only be undertaken by a small number of people, especially those located adjacent to the reservoir area and those with capital.

Beside mentioned reasons, the lack of education and knowledge also complicate the affected peoples to adapt to social and environmental changes. This is exacerbated by the lack of a pattern of empowerment of people who will be affected by development with new job that may be taken in accordance with the potential and function of the Jatigede reservoir itself.

The project owner appeared to be unprepared to anticipate it. Social impact already visible in planning but invisible in implementation. As if the government ignores the conditions of the affected peoples. During observation process in July 2017, there were no initiatives found to anticipate changes in economic conditions except relocation and compensation for land acquisition by project owner. This is also exacerbated by the less knowledge of citizens about new livelihood but their previous work. The ignorance is caused by the implementation was not accompanied by socialization information about new settlements and potential new jobs around the dam.

To improve the economy, agriculture and tourism are the most popular business plan by citizens. The interest is in line with the purpose of Jatigede dam to meet the irrigation of agriculture and tourism. The tourism sector has great potential in boosting economic growth. As mentioned by Minister of Tourism Arief Yahya (Tribunnews: September 26, 2017) that the current growth of tourism reached 24% and contribute 4% to the national GDP. Tourism is very interesting because it is also supported by the government that is now boosting the tourism sector.

Given the enormous potential of tourism, it is necessary to immediately implement the zoning plan of tourism around the Jatigede reservoir as it has been declared since 2013 by SNVT Construction of Reservoir. According to the BPS review in 2016, the contribution of the construction sector to the formation of gross domestic product (GDP) was significant, ie 10.38%, ranked 4th after industry, agriculture and trade sectors. If the construction/ infrastructure is offset by tourism then economic growth is expected to also rise significantly.

4.2 Effect of Infrastructure Availability and Reservoir Management on Socio-Cultural of Society

The condition of infrastructure (X1) and Management of Reservoir (X2) either simultaneously or partially in fact has 5 percent significant influence on socio-cultural (Y1). This is indicated by the value of the second path coefficient which shows the calculated value for both paths is 3.283 and 2.838 larger than the critical limit ie $| 1.96 |$. Simultaneously, the magnitude of effect of Infrastructure Condition (X1) and Reservoir (X2) to Socio-Culture (Y1) was 75.90 percent, while the rest of 24.10 percent was caused by other factors not examined in this study.

artially, Infrastructure availability variables (X1) and Reservoir Management (X2) have an influence on Socio-Culture (Y1) of 0.3948 and 0.5642 respectively. Thus, the influence of the reservoir management has greater impact on socio-cultural compared to the availability of infrastructure. The condition of Infrastructure (X1) and Management of Reservoir (X2) simultaneously has significant effect on Socio-Culture (Y1), with the influence of 75,90 percent. This shows that 75.90 percent of socio-cultural variation of society is determined by the variation of Infrastructure availability and Reservoir management. The remaining 24.10 percent is determined by other variables not examined. The results of this study in accordance with the expectations of researchers, that the availability of infrastructure and management of reservoirs simultaneously have a significant influence on socio-cultural conditions of society.

Based on the partial statistical test that the availability of infrastructure has a positive and significant impact on Social Culture Society of 0.39. This situation indicates that socio-cultural 39.48 percent is determined by the availability of infrastructure. This proves that the variable availability of infrastructure is an important factor that can predict the condition and socio-cultural changes in the relocation community. Partially Jatigede Reservoir management has a positive and significant impact on social culture of 0,56, meaning that social culture variation partially 56% is determined by variation of Jatigede Reservoir management involvement. This proves that the management of Jatigede dam is an important factor in the formation of Social Culture of the community in relocation sites..

Jatigede reservoir management partially has a significant influence on Social Culture. The results of this study generally justify the hypothetical model of the researcher, revealing the positive effect of infrastructure availability variables, and the variables of the Management on the socio-cultural variables. Based on the results of statistical tests supported by the results of previous research and the opinions of experts, the hypothesis proposed in this study can be proved that the availability of Infrastructure and Management of Reservoir either partially or simultaneously affect the social culture of society.

4.3 Effect of Infrastructure Availability and Reservoir Management on Economic Conditions of PAPS.

The path coefficient of both variables shows a significant influence. This means that the condition of Infrastructure (X1) and the management of the reservoir (X2) either simultaneously or partially at the 5 percent real level significantly influence the economic condition of the PAPS. The significance of the two path coefficients shows that the t values for both paths are 3.5911 and 4.1145, respectively, greater than the critical limit of | 1.96 |.

Simultaneously, the magnitude of influence of Infrastructure (X1) and Reservoir (X2) condition toward the economic condition of PAPS (Y2) is 70.90 percent, while the rest of 29.10 percent is caused by other factors not examined. Partially, Infrastructure availability variables (X1) and Reservoir Management (X2) have an effect on Economic Condition (Y2) of 0.4501 and 0.4127 respectively. The availability of infrastructure has a direct effect on the economic condition of 45.01 percent and the management of the Reservoir has an influence of 41.27 percent. Thus, the availability of infrastructure directly has a greater impact on economic conditions than the management of reservoirs.

Having know the magnitude of direct influence of exogenous latent variables of infrastructure availability and management of reservoir to latent variable of endogenous condition of economy, hence analyzed indirect influence and total influence from availability of infrastructure and management of reservoir to economic condition. The effect of the availability of infrastructure to the economic conditions directly amounted to 0.4501, indirectly through the socio-cultural conditions of the community of 0.1283, result to the total effect of 0.5784 or 57.84 percent. his indicates that the availability of infrastructure provides an important role in improving the economy of the PAPS.

The direct influence of reservoir management on economic condition of PAPS is 0.4127 and indirectly through social culture 0.1743, so its total influence is 0,5870 or 58,70 percent. This shows that reservoir management is one of the determinants of good and bad economic condition of AHs. Based on the results of this study and the income of experts above can be explained that the management of reservoirs either by the government, private or management by the PAPS will affect the economic condition of PAPS. The better the management level of the reservoir, the better the economic condition. The results of this study in accordance with the expectations of researchers that partially management of reservoir effect on the good and bad economic conditions of PAPS.

Reviewed from the indirect influence through socio-cultural society and its total influence on the economic condition of PAPS shows that the Reservoir Management gives more influence than the availability of infrastructure. Line Chart Effect of Infrastructure Availability and Reservoir Management (X2) on Socio-Culture and Economic Level of PAPS (Y2) is presented in Figure 5.

Figure 5. Pathway diagrams Effect of Infrastructure Availability and Reservoir Management (X2) on Socio-Culture and Economy (Y2)

Description :

KI	= X ₁	=	Condition of Infrastructure
PW	= X ₂	=	Management of Jatigede
SBM	= Y ₁	=	Social Culture of Society
KE	= Y ₂	=	Condition of Economy
KI ₁		=	Dimension of Relocation Infrastructure
KI ₂		=	Dimension of Social Culture Infrastructure
KI ₃		=	Dimension Economical Infrastructure
PW ₁		=	Dimension of Government
PW ₂		=	Dimension of Private
PW ₃		=	Dimension of PAPS
SB ₁		=	Dimension of Tradition
SB ₂		=	Dimension of Local Culture
SB ₃		=	Dimension Social Process
SB ₄		=	Dimension of Social conflict
SB ₅		=	Dimension of Social Change
KE ₁		=	Dimension of Job Opportunity
KE ₂		=	Dimension of Entrepreneur
KE ₃		=	Dimension of Income

These findings indicate that the availability of infrastructure, and management of reservoirs are important factors in determining the economic level of the Jatigede dam. The high influence of these two variables simultaneously to economic conditions because it gives great support to economic activities in the relocation site prepared by the Jatigede reservoir manager and this is

indicated by the statistical correlation between the variables. Based on statistical test and opinion, it can be explained that the availability of infrastructure and management of reservoirs simultaneously determines the good and bad economic condition of the Jatigede Reservoir Project Affected Peoples (PAPs). It means the two variables are very important role in determining the economy of PAPs in relocation sites.

V. CONCLUSION

1. The field of PAPS work after the flooding of Jatigede Reservoir has changed in comparison with the area of origin. PAPSs that already have employment as much as 54.40 percent. The jobs they work on are in the agricultural sector, farm labor, trade, private employees and services. However, PAPSs are remain about 39.20 percent of the PAPs communities who do not have permanent jobs (unemployment) and odd jobs as much as 6.40 percent. This has an impact on the income level of people affected by Jatigede development after a drastic decline. This indicates that PAPSs around the Jatigede reservoir have not benefited significantly from the construction of the Jatigede dam. Precisely, this is the negative impact on the PAPSs specifically regard to the level of income they receive is decreasing and even many who lost income.
2. The availability of infrastructure and the involvement of the management of the Jatigede reservoir, either simultaneously or partially, has a significant effect on the socio-cultural conditions of the community in relocation sites. The more complete the availability of infrastructure and the more intensive the involvement of PAPs in the management of the Jatigede dam result in more harmonious of socio-cultural in the relocation site.
3. The availability of infrastructure and the involvement of the management of the Jatigede reservoir, either directly or indirectly through the socio-cultural conditions of the community, has a significant effect on the economic condition of the people affected by the development of Jatigede. The more complete the availability of infrastructure and the more intensive the involvement of PAPs in the management of the Jatigede dam, as well as the more conducive socio-cultural communities in relocation sites, the better welfare of the people affected by Jatigede development.

VI. RECOMMENDATION

1. The impact of Jatigede dam on affected people (PAPs) is the number of PAPs who are losing employment and decreasing income levels. Therefore, the sollution efforts by preparing job opportunities for PAPs to be done immediately for short, medium and long term. If this is allowed then there will be social vulnerability, food insecurity and crime.
2. Infrastructure development in relocation site of both social and cultural infrastructure and also economic infrastructure to be built and equipped to support social and economic activities in minimizing socio-cultural and economic impacts.
3. In the management of the utilization of Jatigede reservoirs, it is prioritized to be able to involve and empower the affected people so that they can receive a positive impact from the construction of the Jatigede dam.
4. Limitations of this research are in general variables measurement and can be made in more details.
5. Policy makers should act comprehensively to solve PAPs's problems. Beside the infrastructure development, socializing process for human being's (especially in economic and sosio culture) after displacement preparation program should be intensive and massive. This program may invite and involve other stakeholders like central government, stated own company, private company, public figures, etc. By hand in hand the problems may be solved incrementally.
6. Particularly for Malaysia, this findings can be developed into some industrial strategies by making cheaper and better equipments and components for dam construction, effective and efficient equipments for farmers, tourism partner to promote jatigede dam as tourism destination, etc.
7. The availability of infrastructure, and management of reservoirs are indicated as important factors in determining the economic level of the dam and the need of PAPs management are signicact contribution of the paper to the body of knowledge.

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REFERENCES

- Basrowi. 2005. Pengantar Sosiologi [*Introduction to Sociology*]. Bogor: Ghalia Indonesia.
- Bappeda Kabupaten Sumedang. (2016). *Kajian Pengembangan Pariwisata Kawasan Waduk Jatigede, Kabupaten Sumedang [A Study on Tourism Development of Jatigede Reservoir Area, Sumedang Regency]*. From Bappeda Kabupaten Sumedang [Board of Regional Planning and Development, Sumedang Regency], Sumedang.
- BPS of West Java Province. (2015). *Jawa Barat Dalam Angka [West Java in Numbers]*. From Dokumen BPS Jawa Barat [Document of West Java BPS]. Bandung.
- Dinas Tenaga Kerja dan Transmigrasi Provinsi Jawa Barat. (2013). *Inventarisasi Arah dan Minat Penduduk berdasarkan Potensi Saat ini dan kecenderungan di masa datang [Inventory of Current Directions and Interests based on Current Potential and its Future trends]*. Dinas Tenaga Kerja dan Transmigrasi Provinsi Jawa Barat [Manpower and Transmigration Agency of West Java Province of the Republic of Indonesia].
- Engelbertus Oud. 1997. *Engineering and Economic aspects of Planning, Design, Operation and Contruiction of Large DAM Project*. University of California. California. Retrived from <https://books.google.co.id/books?ID=FIWHSCZD4cC>.
- Golubev, G.N. 1988. Foreword in Jorgensen and RA. Vollenweider. *Guidelines of Lake Management, ILEC, UNEP*.

- Goodlan, R., & Daly, H. [1996]. Environmental Sustainability: Universal and Non-Negotiable. *Ecological Applications* Vol.6, No. 4, 1002 – 1017. Retrieved 11 20, 2017, from <http://www.jstor.org/stable/2269583>.
- Hair, J.F., Anderson, R.E., Tatham, R.L., dan Black, W.C. 1998. *Multivariate Data Analysis*. UK: Prentice Hall International.
- Jorgensen, S.E and R.A. Vollenweider. (Editors). 1988. *Guidelines of lake management*. Volume 1, Principle of lake management. International Lake Environment Committee, United Nations Environment Programme. 199p.
- Kelloway, E. Kevin. 1998. *Using Lisrel for Structural Equation Modeling*. USA: Sage Publications.
- Mulyani, Mulyani. 2016. Kebijakan pemerintah terhadap masyarakat yang terkena dampak pembangunan waduk Jatigede di Kabupaten Sumedang [*Government Policy towards Project Affected Peoples's of Jatigede Dam Construction in Sumedang Regency*]. [Journal.student.uny.ac.id/ojs/index.php/civics/article/.../3475](http://journal.student.uny.ac.id/ojs/index.php/civics/article/.../3475)
- Rizal Pahlefi. 2012. Dampak Pembangunan Waduk Terhadap Kehidupan Sosial Ekonomi Masyarakat: Suatu kajian terhadap kasus perubahan mata pencaharian masyarakat di sekitar waduk PLTA Kota Panjang Kabupaten Lima Puluh Kota Propinsi Sumatera Barat [*Impact of Development of Reservoir on Socio-Economic Life of Society: A Case Study of People's livelihood changes around the reservoir of PLTA Kota Panjang City, Lima Puluh Kota Regency, West Sumatra Province*]. Jakarta. University of Indonesia.
- Ritzer, George. 2002. *Sosiologi Ilmu Pengetahuan Berparadigma Ganda [Sociology of Dual Paradigm Science]*. Jakarta: PT. Raja Grafindo Persada
- Scudder, Thayer. ([2005). *The Future of Large Dams: Dealing with Social, Environmental, Institutional, and Political Costs*. Earthscan. Michigan University.
- Subadra, I Nengah dan Nyoman Mastiani Nadra. 2006. Dampak Ekonomi, Sosial-Budaya, dan Lingkungan Pengembangan Desa Wisata di Jatiluwih Tabanan [*Economic, Socio-Cultural, and Environmental Impacts of Tourism Village Development in Jatiluwih Tabanan*]. *Jurnal Manajemen Pariwisata*, Vol. 5, No. 1, 46--64.
- Sztompka, Piotr. 2004. *Sosiologi Perubahan Sosial*. Jakarta: Prenada Media Group.
- The World Bank. (2004). *World Development Report 2005 A Better Investment Climate for Everyone*. Washington, DC: World Bank and Oxford University Press.
- Schumacker Randall E. and Richard, G. Lomax. 2004. *A Beginner's Guide to Structural Equation Modeling. Sccond Edition*. New Jersey USA. Lawrence Erlbaun Associates Publishers.