Land acquisition for dams: relocation problem and potential change in livelihood of communities affected villages

D W Pujiriyani, H Wulansari and B Suyudi
Sekolah Tinggi Pertanahan Nasional, Jln. Tata Bhumi No. 5, Banyuraden, Gamping, Sleman, Yogyakarta, Indonesia

* lucia_wulan@yahoo.com

Abstract. Dams are agricultural infrastructure that has very important role in supporting food security. Dams constructions indirectly show a change in resources from land resources (terrestrial) to water resources (aquatic). This study aims to analyze the impact of land acquisitions as a consequence of accelerating agricultural infrastructure development policy in East Java Province. This research was conducted using a multiple case study approach. Data were collected qualitatively through documents study, observation, and in-depth interview. There are three cases of land acquisition for dam construction comparing in this study: Semanthok Dam in Nganjuk District, Bagong Dam in Trenggalek District, and Bendo Dam in Ponorogo District. The result shows that land acquisition for dam construction was not immediately responded well. Conflicts usually begin from the value of compensation that is not in accordance to the community expectation. The land acquisition process for the dams has not included a livelihood plan for the people who are relocated from their village of origin. In fact, the dam construction necessitates a shift from the affected communities who originally used land resources eventually turned into water resources due to the dam constructions. A comprehensive impact analysis mapping has not been found covering: the community upstream dam, the community around dam and the community downstream of the dam.

1. Introduction

Dams are one of the most important infrastructures to support agricultural production. Dams are physical investments that have a wide range of benefits to support national food security. Pasandaran [1] uses a Japan syndrome term to illustrate the impact of dam construction. Japan syndrome characterized by industrialization enhancement that will usually be followed by a decrease in food production capacity due to the movement of labor from rural to urban areas, from agricultural sector to industrial sector. Indonesia is also experiencing the same phenomenon. In Japan syndrome, land resources are began to be abandoned. Meanwhile, in Indonesia the term is known as Japan syndrome. Japan syndrome illustrates that Java is losing its ability to become the food production center. This is not only due to the shift in the agricultural sector to industry sector but rather to the high rate of land conversion from irrigated agricultural lands into industrial and residential lands.

As a long-term physical investment, the impact of dams construction must be viewed both in two sides. Dam construction has both positive and negative impacts. When we refer to a dam as a physical investment, we are definitely referring to its positive impact. The positive impacts of dam construction are: to increase agricultural productivity, to support flood mitigation, to become a source of energy for electricity generation, and to create the new sources of livelihood [2-7]. Meanwhile, the negative impacts
of dam constructions are: the livelihoods change from farm laborers to casual daily laborers, and the decrease of community income [2,8-13].

Kraljevic et al. [14], call the impact of dam construction with the term 'seven sins of dam building'. One of them called as external costs or hidden costs. External cost or hidden cost is an effect that is often overlooked. External costs or hidden cost show that the construction of dams do not only cause physical impacts but also non-physical impacts. These impacts are mainly related to the human rights aspects of the affected communities, including the right to obtain a decent life after development.

In the context of dam construction, East Java is one of the priority locations. East Java has an important position as a food barn. East Java was ranked as the largest rice producer in Indonesia by 2020, consequently East Java was supported to become national food buffer province. The National Strategic Project has six specific agendas for dam construction in East Java province as can be seen in Table 1.

### Table 1. Dam project in East Java Province.

| No | The name of construction project | Investment value | Location               | Capacity | Agricultural land coverage |
|----|---------------------------------|------------------|------------------------|----------|---------------------------|
| 1  | Bendo Dam                       | 776 Billion      | Ponorogo District      | 43.11M³  | 7800 hectares             |
| 2  | Gongsgeng Dam                   | 518 Billion      | Bojonegoro District    | 22.43M³  | 6191 hectares             |
| 3  | Tukul Dam                       | 674 Billion      | Pacitan District       | 8.68M³   | 600 hectares              |
| 4  | Tugu Dam                        | 652 Billion      | Trenggalek District    | 9.3M³    | 1200 hectares             |
| 5  | Semantok Dam                    | 805 Billion      | Nganjuk District       | 17.63M³  | 1554 hectares             |
| 6  | Bagong Dam                      | 708 Billion      | Trenggalek District    | 15.5M³   | 857 hectares              |

There are 6 dam constructions that are currently underway in East Java Province, namely Bendo in Ponorogo, Gongsgeng in Bojonegoro, Tukul in Pacitan, Tugu in Trenggalek, Semantok in Nganjuk and Bagong in Trenggalek. The investment value for the each construction is on average above 500 billion.

Most of agricultural infrastructure development project that implemented through the dams construction in East Java are problematic. Land acquisition for the construction of dams in East Java almost faced resistance from the affected communities as quoted in an interview with the Head of Land Procurement of the East Java Province, Ministry of Agrarian Affairs/National Land Agency: “Indeed, in East Java, reservoirs in particular, are mostly problematic, especially related to the results of the appraisal”. Protest from community certainly rise from compensation problem. This study aims to analyze the impact of land acquisitions as a consequence of accelerating agricultural infrastructure development policy in East Java Province.

### 2. Materials and methods

#### 2.1. Materials

This study uses secondary data and primary data. Secondary data was obtained from land acquisition documents including: land acquisition planning document for Bagong dam, land acquisitions planning document for Semanthok dam, relocation plan document (LARAP) for dam construction, decision letter for determination of location, and the list of affected people. All of these documents were obtained from the Agrarian Affairs and Spatial Planning Office/National Land Agency in East Java Province as well as the land office at the district level that implementing land acquisition for the Semanthok Dam, Bagong Dam and Bendo Dam. Meanwhile, primary data was obtained from interviews with relevant agencies and communities at the dam construction site.

#### 2.2. Methods

This study uses a qualitative method with a multiple case study approach. A multiple case study approach was used to obtain a comparison between cases of dam construction in different locations. In this paper
the cases taken are in 3 locations, namely Semanthok Dam in Nganjuk District, Bendo Dam in Trenggalek District and Bagong Dam in Ponorogo District. The research was conducted in March-April 2021. Data analysis was carried out qualitatively by selecting data referring to the topics that had been prepared.

3. Results and discussion

3.1. Construction of Semanthok Dam, Bagong Dam and Bendo Dam in East Java in the national strategic project scheme

Figure 1. Location of construction of Semantok Dam, Bagong Dam, and Bendo Dam

Semanthok Dam, Bagong Dam and Bendo Dam are 3 dams built in East Java Province. These dams are directed to support Indonesian government's program to strengthen the national food barn. Food barns are a priority for the Indonesian government to meet national food needs. Besides, dam construction is expected to ensure water supply to increase agricultural production. The construction of dams in East Java Province is a strategic project that continues to be accelerated.

First, the Semanthok Dam. The dam is projected to drain 1554 hectares of agricultural land. The Semanthok Dam was built in Nganjuk District, East Java. This dam was built to minimize the flooding that occurred in Rejoso District and to retain abundant water in the rainy season and distribute it during the dry season so that there is no drought in the rice fields.

Second, Bagong Dam. The dam is projected to drain 857 hectares of agricultural land. This dam was built in Trenggalek District, East Java. Like the Semantok dam, this dam was also built to reduce flooding and increase irrigation capacity.

Third, Bendo Dams. The dam is projected to drain 7800 hectares of agricultural land. Bendo Dam was built in Ponorogo District. The construction of this dam is expected to increase the planting intensity to three times a year. Bendo Dam is also expected to be a source of domestic and industrial raw water. Finally, this dam is also expected to reduce flood discharge in the Ponorogo area.

3.2. The Impact of dam construction on communities of affected villages

Dam construction indirectly diverts land resources into water resources. This situation is often not realized that the impact of this resource change has a very large impact on the affected community, especially those who rely on land resources. Table 2 clearly shows that the construction of dams, whose main priority is to support the agricultural sector, especially related to increasing agricultural productivity, also has an impact on agricultural land and livelihood change.
Table 2. The impact of dam construction.

|                          | Semanthok Dam construction | Bagong Dam construction | Bendo Dam construction |
|--------------------------|-----------------------------|-------------------------|-------------------------|
| The land required for    | 738 hectares                | 500 hectares            | 294.6 hectares          |
| the dam construction     |                             |                         |                         |
| Number of field          | 258 fields                  | 1032 fields             | 195 fields              |
| Construction impact      | Relocation                  | Relocation              | Relocation              |
| Number of relocated      | 2 subvillages in 2 villages | 4 subvillages in 2      | 2 subvillages in 2      |
| villages                 | Kedung Pingit               | villages                | villages                |
| Name of hamlet/village   | (Sambikerep Village) &      | Beli & Putuk (Sengon    | Mlokolegi (Temon        |
| being relocated          | Kedungnoyo (Tritik village) | Village)                | village) & Krajan       |
|                          |                             | Winong & Pojok (Sumurup | (Ngadirojo village)     |
| Number of relocated      | 145 houses                  | 287 houses              | 89 houses               |
| buildings                |                             |                         |                         |
| Number of paddy          | 2 fields                    | 434 fields              | 134 fields              |
| fields affected by dam   |                             |                         |                         |
| construction             |                             |                         |                         |
| Problems during the      | Rejection of compensation   | Rejection of            | Rejection of            |
| implementation of        |                             | compensation            | compensation            |
| development              |                             |                         |                         |

The construction of dams has an impact on the reduction of agricultural land. This has a further impact on farmers who have lost their source of livelihood. The construction of Semanthok Dam has reduced 2 rice fields. The construction of the Bagong dam reduced 434 rice fields. Meanwhile the construction of the Bendo dam has reduced 134 rice fields. The total rice fields that were reduced due to the construction of these dams were 570 rice fields. If there is one farmer in one rice field, then the construction of the dam has forced 570 farmers to farm elsewhere or even switch to other livelihoods. The construction of the Semanthok Dam showed the least impact because it only lost two fields of rice fields. However, this has serious consequences for the villagers of Sengon and Sumurup villages who have lost 434 fields of rice fields. The medium impact was felt by the people of Temon and Ngadirojo villages. They had to lose 134 fields of rice fields.

In fact, the owner farmers and sharecroppers who are in the upstream area and around the dam will experience the greatest impact from the dam construction [15-17]. Farmers who own rice fields and gardens as main source of income will lose their income. For smallholders, the absence of rice fields and gardens owned by the land owners means that there is also no work for them. As a result, smallholders have to find new livelihoods. This impact has been felt since land measurement begins.

Losing rice fields is not the problem faced by the people in the affected villages. The relocation that occurred due to the construction of the dam also caused them losing homes. It indirectly has an impact on the necessity to live in the new settlement. Moving to new settlements will certainly become more burdensome because most of the affected communities whose main livelihood in farming are in the process of transition. If this process of transition takes too long, it will be increasingly difficult for them to be able to restore their condition as the same condition before they are being relocated.

The risk of losing sources of income and livelihoods is also exacerbated by the fact that people also have to relocate. Losing their homes also means that people are faced with a process of social adaptation that takes time. Losing farmland and shelter at the same time is not an easy phase to deal with. Affected communities certainly have different levels of economic vulnerability, so a livelihood risk analysis should be included in the land acquisition plan.
3.3. The dam construction and the conflict

The construction of the Bagong Dam in Trenggalek District shows the fact that the communities in the affected villages did not necessarily accept the dam construction plan. There is public concern that the compensation will not be proportional to the existing losses. They lost their homes and fields. Figure 2 shows the protests by the community.

Figure 2. The protest against the provision of compensation in land procurement for the construction of Bagong Dam – Trenggalek [18].

The case of protests against the construction of Bagong Dam in Trenggalek District also occurred in the construction of Bendo Dam in Ponorogo District as can be seen in Figure 3. The community is worried that the relocation will have a long-term impact on their livelihoods.

Figure 3. The protest against the provision of compensation for the construction of Bendungan Bendo – Ponorogo [19].

The protests shown by the community at the construction of the Bagong and Bendo Dams show that the construction of the dam is very vulnerable to reveal problems for the people in the upstream area. These are people who do not directly get benefit from the construction of the dam. This is because the construction of the dam is directed primarily for the people at the downstream.

4. Conclusions

The research shows that the development of the dam has been too focused on the people who are in the downstream area. In fact, the most vulnerable problems in dam construction are the people who are in
the upstream area. Communities in the upstream areas have to face the problem of land loss that affects their livelihoods.

The land acquisition for the dam, which was followed by the relocation of the community, forced the community to make adjustments to move to a new place. People affected by the dam construction in the upstream area are mostly farmers and farm laborers. The construction of dams aimed at supporting increased food production, at the micro scale or at the farmer level, has apparently displaced farmers who already own land and carry out their agricultural activities.

In fact, the benefits of dam construction will be felt more by people living in the downstream area and the area around the dam. Communities in downstream areas can benefit from the opening of new sources of livelihood from the dam location which functions as a tourist area.

Acknowledgement
We would like to thank Sekolah Tinggi Pertanahan Nasional for funding this research. Thanks are also conveyed to the Head of the Agrarian Affairs and Spatial Planning Office/National Land Agency of East Java Province, the Head of the Agrarian Affairs and Spatial Planning Office/National Land Agency Nganjuk District Office, the Head of Agrarian Affairs and Spatial Planning Office/National Land Agency Trenggalek District Office for all the support provided to access the land acquisition planning documents to support this research.

References
[1] Pasandaran E 2007 Pengelolan infrastruktur irrigasi dalam kerangka ketahanan pangan nasional. *Anal. Kebijak. Pertan.* 5 126-49
[2] Richter B D, Postel S, Revenca C, Scudder T, Lehner B, Churcill A and Chow M 2010 Lost in development’s shadow: the downstream human consequences of Dams *Water Altern.* 3 14-42
[3] Freden F 2011 *Impacts of dams on lowland agriculture in the Mekong River cathment (Thesis)* (Lund: Department of Earth and Ecosystem Sciences, Lund University)
[4] Prarasta E Y and Khadiyanto P 2014 Dampak proses pembangunan waduk Jatibarang terhadap kondisi lingkungan di Kecamatan Mijen dan Kecamatan Gunungpati Semarang *J. Ruang* 2 111-20
[5] Okuku E O, Bouillon S, Ochiewo J O, Munyi F, Kiteresi L I and Tole M 2015 The impacts of hidropower development on rural livelihood sustenance *Int. J. Water Res. Develop.* 32 267-85
[6] Abdullah A, Rahman S, Essex S and Benhin J 2020 Economic contribution of mega-dam infrastructure as perceived by local and displaced communities: a case study of Merowe Dam, Sudan *Agric.* 10 24 p
[7] Shiamah N L and Nawiyananto 2020 Pengaruh bendungan Wlingi terhadap lingkungan dan ekonomi masyarakat di sepanjang saluran irigasi Lodoyo Tulungagung tahun 1970-1990 *Historia* 2 187-99
[8] Beck M W, Ciaassen A H and Hundt P J 2012 Environmental and livelihood impacts of dams: common lessons across development gradients that challenge sustainability *Int. J. River Basin Manag.* 10 73-92
[9] Acheampong E N, Ozor N and Sekyi-Annan E 2014 Development of small dams and their impact on livelihoods: case from Northern Ghana *African J. Agric. Res.* 9 1867-77
[10] Fadli R, Noor T I and Isyanto A 2019 Dampak sosial ekonomi pembangunan waduk Jatigede terhadap masyarakat tani di Kabupaten Sumedang (kapsus di Blok Pasirkanaga Desa Tarunajaya Kecamatan Darmaraja Kabupaten Sumedang) *J. Ilmiah Mahasiswa Agroinfo Galuh* 6 552-63
[11] Purnama Y 2015 Dampak pembangunan waduk Jatigede terhadap kehidupan sosial budaya masyarakatnya *Patanjala* 7 131-46
[12] Obour P B, Owusu K, Agyeman A Q, Ahenkan A and Madrid AN 2016 The impacts of dams on local livelihoods: a study of the Bui Hydroelectric Project in Ghana *Int. J. Water Res. Develop.* 32 286-300
[13] Oladimeji Y U, Abubakar B A Y and Abdusalam Z 2020 The impact of Shiroro dam project on productivity and livelihood diversification of rural fisher folks in Niger State, Nigeria Agrise 20 191-200

[14] Kraljevic A, Meng J and Schelle P 2013 Sevens Sins of Dam Building (Germany: WWF International)

[15] Fajar R, Busiri A and Budi H 2015 Perencanaan bendungan Bendo Ponorogo J. Karya Teknik Sipil 4 428-38

[16] Wibowo A S 2017 Persepsi dan karakteristik sosial ekonomi masyarakat area terdampak pembangunan waduk di Dusun Bendo Desa Ngindeng Kecamatan Sawoo Kabupaten Ponorogo Swara Bhumi 5 22-30

[17] Widyaputra PK, Wariningsih 2018 Persepsi masyarakat terhadap dampak lingkungan kegiatan rehabilitasi daerah irigasi Bendo di Kabupaten Ponorogo J. Rekayasa Lingkung. 18 1-11

[18] Muttaqin A 2020 Warga Trenggalek Tolak Harga Ganti Rugi Lahan Bendungan Bagong detikNews

[19] Pehrianti C 2018 Warga Ponorogo Kembali Tuntut Ganti Rugi Dampak Proyek Waduk Bendo detikNews