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From Dry-Land Farming to Keramba: The Impact of Kedung Ombo Reservoir for Socio-Cultural Change in Wonoharjo, Indonesia

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Abstract: This study aims to examine the effect and process of the keramba farming done by a number of local people around the Kedung Ombo reservoir. This study was conducted by way of participatory observation in which the researcher took part in the daily activities of the keramba fish-farmers in order to directly observe the cultural phenomena which emerged from the keramba fish farming operations at this location. This participatory observation resulted in numerous questions which eventually were dealt with the means of depth interviews in order to arrive at their significance. Research result indicate that typically the decision of the individual fish-farmer to engage the keramba fishery in Kedung Ombo is driven by a number of complex factors, both internal (from within the farmer's community such as the scarcity of employment opportunities outside the uneconomical dry-land farming) as well as external (from outside community such as the inspiration that from the success of other keramba fish-farmers elsewhere). Same significant changes have been effected from fish farmers' engagement in the keramba fisheries. The have become increasingly skillful and disciplined in allocating time: when to set up nurseries, show long to fatten the young when to harvest, all with a view to obtain the greatest possible efficiency and profit. The profit which is routinely acquired has in general improved their lives as it has allowed them to upgrade their houses to purchase motorcycles, radios, TV sets as well as to expand their businesses. The social implications of the keramba fish farms are also significant, particularly the opening of employment opportunities to local people with promises of improvement to their lives.

Key words: Keramba, dry-land farming, cultural changes, efficiency, profit

INTRODUCTION

Dry land farming is a non-irrigated farming method dealing with the needs of water (Mosher, 1987). This method is employed by the farmer in the dry area on the slope of mountains. This method is commonly found in rural areas of Java where people are still not familiar with irrigation technology. In this system, farmers cultivate the land by relying only on the rain as the source of water. The kinds of cultivated plants are also limited to local plants only such as cassava. Mosher (1987) categorized this finding as the feature traditional farming.

The time flies and the Indonesian government began to plan updates on irrigation system. One attempt to resolve this problem is by constructing dams. In fact, the construction of irrigation facilities in the form of the dam has been started from the time before interdependence day with cultuurstelsel policy and reciprocate politic when it applied during the early 20th century (Poesponegoro and Notosusanto, 2008).

In the post-independence age, Sukarno started the giant dam project. Those dams are Djatiluhur (West Java), Asahan (North Sumatra), Sempor (Central Java), Karangkates and Selorejo/Kalikonto (East Java) and Riam Kanan (South Kalimantan). The construction finished in Soeharto era. The construction of multipurpose dams which are used for irrigation, power generation and flood handlers have actually raises new problems. These problems came from the land acquisition from the land owner. Land acquisition problems mostly associated with the reluctance of citizens to leave the residence and rice fields as a source of livelihood. In addition, the most crucial problem is related to the change in farmers' cultural identity especially ones who lost their land. This case happened in 1990s at Kedung Ombo dam construction site.

Kedung Ombo dam located in three districts in Central Java province, namely Sragen regency, Boyolali regency and Grobogan regency. Construction of the dam began in 1985 when the government set up a power plant with a capacity of 22.5 MW and to fulfill the needs of irrigation for 70 ha of rice fields. The dam construction was financed US $156 million from the World Bank, US $25.2 million from the Exim Bank of Japan and the state budget starting in 1985-1989. The dam was finally inaugurated by President Soeharto on May 18, 1991 (Nusantara and Tanuredjo, 1997).

Kedung Ombo dam construction caused large submerged area. This case costs to the loss of agricultural land area as the most important assets for farming communities (Pakpahan, 1994). The conditions for the majority of the society raised anxiety. Culturally, this has caused a huge change in the culture system of the society. The disappearance of productive capacity of the society by of the construction of the dam created a change of culture. Communities are forced to get out of dry land farming systems into new farming systems that employ the dam as an alternative source of new livelihoods. A new system that is an alternative troubleshooting is cage system. Cage culture system is a method of raising fish by placing a basket or a bamboo box on the banks of a river or dam (Cahyono, 2001).

Dryland farming systems changes to Cage Culture not only have an impact on economic change. The changes have impacts on a more complex change in the culture of the community. Thus, the changes in dry land farming systems into cage culture not only on the material aspects but also on aspects of behavior patterns, social institutions and cultural systems around the Kedung Ombo dam (Ahimsa, 1999).

The emergence of the fish cage culture system maintenance on Kedung Ombo dam can be interpreted as a new source of economic income that also brought values or new symbols. In cage culture farming communities, the activity was much more complex. In addition, the main source is no longer on a mountains dry land but Kedung Ombo dam water which the water ownership is shared. Water in Kedung Ombo is not only owned by communities around the but also by the general public in three different regencies. A distinct feature of a society that uses the cage culture is their dynamic behavior, discipline, punctuate on time, creative, skilled and ability to regulate and manage the capital (Siregar, 1981).

Fish cage culture system in Kedung Ombo dam was firstly developed in 1992 by the villagers in Wonoharjo. Furthermore, the village developed into the center for the cage culture system. Currently, the village atmosphere is now dominated by the presence of dozens of activities maintain the cage culture fishing. Therefore, this change in livelihood is definitely also bring changes in various aspects of community's life. Based on the above explanation, changes in the livelihoods of dry land farmers to the cage culture farmers have consequences leading to the more complex of the way people life. One interesting thing here is the about the farmer's way thinking of viewpoint at a group of cage culture farmers. From the perspective of anthropology, cage culture farmers will not be described from the individual character presence of the personal character of the individual but rather described and viewed as a social phenomenon that is present in the context of space and time. That means, about the understanding of livelihood changes must be viewed in a holistic context which is related to other aspects of life that surrounds them. Therefore, this study aims to reveal sociocultural changes in the society of Wonoharjo.

MATERIALS AND METHODS

The study was conducted in Wonoharjo village, Kemusu district, Boyolali Regency, Central Java. The village was chosen with consideration that the village had an area that is very close to Kedung Ombo dam. Then Wonoharjo in the village there is a hamlet that most of its resident's livelihood is keeping fish in cage culture. Data collection employs participant observation in-depth interviews and document collection. Observations were made during the three-month on January to March. In-depth interviews conducted with the selected capable informants, namely the owners of cages, village officials, workers cages, traders and buyers of the fish. In addition it is also used secondary data which was obtained from the Wonoharjo village monograph. Data analysis was using qualitative analysis including data collection, data display and verification. This method emphasizes the cyclical activity.

RESULTS AND DISCUSSION

Appears and growing cage in Wonoharjo: Kedung Ombo dam water concentration is located right at the meeting border of three regencies, namely Boyolali, Sragen and Grobogan. Serang river has the water source from Mount Merbagu and the dam was built there. Location of dam is in the Ngrambat village and Kalangbancar village, Geyer district, Grobogan. The area of Kedung Ombo inundation dam is covering 33 villages in three regencies. Kedung Ombo dam's construction caused 17606.58 ha of land was flooded. The area consists of rainfed land (9.78%), irrigated rice paddy (0.40%), dry land (28.94%), plantation (15.50%), forest (43.61%), grazing land (0.18%), cemetery (0.31%) and roads, dikes and ditch (1.27%). One area that experienced a fairly large inundation is the Kemusu district which has 7,215 ha inside the inundation area. Wonoharjo village is also belongs to Kemusu district.

Wonoharjo village is one of the villages which get the impact of Kedung Ombo dam inundation. In this village, there are seven hamlets submerged due to waterlogging. In 1970, Wonoharjo village area consists of 18 hamlets. However, in 1990, it had only the remaining 11 villages. Those hamlets are Tarup, Blawong, Rejosari,

Ngeboran, Ngubalan, Wonoharjo, Sumurwatu, Kedokan, Sumberan, Sendang Nongko and Bulu. Wonoharjo village area has an area of 1609.04 ha. The topography feature is mountainous with many hills. The availability of natural resources such as hills allows public of Wonoharjo to use it as a dry agricultural field. Some types of plants that are cultivated upland rice and pulses. Upland rice is a subspecies of rice (*Oryza sativa* L.) which has the advantage to grow in dry areas (Siregar, 1981). While the other crops or pulses is a type of plant sources of carbohydrates and proteins such as corn, cassava, beans and tubers (Brotonegoro, 1986).

Administratively, the Wonoharjo village led by a village chief who is assisted by a secretary and departments chiefs of the people's welfare, development and general field affairs. In addition, the village chief also oversees the heamlet head. Hamlet is an administrative region under the village. Before by the construction of dam most of the people in Wonoharjo make their living as dry land farmers. They employed of the slopes of the numerous mountains and hills in Wonoharjo as agricultural land. Based on the research by Wiryanti (1981) the situation of dry land farming has some problems. They have limited access and the ability of farmers to manage land as well as the way to increase agricultural businesses income. The study also outlines that the local dry land farmers income have relatively smaller compared to farmers who live in low-lying areas. But, when most of the dry agricultural land was submerged by dam, community in Wonoharjo switched professions as fish farmers through the use of cage culture.

Historically, the fishing with cage culture system in Wonoharjo village began in 1994. According to the informant, at that time, there were researchers from Gadjah Mada University, the Faculty of Agriculture. They settled there for three months to complete the research. The research related to water conditions and atmosphere Kedung Ombo dam area. On one night, the researchers held a meeting with one of the residents. The conversation led to the idea of farming activities associated with the presence of Kedung Ombo dam. On that occasion, the researchers suggest that the state of a large water concentration should be employed to increase revenue. To answer that question, there was designed a method to keep fish in cage culture system.

Floating net cages (cage culture) is a system of fish cultivation in a container made of floating net with the help of a float material and placed in water surface such as lakes, reservoirs, rivers, straits and bays. The system consists of several components such as frame, net sets, buoys, floating inspection bridge and guard house. Net sets are made of polyethylene and polypropylene with various mesh sizes and a variety of thread sizes, serves as a container for the cultivation and treatment of fish. The buoy is made of a plastic drum, steel drum with the 200 L of volume, Styrofoam or foam are wrapped in tarps to maintain the net bag floating fixed near the surface of the water. Floating net cages placed in >2 m depths of water (Rochdianto, 2005). Siregar (1995) adds that in a cage unit consists of several parts, the raft, confinement/cages, floats as well as the anchor and sinker.

In addition to the demands of geographical changes, the emergence cage culture farmers also driven by the market demand of fresh and intact fish (Jangkaru, 2001; Ghufran, 2000; Siregar, 1995). If a fish is caught by using fishing line, it can cause the fish's body broken. In addition, the amount fish come out from fishing line was also relatively small and regarded old mehod. Therefore, for buyers who do not have the sufficient time and wanted to quickly get freshwater fish fresh in large quantities; they prefer to buy the fish catch from the cage culture. This option is chosen because it can be done in a relatively short time to likely get more freshwater fish.

In Wonoharjo village, there are several different sizes floating cages were used. The size of the cages are vary from 3, 6 and 8 m^2. The cage placement is done with the consideration on the condition of the waters and currents in Kedung Ombo dam. At first, the cage culture farmers only consist of three people. But gradually there are followed by other neighbors. Dissemination of information about the cultivation of cage culture are administered by traders who buy fish and food merchant as well as the tourists who want to see the activity of cage culture farmers.

However, until the early 2000's with cage culture fish farming was administered on an individual basis and it developed slowly. Based on interviews with informants, it was influenced by the fact that the business treatment for cage culture was not as easy as growing corn in the fields. Cages require more capital, skills in keeping fish and farmers' perseverance. In addition, the limited access to obtain capital loan also encourages the low rate of cage culture's growth.

The development of cages increased when in mid-2000 investors came from West Java and interested in developing aquaculture cages. Based on the citizens' informant, the investors named Darwis. He is interested in Kedung Ombo because of his experience in maintaining fish cages in Jatiluhur, West Java. The entry of investors into the village Wonoharjo has influenced the development of cage farmers. From the Wonoharjo village's monograph since 2002-2007, there were an increasing number of cages. In 2002, it was recorded of 40

plots cages. Then it was increased to 425 cages in 2007. The year 2007 was the heyday of cage culture in Wonoharjo.

Cage management in Wonoharjo: Fishing activity needs intensive capital. Large amount of capital was preferred to buy the production utilities such as cages, fish seed, feed and labor. Sources of capital for traditional cages farmers in Wonoharjo were derived from selling cattle, goats, personal property or loans from relatives. The problems of this capital were the main challenge to the cage business management in Wonoharjo. Beside to buy the production utility and maintenance, capital stock was required to finance the maintenance operational needs every day. According to one cage farmers, the needs can be classified into three: the need for daily, monthly and annual needs. Daily needs were to buy fuel for diesel engine motor boats, kerosene to fuel lamp and cooking, as well as lamp spare parts. Monthly requirement includes the availability costs to overcome with the damage cages such as nets, ropes and a motor boat engine damage. While the monthly needs was including the availability of the required costs to repair the damage of cages in total.

To manage sages by labor requires recruitment mechanism. In Wonoharjo, manpower recruitment process very concerned about family relation and adjacency. According to one informant cages owner in Wonoharjo, there were two types of recruitment. First, the recruitment by locals tended to recruit people who still have famils relationship. Second, the recruitment developed by immigrants or investors tend to prefer freelancers who were recruited from people around the dam. In general, family relation factor was a key element in the recruitment of workers in Wonoharjo cages business. Here, the community embraced the bilateral system. This system was based on the view that family lineage came from father and mother (Sairin, 1982). Relatives according Wonoharjo community is not only limited to the nuclear family or conjugal but also relative or sedulur (Kindred). Sedulur relatives' members usually consist of brothers who live in close proximity.

In the daily life of the cages farmer community in Wonoharjo, cage farmers' wives were also active in helping husband's work. This concurred in the research conducted by Illo and Polo (1990). The wife helped to manage the cages in the form of feeding fish, sew the damaged nets and sold fish. This activity is done because their husbands generally have a double job. When finished cooking, the farmer's wife went to the business cage location and brought food to her husband. In addition, the cages farmer's wives were holding the establishment of savings and loan institutions. Wife's active involvement in cages business activities carried out as a form of efficiency to save the household expenses as well as establishing finance. That was administered because their husband earned income below the levels of sufficient for daily living (Upton and Susilowati, 1992).

In cage farming families, there was a tendency that the farmers prefer to have daughters. This was because having a child is not merely to continue family generation and peace of mind but also can guarantee to help parents when they has reached old age and no longer able to work hard. Compared with boys, girls relatively more easy to be asked helping their parents work and relatively have a better understanding to the state of the parents. In general, boys after marriage tend to be closer to the wife's family than with his parents. Cages management was closely related to the market scheme. Marketing scheme of the product from cages in Kedung Ombo dam had the following pattern. Traders bought fish from farmers and then transported to the market. The fish were purchased from the farmers and then resold by retail traders to consumers. However, the selling sometimes often was done to a middleman (the buyer on a large scale). The frequent meeting between farmers who pick the fish cages with the middlemen in the market has increased the activity of buying and selling fish. The existence of interaction between farmers and middlemen has supported the social mechanism (Nugroho, 2001).

Cages and the change of system value: Dry land farming in Wonoharjo village by Redfield (1985) can be regarded as the category of peasant. Peasant is the rural people who live on the farm by using old technology and feel that he is part of a larger culture. The economic system of farming communities in this model is still uses simple technology and the production unit which is not specialized. Therefore, when the innovations and changes happened in the patterns of livelihood, it will also be followed by changes in the system of cultural values. Cage fish farming is an innovation of livelihood for the people in Wonoharjo village. This fish caging system in the context of livelihood was a brand new and has never been introduced in the area before. Prior to the construction of dams Kedung Ombo, communities for generations have accustomed to dry land farmers. Then because the farm inundated by water, then dry land farmers need another alternative employment to make a living.

The shift on the residents' occupation directly influenced the cultural value system. System of cultural values (cultural value system) is a series of abstract conception of life in the minds of most people in a society about what should be considered as good, important,

valuable and on what is considered as bad, trivial and not worth in life. Cultural value system arose on the basis of human experience in interacting each other. Furthermore, Koentjaraningrat revealed that the cultural value system serves as a guide and motivation of human behavior. Then the system of cultural values is one of the highest system among other system in life. Related to the implementation of the cage system, there were some changes in the values that people are in. The first value was independence. Before the cage system is introduced, community in Wonoharjo often was not able to complete all the work by itself. They need additional assistance in agricultural task. Personnel assistance in dry land farming was not hired as workers but workers who are politely requested from fellow villagers. In society of Wonoharjo, additional manpower is known as the sambatan (derived from the word 'Sambat' = need help). Sambatan system is also often associated with the term cooperation. Koentjaraningrat stated that mutual cooperation is an additional man power from outside of the family to fill the worker needs in a busy period of farming production activities especially in the rice field jobs. This man power is usually depend heavily on volunteerism between the two sides.

In line with the changing patterns of livelihood, geographically, the conditions of Wonoharjo village have been separated by the dam. Then, the production procedures in this society were also changing. Thus, the prevailing economic system was also changed. Farmers' activity in the cage fishing system was conducted by the loss-profit calculations and assessed with money. Farmers consider that the pattern of activity employing mutual cooperation has been less unacceptable when it was applied in cages fishing systems. Then the manpower is more practical if paid by a monetary reward. Thus, changes in the geographical conditions and livelihoods have an impact on the growing awareness independence attitude. The society was no longer depending on the resident from another village to have the job done.

Based on information from the village Chief, at the of time dry land farming system, the income was in the form of groceries, then when they moved to cage fishing, farmers earn money as their income. In Wonoharjo community, crops were sold and then, the farmers' income was divided into four parts. About 30% was spent to buy the seeds and fish feed, 30% to the pay the labor and repair broken tools, 30% is considered as an advantage as well as the 10% reserved for the social fund. Social funds are intended to help others, relatives or neighbors who are sick and to give a fund assistance to conduct a celebration. From these results, cage farmers have economically developed to a higher level compared with the time they manage the dry land farming. This means that the income obtained from the results of cage fishing system operations is not just only intended to fulfill for primary needs but also for the secondary needs. From the cages fishing system, they were able to repair houses, motorcycles and purchasing electronic equipment such as radio and television. Then, the saving money is intended to secure the wealth for the future.

The economic income in the form of money from the fishing cages system in Wonoharjo influenced on how society's view on money. A Chief of Hamlet in Wonoharjo revealed that the public at that time was different to the conditions prior to the construction of dams in the 1980's in the viewing the money. In the past, people Wonoharjo viewed that money was merely used for payment in the process of buying and selling. However, after the public occupations were switched, money was not viewed as the payments tool but also as a symbol of social status in society. The shifting view of local residents about money in the economical context of the cages fishing will influence the change of old cultural values system.

The second value is the changing view of social awareness. When humans began to face new or an unusual environment, then people will adjust. One way humans can adapt to the environment is through adaptation. Ahimsa (1999) explains that adaptation is a process of sensory systems that are manifested by the presence of a continuous stimulus. The adaptation process is managed since, there was no a proper balance situation between the individual and the environment in the first place. Therefore, the process of adaptation occurs at the time when an individual feel need to do that or as the result environmental demands. Adaptation process is formed by psychological habituation response which weakens the stimulus strength (Rakhmat, 1999). Relating with the livelihood changes after the construction of dams, there were some adaptations made by the community. The first adaptation is the psychological adaptation. In some cases that occurred in the cage fishing system basically initiated by the strong psychological motivation that someone wants to get a new occupation. This motivation was often emerged from the subconscious so that in the social context often created a disadvantage situation for others.

One of the cases that occurred in the cage fishing farmer's community was the problem related to the usage of the boat. In some cases, sometimes a farmer who do not have a boat had to borrow with the other fellow farmers. However, since both of them need to use the boat, conflict of interest was emerged. The problems selfishness became a sensitive issue in relation to the use

of the boat. Sometimes boat users do not pay care the other farmers who also need that one. The limited number of boats and the urgency of the need to use it raised a certain adaptation effort. Adaptation is done in order to overcome conflicts of interest due to the limited number of the boat. It is done by increasing the number of boats and set up a mechanism of boats' usage. With the increase in the number boats and its usage mechanisms, conflicts of interest among cage fishing farmers in Wonoharjo was able to be minimized.

The second adaptation associated with changes in the value of social environmental awareness is a social adaptation. It was required a good relationship in a cage farming business location, among farmers themselves and the farmers with the communities around. This needed to be done so that, the cages fishing system management goes well. A cage farmer admitted that he had to maintain a good relationship with the other cage farmers. This needed to be done to reduce the jealousy that supposedly led to a negative impact. In addition, cages farmers should also have a good relationship with the community around so that cages' security can be maintained. In addition to the psychological and social adaptation, the cultural adaptation was definitely needed. That was needed since, each cage farmers in the cages location actually carry a different habit. Old regular and routine habits as dry land a farmer changed by itself when someone is in the location of fish farming cages. An ordinary farmer who regularly went to the fields will soon find a new habit in the location of cage fishing.

These changes will bring the cage farmers to make adjustments by the time goes by. It was important to be disclosed, since once a farmer joined to the cage farming community as fish farmers, they must respected the rules that exist to administer the fish farming activity. One of these habits change was experienced by a farmer. As a dry land farmer, he used to get up at five in the morning. After cleaning himself, he then drank coffee in the front seat of the house and smoke cigarettes. After sunrise, he took the hoe and sickle to go to the fields. These habits are so routinely implemented so that, it deeply implemented in the subconscious mind. By the time the farmers were on location fish farming cages those habits totally gone.

There were certain values that collectively perceived by each cage fishing farmer. One thing that was perceived was feeling depressed. Distress was realized through the heat stroke and fear when using a rowboat to make a trip. In addition, there was also a sense of loss to the specific activity which was shaped by the daily routine which had been transformed into a culture. The context of cultural adaptation in the cage fishing society was an attempt to get out from the previous certain cultural boundaries that has been formed through daily activities in the very long period of time. In discovering a new culture, there was a dialectic process between the social environments of cage fishing farmers with the farmers as individual. A cage fishing farmers will seek an adjustment where he belonged to. In the meantime, the social environment of agricultural enterprises also made the efforts to adapt to the other cage fishing farmers and their family.

CONCLUSION

Kedung Ombo dam construction has changed the social and cultural conditions in Wonoharjo village, Boyolali, Indonesia. Fishing in a cage system in Wonoharjo village is an effort to use flooding land in Kedung Ombo dam as a new source of residents' income. This was driven by lower revenues due to geographical changes that farmers got the impact on the shrinking size of arable land. The presence of the keeping the fish farming cages system by Wonoharjo residents has affected the change in the old cultural value system that heavily perceived for generations. This was happened because of the difference system and the working patterns between the dry land farmers and cages fishing system. The farming activities were no longer on growing and maintaining rice or pulses. The farmer's activity was shifting to the making of cages, keeping the fish, fish's feed supply and selling the product. This fish caging system produced the fresh fish which was not only functioning as subsistence but also it can be enjoyed by people outside of this community. Therefore, since the product cannot be stored, people must sell to traders or to the market. Thus, the form of the farmers' crop was no longer in the form of food but money. This encourages people to be able to manage their own economy, buying secondary and tertiary needs as well as to prepare the better lives in the future. In addition to the changes in terms of income, there was also a change in the social and cultural value of the community. Wonoharjo society in general became more independent economically and socially. Moreover, the society was likely to be more adaptive to accept the new environment.

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