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CLIMATE CHANGE AND PLANT TIME (STUDIES IN RICE CULTIVATION STRATEGY PEASANT, CASE STUDY: LEUWIHIDEUNG VILLAGE DARMARAJA SUB DISTRICT, SUMEDANG)

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ABSTRACT

The main livelihood of people living in rural areas with the main crop is rice peasant. Rice cultivation by the peasant is rely availability of water, both from irrigation or rain water. Peasant are planting rice irrigation sourced from both technical and semi-technical irrigation especially in the dry season flow of the river by making a "Dawuan". However, the availability of river water also depends on the climate or rainfall and upstream environmental conditions that concerned. The purpose of this paper is to describe the impact of climate change on cropping time and or income of rice peasant in the village Leuwihideung. The selection of these villages or peasant because this village is partly technical and partly irrigated half is rained and or there are peasant who grow crops in both the land. The data obtained from the results of field research using a qualitative approach. Peasant in the village Leuwihideung on normal rainfall conditions in semi-technical fields could grow rice three times a year by relying on irrigation, while the rained land can be planted once a year rely on rain water. However, recent rainfall is erratic even on irrigated land impact on cropping time that can only be planted with rice twice a year and the impact on rained cropping time. Climate change is not only an impact on the incomes of peasant but also have an impact on peasant' income.

Keywords: *Climate change, cropping time and income rice cultivation, peasant, strategy.*

INTRODUCTION

Indonesia is an agricultural country and most of the population which is about 60% dependent on the agriculture sector with rice farming. During the New Order government (ORBA) agriculture is given priority. Government attention in this field stated in the outlines of the bow of the State (the Guidelines) and or the five-year development plan (Repelita). ORBA government's attention to the agricultural sector since the 1970s, not only to meet the domestic need but also to increase the income of peasant, and achieving self-sufficiency in rice (SSB). The efforts made by the government that future is to increase production doubled, from 3 tons per hectare to 6 tons per ha (BPS, 1980). In the government launched a program to increase production five farming, namely land management, irrigation, use of new seeds, fertilizing and pest control. At the same time the government announced the intensification of agriculture is to optimize the utilization of agricultural land intensive. That is, the government triggered peasant to grow rice more than once in a year with regard agricultural rules contained in the farming.

In the field of irrigation for the peasant to plant only once a year because the irrigation systems rely solely on rain water, then build both traditional irrigation channels through non- governmental as well as technical or modern irrigation channel. Traditional irrigation is managed directly by citizens and modern irrigation through a government-run public works department (PU) by forming an association of peasants irrigation water users called P3A.

Government efforts in achieving that goal and then did guidance to the peasant who called the mass guidance (BIMAS) that began this program in 1974 and then followed up with government support for peasant called SUBSIDY the price of inorganic fertilizer. Artificial fertilizer subsidy is intended to increase production, lower the cost of production and increase the income of peasant or peasant that remain passionate or do not switch to another sector. Therefore, in disseminating these programs to spread government agricultural extension field (PPL) in each district. The PPL is spearheading the charge to promote the program, control, supervise and forming farmer groups as a means of mediation in delivering the program. As a result, rice production increased from 3 tons per hectare to 6 tons per ha. Furthermore, the government set aside land use in each sleeping area through the department of agriculture in cooperation with the local government in the early 1980s. The central government in this case the president instructed the head of each region that in each region there should be no unused land. Unused land should be used to grow rice. This government program to get an appreciation of each head region and then disseminate to the people to plant rice in each sleeping area.

Availability of abundant rice during ORBA not only from the increased production of 3 tons per hectare to 6 tons per ha but also the production of unused land. The abundance of rice availability of both programs Indonesia enjoyed a surplus of rice and then get an award from the world body achieve rice self-sufficiency in rice self-sufficiency program in 1984 is primarily related to the utilization of idle land, impacts on areas that originally the staple food of the population is quite diverse such as sago, cassava and maize are now turning to a type of staple foods such as rice or rice. The transition from monoculture to crop diversification is nationally perceived impact by the end of 1990 or in the reform era. At the beginning of this reform almost all of Indonesia's population is transferred to the main food types of food such as rice or rice, thus increasing the need for rice. Availability of government rice stocks were collected through procurement agency (Bulog) of domestic production is often not sufficient to meet the requirements, so that the government imported from other countries.

Climate change is closely related to the season so far Indonesia is in the tropics have two seasons, rainy and dry seasons each year. Changes that occur during this season are not only felt by the peasant but also for non-peasant and the general population. For non-peasant and the general population on the cold rainy season and the dry season is hot. Residents feel the hot weather; especially in the dry season length exceeding 6 months from the end of these days oflen occur. In the long dry season the weather was hot, a lot of dust and to certain areas of drinking water shortage. For prolonged drought peasant feel the heat of the sun and in addition to a shortage of drinking water also cannot grow

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crops. The impact of the latter is the shortage or lack of food and the cost of production during the growing season arrives to conduct. Thus, prolonged drought reduced the government's efforts to remain self-sufficient in rice, and maintain or increase peasant' income and reducing poverty. Uncertain climate that is common in these days is interesting to study how peasant' strategies and adaptation to climate change in order to survive? Question more specifically is how the pattern and timing of planting is done and how the technology is done by the peasant?

METHODS

The method used is analysis with a qualitative approach. Data compiled based on data primer and secondary data. Primary data were collected based on field monitoring carried out during the last 10 years since the year of 2004-2005. This is done by collecting data related to dissertation writers on population under conditions of uncertainty strategy development Jatigede Reservoir. Activities undertaken during the last 10 years are in any planting or harvest season went to the village to observe and talk with the peasant, both rich peasant and smallholders and peasant, or both in developed and traditional peasant. Rich peasant are peasant who have more than 1 ha of land and small peasant who have land less than 0.5 ha. While advanced peasant are peasant who "Motekar" or creative initiatives that peasant have to plant crops in the dry season with irrigation systems and wells panted or suck water from the river using a generator (genset).

Secondary data sourced from Suwartapradja dissertation, (2009), the results of research and Suwartapradja & Harahap (2012) as well as papers and Suwartapradja & Harahap (2013). Other research documents such as research reports PPS DAL collaboration with Irrigation Works (1984), Profile village in 2009 and some of the literature related to this paper.

RESULTS AND DISCUSSIONS

Geographic Location

Leuwihideung Village is one of villages of 17 villages located in the District Darmaraja. This village is located adjacent to the eastern lowland city districts with a distance of about 3 km. In this village there is a road that connects the village to the district roads connecting Sumedang - Malangbong Garut district through the District Wado. The village is bordered by 3 villages administratively included into the District Darmaraja, which borders the north side of the Village Cibogo, bordering tributary Cimuja and Sukamenak Village in the south, bordering the village Padajaya Cimanuk River and eastward Wado subdistrict and village bordering Sukaratu Subdistrict Darmaraja next to the West. To be able to achieve this through the village to village roads located 1 km west and is bordered by the Village Sukaratu or enter from the south through the village along the 0.5 km Sukamenak. Both the entrance to the village can use the two-wheeled vehicle or four wheels.

Land Classifications

Land use in rural areas follows topography that there are areas in question. Land use in rural areas in West Java in general is relatively the same which is divided into 3 types: wetland, upland / garden (land) and residential / yard. Leuwihideung village is a low-lying area with a slope of 8% - 15% with an area of 215.39 ha. Is a type of wetland which covers 128.12 ha consisting of technical irrigated land area of 85.42 ha and rained land area of 42.7 ha? In rained land planted with rice once a year during the rainy season and crops (peanuts, long beans, cucumber and eggplant) before the dry season. On irrigated land planted with rice 3 times a year. The second type is a more land or land that is lower than the broad fields of wetland but wider than residential land / yard is 46.27 ha. On dry land planted with rice and pulses and huma on agricultural lands planted with fruit trees and annual crops. The third type of settlement land is lower than the land area of 38.2 hectares of land and land the common grave of cells; 2.8 ha. In the settlements on their yards planted with fruits, vegetables, herbs and vegetables. At the tomb of land / common grave was not planted but grows wild plants and the shade Samoa graves beneath or beside it.

Climates and Rainfall

Leuwihideung village located on the plains and basins with an elevation / altitude of 261 above sea level. This village is a lowland area feels hot and cold dry season and the rainy season. In the rainy season the environmental sanitation conditions are poor or not good enough for the left and right of the township there are water channels that flow into the irrigation water channel (gutter). In addition, the distance between the house coincide, there is distance (lolongkrang) adequate, so that each homeowner has a water channel to drain / dispose of rain water. Leuwihideung village located at an altitude of 261 m above sea level. Average daily temperature at 26 ° -28 this village ° C with rainfall ranging between 2000-3600 mm (PPS DAL, 1984). Rainy or wet season month for 7 months i.e. from September to March and a dry season or dry for 5 months i.e. from April to August.

According to Koppen (1936) in PPSDAL (1984) type of climate in watershed areas Cimanuk (including the Village Leuwihideung) including climate type Aw, Am, Cow and Cuff But according to Schmidt and Ferguson (1951) generally the watershed Cimanuk including rain type C.

Strategy In A Climate Change Adaptation Of Peasant

Rice Cultivation

Cultivation of paddy cultivation is the main livelihood for the peasant in the rural areas and is the staple food for the majority of the Indonesian population. This rice cultivation has long done well in wet and dry land. In wetlands planted with paddy and upland or upland rice planted huma (pare ageung) and pulses (Iskandar, ...). Pare ageung a kind of local rice to the age of about 6 months or 180 days. Wetland rice peasant rarely or no longer grow local rice varieties and types of rice are only grown by peasant or people living area plateau or mountainous regions. As performed by indigenous people in Lebak district of Banten Baduy and the community in Ciptarasa or Sirnarasa kasepuahan Sukabumi West Java (Iskandar ...). Rice cultivation is heavily socialized by the government through various programs, one through farming. As mentioned in the introduction that the program announced by the government since 1970, i.e. during the reign of the new order (ORBA). This declaration of the five farming, not only meant to increase production to meet domestic demand, increase peasant' income, but also to achieve self-sufficiency in rice. Panca farm is five activities related to rice cultivation, the land preparation, irrigation, use of seeds, fertilizing and pest control.

Peasant in the village before the launching of the program Leuwihideung Five Farms has been doing farm rules through indicator and also as a motivator in government programs. Insulator which also existed as a village head, agricultural education background is a graduate of the School of Agricultural Senior High (SPMA) in West Java Sumedang Tanjungsari 1950s. The initiator actively assists government programs especially in the field of agriculture in disseminating the new high-yielding rice seeds through a pilot (demonstration) on his land. It has a wide area of about 5 hectares and about 3 hectares used for the test (demonstration) each occurrence of a new seed. This means quite effective in disseminating new high-yielding rice seeds because peasant can know directly cultivation techniques were performed and the resulting production figure, so they immediately adopt the next planting season.

Leuwihideung Rural Advancement in agriculture that began in the 1960s it is not separated from the role of the initiator was market a pilot villages (pilot project) by the central government. At this time the climate is still relatively stable and peasant can grow rice three times a year. Production produced depends on the type of rice planted, ranging from 6 tons to 8 tons per hectare. Villages are often visited by officials, such

as agriculture minister and the head of the West Java either itself or outside the head region of West Java to perform comparative studies in agriculture or to be implemented and developed in their respective regions.

The initiator is a smart person, rich and caring for others. The success of rice cultivation that do follow the rules of the five farming, because rice as living beings have the same needs with other living beings such as humans. As with humans, he said the rice needs to be loved is often controlled or supervised, have to eat rice that is given sufficient fertilizer and rice also need to drink that requires the availability of adequate water and rice also need treatment when ill (pests). When exposed to pests or illness as well as people in general that require medication and or treatment. In rice plants treated the same thing, namely the maintenance required for the emergence of disease (pests) and or treatment of diseased or exposed to pests. Procurement of adequate water for drinking (irrigation) water source adequate strictly necessary. For it is as the initiator of the establishment initiator traditional irrigation channels through nongovernmental sourced from Cimanuk River. Drainage is done by making embankments called "Dawuan" on the part of the river with the use of materials such as bamboo are made in such a way to accommodate the rock called "babadak". Upstream irrigation or "Dawuan" is located to the south of the village past the neighboring village (Sukamenak) with a length of about 3 km. These canals repaired or trimmed through non-governmental every year, especially on the eve of the planting season arrives. Knowledge and experience of the initiator or the forerunner in the field of cultivation of paddy in the village of Leuwihideung is then followed by the next generation of peasant. Peasant in the village Leuwihideung at this time that the third generation in rice cultivation can be categorized as advanced peasant. They said peasant developed as follow the five principles, namely farming agricultural technologies associated with seeds, use of fertilizers, pesticides and plant crops on land rain before the dry season. Leuwihideung rice cultivation in the village during the rainy season means the condition of sufficient water, irrigated land is planted with rice technical half 3 times a year with a production of 6 tons to 8 tons per hectare. In this case choose the type of rice peasant who planted adapted to the planting period ranging from 90 days to 120 days, or an average type of rice planted 105 days old (Table 3). This means that during the 315 days of the year are overgrown rice paddy fields and only about 45 days or just the land fallow. On the face of it the cultivation of rice 3 times a year and this raises questions or less rational because the time of land preparation and seeding also requires time. In these cases the strategy undertaken peasant to grow rice three times a year is a seed nursery done around 10-15 days before harvest already done the nursery in the provided, so that the rice is harvested and then hoeing rice seedlings are ready to be planted. And so on that occurs in cycles of rice cultivation by peasant in this village.

The results obtained depend on the type of rice planted. As presented in Table 3, on the table other than the present age of rice also production rate of each type. However, the average rice production occurs in this area ranged from 6 to 8 tons per hectare

Irrigation of paddy cultivation in the village this leuwihideung sourced from rain and irrigation water. Originating from agricultural land is rain water or rained rice fields geledug not covered by irrigation. Geledug rice fields can only be planted with rice once a year. Type of rice planted just as it had grown on irrigated land as presented in table 3 and table 1 growing season is done before or during the rainy season which starts in August. Right season in August this brings positive impact for peasant because it wills Kapat. As stated above that the planting in August this will bring good luck for peasant because it is the peak of production or to obtain optimal results from the rice production. However, along with climate change is a long dry season as it did in 2011-2012 that it started raining in November with rainfall only 3 months. Planting in November which is the rainy season is considered to be less than optimal outcome and short rainfall could cause water shortages. In this short rainfall strategies by peasant not to plant the type of long-lived as established, depgen, pandan and meroke, but the types of rice plant age is relatively shorter-lived 90 days sampai 100 days, such as super rice varieties Midun, impair and pennant type (table 3).Sources of water in semi-technical irrigated land are in season rainwater and irrigation water in the dry season. In the rainy season is prolonged continuously for one year (sataun Landung) as it did in the year 2013-2014. Long rainy season is not only an impact on the availability of water is relatively abundant, but also can cause damage Dawuan and irrigation channels. In this condition does not improve Dawuan peasant and irrigation drains or adequate water availability. The peasant then fix Dawuan and irrigation channels (solokan) ahead of the dry season. Toward the growing season in the dry season as it did in August 2014, the peasant improve Dawuan that was heavily damaged by overflow of river flooded a question of continuous rain (figure 1). Repair Dawuan done in the traditional way through self-help. The peasant work together and devote his mind and donate Material like bamboo. Bamboo is not bought but obtained from the owner of the rich peasant. This self- employment in accordance with the amount of damage or difficulty level that is then governed by the village government ranging from 50 people to 100 people a day were performed for 9 days in accordance with the degree of difficulty. Division of labor and irrigation repair Dawuan is governed by mutual agreement based on the extensive land holdings of small peasant who have less than 0.5 ha of land as much as 1 -3 days, medium peasant who have land of 0.5 ha to 1 ha 3 to 6 days and rich peasant who have more than I ha of land 6 to 9 days.

Furthermore, irrigation system repairs carried out after fixing Dawuan 3 km. Type of work done is improve the channel (ngeduk) of sludge-borne mud during the rainy, repairing dikes breached in the channel cannot hold water during the rainy season and dikes and clearing of weeds that grow during the rainy season. Grasses that hamper the speed of water. Peasants labor is itself the number of working days to broad ownership of land as outlined above.

Irrigation systems in turn are governed by a village official in charge of organizing the water called "ulu-ulu" Irrigation, from upstream to downstream in its implementation, "Ulu-ulu" accompanied by any owner of land. This is done to avoid the seizure of water at the time of land preparation and planting simultaneously, avoid conflicts of interest. Watering is done before the processing of land, a few days after planting and during the rice growing to harvesting.

Table 1. West Java area experiencing drought - July January 2012

No.	Area	Aroad (acres)	Fused
1	Districts Cianjur	300	
2	Districts Subang	1.485	136
3	Districts Indramayu	7.345	74
4	Districts Bandung	726	
5	Districts Sukabumi	7.553	988
6	Districts Ciamis	5.049	399
7	Districts Kuningan	3.480	389
8	Districts Cirebon	3.900	109
9	Districts Cianjur	300	91
10	Districts Majalengka	3.591	82
11	Districts Garut	11.725	77
	Total	38.111	2.345

Source: Saturi, 2012

Farmer adaptation strategic.s to climate change

Climate change lately we can see and we feel directly from this natural phenomenon. Take for example the last 5 years, i.e. in the years 2010-2011; 2011- 2012 perhaps we still remember that in the case of the prolonged drought. In 2012-2013 and 2013-2014 now we feel rainy continuously throughout the year. Symptoms of this are a natural phenomenon and occur in various parts of the world or going on global

climate change (Alexander, 2014). The impact of global climate change is a long dry season temperatures rise sharply and living beings feel the heat. The impact of this prolonged summer can cause death to a living creature. As in India there are dead animals and humans because it is not resistant to the heat of the scorching sun and the sun can cause a vacuum, so that no living thing can survive. Likewise, a prolonged rainy season lowers the temperature to the lowest point can also cause death.

Rainy season and dry season change is a natural phenomenon that occurs as a result of human activity. This phenomenon occurs not mean nature hostile to humans, but otherwise human not friendly to nature. This is the act of human deforestation and excessive use of technology impact on the increase of greenhouse gases. In the United States and in India, for example, there has been a prolonged summer and not a few numbers of people who died from the heat. Prolonged drought in Africa, for example, has led to famine. Climate change in Indonesia has an impact on crop failure and the time of planting rice in different regions. In Java, for example, there has been a drought and the impact on cropping patterns and cause losses for farmers. In Central Java wetland drought reached 710 ha and 38 111 ha of West Java. In West Java there in 14 drought-prone districts namely Sukabumi, Cianjur, Purwakarta, Karawang, Bekasi, Subang, Garut, West Bandung, Tasikmalaya, Cirebon, Majalengka, Indramayu and Kudat (BPBDs Jabar, 2012). In West Java, there are 2,345 hectares of rice fields were experiencing Fuso (Table 1). These conditions also affect the income of farmers who live in rural areas, not least the farmers in the village of West Java leuwihideung Darmaraja Sumedang.

Farmers in the village of Leuwihideung prefer the good rice crop in wetlands and in the rain-fed land. As presented in Table 3, the wetlands planted with rice during the year of planting as many as 2-3 times per year. In the dry season before the normal rainy season the farmers are planning to plant a certain kind of rice, but that should be the growing season months but there is no rain water or no water due to changes in the rainy season (climate), they prefer not cultivated or fallow than growing crops. This means that the farmers in the village have a system of values and culture in the paddy field, i.e. if they think the land

Planted crops will not succeed, because the wetland is not suitable for growing crops. Therefore, the cropping pattern that occurs in the area of rice-paddy-rice. In contrast to the irrigated lands. In rained land they grow rice and pulses. Rice planting in the rainy season and crops planted afler the rice crop ahead of the dry season. They plant crops on rained land is considered suitable or good enough because the land "tuus", ride or loose and not muddy like the irrigated land and the results quite well. In the event of a prolonged season, they did not plant crops, but only grow rice only. As presented in Table 2, in 2012 for example, there was a long dry season and they only grow rice only during the rainy season. While in the years 2013-2014 is now the rainy season is quite long and they do not plant crops, but growing rice - rice. They are more because crops grow rice in the rainy season are considered unfavorable. Cropping patterns in rained follows the availability of water and rice or the season - and second crops or rice.

Table 2. Planting Pattern on land irrigated and rain-field

Criteria	Year	Type Of Plant		
Irrigated Paddy Fields	2013-2014	Paddy	Paddy	Paddy
	2012-2013	Paddy	Paddy	Paddy
	2011-2012	Paddy	Paddy	
	2010-2011	Paddy	Paddy	
	2009-2010	Paddy	Paddy	
	2008-2009	Paddy	Paddy	
	2007-2008	Paddy	Paddy	
	2006-2007	Paddy	Paddy	Paddy
	2005-2006	Paddy	Paddy	
	2004-2005	Paddy	Paddy	Paddy
Rainfed Lowland	2013-2014	Paddy	Paddy	Paddy
	2012-2013	Paddy	Paddy	Paddy
	2011-2012	Paddy	Secondary Crops	
	2010-2011	Paddy		
	2009-2010	Paddy	Secondary Crops	
	2008-2009	Paddy		Paddy
	2007-2008	Paddy		Paddy
	2006-2007	Paddy	Paddy	Paddy
	2005-2006	Paddy	Secondary Crops	Paddy
	2004-2005	Paddy	Secondary Crops	Paddy

Rice plant is very dependent on water availability. When prolonged drought not only affects the water availability for the agricultural sector but also affect the availability of water for drinking. Well water is receding drought; spring water does not flow and reduced water impact on the time of planting. Good planting time according to the farmers is in August each year because this month that will harvest about a month November will obtain optimal results from the results of previous crop harvest called "Kapat".

Table. 3 Climate change and the time of planting rice

No.	Year	Rainy Season (Months)	Dry Season (Months	time planting	type of Rice	Age (days)	Product (tons)	Taste
1.	2013-2014	September-August	August	1.April 2.December 3.August	1.Umbul 2.Jumbo 3.Maroke	90 100 110	6 7 7	Not-fluffier Fluffier
2	2012-2013	September-February	March-August	1.December 2. April 3. August	1. Mapan 2. Depgen 3. Satron	120 110 100	9 9 7	Fluffier Fluffier Fluffier
3	2011-2012	January	August-July	1.January 2.April	2. Maroke 3. Impari	110 90	7 6	Fluffier Fluffier
4	2010-2011	January	August-July	1. April 2. November	1. Ciherang 2. Hihonje	100 100	7 7	Fluffier Fluffier
5	2009-2010	September-February	March-August	1. April 2. September 3. January	1. Impart 2. Maroke 3. 1r 64	100 110 110	7 7 8	Fluffier Fluffier Not
6	2008-2009	November-December	August-July	1. April 2. December	1. Mikongga 2. Satron	100 100	7 7	Fluffier Fluffier
7	2007-2008	November-December	August-July	1. December 2. September	1. Cihonje 2. Cibungur	100 100	7 7	Fluffier Not
8	200b-2007	September-February	March-August	1. February 2. September	1. Isadane super 2. Pandan wangi	110 100 110	7 6 8	Fluffier Fluffier Fluffier
9	2005-2006	November	August-July	1. April 2. November	1. Ciherang 2. Cigeulis/ Cidenok	100 105	7 7	Fluffier Fluffier
10	2004-2005	November-December	August-July	1. January 2. April	1. Sadane 2. Super Midun	100 90	7 7	Fluffier Fluffier

Harvest "Kapat" this be the desire of every farmer, but due to the uncertain seasons planting schedule was also changed and to reach the next planting season in August they chose the seed fluorescent. As in Table 3, the growing season in August for any type of rice grown in the month with production varying according to its kind to obtain optimal results. For example maroke rice varieties planted in the month to get the results that about 7 tons per hectare, while in non-crop "Kapat" or after the planting season in August, October, November and December production levels below it.

The impact of the dry season would actually happen land in the dry season is called "diberakeun". This fallow period fallow silenced and then planted with rice in the next season. This fallow effect on soil fertility, which can reduce the cost of production and rice production, is quite good. However, farmers do not get your hopes up cases like this happen; the farmers are expected to harvest "Kapat".

CONCLUSION

Every living creature (animal, plant, and human being) needs water. The need of water on the paddy cultivation is not only for the paddy itself, but it is also from the soil cultivation. The soil cultivation cannot be done without the water since the cultivation makes the soil cultivation easier and reduces the production cost. The water in the paddy cultivation is taken from the rainwater (rainfed lowland) and the irrigation that is made by people with the traditional system in which its distribution is regulated by ulu-ulu (the village officials who manage the field irrigation). The technical irrigation is regulated by the government, while the irrigation system is regulated by Perhimpunan Petani Pemakai Air/Association of Water-Using Farmers (P3A). The water source is currently related to the rainfall and climate change and they affect time and cropping pattern that also determines the income of farmers at last.

Adaptation of farmers on the climate change in the paddy cultivation is implemented in the selection of seed and building/maintaining of irrigation. The different variety and age of paddy as well as the its production level are chosen and adjusted to the rainy season or the water availability. Farmers build and/or maintain "Dawuan" and irrigation before the growing season, especially dry season, through the self-reliance of the people. The availability of water for irrigation from Cimanuk River is also related to the climate change; in long dry season, the river becomes dry and farmers cannot grow crops.

The climate change also affects the farmers' income. In the normal dry season and rainy season or with normal rainfall, farmers can plant paddy three times in a year. In long dry season, farmers can plant paddy twice in a year since there is the drought that affects the harvest. It means that the farmers lose their income in one growing season or they experience the crop failure

REFERENCES

Bennet, John William (1976) Adaptation as Social Process dalam The Ecological Transsition: Cultural Anthropology and Human Adaptation, New York : Pergamon Press Inc.

BPS (1980) Sensus Penduduk 1980. Biro Pusat Statistik. Jakarta

Geertz, Clifford (1976) *Involusi Pertanian, Proses Perubahan Ekologi di Indonesia.* Jakarta: Bhratara Karya Aksara.

Irma (2012) Skripsi. Jatinangor: Jurusan Antropologi Fisip Unpad

Iskandar, Johan (2014) Manusia dan Lingkungan dengan Berbagai Perubahannya. Yogyakarta. Graha Ilmu.

Iskandar, Johan (2012) Ekologi Perladangan Orang Baduy Pengelolaan Hutan Betbasis Adat Secara Berkelanjutan. Bandung: PT. Alumni.

Iskandar, Johan (2001) Manusia Budaya dan Lingkungan. Bandung: Humaniora Utama Press.

Iskandar, Johan (1992) Ekologi Perladangan di Indonesia. Jakarta Djambatan..

Koppen, W (1936) Dalam Laporan Akhir. Studi Land Clearing dan Pengendalian Gulma Air Di Daerah Genangan Rencana Waduk Jatigede 1984. Kerjasama Departemen Pekerjaan Umum Direktorat Jenderal Pengairan Proyek Pengembangan Wilayah Sungai Cimanuk dengan Lembaga Ekologi. Universitas Padjadjaran. Bandung.

Pasandaran, Effendi dan Donald C. Taylor (1988) Irigasi Kelembagaan dan ekonomi. Jakarta. Yayasan Obor Indonesia. PT. Gramedia. Jilid 2.

Profil (2009) Profi I Desa Leuwihideung. 2009.

PPSDAL (1984) Laporan Akhir. Studi Land Clearing dan Pengendalian Gulma Air Di Daerah Genangan Rencana Waduk Jatigede. Kerjasama Departemen Pekerjaan Umum Direktorat Jenderal Pengairan Proyek Pengembangan Wilayah Sungai Cimanuk dengan Lembaga Ekologi. Universitas Padjadjaran. Bandung.

Redfield, Robert (1982) *Ma.syarakat Petani dan Kebudayaan.* Jakarta: Yayasan Ilmu-Ilmu Sosial.

Sajogyo(ed) (1982) *Bunga rampai Perekonomian Desa.* Jakarta: Yayasan Obor dan IPB.

Saturi, Sapariah (2012) Kekeringan Landa Lahan Pertanian di Berbagai Daerah. Antara. 3 September.

Schmidt, FH and Ferguson, J.H.A., 1951. Dalam Laporan Akhir Studi Land Clearing dan Pengendalian Gulma Air Di Daerah Genangan Rencana Waduk Jatigede 11984) Kerjasama Departemen Pekerjaan Umum Direktorat Jenderal Pengairan Proyek Pengembangan Wilayah Sungai Cimanuk dengan Lembaga Ekologi. Universitas Padjadjaran. Bandung.

Scott, James C. 1981. *Moral Ekonomi Petani. Pergolakan dan Sub.si,stensi âi Asia Tenggara.* Jakarta: LP3ES.

Soemarwoto, Otto (2004) Ekologi Lingkungan Hidup dan Pembangunan. Djambatan

Suratiyah (1992) Laporan Penelitian. Peran Perempuan dalam Sawah Surjan. Yogyakarta. PPK-UGM

Suwartapradja, Opan, S (2009) *Disertasi.* Strategi Penduduk dalam Kondisi ketidakpastian Pembangunan Waduk Jatigede. Sumedang Jawa Barat. Bandung. Universitas Padjadjaran. Program Pascasarjana.

Suwartapradja, Opan, S. dan Junardi Harahap. 2012. *Laporan penelitian.* Strategi Petani dalam Meningkatkan Produksi Padi Lahan Basah. Sumedang. Jurusan Antropologi Fakultas Ulmu Sosial dan Ilmu Politik Universitas Padjadjaran.

Suwartapradja, Opan, S. dan Junardi Harahap (2013) Paper. Inovation Adoption Rice Farming Community fCase Study in Leuwihideung Village, Districts Darmaraja, Sumedang Regency, West Java) SKIM XIII Indonesia Malaysia. Bandung. UNPAD-UKM. On 12-14 November 2013

Wiratno, Gunawan (2000) Masa Cerah dan Masa Curam Petani di Pedesaan Jawa, Gama Press, Yogyakarta

Wolf, Eric R (1983) *Petani, Suatu Tinjauan Antropologi.* Jakarta: Yayasan Ilmu-Ilmu Sosial.