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Fighting Through Community Participation Based on Vegetative Conservation Approach of Wonogiri Reservoir Sedimentation in Sub - Watershed of Keduang

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Abstract
Humans are the main trigger factors causes of sedimentation. It's happened because of the farming and cultivation system that is not based on the principles of sustainable development. These human activities causes in damage to the environment in the region surrounding reservoir (hinterland), further more causing sedimentation that deposited in the water body. The consequence of this circumstance, the capacity of reservoir is decreasing. In order to reduce the level of sedimentation, a proper conservation has to be done. The research concerning the related matter was conducted in Sub Watershed (Sub-catchment) Keduang which is constitute one of six sub-watershed in the rain catchment area of Wonogiri reservoir which is contributed the largest amount sedimentation silt in to reservoir. This study focused on vegetative conservation approaches and community involvement related to the five capitals in relation to watershed conservation, namely: social capital (public power), human capital (community resources), financial capital (the physical condition of the land) and natural capital (natural forces); vegetative capital and government incentives.
The General purpose of this study was to find a relationship between the five capitals and government incentives as a motivating factor that may affected to the public (farmers who live in the catchment areas) in a participatory conservation for controlling sedimentation rate in the areas surrounding reservoir. The specific objectives of this study were as follows: (a) to find the amount of community participation in conservation, especially the education community, (b) to find a major role in the conservation of human resources, (c) to find the role of power / financial capital for conservation, (d) to find the magnitude of the role of the physical conditions in conservation activities; (e) to find major role for the conservation of natural resources, (f) to find the magnitude of the role of government and NGOs in Keduang Sub watershed conservation.
The method used was survey method with a sample of 300 respondents was taken by using a purposive sampling in five villages, they are Gemawang Village (Ngadirojo SubDistrict); Sambirejo Village (Jatisrono SubDistrict); Pingkuk Village (Jatiroto SubDistrict); Sukoboyo Village (Slogohimo SubDistrict), and Sembukan Village (Sidoharjo SubDistrict). Data collection techniques performed by using a questionnaire and Focus Group Discussion. Data analysis was done by using the validity test: reliability Test, Multicollinearity Test: Autocorrelation Test: heteroscedasticity Test; hypothesis testing performed by T test and F test, and coefficient of determination analysis, in order to determine the amount of capital contribution of the influence of these five variables and the government's decision to implement watershed conservation. The results showed that the five capitals and government incentives are jointly significant effect on farmers' conservation decisions in the prevention of sedimentation in the sub-watershed of Keduang, while for the grass vegetation, in addition also having support to the economic value of conservation especially for supporting livestock and cattles.
Keywords: community participation, equity (capital) and government incentives, watershed conservation, reduction of sedimentation, Keduang Sub-Watershed.

1. Introduction

Water is one of the main components that are needed for living of the organisms, human being and all activities related concerned. Because of its function is so important, then the presence of water need has to be managed as well. According to Aldaya et al (2009) there are two kinds of water that directly used by or related to living organisms and all parties concerned, namely: virtual water and water foot print. Virtual water is defined as in the volume of water use in the production of a community, good and or services, it means that the amount of water used for production and a great community services, whereas the water foot print is divided into three kinds, namely: blue water foot print, which can be defined as the water that comes from the global evaporation of ground water and surface water; green water foot print is water which come from rain water stored in soil, and grey water foot print the rest of water that has been contaminated human activities.

The orientation of the discussion in this study is how to manage properly the green water or rain water stored in the soil. For this purpose, the catchment area need to be conditioned and managed, so the presence of

water can be used in a sustainable manner, it can be maintained by participating the community. One of the efforts to achieve green water management is to conduct conservation activities in upstream areas. This conservation includes two important events, namely the mechanical (structural) conservation and the vegetative conservation (non structural) associated with the public and community as an actor who has a big role in the realization of the upstream areas of the green for spring bequeath to future generations.

Sustainability of the Solo river water is strongly influenced by the conditions of the upstream catchment area, and depending also on the condition of ecosystems in the catchment area itself. The Upstream catchment ecosystem of Solo River Basin, especially in Sub-catchment of Keduang experiencing severe degradation. A huge amounts of sediment was originated from sub catchment of Keduang is about 1.21858 million m^3 / year of total sediment entering into the reservoir of Wonogiri which about 3.17851 million m^3 / year (Ouchi, 2007). Intake blockage caused by deposition and waste almost entirely from Sub Catchment of Keduang. Please note also that the Sub-watershed with the largest sub watershed of Keduang constitutes Water Catchment Area with the ample of about 421 km^2 or about 34% of the entire watershed of Wonogiri. From these data it has to be handled as immediate and urgenty as possible intended to address the influx of trash from the Keduang river. The total land area of critical reservoirs Wonogiri approximately 1087 km^2 (Ouchi, 2007). The extent of degraded lands was caused by deforestation in the headwaters of the looting or land-uses into agricultural areas.

Hence it is clear that the motive for encouraging economic activity through the unbalanced of land cultivation will causes environmental damage. Humans are the main factors on triggering causes of sedimentation as a result of farming land that is not based on the principles of sustainable development which off course will also resulted in damage to the environment which causing silting process and sedimentation. The research was conducted in Sub Watershed (Sub-basin) of Keduang which is one of six sub-watershed Sub-basin in the catchment area that has contributed the largest of reservoir sedimentation. This study focused on vegetative conservation approaches and community participation in relation to the five capitals and watershed conservation. The five capitals constitute social capital (public power), human capital (community resources), physical capital (the physical condition of the land), natural capital (natural forces); and vegetative capital and government incentives. General purpose of this study was to find a relationship between the five capitals and government incentives as a motivating factors that may affect the public (farmers who live in the catchment area) in a participatory conservation decisions in order to control sedimentation in the reservoir. The specific objective of this study are as follows: (a) to find the amount of community participation in conservation, especially the education community, (b) to find a major role in the conservation of human resources, (c) to find the role of power/financial capital for conservation, (d) to find the magnitude of the role of the physical conditions in conservation activities; (e) to find major role for the conservation of natural resources, and (f) to find the magnitude of the role of government and NGOs in Keduang Sub watershed conservation. The method used was survey method, with 300 respondents was taken by using a purposive sampling in five villages, they are: the Village of Gemawang which is located in Ngadirojo sub district; Sambirejo Village of Jatisrono sub district; Pingkuk Village of Jatiroto sub district; Sukoboyo Village of Slogohimo sub district, and Sembukan Village of Sidoharjo sub district. Data collection techniques performed by using a questionnaire. Data analysis was done by using the validity test; reliability; multicollinearity; Autocorrelation, and heteroscedasticity test; beside that the hypothesis testing was performed by "*T* "test and "*F* " test. A coefficient of determination analysis was also done in order to determine the level of these five capitals contribution and its influence variables and signals of the government's incentives to the community's decision for implementing a sub watershed conservation.

Complex problems encountered in Solo Watershed Management, primarily stem from a very high population pressure so that the carrying capacity of land and environment in the watershed is diminishing; this problem will continuing happened if not supported by appropriate efficient and effective manner of watershed management strategies. Several times of flooding occurrences were due to overflow of the river Solo, namely: in 1966, the flood was inundated an area of 120,000 hectares and 152,000 houses; 1987, floods caused 3 peoples deaths, 57, 500 hectares and 53,000 flooded homes; the 1993 flood inundated of about 15,000 hectares of rice fields, 3,000 hectares of houses, 1700 hectares of grounds, 182 farms and 5,000 homes, and in 2007 the largest flood again happened during the 40 (forty) years returned periods that claimed 67 human lives and flooded the 8 (eight) districts/the city of Solo, Sragen, Ngawi, Madiun, Bojonegoro, Blora, Tuban, and Lamongan. Floods and landslides caused by natural factors and human activities associated with the use of natural resources leading to decreased function of the hydrological basin. Natural factors caused climate/rainfall is very high and geomorphological conditions (geology, topography and soil type). While the factors due to human activities and practices of forest use patterns, soil and water are not in harmony with the principles of soil and water conservation, while also poor management of river systems and infrastructure of irrigation/ drainage in the urban / rural.

The extent to which the role of community, human resources, financial capital, physical condition, natural resources and government incentives to watershed farmers' decision to save the environment in sustainable

watershed environment. From the above brief description of the research problem can be formulated through the following research questions: 1. How big is community participation in watershed conservation? 2. How effective is the role of human resources in Sub watershed conservation? 3. How does the role of financial capital to the implementation of conservation organizations? 4. How much influence the physical condition of the conservation? 5. How big is the influence of natural resources/vegetative region of the? 6. How do the incentives of the government towards the implementation of watershed conservation?

This research-oriented also addressed to human resource management. Many frameworks used to explain the relationships between cause and effect in environmental management. This research used the concept of Driving Forces State Response (DSR) that it has been widely used and accepted in the study of environmental management. DSR framework is used for describing the reliability of a simple relationship between environmental conditions and determining factors, or the ability to push (the driving forces), hereinafter referred to as DSR organization driving forces.

2. Result and Discussion

2.1. Description of The Study Area

Keduang is the largest among the six sub catchments of Wonogiri reservoir. Geographically, the Sub-watershed Keduang is located at $7^0$42'-$4^0$11' $7^0$55'LS and $4^0$24'BT. Natural conditions in sub catchment of Keduang included in the watershed with high annual rainfall is about 5,404 mm/year with a number of 165 rainy days (BPTDAS, 2005). Sub watershed of Keduang is about 39,700 hectares (397 km^2) consisting of 42.6% rice, 15.6% residential, 15.1% forest, and 26.7% of the garden (Water Resources Research and Development, 2005). Sub-watershed Keduang is located in the District Wonogiri, Central Java, Indonesia. Agricultural land in Sub watershed Keduang included rice fields and the moor. Types of crops on dry land are teaks, rosewoods, chocolate, cashew, coconut, mango and *lamtoro*. While the types of crops on forest land is almost non-existent. Existing vegetation on the forest covered of pine, teak, rosewood, acacia and cashew. Soil types that exist in Sub catchment of Keduang consists of three types: litosol, Mediterranean, and Latosol with variety of slope classes Keduang ranging between 1-15% and above 40%.

2.2. Slope Classification and Conservation

Sub catchment of Keduang has been classified into three classes of slope as follows: the slope of 2-15% of about 22 000 ha (54.41%); 15-40% of about 3400 ha (8.57%) and> 40% of about 14 300 ha (36.02%). Slope classes is the largest percentage of land with a slope of 2-15%. In general, sub watershed Keduang does not have a steep slopes. From the results of a study that was conducted by PWBS estimated that an annual sediment which was entering to the reservoir Wonogiri from 1981 until 1987 showed that sub catchment of Tirtomoyo, Keduang and Solo Hulu were the largest contribution of sediment that entered into reservoir level.

Conservation means the preservation or protection of the environment (Echols & Shadily, 1989: 140). Another notion that conservation is expressed by Dassmann (1984) which states that conservation is an effort and careful protection against anything in particular management of natural resources to prevent the exploitation and destruction or extinction. Conservation in the study include soil and water conservation. There once close relationship between land and water, and that any treatment given to a parcel of land will influenced the water system in the downstream, then the problem of soil and water conservation are closely related matters. Various measures of soil conservation is automatically also a water conservation measures. Soil conservation efforts aimed to prevent damage in addition to soil erosion and improve soil that has been damaged, also aimed to establish land capability class and actions or treatment that is required in order to land could be used optimally in an unlimited period of time. As we know that the purpose of soil conservation is to obtain a maximum support from the production rate given by the ground to maintain the balance of the lost ground by setting the average soil erosion. In the broader context, erosion must be controlled to prevent soil conditions continue to deteriorate and ultimately can not be reclaimed back. Erosion is a natural process that can not be prevented but can be reduced to a maximum tolerance of the average soil loss (Sevastel, 2010). Thus it does not mean a delay of soil conservation or land use restrictions on land use, but its use to adjust the range of soil properties and provide treatment in accordance with the properties of the soil and provide treatment in accordance with the terms of the required.

2.3. Land Conservation Approach

Under these both conditions, there are three approaches to land conservation there are: a. Repair and maintain the state of the soil to resist destruction and transport, as well as greater power to absorb water; b. Soil close to plants or plant debris from a direct blow to rain water that falls; c. Regulate the flow of the surface so that the flow is not destructive force. Soil and water conservation strategies can be divided into three main methods, namely: a. Vegetative methods in soil and water conservation strategy is the management of plants in such a way so as to suppress the rate of erosion and runoff. As has been stated in advance that the plant can reduce erosion and runoff because of: 1) Reduction of the rain beating against the surface of soil grains as a result of interception of rainfall

by plant canopy grain, 2) reduction in surface flow speed as a result of increased surface hardness, 3) Improved aggregation of land as a result of the activity of plant roots and the addition of organic matter, thereby also increasing the infiltration capacity, 4) increase in soil water loss due to evapotranspiration, so the soil dries quickly.b. Methods of physical/mechanical erosion control efforts can also be done by mechanical technical despite the fact that this method requires large financing compared with vegetative way, because it involves the creation of infrastructure, such as: 1) Preparation of routes for the drainage of water from certain places to disposal sites; 2) Preparation of the terraces that water flow can be inhibited so that runoff can be reduced and the carrying capacity will a bit improved, 3) Perform tillage in such a way that is parallel with the contour lines. Methods of physical/mechanical require considerable expense, but for the sake of avoiding the erosion that would result in far greater losses, the way it should be noted. Through the manufacture and treatment by using mechanical erosion control efforts can be expected to reduced or impaired surface flow (run off) so that the power of the soil erosion will decline.

2.4. Vegetative Conservation

The vegetative method is included in the soil and water conservation strategies are: a. Planting a cover crop (permanent plant cover). The ability of cover crops to reduce erosion is no doubt. Cover crops can be planted separately (when the soil is not cultivated staple crops), or planted with staple crops as ground cover under the principal crops, or even sometimes as a staple crop protection. Although all plants that can close the ground as well (either deliberately planted in order to cover ground or not) it can be regarded as cover crops, but in a special sense is a cover crop is a crop that was deliberately planted to protect soil from erosion , increase soil organic matter, and while increasing the productivity of the soil; b. Planting in the strip is a way of farming with several crops, in which each type of crop planted in strips that criss cross on a piece of land and is based on contour lines or cut slope direction. In this system all tillage should be done to cut the slope. In addition, in a strip cropping is also recommended the crop rotation, even on lands that easily rotated (high erodibility) suggested that one of the plants in the strip is a cover crop in the ground permanently.

2.5. Farmers Status

Based on the education, farmers that settled in sub-watershed Keduang was 34.48% have primary school education, 34.05% of junior high school level; and 13.79% high school, 0.86% college degree, and 16.81% not in school. The results of *Chi* square (x2 count) is smaller than the x2 table (0,05:4) so the null hypothesis (Ho) is rejected, which means there is a significant mean differences between the five groups (populations) for the variable levels of education. Based on farmers' incomes in sub watersheds Keduang is about 10,34% had incomes of less than Rp.500.000, -, 42.67% have incomes in between Rp.500.000, - to Rp.1.000.000, -, 35.78% have incomes of between Rp.1.100.000, - to Rp.2.000.000, -; 6.90% have incomes Rp.2.100.00, - to Rp.2.500.000, - and 4.31% had incomes of more than Rp.2.500.000, -. The results of Chi square test (x2 count) is greater than the x2 table (0,05:4) so the null hypothesis (Ho) accepted, which means that there are no significant mean differences between the five groups (populations) for the variable level of income.

Based on extensive land cultivation shows about 21:21% indicates that farmers has an area of arable land is less than 0.5 hectares, 54.74% has arable land area of 0.5 to 1 hectare, 14.66% has arable land area from 1.1 to 1.5 hectares, 8:19% of arable land has an area of 1.6 to 2 hectares, and 1:29% of arable land has an area of more than 2 hectares. The results of Chi square test (x2 count) is greater than the x2 table (0,05:4) so the null hypothesis (Ho) accepted, which means that there are no significant mean differences between the five groups (populations) for the variable area of arable land.

2.6. Demonstration Plots

The model is done by planting vegetative grasses in the system demonstration plots conducted in five villages of the sample, the village of Sukoboyo in Slogohimo sub District, Sumberejo village in Jatisrono sub District, the Pingkuk village in Jatiroto subDistrict, Sembukan village in Sidoharjo sub District, and Gemawang village which is located in Ngadirojo subdistrict. The ample area of each demonstration plot was 60 square meters, consisting of six plots each having an area of 10 square meters. Five boxes planted with five species of grass, namely: *elephant grass, vetiver grass, Setaria grass, kolojono grass, and blembem grass*). At each plant was observed about root length, number of tillers, number of roots, traction, and sediment that affected by each kind of grass. The results of the number of tillers plant damplot shows that *elephant grass, vetiver, Setaria, kolonjono, and blembem* grass in the five villages which are used as a sample at a predetermined age range is 2, 4, and 6 months. The fifth plant used has a number of different tillers. This can be the basis of selection as a model of vegetative plant. The length of the roots of grass plants, vetiver, Setaria, kolonjono, and blembem in the five villages which are used as a sample at a predetermined age range of 2, 4, and 6 months. These five plants that used to have long roots that is different. It was found that the average length of roots which has the largest elephant grass lawn. This can be the basis of selection as a model of vegetative plant. Traction plant *Gajah* (elephant), vetiver, *Setaria*, *kolonjono*, and *blembem* grass (*the local name of grass*) in the five villages which are used as a sample at a predetermined age range is 2, 4, and 6 months. These five plants that used to have traction different. It was found

that the average traction has the largest grass *Setaria (the name of grass)*.This can be used for the basis of selection as a model of vegetative plant.

2.7. Research Instruments, Statistical Analysis and the Result of Research

Questionnaires were used as Research Instruments. Questionnaire was also used to measure human capital and used a Likert scale with five alternative answers. The number of questions is 11 (eleven) items, so the ideal total score is five times eleven is 55. The results of real measurements in the field showed that the average score achieved for the variables of human capital is 40.70 with a standard deviation of 6:51. If the ideal total score of 55, and the score total results of measurements of the real / real 40.70, it can be said to exist at the level of human capital is moderates. The results of the *Chi* square test (x2 count) is greater than the x2 table (0,05:4) so the null hypothesis (Ho) accepted, which means there are no significant mean differences between the five groups (populations) to variable human capital. Questionnaire was used to measure financial capital and using a *Likert* scale with five alternative answers. The number of questions is 12 (twelve) items, so the ideal total score is five times twelve is 60. While the results of real measurements in the field showed that the average score achieved for the financial capital variable is 47.31 with a standard deviation of 5:53. If the ideal total score of 60, and the score total results of measurements of the real of about 47.31, it can be said that the financial capital is at moderate levels. Based on the analysis showed that the results of *Chi* square test (x2 count) is greater than the x2 table (0,05:4) so the null hypothesis (Ho) is accepted, which means that there are no significant mean differences between the five groups (populations) for variables of financial capital. Questionnaire also used for measuring the natural resource capital, Likert scale also apply with five alternative answers. The number of questions is 8 (eight) items, so the ideal total score is five times eight is 40. The results of real measurements in the field showed that the average score achieved for the natural resources capital variable is 31.59 with a standard deviation of 3:02. If the ideal total score of 40, and the score total results of measurements of the real 31.59, then can be concluded that the existing capital of resources comes at a moderate level. The results of *Chi* square test (x2 count) showed greater than x2 tables (0,05:4) so the null hypothesis (Ho) is accepted, which means there are no significant mean differences between the five groups (populations) for the variable sources of capital natural resources.

2.7.1. Production Of Capital Equipment And Infrastructure Facilities

In this study, a questionnaire was also used to measure the production of capital equipment and infrastructure facilities, Likert scale also used with five alternative answers. The number of questions were 9 (nine) items, so the ideal total score is five times nine is 45. The results of real measurements in the field showed that the average score achieved for the variable inputs of capital equipment and infrastructure is 33.63 with a standard deviation of 4.87. If the ideal total score of 45, and the score total results of measurements of the real / real 33.63, it can be said that capital equipment and infrastructure of production is at moderate levels.

2.7.2. Social capital observation

Social capital observation was used a Likert scale with five alternative answers. The number of questions are 9 (nine) items, so the ideal total score is five times nine is 45. The results of real measurements in the field showed that the average score achieved for the variables of social capital is 32.68 with a standard deviation of 3.44. If the ideal total score of 45, and the score total results of measurements of the real / real 32.68, it can be said of social capital existing at moderate levels. The results of the *Chi* square test (x2 count) is greater than the x2 table (0,05:4) so the null hypothesis (Ho) accepted, which means there are no significant mean differences between the five groups (populations) to variable social capital.

2.7.3. Government Incentives Capital

Government incentives Capital were measured using Likert scale with five alternative answers. The number of questions is 8 (eight) items, so the ideal total score is five times eight is 40. The results of real measurements in the field showed that the average score achieved for variable capital incentives the government is 29.78 with a standard deviation of 4.91. If the ideal total score of 40, and the total score measurement results of real / real 29.78, it can be said of capital there are government incentives to moderate levels. The results show that the Kolmogorov Smirnov *Z* value for the variable is 3544, while government incentives Kolmogorov Smirnov *Z* value is 0.0892 according to the table shows that the calculated value of *Z* is greater than the *Z* table (0,05:232) so that the null hypothesis (Ho) is rejected which means that the data for government incentive variables are normally distributed.

2.7.4. Multicollinearity Test Independent Variables

Multicollinearity test results show that for all independent variables included social capital, human capital, financial capital, capital resources, capital equipment production facilities and infrastructure as well as government incentives the *VIF* (Variance Inflation Factor) is smaller than 10 and greater tolerance value of 0.10. Based on these results, it can be concluded that there is no multicollinearity in all the independent variables. Autocorrelation test results showed that the Durbin-Watson coefficient obtained was 1.329. Because the Durbin-Watson coefficient values greater than 0.05 then it can be concluded that in all the independent variables include social capital, human capital, financial capital, capital resources, capital equipment production facilities and infrastructure as well as government incentives are not going autocorrelation. Heteroscedasticity symptoms

occur as a result of the residual variation that is not the same for all observations.Heterokedastisitas occurs when the variance in the regression error (ei) for some value of x is not constant or variable. Constant detection or absence of constant error variance can be done by drawing the graph of y with the residual (y-y). If the line that limits the distribution of the dots are relatively parallel then said to be a constant error variance. It can be concluded that there was no heterokedastisity.

2.7.5. Multiple linear regression test

Multiple linear regression test used to measure the magnitude of the effect of independent variables, namely social capital, human capital, financial capital, capital resources, capital equipment production facilities and infrastructure and government incentives for the dependent variable is the decision conservation of Keduang sub watershed. Dependent variable has a mean of 55.4612 berkonservasi decision by the number of data 232 and a standard deviation of 7.37776. Independent variables of social capital has a mean of 32.6767 with a standard deviation of 3.43949 and the amount of data 232. Human capital variable has a mean of 40.6983 with a standard deviation of 6.51435 and the amount of data 232.Financial capital variable has a mean of 47.3103 with a standard deviation of 5.53370 and the amount of data 232. Variable capital resources has a mean with standard deviation 31.5862 3.02105 and the amount of data 232. Physical capital variable has a mean of 33.6250 with a standard deviation of 4.87079 and the amount of data 232. Variable incentives the government has a mean with standard deviation 29.7888 4.91515 and the amount of data 232.

Multiple correlation coefficient *R* of 0.914. The coefficient is significant because it can be said after tested by *F*-test *F* price obtained for 190.116 with a significance of 0.00. another result from analysis show that a constant price of 15.109 with a coefficient of *X1* at 0038 prices, the coefficient for *0120 X2, X3* coefficient of -0.239, the coefficient of *X 4* 0224, the coefficient of *0.329 X5, X6* and 0919 coefficients. Of the six coefficients of the coefficient of X1, X2, and X4 are not significant because each has a significance of more than 0.00. The regression equation is *Y = 0.038X1 0.120X2 + 0239 + 0329 + X3 + X5 + 0.224X4 X6 + 15 109 0919*. Partial correlations for the six variables, respectively 0034, 0127, -0365, 0152, 0271, and 0532.

2.7.6. "T " Test Results Analysis

T test results between social capital variables and the decision indicates that conservation count of 42 634 t while t table (n = 462 with a level of significance level α = 0.05 is 1.984. Because t calculated <t table means the Ho accepted that there is significant influence between variables social capital (social capacity) to decisions taken in implementing the watershed communities sustainable conservation. T test results between human capital variables and the decision of conservation activities shown that t count of 22.847 while the t table (n = 462 with α = 0.05 significance level is 1.984. Since the t count> t table then Ho is rejected, which means there is significant influence between variables human capital (human capacity) to decisions taken in implementing watershed conservation community development, t test results between financial capital and the decision variables berkonservasi show that t count of 13.462 while the t table (n = 462 with α = 0.05 significance level is 1.984. Due t calculated <t table means the Ho accepted that there was no significant effect between the variables of financial capital (financial capacity) of the decisions taken in implementing watershed conservation community development. t test results between variable capital and natural resources conservation decision shows that t count of 45.614 while the t table (n = 462 d with a significance level α = 0.05 is 1.984. Because t count> t table then Ho is rejected, which means that there is significant influence between variable capital resources (natural capacity) of the watershed community decisions in implementing sustainable conservation. t test results between physical capital and the decision variables of conservation count shows that of 37 622 t while t table (n = 462 with α = 0.05 significance level is 1.984. Since the t count> t table then Ho is rejected which means that there is an influence significant association between the variables of physical capital (physical capacity) to decisions taken in implementing the watershed communities sustainable conservation of t test results between government incentives and the decision variables of conservation count shows that of 44 109 t while t table (n = 462 with α = 0.05 significance level is 1.984 . Since the t count> t table then Ho is rejected it means that there are a significant effect between the variables of government incentives on decisions taken and in implementing the watershed communities sustainable conservation.

2.7.7. "F" Test Probability Value and Coefficients of Determinant

The analysis is also performed by "*F*" test, "*F*" test probability value is less than the 0.05 level so that it can be concluded that Ho is rejected means that there are significant variables that influence human capital, financial capital, natural capital, physical capital, social capital, and signals the government of the decisions taken in implementing watershed conservation community development; the value of the coefficient of determination (R) for the variables of social capital, human capital, financial capital, capital resources, capital equipment production facilities and infrastructure, and government incentives is 0.835 so that it can be stated that the contribution of social capital, human capital, financial capital, capital resources, capital equipment production facilities and infrastructure, and government incentives to the decision of conservation was 83.5%. That is, decisions are influenced by conservation factors, social capital, human capital, financial capital, capital resources, capital equipment production facilities and infrastructure, and government incentives amounting to 83.5% while the rest is

influenced by other factors: the value of the coefficient of determination (R) for social capital variables is 0.215, so it can be stated that the contribution of social capital on the decision on conservation was 21.5%. That is, decisions are influenced by factors berkonservasi social capital of 21.5% while the rest is influenced by other factors. Coefficient of determination (R) for human capital variables is 0.619, so it can be stated that the contribution of human capital to the decision on conservation is 61.9%. That is, decisions are influenced by factors of conservation of human capital by 61.9% while the rest is influenced by other factors.Coefficient of determination (R) for the financial capital variable is 0.042, so it can be stated that the financial capital contribution to the decision of conservation was 4.2%. That is, decisions are influenced by factors of conservation based on financial capital by 4.2% while the rest is influenced by other factors. While the value of the coefficient of determination (R) for natural resource capital variable is 0.439, so it can be stated that the capital contribution of natural resources against the decision of conservation was 43.9%. That is, decisions are influenced by factors of conservation related to capital resources amounting to 43.9% while the rest is influenced by other factors.

Coefficient of determination (R) for the variable inputs of capital equipment and infrastructure is 0.672 so that it can be stated that the contribution of capital inputs and infrastructure tools for doing conservation decision was 67.2%. That is, decisions are influenced by conservation factors related to capital facilities and infrastructure for the production of 67.2% while the rest is influenced by other factors.Coefficient of determination (R) for government incentives variable is 0.783, so it can be stated that the contribution of government incentives to conservation decision was 78.3%. That is, decisions are influenced by conservation incentive factors for the government while the remaining 78.3% influenced by other factors.

2.7.8. Demonstration Plot and the rate of Sedimentation

In this study, conducted in five Demonstration Plot sample, The area of each demonstration plot 60 square meters, consisting of six plots each having an area of 10 square meters.Five boxes planted with five species of grass *(elephant grass, vetiver grass, Setaria grass, grass kolonjono, and grass of blembem*).One plot to another is a control area with no plants at all. Each plot length of 10 meters and a width of one meter, one end section made a hole reservoir sediment erosion results 1x1x0, 5 meter. Each plot to one another is limited by the small embankment. Traction observations of each plant is known that traction plant *elephant grass, vetiver, Setaria, kolonjono, and blembem* in the five villages which are used as a sample at a predetermined age range is 2, 4, and 6 months. The fifth power plant used to have a different grip. In the table it was found that the average traction has the largest grass Setaria. This can be the basis of selection as a model of vegetative plant. Based on the test it was found that the average traction are significant differences between Pingkuk Gemawang, Gemawang-Sumberejo, and Gemawang-Sembukan villages. Based on the calculation of average traction, which has the largest root length for all plants in general is in the village of Sembukan.

The stronger the root system with age of vegetation, and therefore the increasing age of plant vegetation so traction will be higher. This means that the rate of erosion will be more suppressed. Plant root system greatly affect erosion, because the root system of plants to help determine the activity of the formation and stabilization of aggregates, which means it also increases the porosity of the soil. As stated in advance that will determine the capacity of the soil porosity and infiltration rate. Vegetative methods in soil and water conservation strategy is the management of plants in such a way so as to suppress the rate of erosion and runoff in the sub-watershed Keduang Based on test results and the differences in the calculation of the average length of shoots, number of tillers, and root length for all plants is the largest general Sumberejo village. As for the average traction is greatest in the village Sembukan. Ability to resist erosion rate of each grass plant can be determined from the volume of sediment that accumulated in the holes provided on each plot plots, including plots of control plot. The total volume of sediment of each plot as follows: (1) *elephant grass* = 1.2 cubic meters / ha, (2) Grass Roots fragrance = 2.0 cubic meters / ha, (3) *Setaria Grass* = 3.8 cubic meters / ha, (4) *kolonjono Grass* = 3.6 cubic meters / ha, (5) *blembem Grass* = 5.6 cubic meters / ha, (6) Without plants (control) = 20 cubic meters / ha. Based on observations of sediment collected from each plot, it is known that the *elephant grass* plants have the best ability to resist erosion, erosion occurs only 1.2 cubic meters per hektar. This number of relatively small volume compared with the grass plant other. As for the plot without Tamanan grass plots, sediment produced by 20 cubic meters per hectare for six months. For one year of sediment that occurs in one hectare of land without a crop of 40 cubic meters. This is a considerable loss of land, economically is a huge disadvantage because many of topsoils are washed away resulting in lower soil fertility. Conservation approaches in sub-watershed vegetative Keduang can maintain the stability of the structure of the soil through the root system and land cover so as to increase infiltration and prevent erosion, improve soil nutrient and economic value. So that with this vegetative approach sedimentation rate of sub-watershed Keduang decreases.

Implementation of watershed management using an approach based vegetative communities have characteristics that are quite complex, because it involves various parties together. In this study deliberately selected the vegetative element in the form of grass monocot plants, not the tall plants in the form of trees, by the

reason that the grass has increased the welfare aspects of farm community watershed sustainability. Beside benefits primarily as animal feed, grass also has a defensive aspect and watershed conservation. If the commodity carefully traced the grass can generate economic activity, especially in the rural sector and watershed areas. With the availability of grass in all the basin's reserves, will motivate the farmers to develop the livestock sector.

In developing the venture capital business and the addition of the farmers in cooperation with the parties, for example by banks in the region. Farmers as customers enjoy credit facilities from banks, both state banks and banks of this private activity. From banking sector will grow rapidly. This will stimulate the emergence of a lot of cows and cattle traders in various places in the sub watershed of Keduang. Market presence and ample animal traders, the more the circulation of money, particularly in the sub watershed of Keduang.Thus further increase the welfare of society.

2.7.9. The new research findings

The new research findings about the urgency of conservation of plants and grasses as an economic commodity to all of the farmers equally socialized. This can be done by increasing the frequency of meetings through the communication forum of Soil and Water Conservation Group, in the village, in the local knowledge is called KKTA. With cultivate grass as an alternative crops of watershed land conservation will motivate increasing efforts and spur the growth of farm economy. A crowded village market, turnover in the area more smoothly. Thus it would encourage growth in rural development banking world. In addition, capacity building of human resources should always be done by providing courses and practical training about conservation efforts. Efforts can also be done formally by incorporating the materials into the watershed conservation into formal school curriculum.

3. Conclusion

Based on the results of the analysis conducted, it can be concluded that the five capitals and government incentives are jointly significant effect on farmers' conservation decisions in the prevention of sedimentation in the sub watershed of Keduang, while for grass vegetation, in addition to having conservation advocates also have an economic value for livestock and cattle purposes.

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