



Research Paper

## The Influences of Internal and External Factors on Farmers' Perception and Participation in Bolaang Mongondow Regency

Benny AB Sagay<sup>1</sup>, Zaenal Kusuma<sup>2</sup>, Kliwon Hidayat<sup>2</sup>, Jen Tatu<sup>3</sup>

<sup>1</sup>PhD Student, Faculty of Agriculture, University of Brawijaya

<sup>2</sup>Lecturer, Faculty of Agriculture, University of Brawijaya

<sup>3</sup>Lecturer, Faculty of Agriculture, University of Samratulangi

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**ABSTRACT:-** Public awareness of environmental issues such as declining soil fertility has started to grow, but the awareness hasn't been applied in real actions. The aim of this research is to investigate to relationship between internal factors, external factors to farmer's perceptions and farmer's participation. Internal factor is factor from within an individual which influences the individual in behaving. External factor is a factor from outside of an individual. This study was conducted in Torout irrigation area in Bolaang Mongondow regency, in North Sulawesi Province. The research location was selected because the area is the main irrigation area in Bolaang Mongondow Regency. The research period in this study was more or less 3 months, from January-March 2013. Influences of internal factors and external factors on farmers' perception contributed to the development of the concept of people's perception in irrigation areas in irrigation water management at micro level and community empowerment at macro level in environmental management, the higher the internal and external factors, the higher the farmers' perception. Based on the highest result of Path analysis, it could be seen that the main factor of perception formation was internal factors, followed by external factors.

**Keyword:-** External Factor, Farmer's, Internal Factor, Perception, Participation

### I. BACKGROUND

Water resources is an essential natural resources, important determinant for every living creature, and in certain conditions is a factor which determines the level of prosperity of the people of a nation. In Indonesia at the start of the development, most water resources are specifically allocated for agriculture, i.e. for the development of irrigation, especially to solve the problem of food productivity. However, with increasing population growth and rapid economic growth, water resources allocation for human needs and economic growth are diversified and tends to be scarce.

Therefore, water resources become goods and services which should be valued economically. Irrigation is human effort to flow water from its sources (rivers, dams) through surface channels or pumps to plantation areas for cultivation needs. Irrigation water isn't independent, it's related to other environmental elements such as forests as water providers and stabilizers and people as irrigation water resources users and managers. Human activities in drainage basins, irrigation areas in headwaters and downstream strongly influence the availability, use and management of irrigation water. North Sulawesi is one of the provinces with farm areas for rice/paddy production with farms with technical, semi-technical and traditional/country irrigation.

Community participation in managing irrigation areas is one of the main conditions for the success of the development in the region. There are obstacles in the field in the implementation of participative development process because development planner and implementer (government) doesn't understand the meaning of the concept of participation. According to [1], the definition of participation among development planners and implementers is people's willingness to absolutely support programs designed by the government and the objectives set by the government. Rural development projects from the government is called development projects required by the society, while development projects proposed by the society is considered a wish, therefore the projects don't have government's high priority.

The correct perception on an environment is required because perception is the basis of behavior formation. If the society/farmers should treat their environment well, there should be an inference to create the

correct perception in the society, especially if the current perception is incorrect. Therefore, intensive and continuous coaching, education, trainings and socializations on the techniques and benefits of conservation implementation in agriculture is required for the society, particularly people who live in irrigation area.

Public awareness of environmental issues such as declining soil fertility has started to grow, but the awareness hasn't been applied in real actions. Theoretically, people's behaviors to their environment which don't fit their attitude could be influenced by several factors. Identification of these factors is required because they can be used to improve people's behaviors to their environment. Based on the background above, the aim of this research is to investigate to relationship between internal factors, external factors to farmer's perceptions and farmer's participation.

## **II. THEORETICAL BASIS**

Agriculture is one of the sectors which utilize water and is the biggest water user compared with manufacturing and service industries and household sector. Excessive water use tends to happen in agriculture sector and this is because there are several factors, such as economic factor, physical factor, and social factor. Since there is no price for farmers on water use, farmers tend to use water excessively. Furthermore, buildings which regulate water distribution are often inadequate. Things which shouldn't be used in water allocation is the same "marginal value in use" principle among users.

Water distribution based on time according to [2] is maintaining available water capacity so that it can always meet the demands in a certain time period. In relation with this, maintenance of water source such as forest conservation and dam to store water are required. These efforts are to maintain water availability in the future.

For optimal and fair water use, it should be clear who uses it. Everyone has their own motive, i.e. government must think and guarantee people's right to water as an absolute necessity, while private sector wants efficiency to obtain profit. Therefore, people should be involved in managing irrigation water.

Internal factor is factor from within an individual which influences the individual in behaving. Psychology acknowledges the division of human internal aspects into three categories, i.e.; (1) cognitive aspect which includes knowledge and understanding, (2) affective aspect which includes feelings, interests, motivations, attitudes, and values, (3) psychomotor aspect which includes observation and motoric movements. Each aspect includes a complex scope and is possible to be defined further. The internal aspects show in human behaviors. Division based on internal aspects above can be used as a basis in formulating a categorization systematic on behavior types [3].

External factor is a factor from outside of an individual. External factors consist of social factor, economic factor, cultural factor, and environmental factor.

Perception in the narrow sense of the word means sight, how people see something, while broadly it's view or understanding, meaning how someone sees or interpret something [4]. While [4] gives broader definition on perception which defines it as a process of accepting, selecting, organizing, interpreting, testing, and giving reactions to sensory stimuli or data.

[4] Introduces perception process known as stimulus-response/SR theory where perception is a part of an entire process which produces response after stimulus is applied on human. Other possible psychological sub processes are introduction, feelings, and reasoning. Feelings and logic aren't necessary parts of every stimulus-response situation, although most individual's responses which are conscious and free of a stimulus or a field of stimuli to a certain level are considered to be influenced by mind or emotion or both.

The result of [3] on the perception of people of Malang on the benefits of open green spaces shows that the majority of the people consider open green spaces in residential areas are beneficial. Residential open green spaces are beneficial for people and the environment, such as aesthetics, ecological, economic, social, recreational, and cultural benefits, as well as preservation of biological diversity.

## **III. RESEARCH METHOD**

This study was conducted in Torout irrigation area in Bolaang Mongondow regency, in North Sulawesi Province. The research location was selected because the area is the main irrigation area in Bolaang Mongondow Regency. The research period in this study was more or less 3 months, from January-March 2013.

This study used survey study method, which is a method of collecting primary data using questionnaires as an instrument on scopes, such as people's social environments, activities, opinions and attitudes [5]. This study was also an explanatory research which is a study that tries to explain the relations between variables through hypothesis test [6].

Population or universe is the total analysis units whose characteristics will be predicted [7]. The objects in this study are farmers who lived in and used irrigation in Torout area of Bolaang Mongondow Regency, so the population in this study was all farmers in Torout, Bolaang Mongondow Regency. Torout is one of the villages in West Dumoga Sub-district, Bolaang Mongondow Regency, North Sulawesi Province,

Indonesia. Based on BPS data in 2011, total farmers were more or less 500 households, or in other words 500 farmers. Therefore population size was 500 farmers. The sample in this study was part of the population, which was some farmers in Torout area, Bolaang Mongondow. Sample size was determined using Slovin Formula at 10% precision and the sample size produced was 84 farmers. In this study, the analysis used to test the proposed hypothesis was path analysis.

#### IV. RESEARCH RESULT

##### 1. General Overview of Research Location

In North Sulawesi there is still 120.000 ha land suitable for rice fields and around 350.000 ha dry land suitable for upland rice, secondary crops, and various horticulture plants. Water sources such as lakes, rivers and dams (+ 40.000 ha) can be used for irrigation, aquaculture, drinking water, and power generator. Aside from land and irrigation potentials, this area has mining potential (minerals), such as copper in Gorontalo Regency, cement Lolak (Bolaang Mangondow Regency) and in Ratatotok (Minahasa Regency), kaolinite in Langoan (Minahasa Regency), geothermal or natural gas in Lahandong (Minahasa Regency), and gold in Ratatotok area (Minahasa Regency) and in Modayak (Bolaang Mangondow Regency). Other mining potentials are sulfur, limestone, ironsand and gypsum.

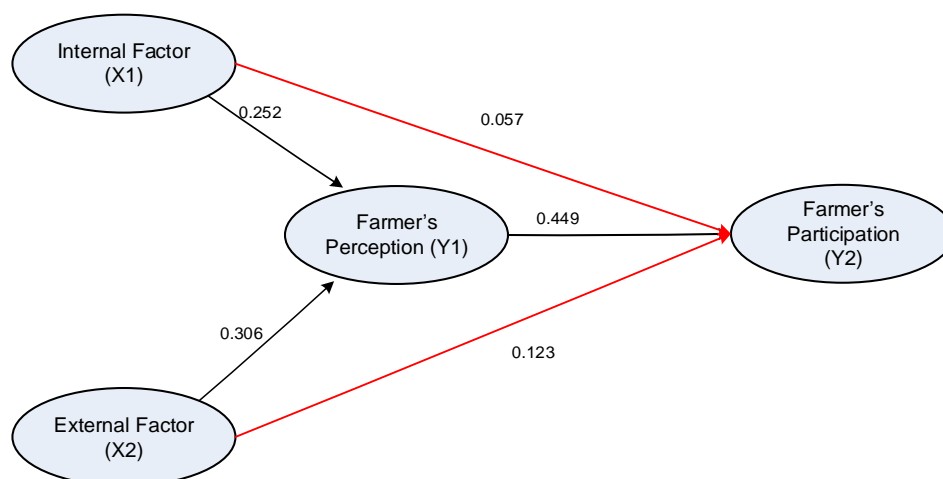
The production of various crops such as paddy, corn and secondary crops increased to a satisfactory result. At the end of Repelita II (1978) paddy production increased from 333.710 tons of milled rice to 472.035 tons at the fourth year (1982) of Repelita III or 10,36% production increase per year, corn production increased by 6,88% per year, sweet potato increase by 19,27% per year, and soy increased by 28,45% per year. In smallholder plantations, the production of plantation crops such as coconut, clove, nutmeg, and coffee also increased. This also happened in fishery.

To support the effort to increase the production of food crop, especially paddy, various types of irrigation have been built, such as technical irrigation, semi-technical irrigation, and non-technical irrigation. Total irrigation area was 124. The biggest irrigation in this area is Dumoga technical Irrigation in Bolaang Mangondow Regency which can irrigate around 14.000 ha of rice fields.

##### 2. Path Analysis Result

The first stage in path analysis is testing goodness of fit model. Total determination coefficient is 62.63%. This indicated that the data diversity which could be explained by the model was 62.63% or in other words 62.63% information in data could be explained by the model. The remaining 37.37% was explained by other variables (not in the model).

Hypothesis test was performed using T-statistics on each direct influence path partially. Graphically, the result of path analysis test is as follows



**Fig. 2: Path Analysis result**

Note: the numbers in the brackets are p-values (sig), and red lines show insignificant relations

The graph above shows that the results of structural model test are as follows:

1. There was significant influence of Internal Factors on Farmers' Perception, as shown in  $P$ -value  $0.017 < \alpha/\text{error rate } (0.05)$ . Positive coefficient (0.252) indicated unidirectional relation, meaning the higher the value of Internal Factors, the higher the value of Farmers' Perception.
2. There was significant influence of External Factors on Farmers' Perception, as shown in  $P$ -value 0.004

- <alpha/error rate (0.05). Positive coefficient (0.306) indicated unidirectional relation, meaning the higher the value of External Factors, the higher the value of Farmers' Perception.
3. There was no significant influence of Internal Factors on Farmers' Participation, as shown in  $P$ -value 0.569 > alpha/ error rate (0.05). Meaning the value of Internal Factors doesn't influence the value of Farmers' Participation.
  4. There was no significant influence of External Factors on Farmers' Participation, as shown in  $P$ -value 0.230 > alpha/error rate (0.05). Meaning the value of External Factors doesn't influence the value of Farmers' Participation.
  5. There was significant influence of Farmers' Perception on Farmers' Participation, as shown in  $P$ -value 0.000 < alpha/error rate (0.05). Positive coefficient (0.449) indicated unidirectional relation, meaning the higher the value of Farmers' Perception, the higher the value of Farmers' Participation.

Internal factor is factor from within an individual which influences the individual in behaving. Psychology acknowledges the division of human internal aspects into three categories, i.e.; (1) cognitive aspect which includes knowledge and understanding, (2) affective aspect which includes feelings, interests, motivations, attitudes, and values, (3) psychomotor aspect which includes observation and motoric movements. Each aspect includes a complex scope and is possible to be defined further. The internal aspects show in human behaviors. Division based on internal aspects above can be used as a basis in formulating a categorization systematic on behavior types [3]. High farmers' internal factors will impact high farmers' perception. One of the main internal factors was attitude factor. Attitude is tendency to act, to react to stimuli (Dayakisni and Hudaniah, 2009). Therefore the manifestations of attitudes can't be seen directly, but have to be interpreted first as closed behaviors. Attitude isn't inherited, but the result of interactions between an individual with his/her environment instead, so attitude is dynamic and experience has major role in forming attitudes. Attitude can be called learning result, therefore attitudes can change.

External factor is a factor from outside of an individual. External factors consist of social factor, economic factor, and cultural factor. High external factors were expected to improve farmers' perception in managing irrigation. In this study, main external factor was economic aspect. This study limited economic aspect by calculating the income of a household by calculating all family income, whether main income or side income. This was similar to the result of [3] where dominant factors influencing external factors are area size and economy.

Farmers' participation in managing water resources should be improved, not only management at farming level, but also distribution and transportation at the upper level. The establishment Integrated P3A Organization based on hydrological overlay (secondary channel) was a strategic step in giving bigger authority in managing irrigation OP. Aside from efforts to adjust institutions at farmer level, the success of irrigation management also depended on management at distribution and allocation levels. Therefore, institutions which should be considered were committees of Irrigation Tk. I and II, Committee of Water Arrangement (PTPA), and Water Source management unit and P3A.

Seeing the description above the involvement of the government and technical institutions elated to provision and management of water sources, especially in productions centers should be improves and should synergize in solving the potential problem of water reserve shortage. Abundant water availability didn't reflect water sufficiency. If world economy grows rapidly, water demand will also increase even exceeding earth's ability to provide water. Water needs in Indonesia for irrigation will compete with continuously increasing industrial needs, residential needs, etc. To face this, the availability of ground water and shallow water sources should be maintained. One of the methods is reforestation all deforested hills and mountains and preserving existing protected forests.

Water availability was predicted to be sufficient until 2020. On the other hand, pressure on water resources in several locations increased along with population growth, economic growth and urbanization. Water quality and quantity decreased due to demographic pressure, climate anomaly (El Nino), and low commitment of the parties in water resources management.

The purpose of developing surface water irrigation is utilizing the potential of surface water sources for irrigation. The role and benefits of land and water cultivation include: (1) controlling the rate of land transfer of function, (2) expanding agricultural areas in the areas of crops, horticulture and farming, (3) using neglected agricultural areas, (4) conserving and rehabilitating agricultural areas and reclamation of agricultural areas, (5) strengthening land rights, (6) developing irrigation water sources, optimizing the utilization of irrigation water, conserving water, and (7) empowering institutions and human resources quality of land and water managers.

## V. CONCLUSION

Influences of internal factors and external factors on farmers' perception contributed to the development of the concept of people's perception in irrigation areas in irrigation water management at micro

level and community empowerment at macro level in environmental management, that the higher the internal and external factors, the higher the farmers' perception. Based on the highest result of Path analysis, it could be seen that the main factor of perception formation was internal factors, followed by external factors. So it could be concluded that internal factors was the main focus in improving farmers' perception in developing irrigation areas.

Farmers' perception was mediating variable (bridging) of influences of internal and external factors in improving public participation. It contributed to the complexity of various factors influencing public participation in managing irrigation water resources and gave recommendations for policy making in irrigation water resources management.

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