

EXTENSION ABOUT THE GROUNDWATER CONSERVATION AND ITS INFLUENCE ON FARMERS KNOWLEDGE AND ATTITUDE IN TAKALAR REGENCY, INDONESIA

IR. DARWIS

Engineering Faculty, Universitas Muhammadiyah Makassar, Indonesia

ABSTRACT

This research was conducted in Takalar (Indonesia), in the area of agriculture since the early 1980s have made use of groundwater as irrigation water for irrigation of crops and paddy fields. The research was conducted to see the effect of the action outreach to increase farmers' knowledge about the existence of groundwater users of groundwater, as well as the improvement of farmers' attitudes towards the urgency of conservation of groundwater. The treatment in this study using extension methods, with the learning material that consists of 5 modules, respectively: (1) Groundwater & Process Formation; (2) Benefits and Utilization of Groundwater; (3) Mechanical recharge Groundwater; (4) Organizations user associations Groundwater (P3AT); and (5) Groundwater Conservation Urgency in Takalar. This research is a Quasi-Experimental Research; with research design is the Non-equivalent Control Group Design. A Result of research as: (a) There are differences in their knowledge of groundwater between before and after treatment (counseling) is given. (b) There is a difference of attitude scale farmers on soil, water between before and after treatment (counseling) is given. (c) Effect of treatment of the dimensions of attitude can be seen in correlation analysis attitude, quality improvement in the treatment group. From the discussion of these results, the authors conclude that; (i) Extension significant effect on the increase in farmers' knowledge about the existence of groundwater users; (ii) Extension significant effect on the increase in scale of farmer attitudes about the urgency of groundwater conservation on their farms; (iii) Extension strong influence on the three domains of knowledge (cognitive, affective, and psychomotor), and the effect of inter-domain knowledge in the domain a strong indication that a sequence (hierarchy skills); (iv) Extension weak to moderate effect on the five dimensions of attitudes (toward the attitude, the intensity of the attitude, the attitude breadth, consistency attitude and spontaneity); (v) In addition to the breadth of the influence attitudes and attitude consistency, also occurs a significant influence on the dimensions of the intensity of attitude towards the emergence of spontaneity.

KEYWORDS: Extension, Conservation, Groundwater, Knowledge & Attitude

INTRODUCTION

Groundwater management requires an integrated management, to be balanced between making groundwater with a particle that occurs in aquifers exploited. The latest data contained in the writings of Margat & Gun (2013), informed that the extraction of groundwater in the world for the year 2010 amounted to 1,000 km³ / year. 67% of water used for irrigation, 10% for industrial water, and the remaining 23% needs clean water (domestic use). Indonesia is the largest order of 9 in decision groundwater by taking the volume in 2010 is as follows: 14.93 km³ / year, 2% for irrigation water, 5% for the water industry, and 93% as fresh water (domestic use).

Groundwater management is an attempt to manage the relationship between the various determinants of the groundwater resources, such as vegetation, recharge areas, catchment patterns, and human resources and their activities, including those that exploit groundwater in an area of the groundwater basin. The whole of human activity is generally intended for the sake of economic benefits, and it is not wise if you do not care about the safety of the environment, to create a sustainable environment. Groundwater existence is very important because it can influence the characteristic and stabilities of soil (*abiotic*), as well as maintaining the environmental balance (*biotic*), a good environment in the soil and the environment above ground level. Water as a fluid surface is always looking for balance, so every action that upsets the balance of groundwater, will soon be responded with the formation of a new balance, will naturally have an impact on the surrounding environment.

The condition of the soil surface layer is semi-permeable, it has a natural recharge rate is low, as well as the agricultural land in Takalar. Farmers in the region are taking groundwater for agricultural purposes. Urgency of soil water conservation has not been understood by the user farmers groundwater in the area, and even symptoms of groundwater degradation that has occurred at this time, as indicated by symptoms deepening groundwater sources, only farmers responded by deepening the exploitation wells every year. Farmers are not felt the need to preserve groundwater resources on their lands. Such attitudes are caused by lack of knowledge of farmers about the dangers of groundwater degradation, as well as knowledge of the techniques of soil water conservation.

Farmers need to be given the knowledge and awareness that if the groundwater is not conserved now, then one day the water will run out, so that future generations cannot be farmed using groundwater as they do now. To increase knowledge of groundwater user farmers in Takalar necessary counseling program, and is expected through increased knowledge gained from the extension, able to improve the attitude of farmers on soil water conservation urgency. Some understanding of counseling quoted (Wastika, 2013), among others; Counseling as an educational process, the success of education is strongly influenced by the learning process experienced and conducted by the target extension (Mardikanto, 1993); Extension is the involvement of a person to knowingly communicate information with the purpose to help others give opinions so they can make the right decisions (Van den Ban, 1999); Counseling is the activity of educating people (educational activities), with the aim of changing the behavior of the client according to the planned or desired that the more modern (Asngari, 2003); Counseling in a general sense is a social science that studies the system and the process of change in individuals and society to change for the better materialize as expected (Setiana, 2005). Based on the direction and purpose of this study, the authors define that the *extension of water user farmers land is the activity of non-formal education for farmers water-using land as collateral for the right to education, which is expected to utilize the water resources of the land, in order to improve and increase the income of farming is carried out farmers and their families, can improve the welfare of his family.*

According to Van Den Ban *et al.* (2003) in Suharto (2005), that extension can help farmers gain knowledge, related specifically to the ways of solving the problems that happened and the consequences thereof, so that they have a variety of alternative actions. Thus, it can be stated that the extension would increase knowledge. Definition of knowledge according to some experts quoted Bakhtiar (2011), among other things: *knowledge is justified true belief* (Edwards, Paul, 1972); Knowledge is the development of pragmatic instrumentalist view, where intelligence is seen as a sensitive and flexible adjustment to the intended *ends in view* (John Dewey, 1976); Knowledge is the ability to form a mental model that describes the object appropriately and representing them in the action

taken against an object (Martin & Oxman, 1988); Knowledge is the result of out and do this after the sensing of the particular object (Notoatmodjo, 2007); Knowledge is a value that accustoms people to always carry it out (unconscious) about what he is doing and independent research (Onny S. Prijono, 2008). From some sense it can be concluded that the knowledge arises when a person uses his reason, to recognize objects or certain events that have never seen or felt before. Like when someone tasting dishes just met, he will gain knowledge about the form, taste, and aroma of the food. With the above conclusions, the authors argue that *knowledge is the ability of a person resulting from the sensing of an object, so as to describe precisely presented in an action performed on the object*. Taxonomy Bloom describes the domain knowledge consists of, the cognitive domain, affective domain, and psychomotor domain. Bloom's theory known their hierarchy *skills* development should be tired from a low level to a high level.

The quality of knowledge, especially in the psychomotor domain will determine the formation of the attitude of a person (Anwar, 2011). Thus, the increase of knowledge that results from following the extension will provide indirect influence on a person's attitude improvement. Understanding attitudes according to some experts (Anwar, 2011), among others: Attitude is the views or feelings accompanied by a tendency to act in accordance attitude last object (Heri Purwanto, 1998); The attitude is a reaction or response of someone who is still closed to a stimulus or object (Notoatmojo, 1997); Attitude is a general evaluation made man against himself, another person, object or *issue* (Anwar *et al.*, 2000). According to the authors, the attitude of each person cannot be separated from feelings, knowledge, thoughts, and conditions that are nearby. Therefore, the authors mean that *attitude is feeling towards the object and/or the surrounding conditions, which are based on its knowledge and thoughts about the object*. Characteristics of attitudes according to Sax (1980) in Azwar (2011), there are five dimensions, namely; directions attitude, the intensity of the attitude, the attitude breadth, consistency attitude and spontaneity or openness of attitude. According to Fritz Heider (1965) in Azwar (2011), that consistency and breadth greatly affect attitudes appear spontaneously in an individual attitude in dealing with an object.

RESEARCH METHODS

This study is a quasi-experimental research (*Quasi-Experimental Research*) in the form of *Non-equivalent Control Group Design*, conducted to determine the level of treatment effect on knowledge and attitudes of farmers. *Quasi-Experimental Research* methods chosen because there is a control group (*control group*), although not completely control the effects of external variables. While the form of *Non-equivalent Control Group Design* chosen for selecting respondents in the treatment group and the control group was not random. Respondents in this study were taken from members of farmer groups as a whole, in which both farmer groups (intervention and control) have a membership of 30 people. The treatment in this study of the action of the extension given to the treatment group using five learning modules, namely;

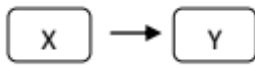
- Groundwater & Process Formation
- Benefits and Utilization of Ground Water
- Mechanical recharge Groundwater
- Organization of Ground Water user associations (P3AT); and

- Urgency Groundwater Conservation in Takalar.

RESEARCH DESIGN

The design of this study consisted of four series, namely:

- Treatment relations with Farmer Knowledge about groundwater; in this case, there is one independent variable and one dependent variable, the variable relationship is described as follows:

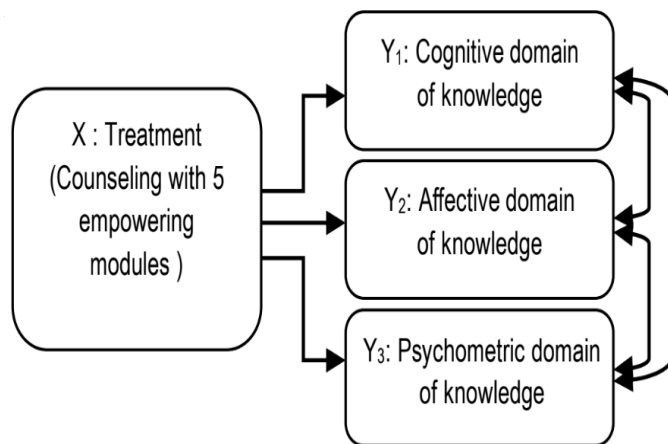


Independent variable; X = Treatment (5-module extension with empowerment)

Dependent variable; Y = Knowledge about groundwater Farmers

Indicators: The ability of farmers in answering the knowledge test.

- Effect of treatment of the three domains of knowledge; a natural this case there is one independent variable and the dependent variable 3, the relationship variables are described as follows:



Independent variable; X = Treatment (5-module extension with empowerment)

Dependent variable;

Y1 = Farmers' knowledge on the cognitive domain

Y2 = Knowledge of farmers in the affective domain

Y3 = Knowledge of farmers in the psychomotor domain

Indicators:

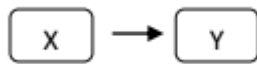
Y1: The ability of farmers in answering test knowledge on the cognitive domain.

Y2: The ability of farmers in answering a knowledge test on the affective domain.

Y3: The ability of farmers in answering a knowledge test on the psychomotor domain.

To measure the knowledge of farmers and knowledge three domains, used instruments Guttman scale graded test with TRUE and FALSE.

- Effect of Treatment of Farmer Attitudes about groundwater, in this case, there is one independent variable and one dependent variable, the variable relationship is described as follows:

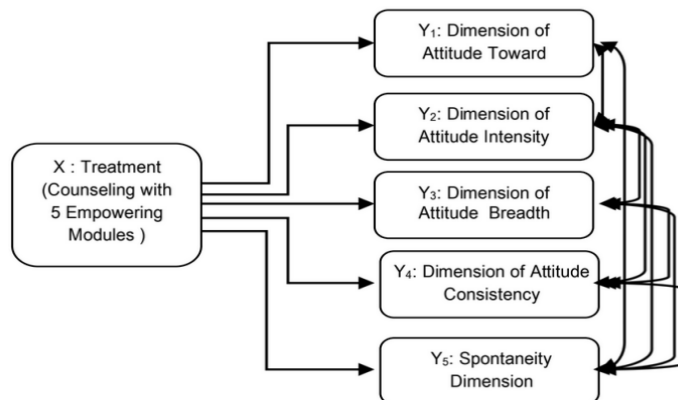


Independent variable; X = Treatment (5-module extension with empowerment)

Dependent variable; Y = Attitude Farmer on groundwater

Indicators: The ability of farmers in answering test attitude.

- Effect of treatment of the five dimensions of attitudes, a natural it is 1 independent variable and 5 dependent variables, the variable relationship is described as follows:



Independent variable; X = Treatment (5-module extension with empowerment)

Dependent variable;

Y1: Attitudes towards the attitude of farmers on the dimensions

Y2: The attitude of farmers on the dimensions of the intensity of attitude

Y3: The attitude of farmers on the breadth dimension of attitude

Y4: The attitude of farmers on the dimensions of the consistency of attitudes

Y5: Attitudes of farmers on the dimensions of spontaneity/openness attitude

Indicators:

Y1: The ability of farmers in answering test attitudes on the dimensions of attitude toward.

Y2: The ability of farmers in answering test attitudes on the dimensions of the intensity of the attitude.

Y3: The ability of farmers in answering test attitudes on the dimensions of the breadth of attitude.

Y4: The ability of farmers in answering test attitudes on the dimensions of the consistency of attitudes.

Y5: The ability of farmers in answering test attitudes on the dimensions of spontaneity/openness attitude.

To measure the attitudes of farmers and fifth dimension of attitude, used the test instrument with a Likert scale graded from very positive to very negative.

RESEARCH FINDINGS

Effect of Treatment of Knowledge

Statistical analysis (t-Test Paired Two Sample) for the treatment group, showed indications as follows:

$$t_{arith} (14.467786) > t_{table} (2.045229611); \text{ and } p = 0.001 < 0.05$$

Meaning: Ho rejected; H1 is accepted \rightarrow There are differences in their knowledge of groundwater between before and after treatment (counseling) is given.

Statistical analysis (t-Test Paired Two Sample) for the control group, showed indications as follows:

$$t_{arith} (1.720227797) < t_{table} (2.045229611); \text{ and } p = 0.625 > 0.05$$

Meaning: Ho rejected; H1 is accepted \rightarrow No differences in their knowledge of groundwater between before and after treatment (counseling) is given.

Effect of Treatment of 3 Domain Knowledge

Effect of treatment of domain knowledge can be seen in the analysis of correlation increased knowledge in the treatment group, the three domains of knowledge (cognitive, affective, and psychomotor).

Statistical analysis (*Product Moment Correlation*), an indication as follows:

- The correlation coefficient of cognitive domain: $r = 0.8732 > 0.76$ (very strong).
- The correlation coefficient of affective domain: $r = 0.8374 > 0.76$ (very strong).
- The correlation coefficient of psychomotor domain: $0.51 < r = 0.7573 < 0.76$ (strong).

Effect of cross-domain knowledge analyzed by double correlation (*Multiple Correlation*), the results are as follows:

- Correlation of Cognitive with Affective domain; $r = 0.31958$ (medium)
- Correlation of Cognitive with Psychomotor domain; $r = 0.24818$ (weak)
- Correlation of Affective with Psychomotor domain; $r = 0.40707$ (medium)

The Influence of Behaviors Attitudes

Statistical analysis (t-Test Paired Two Sample) for the treatment group, showed indications as follows:

$$t_{arith} (90.52394526) > t_{table} (2.045229611); \text{ and } p = 0.000 < 0.05$$

Meaning: Ho rejected; H1 is accepted \rightarrow there is a difference of attitude scale farmers on soil water between

before and after treatment (counseling) is given.

Statistical analysis (t-Test Paired Two Sample) for the control group, showed indications as follows:

$t_{arith} (1.094690416) < t_{table} (2.045229611)$; and $p = 0.283 > 0.05$

Meaning: H_0 rejected; H_1 is accepted \rightarrow No difference in attitude scale farmers on soil water between before and after treatment (counseling) is given.

Effect of Treatment of 5 Dimensions Attitude

Effect of treatment of the dimensions of attitude can be seen in correlation analysis attitude, quality improvement in the treatment group, the five dimensions of attitudes (toward the attitude, the intensity of the attitude, the attitude breadth, consistency attitude and spontaneity or openness of attitude).

Statistical analysis (*Product Moment Correlation*), an indication as follows:

- The correlation coefficient of the attitude towards dimension. ; $r = 0.11888 < 0.25$ (very weak)
- The correlation coefficient of the attitude, intensity dimension weak). $r = 0.11982 < 0.25$ (very weak)
- The correlation coefficient of the attitude breadth dimension; $r = 0.21005 < 0.25$ (very weak)
- The correlation coefficient of the attitude consistent dimension; $r = 0.13774 < 0.25$ (very weak)
- The correlation coefficient of the spontaneity dimension; $r = 0.07163 < 0.25$ (very weak)

Effect of inter-dimensional attitude with multiple correlation analysis (*Multiple Correlation*), the results of correlation coefficient are as follows:

- Correlation of toward with Intensity of attitude; $r = 0.43672$ (medium)
- Correlation of toward with Breadth of attitude; $r = 0.27657$ (medium)
- Correlation of toward with Consistency of attitude; $r = 0.33984$ (medium)
- Correlation of toward attitude with Spontaneity; $r = 0.00086$ (very weak)
- Correlation of Intensity with Breadth of attitude; $r = 0.31364$ (medium)
- Correlation of Intensity with Consistency of attitude; $r = 0.22497$ (weak)
- Correlation of Intensity attitude with Spontaneity; $r = 0.41373$ (medium)
- Correlation of Breadth with Consistency attitude; $r = 0.44032$ (medium)
- Correlation of Breadth attitude with Spontaneity; $r = 0.43299$ (medium)
- Correlation of Consistency attitude with Spontaneity; $r = 0.45067$ (medium)

DISCUSSIONS

The results showed clearly that the effect of outreach to increase farmers' knowledge is very strong, thus giving an indication of the importance of action to farmer extension groundwater users. The response of farmers fairly

well against the implementation of the extension, to provide systematic knowledge about the threats that may arise, when the use of groundwater is not accompanied by efforts to the maintenance and protection of groundwater resources. The results of this study are consistent with the opinion of Van Den Ban *et al.* (2003) in Suharto (2005), that extension can help farmers acquire knowledge related specifically to the ways of solving the problems encountered and the consequences thereof, so that they have a variety of alternative actions.

Similarly, the effect of the extension of the three domains of knowledge indicated strong (strong) to very strong (very strong). While the influence of inter-domain knowledge, seen a better relationship in the relationship between the influence domain sequence. This is in line with the theory of hierarchical taxonomy Bloom domain knowledge in the development of knowledge on the condition a person while receiving knowledge. In reflecting aspects of the causes of the high correlation between the treatment given in the form of counseling to increase knowledge in all three domains of knowledge, according to the authors is caused by three factors, namely:

- Farmers who became the target of extension in this study is that the real farmers use groundwater in their daily activities run farms that rely on groundwater supplies (*real target*).
- Extension modules relevant to the conditions faced by farmers, and served as a popular easily digested and understood by farmers (*right module*).
- Indicated that farmers are beginning to realize the condition of groundwater on their land further away from the surface, it becomes the initial stage concerns farmers will be the continuous utilization of groundwater (*anxious attitude*).

Influence of illumination the changes in attitudes was significant, but the results of other analyzes showed that the level of education influences the dimensions lax attitude. While the influence of inter-dimensional attitude, also seen their better relations on the relationship between dimensional effect sequential manner. What's interesting about this research that in addition to the breadth dimension of attitude and consistency of attitudes that influence the attitude of spontaneity or openness as stated by Fritz Heider (1965), was the influence of the intensity or strength of the attitude of spontaneity also quite significant. In examining the causes of low-quality aspects influence directly from an extension of the dimensions of attitudes of farmers in soil water conservation independently, according to the authors is caused by three factors, namely:

- The strong assumptions farmers that the presence of groundwater will always be available naturally. This view of the writer mentioned the view primitive (*primitive view*).
- The still high customs farmers who only want to utilize these resources to get added value, without the need to think and calculate losses when natural resources are degraded or damaged. The habit of this kind of writer would call a culture of selfishness by road me ne discharge (*bypass culture*).
- The reluctance of farmers then makes a charge for conserving groundwater is considered expensive by using farmer groundwater. This kind of attitude I mentioned stingy attitude toward oneself (*stingy attitude*).

CONCLUSIONS

From the discussion above results, the authors' give some conclusions among other things:

- Extension significant effect on the increase in farmers' knowledge about the existence of groundwater using groundwater.
- Extension significant effect on the increase in the scale of farmer attitudes about the urgency of soil water conservation on their farms.
- Extension strong influence on the three domains of knowledge (cognitive, affective, and psychomotor), and the effect of inter-domain knowledge in the domain a strong indication that a sequence (*skills hierarchy*).
- Extension weak to moderate effect on the five dimensions of attitudes (toward the attitude, the intensity of the attitude, the attitude breadth, consistency attitude, and spontaneity).
- Besides the influence attitudes breadth and consistency of attitude, also occurs a significant influence on the dimensions of the intensity of attitude towards the emergence of spontaneity.

SUGGESTIONS

From the discussion and the conclusion, the authors suggest several things, among others:

- Extension modules used in this study, should be developed and then applied to a group of other farmers, which also uses ground water as irrigation water.
- Takalar Government, need to implement a conservation outreach program of groundwater for all farmers who use groundwater as irrigation water in the region.
- Research on the influence of illumination to improve the knowledge and attitudes of groundwater user farmers need to be developed in the future, so that the resulting extension modules are most effective for raising awareness and active participation of farmers to conserve groundwater resources.

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