International Journal of Civil Engineering (IJCE)
ISSN(P): 2278-9987; ISSN(E): 2278-9995
Vol. 3, Issue 4, July 2014, 1-10

International Academy of Science, Engineering and Technology
Connecting Researchers; Nurturing Innovations

THE ROLE OF GOVERNMENT AND STAKEHOLDERS TOWARDS FLOOD CONTROL PERFORMANCE IMPROVEMENT

MUHAMMAD IDRUS OMPO[1], MUH. SALEH PALLU[2], LAWALENNA SAMANG[3], & DAN FAROUK MARICAR[4]

[1]Doctoral Student, Department of Civil Engineering, Hasanuddin University, Makassar South, Sulawesi Selatan, Indonesia

[2,3,4]Lecturer, Department of Civil Engineering, Hasanuddin University, Makassar South, Sulawesi Selatan, Indonesia

ABSTRACT

The rapid development of the city can indirectly affect land use changes that affect the utilization of space irregularity which in turn can cause problems to the decline in the quality of infrastructure services, particularly flood control infrastructure. This research is a descriptive study conducted to determine the relationship of government and the role of stakeholders as latent variables on the performance of flood control in Makassar. Therefore, in analyzing the causes of flooding as the source of the flood control performance test rank the variables that determine the variables that are associated with the activities and attitudes of men. By reviewing and analyzing the role of government and stakeholders on the performance of flood control through SEM modeling the relationship between variables can be understood. The results of this study will illustrate the extent of the role of government and stakeholders affect the performance of flood control. Therefore, this research is expected to produce a picture of how the role of government and stakeholders as an input in the policy making process, especially in urban flood management in non-structural.

KEYWORDS: Government's Role, Performance, Control Floods

INTRODUCTION

Urban population growth in an increasingly dense city of Makassar is not accompanied by an effective provision of urban infrastructure including urban drainage can cause flooding and inundation problems. One cause flooding which became a public issue today is the change in land use that is often not in the manner intended. Residential density as the cause of the closing of the land, erosion and sedimentation that occurs in many urban areas. Handling the drainage system in the city of Makassar has not been addressed in an integrated manner by all parties. In a few places to start planning the construction of drainage did not show lack of coordination and involvement of the public and stakeholders. Behavioral and cultural attitudes that often throw garbage in the channel is a problem of the problem in urban flood management. Flood control functions built physically (structure) is a government effort to overcome or minimize the risk of losses due to flood society. However, the government should play a role in providing a space for people to participate in order to flood prevention.

BASIC THEORY

Understanding the Causes of Flooding

According Suripin (2004) [2], flooding is the amount of water flow that exceeds the capacity of a particular discharge, or overflow of water flow in the riverbed or channel so that the water overflows from the left and right

embankment of the river or canal.One of the most dominant cause of the flooding this time is due to changes in land use so that structural development is no longer effective without control is non-structural (Kodoatie, 2005) [4] is a non-structural flood control this is to minimize efforts flood risk through integrated policy. The method is non- structural flood control methods that optimize the function of flood control to flood control. The success of the method to non-structural flood control contributes significantly greater than with the method of the structure. Moreover, the costs incurred for non- structural method is much cheaper than the cost incurred for the structure of the method, because the method is more of a non- structural preventive actions before the occurrence of floods. If the initial cause of the flooding can be minimized, then the cost of construction and repairs will be much cheaper (Robert J. Kodoatie, 2010) [1]. Description of how to determine the role of government and stakeholders towards flood control performance can be analyzed by SEM method for path analysis as in Figure 1 below:

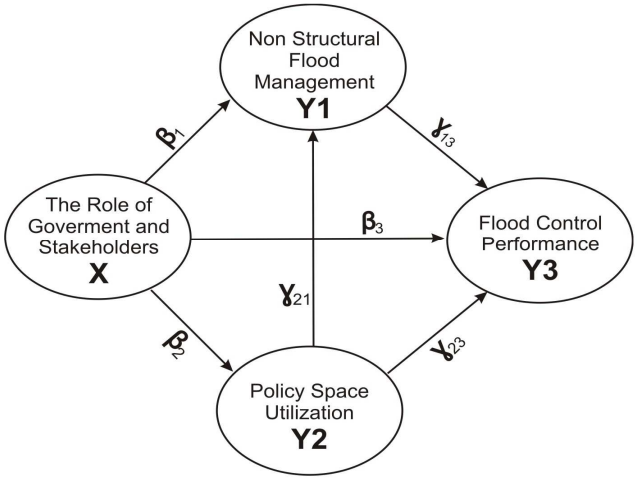

Figure 1: Structural Modeling Framework Flood Control Performance

Grouping variable is done in two parts, ie variables that explain (exogenous) also known as exogenous variables and the variables described (endogenous) or sometimes referred to as endogenous variables. The role of exogenous variables, namely government and Stakeholders (X). Flood control performance (Y3) as the dependent endogenous variable while the other endogenous variables such as non-structural flood management (Y1) and spatial planning policy (Y2) as intervening endogenous variables. To see the influence of the functional relationship of each independent variable on the dependent variable, then developed the following functions simultaneously:

$$Y1 = \alpha 1 + \beta 1\ X + \gamma 21 Y2 + \mu 1 \quad (1)$$

$$Y2. = \alpha 2 + \beta 2\ X + \mu 2 \quad (2)$$

$$Y3 = \alpha 3 + \beta 3\ X + \gamma 13\ Y1 + \gamma 23\ Y2 + \mu 3 \quad (3)$$

Dimana

X = exogenous variables that describe the role of the Government and Stakeholders

Y1 = endogenous variables intervening in non-structural flood management

Y2 = dependent endogenous variable intervening space utilization policy

Y3 = Performance dependent variable flood control Performance dependent variable flood control

$\mu 1,2,3$ = Structural relationship value estimation error

$\alpha 1,2,3$ = Constants estimated structural relationship

$\beta_{1,2,3}$ = The coefficient of exogeneous variables influence the endogenous variables

$\gamma_{1,2}$ = Endogeneous variable effect coefficient intervening against endogenous variable dependent

Results simplification reduced form of the structural model revealed;

$$Y1 = \alpha 1 + \beta 1\ X + \gamma 21 Y2 + \mu 1 \quad (4)$$

$$Y2. = \alpha 2 + \beta 2\ X + \mu 2 \quad (5)$$

$$Y3 = \alpha 3 + \beta 3\ X + \gamma 13\ Y1 + \gamma 23\ Y2 + \mu 3 \quad (6)$$

$$Y3 = (\alpha 3 + \alpha 1\gamma 13 + \alpha 2\gamma 23) + (\beta 3 + \gamma 13\ \beta 1 + \beta 2\gamma 23)\ X$$

$$+ (\gamma 13\gamma 21)\ Y2 + (\gamma 13\ \gamma 21)\ Y2 + (\gamma 13\mu 1 + \gamma 23\mu 2 + \mu 3)$$

METHODOLOGY

Based on the characteristics of the problem under study, this research is a descriptive study or often called eksplainatory analysis study. Descriptive research is research on issues such as the current facts of a population that includes assessment of attitudes, or opinions of the individuals, organizations, state or procedure (Etta Mamang Sangaji et al, 2010) [3]. Descriptive study is expected discover facts through the proper interpretation and can be useful as a reference for problem-solving. According to Cooper, HM (2007) [10], desriptif research is research conducted to determine the value of either one independent variable or more variables without creating or connecting with other variables. In addition this study can also be named as empirical research if viewed in terms of the nature and purpose. Empirical research is the study of empirical facts obtained by observation or experience. The main empirical research more emphasis on behavioral aspects of the investigation of opinions (Etta dizzy Sangaji et.all, 2010) [3]. Object studied in empirical research is more focused on the actual events of the person 's perception of events eg case studies. The analysis is expected to test hypotheses and conduct hiptesa - depth interpretation of the functional relationship variables. According to Kerlinger (2006) [8], hypothesis is the prediction of phenomena or alleged statement about the relationship between two variables or lebih.FMAndrews et al, (2001) [6] defines a hypothesis is a tentative answer to the problems of research to proven by the data collected. Opinions JW Buckley et al (2006) [7] defines that the hypothesis is a simple form of statement about the relationship between the researcher hope of variables in the problem to be tested in the study. The main data collection or a primary data sample of the population conducted by questionnaire. The analysis technique used is Structural Equation Method (SEM) which is one of the multivariate analysis to analyze the relationship between these variables kompleks. Analisis generally used for studies that use a lot of variables.

The Location and Type of Study

Were taken at random locations, and the location in the city of Makassar in order to obtain input in analyzing the performance of various flood control locus research area in East Makassar which is a flood-prone spots. This research is a survey, while the analytical method is an explanatory study. Survey methods explanatory study is a research method that takes from a population and use the questionnaire as a data collection tool.

Population

According Sedarmayanti and Syarifuddin Hidayat (2002) [9]. The population is the entire set of characteristics of the object under study. The population in this study as tabel 1 below:

Table 1: Sample Population Research Unit

Research Unit	Sample (Respondents)
Official of water resources Development in South Sulawesi province	30
Office Basin Jeneberang South Sulawesi Province	30
Official of Spatial planning and Building Makassar City	20
Official planning and regional development Makassar city	20
Makassar City sanitation Departemen	30
Official of Public Works Makassar City	30
Indonesian Assosciation of Hydraulic Engineers South Sulawesi branch	15
International Commision Irrigation and Drainage (ICID) South Sulawesi	15
Representing the community	40
TOTAL	**230**

Total samples taken are intended to further research untu looking for any correlation of latent variables in the SEM method in which the amount of the minimum data requirement is 5-10 times the number of manifest variables (Hair, 1998) [5] while the total manifest variables in this model as much as 16 variables manifest, so that by 230 the data has been qualified. the number of respondents in the research unit

Research Variables

The research variables are abstract concepts that can be measured (observed variables), but there is also an abstract concept that can not be measured directly (unobserved variables). The role of government and stakeholders (X), non-structural flood management (Y1), space utilization policy (Y2), and flood control performance (Y3) is an abstract concept that can not be measured but through the research instrument. Researchers must observe the latent variable relations with the manifest variables. To analyze the relationship between variables can be dilhat as table 2 below.

Table 2: Theoretical Model Structure Construction Research Variables and Measurement Scales

No	Dimension of the Study Variable			Scale of Measurement
	Type	Variable	Indicator	
1	Exogenous	The role government and stakeholders (X)	1.Preparation of fund (X.1) 2 Commitment to the role (X.2) 3.Causus of flooding (X.3) 4.Technical planning (X.4) 5.Maintenance of flood control (X.5)	Likert, 5 opsi
2	Endogenous intervening	Non structural flood management (Y1)	1.Coordinated planning (Y1.1) 2.Watershed management (Y1.2) 3.Land use (Y1.3) 4.Law enforcement (Y1.4) 5.erosion control (Y1.5)	Likert, 5 opsi
3.	Endogenous intervening	Policy space utilization (Y2)	1.Spatial planning control (Y2.1) 2 Stakeout of spatial planning (Y2.2) 3.Consistency of spatial palanning (Y2.3)	Likert, 5 opsi
4	Endogenous independent	Maximum flood control function (Y3)	1.Sedimentationi (Y3.1) 2.Routin maintanance (Y3.2) 3.Demage to the drainage network (Y3.3)	Likert, 5 opsi

To further analyze the relationship between latent variables and manifest variables or variable constructs can be developed operational framework modeling Structural Equation Model (SEM) that can have the ability to involve latent variables (variables that are not observed directly) into the analysis. A latent variable is a variable that is hypothesized and is a concept that can not be observed directly, but through the indicator variables that can be observed or measured. The measured variables obtained from respondents through various techniques of data collection (surveys, tests, observations, interviews) and is referred to as manifest variables (manifest variables). SEMs produce measurement model that governs the relationship between the manifest variables with the variable measuring laten. Model memvasilitasi researchers to use a variable or more for a single concept of dependent or independent, and then estimate (specify) reliability. SEM illustrates the latent variables in the form of ellipses and manifest variables in the form of a square box, as figure 2 below:

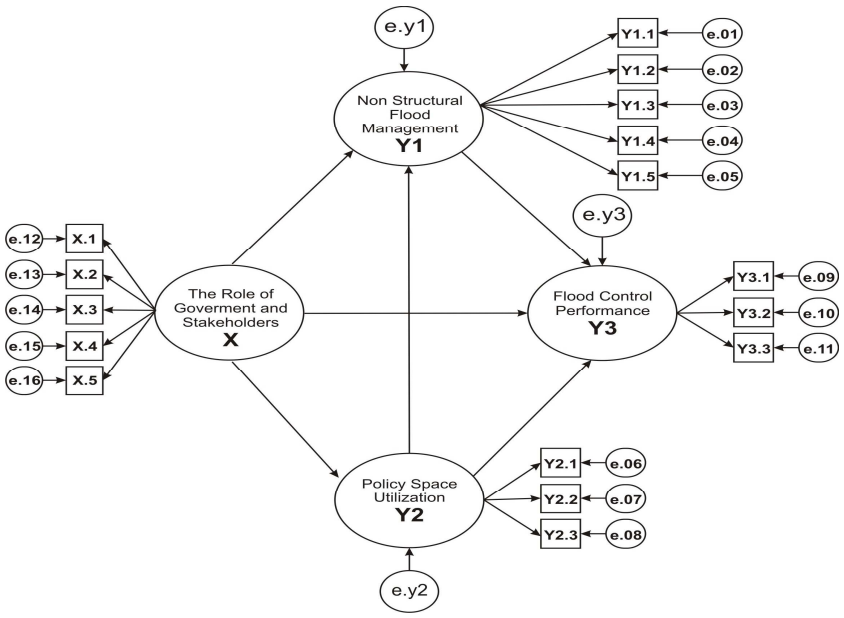

Figure 2: Kerangka Operasional Pemodelan SEM Penelitian Variabel Laten X, Y1, Y2, Dan Y3

Characteristics Latent Variable Role of Government and Stakeholders (X)

Characteristics of Exegenous Latent Variable the Role of Government and Stakeholders (X)

Observations on the value of the latent variable scores the role of government and stakeholders (X) is indicated by the manifest variable preparation funds (X1), commitment to the rule (X2), the cause of flooding (X3), technical planning (X4), maintenance of flood control (X5) as the table 3 below:

Table 3: Characteristics of Exegenous Latent Variable the Role of Government and Stakeholders (X) and Indicator Variables (X1 -- X5)

Indicator Variable Role of Government and Stakeholders	Distribution of Respondents (%)				
	Strongly Disagree	Disagree	Between Agree and Disagree	Agree	Stronly Agree
Preparation of funds (X.1)	1,70	3,00	9,60	76,95	8,75
Commitment to the role (X.2)	1,30	3,00	11,30	74,80	9,60
Causus of flooding (X.3)	1,70	2,62	13,49	72,19	10,00
Technical planning (X.4)	0,70	3,47	9,56	73,90	12,37
Maintenance of flood control (X.5)	1,30	3,47	10,86	74,77	9,60
The role of government and stakeholders (X)	1,30	3,04	10,86	74,34	10,46

Sources of Data: Primary data processing.

Overall indicator of the role of governments and all stakeholders agree and got a response the answer strongly agree that high average above 80% but the most dominant was 86.27% for engineering planning and preparation of fund of 85.70%. thus expected that the role of government in planning and preparation techniques can be implemented with funds as effectively as possible. Distribution of respondents can be seen in Figure 3 below:

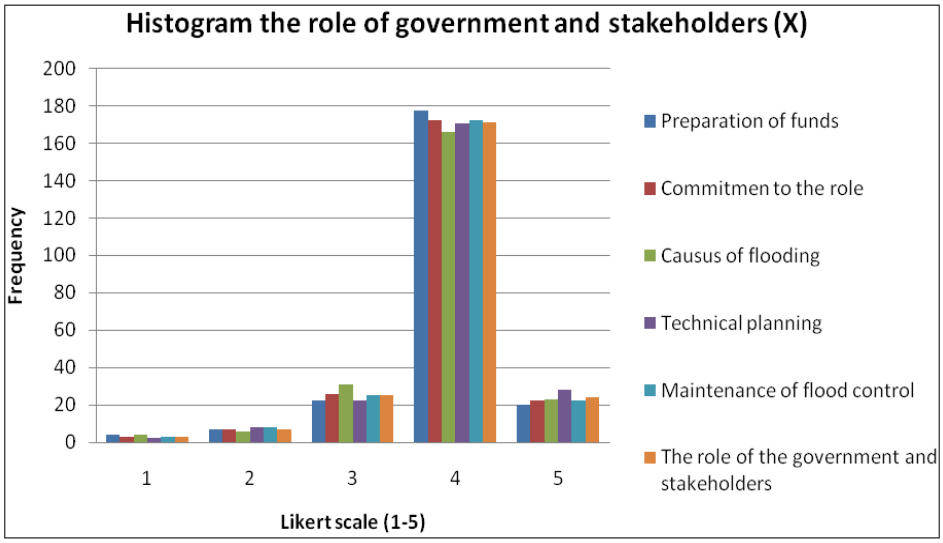

Figure 3: Distribution of Frequency Laten Variable the Role of Goverment and Stakeholder (X)

Characteristics of Latent Variables are Non-Structural Flood Management (Y1)

Value of the observation scores on latent variables are non-structural flood management (Y1) is indicated by the coordinated planning of manifest variables (Y11), watershed management (Y12), land use (Y13), law enforcement (Y14), erosion control (Y15). As table 4 below

Table 4: Characteristics of Exegenous Latent Variable the Non Structural Flood Management (Y1) and Indicator Variables (Y1.1 – Y1.5)

Indicator Variable Non Structural Flood Management	Distribution of Respondents (%)				
	Strongly Disagree	Disagree	Between Agree and Disagree	Agree	Stronly Agree
Coordinate planning (Y1.1)	0,87	3,04	11,30	76,52	8,27
Watershed management (Y1.2)	0,87	3,04	10,86	77,82	7,41
Land use (Y1.3)	0,87	3,04	10,43	81,70	3,96
Law enforcement (Y1.4)	0,87	2,60	10,43	78,69	7,41
Erosion control (Y1.5)	0,43	3,47	11,73	77,82	6,55
The non structural flood management (Y1)	0,87	3,04	10,86	78,26	6,97

Sources of Data: Primary Data Processing

Overall all indicators Management of non-structural flood response received answers agree and strongly agree that high average above 80% but the most dominant is the law enforcement 86.10% 85.66% land use, watershed management 85.23%, this illustrates that the third indicator is a variable that affects the non-structural flood control. Distribution of respondents can be seen in the figure 4 below

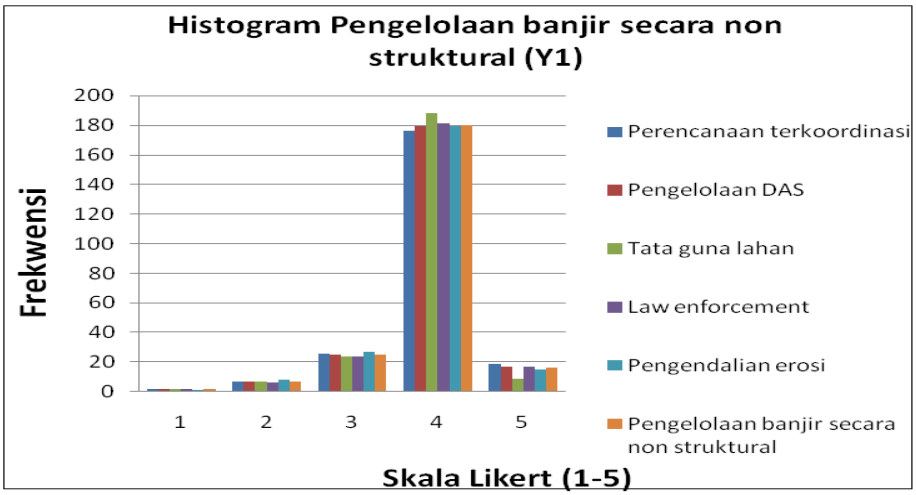

Figure 4: Distribution of Frequency Laten Variable Management of Non Structural Flood

Characteristics of exegenous latent variable of policy space utilization (Y2) and indicator variables spatial planning control (Y2.1), Stakeout of spatial planning (Y2.2) and consistency of spatial planning (Y2.3) as table 5 below

Table 5: Characteristics of Exegenous Latent Variable of Policy Space Utilization and Indicator Variables (Y2.1 – Y2.3)

Indicator Policy Space Utilization	Distribution of Respondents (%)				
	Strongly Disagree	Disagree	Between Agree and Disagree	Agree	Stronly Agree
Spatial planning control (Y2.1)	0,87	3,47	9,14	76,52	10,00
Stakeout of spatial planning (Y2.2)	1,30	2,60	7,39	73,04	15,67
Consistency of spatial planning (Y2.3)	0,87	3,47	6,95	77,39	11,32
Policy space utilization (Y2)	0,87	3,04	7,82	75,65	12,61

Sources of Data: Primary Data Processing

All indicators of overall space utilization policy responses received answers agree and strongly agree that average above 85% but the most dominant is the supervision of spatial impleementasi by 88.71% and also the spatial consistency of 88.71%. This illustrates the that both indicators are very influential on policy space utilization. Distribution of respondents can be seen in Figure 5 below:

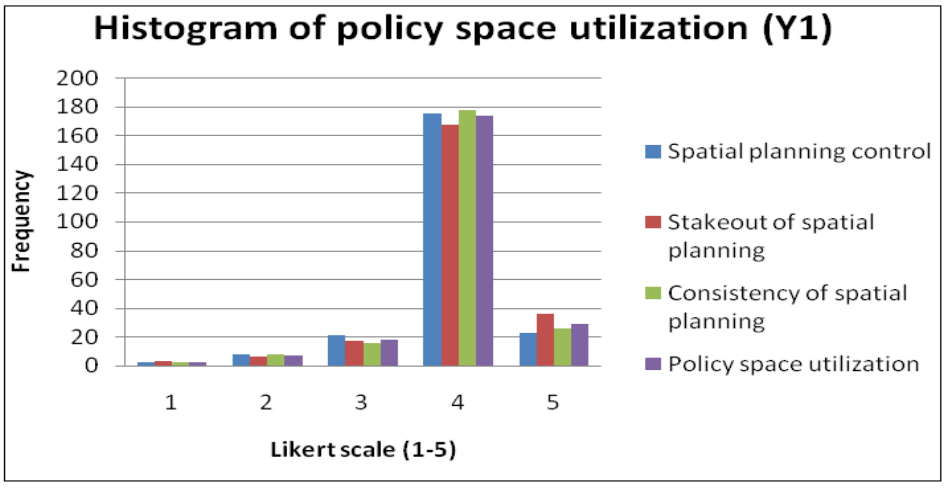

Figure 5: Distribution of the Frequency Response Latent Variable Space Utilization Policy (Y2) and Indicators (Y21 - Y23)

Characteristics of endogenous latent variable flood control performance (Y3) Score of observations on the performance of latent variable flood control (Y3) is indicated by the manifest variable sedimentation (Y31), routine maintenance (Y31), damage to drainage network (Y33) as Table 6 below:

Table 6: Characteristics of Endogenous Latent Variable Flood Control Performance (Y3) and Indicator Variables (Y31 s / d Y33)

Indicator Flood Control Performance	Distribution of Respondents (%)				
	Strongly Disagree	Disagree	Between Agree and Disagree	Agree	Stronly Agree
Sedimentation (Y3.1)	0,87	3,04	6,08	73,47	16,54
Routin maintanance(Y3.2)	0,87	3,04	4,78	75,65	15,66
Demage to the drainage network (Y3.3)	0,43	2,60	5,65	74,34	17,11
Flood control performance (Y3)	0,87	3,04	5,65	74,34	16,10

Sources of Data: Primary Data Processing

Overall all performance indicators flood control response received answers agree and strongly agree that high average above 90% but the most dominant drainage network is 91.45% Damage This condition illustrates that all three of these indicators when viewed response or answer that all respondents almost the same but is the dominant tissue damage amounted to 91.45% this illustrates that the tissue damage is very big influence on the magnitude of the control performance latticework. Distribution of respondents can be seen in Figure

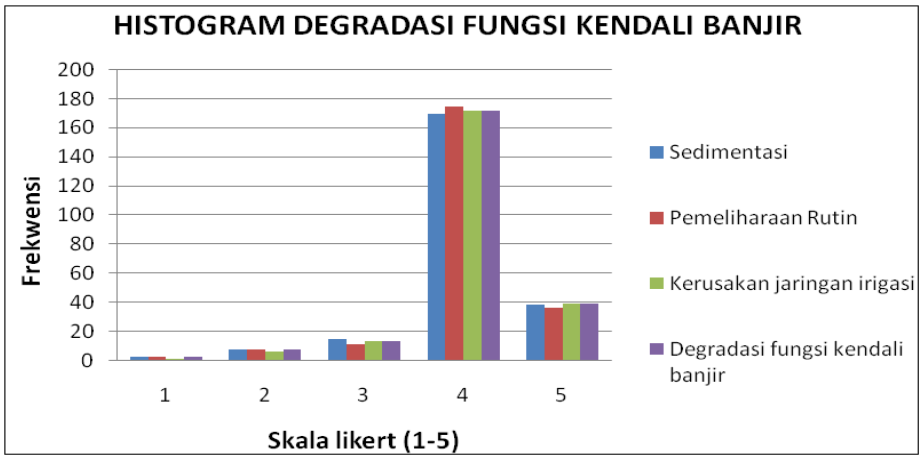

Figure 6: Distribusi Frekwensi Jawaban Variabel Laten Kinerja Kedali Banjir (Y3) Dan Indikator (Y3.1 s/d Y3.3)

CONCLUSIONS

Based on the results above, we conclude terbut some of the following

- From the results of this study indicate that the manifest variables are an important influence on the latent variables are highly relevant to field conditions that occur at this time of the flood control performance.
- From the research results can be used as input in the formulation of policies relating to the performance of flood control in the context of non-structural flood control.
- Through the description of the results of research that shows there is a very close relationship between the variables manifest its association with latent variables that have the answers of the respondents agreed and strongly agreed that a very high average of 80%.

- Likely, when the results of the study followed by SEM method correlation between latent variables numbers have high enough influence.

REFERENCES

1. Kodoatie, Rober J, Syarief Roestam (2010), *Tata Ruang Air*, Andi Offset, Yogyakarta 55281.
2. Suripin (2004), *Sistem Drainase Perkotaan yang berkelanjutan*, Andi Offset Yogyakarta 55281
3. Etta mamang, Sopiah (2010), *Metodologi Penelitian*, Andi Offset, Yogyakarta 55281
4. Kodoatie, Roestam, *Pengelolaan Sumber Daya Air Terpadu*, Andi Offset Yogyakarta 55281.
5. Hair, J. F (1998) *Multivariate Data Analysis*, Englewood Cliffs, NJ; Prentice-Hall Intl
6. Andrews, FM., L.Klem, T. N. Davidson, P. M. O' Malley, dan W. L. Rodgers, 2001, *A Guide for Selecting Statistical Analyzing Social Science Data 2nd Edition, The Institute for Social Research*. The University of Michigan, USA
7. Buckley, J. W. M. H., dan H.Chiang, 2006, *Research Methodology & Business Decision, National Assoiation of Accountant and the Society of Management Accountants of Canada*.Sage Publication, Inc., California, USA
8. Kerlinger, F. N, 2006, *Fondation of behavioral Research*, Third Ed. New York: CBS Publishing Japan, Ltd
9. Sedarmayanti dan Syarifuddin Hidayat (2002), *Metodologi penelitian*, Penerbit Mandar Maju Bandung.
10. Cooper, H. M., 2007 *Integrating Research A Guide for Literature Review*, 2nd Edition, Sage Publication, Inc, California USA.