CHAPTER III
METHODOLOGY

3.1. Conceptual Approach

In the reality, flood control is something complicated, because it involves many science disciplines. For instance, there are hydrology, hydraulic, morphology and sedimentation of river, system of drainage, social, economic, politic etc. Success of flood control is determined by many aspects, such as public participation. Therefore, strategies are needed to overcome flood and the impacts which might be produce. There are two methods that can be used to overcome these problems, non structural and structural method. Non structural method is a method to mitigate disaster without construct technical building to control flood. Flood control without constructing building will give significant advantages. In other ways, non structural method gives more contribution, because it is more effective and cheaper than structural method. This study will more focus on non structural method. This final assignment is based on non structural measures to manage the disaster, especially flood impacts. This non structural measure is including:

- Watershed management
- Law-enforcement.
- Environment conservation.
- Land use regulation.
- Flood warning system, etc

All measures above are being part of disaster management system. Therefore, this final assignment is expected give an appropriate measures to overcome flood problems which occur in north Semarang city. The measures are obtained from analyzing primer data and secondary data. The management disaster is applied for the measures that had obtained. The analysis is using three strategies, there are (Grigg, 1996):

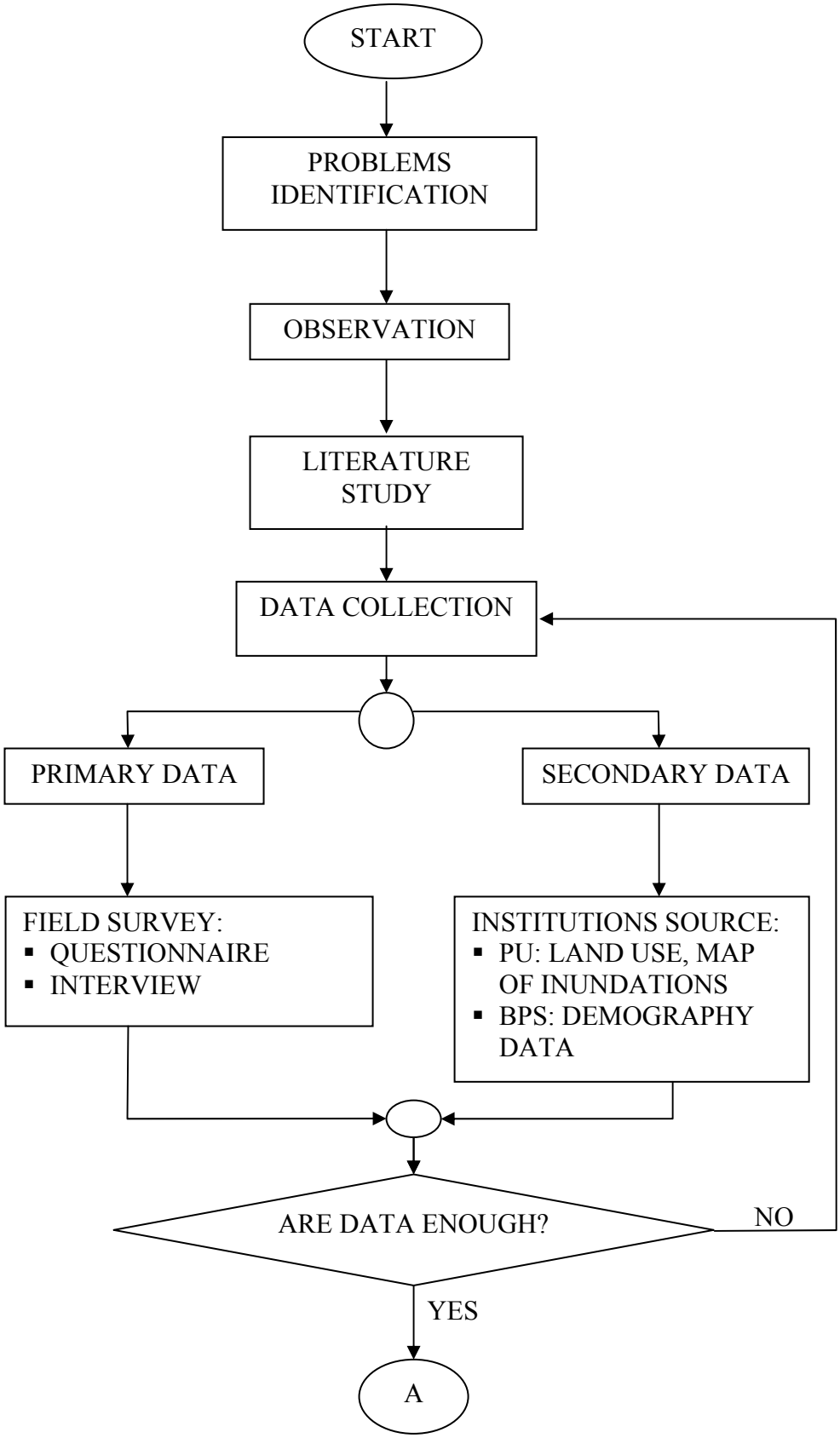
a. Modify susceptibility to flood damage and disruption.
b. Modify the impact of flooding on individual and the community.

c. Restore and preserve the natural and cultural resources of floodplain.

From those strategies, assessment was done to identify the implementation of non structural method in north Semarang city. The detailed of conceptual approach shows on figure 3.1 and figure 3.2.

3.2. Analytical Frame Work

In this final assignment is begun from the identification problems, then observation to the field to find the real problems. Literature study is used for finds the reference of suitable solutions to overcome the problems. Afterward, data are collected as input which will be analyzed for getting the output. The output of this study is value which illustrated the percentage of implementation on north Semarang city. Afterward, measures will be obtained by correlated the value with the reference which represented non structural method. Therefore, those measures were illustrating the disaster management which expected will overcome the flood problems in north Semarang city. The flow chart is given as follows:


START
PROBLEMS IDENTIFICATION
OBSERVATION
LITERATURE STUDY
DATA COLLECTION
PRIMARY DATA
SECONDARY DATA
FIELD SURVEY:
QUESTIONNAIRE
INTERVIEW
INSTITUTIONS SOURCE:
PU: LAND USE, MAP OF INUNDATIONS
BPS: DEMOGRAPHY DATA
ARE DATA ENOUGH?
NO
YES
A

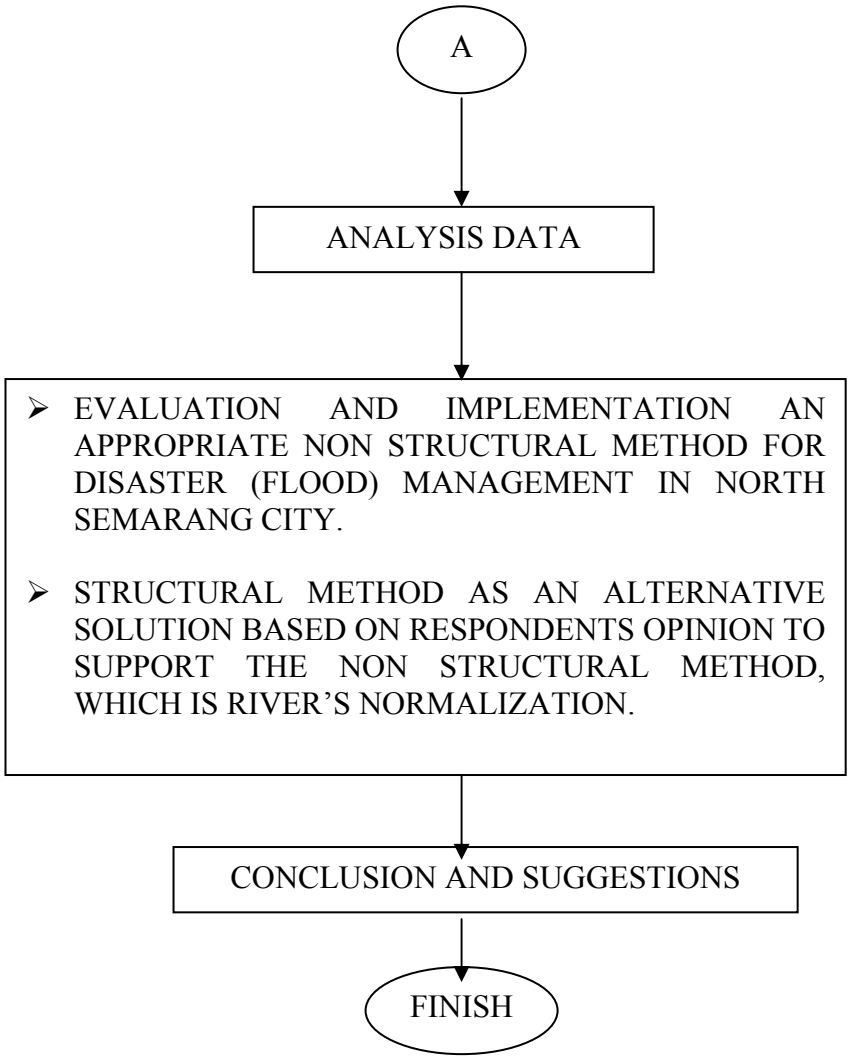


Figure 3.3 Flowchart of methodology

3.3. Data Collections and Sampling Method

3.3.1. Data Collection Method

The data needed are the primary data and secondary data. The primary data collected from questionnaire and interview. The secondary data compiled from the Statistic Central Bureau / *Biro Pusat Statistik (BPS)*, The Planning Board of Semarang Municipality (*Bappeda Kota Semarang*), Directorate of Public Works / *Dinas Pekerjaan Umum* (DPU), and other relation institutions. A part of that there

are primary data which are formed as outcomes of observations in relation with this study.

a. Survey on field area

In order to collect primary data, primary survey is needed. The technique of primary data collection is:

- Visual observation, which direct inspection to the study area, that is done to evaluate the attained information from secondary survey with the actual condition in the area, as well as adding information which can not be obtained by secondary survey.
- Questioner distribution, which is done to distinguish the experts and the north Semarang inhabitant's opinion for the input of non structural measure method for disaster management to overcome floods impact in north Semarang City. The respondents chosen are the bureaucrats, and inhabitants.
- Interview, which means to collect information directly from the local inhabitants. The activity of interview is done in the unstructured interview when distributing questionnaire or when searching data in the related institutions.

b. Institution survey

The secondary data collections are performed by secondary survey, which is survey to some relevant institutions, are *Bappeda*, *BPS*, and *PU*.

3.3.2. Sampling Method

a. Population

Population is the overall of individual in area, in certain time which matching with the target of research (Sugiarto, 2001). Population in this research is the overall resident who lives in flood prone in north Semarang City. Flood prone in north Semarang City covering some sub district, between west and east flood way which relevant with scope of this report. Detailed flood prone region shows on table 3.1.

Table 3.1 The amount of population on study area (North Semarang, Central Semarang, East Semarang Sub District, 2006)

Sub District	Village	Total Population
1. North Semarang	1. Panggung Lor	14399
	2. Panggung Kidul	5533
	3. Kuningan	13640
	4. Purwosari	8975
	5. Dadapsari	10739
	6. Bandarharjo	19322
	7. Tanjungmas	29343
2. Central Semarang	1. Purwodinatan	4880
	2. Kauman	4080
	3. Pandansari	3683
3. East Semarang	1. Kemijen	13362
	2. Bugangan	9354
	3. Mlatiharjo	6061
Total population		143371

(Source: BPS, 2005)

b. Sample

Sample is overall of individual to become set of analysis in competent population and according to made / to be pulled as research sample as according to frame sample (Sugiarto, 2001). A sample is a small representation of the whole population target. The use of sampling allows for more adequate scientific work by making the time of the scientific worker count.

c. Sampling Method

In this final assignment, the chosen sampling method is random sampling, which is a method of probability sampling in which the selection of respondents is random. The random sampling uses a representative number of subjects from various sub groups which are randomly selected. A

probability sampling method is any method of sampling that utilizes some form of random selection. In probabilistic sampling method each unit in population have equal chance to be chosen sample of the whole population. In order to have a random selection method, must set up some process or procedure that assures that the different units in population have equal probabilities of being chosen. Sample could get by some method, there are drawing, table of random number. This research use drawing method, which passing some phase. The result of drawing method can be shown on table 3.2 below.

1. 13 villages from 3 Sub District selected 8 villages.
2. 8 villages selected 16 RW.
3. 16 RW selected 32 RT.

Tabel 3.2 Sample result from sampling analysis of north Semarang city population (Simple Random sampling)

Sub District	Village	RW	RT	Amount of sample
1.North Semarang	1. Dadapsari	IV	1	13
			3	13
		IX	3	13
			4	13
	2. Bandarharjo	I	1	13
			2	13
		IX	4	13
			5	13
	3. Tanjungmas	XIV	5	13
			6	13
		XV	3	13
			5	13
2. Central Semarang	1. Kauman	IV	2	13
			3	13
		V	1	13

Sub District	Village	RW	RT	Amount of sample
			2	13
	2. Purwodinatan	I	3	13
			5	13
		II	1	13
			3	13
3. East Semarang	1. Kemijen	I	3	13
			5	13
		V	1	13
			6	13
	2. Mlatiharjo	I	1	13
			3	13
		III	2	13
			5	13
	3. Bugangan	V	5	13
			7	13
		VII	1	13
			4	13

(Analysis, 2006)

Time and financial consideration in this study are important factors that can be considered with the data analysis plan. Due to deciding the sample amount of this study, the formula used that suitable with this study methodology is:

$$n=\frac{N}{(N\times d^{2})+1}$$

Where:

n = the required sample amount

N = the known and estimated total population

d = precision level

Data calculation:

$$n = \frac{N}{(Nxd^2)+1}$$

$$= \frac{143371}{(143371x0.05^2)+1}$$

$$= 398.887 sample \approx 400 sample$$

The precision level used ranges 1%-10%, this research used 5% which means that 90% of respondents are representing the whole, or in other word valid. The population of research on north Semarang city is 143371 populations. Therefore, the required sample amount as calculated with the above formula for this study is 398, 9 which is then cumulate as 400 respondents. The sample amount is taken with the calculation of the total sample number (400 respondents) divided into 32 RT which selected randomly, from the calculation is obtained 13 respondents each RT, the result shows on Table 3.2 above. The spatial scope of sample location can be seen on figure 3.4 below.

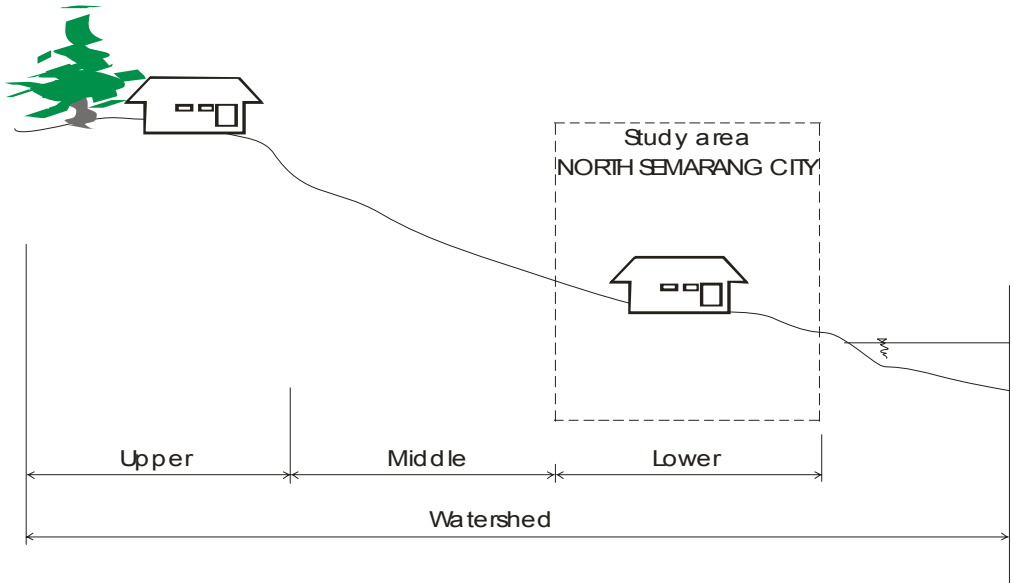


Figure 3.4 Study areas on north Semarang City

3.4. Data Requirements

The data used in this study is the data which relevant with the research aims. The data consist of primary data which is gathered from questionnaire and interview

with respondents and data secondary which is collected from the relevant institutions.

3.5. Analysis Technique

1. Collecting data, Data summary, Data appearance

   The data which have been obtained will present detailed by tables and diagrams as summary. Furthermore, data are processed and find the correlations with the disaster management then shown to graphs or diagrams. This phase is meant to facilitate read data.
2. Analysis data, Correlation the result of data summary with the system disaster management

   Data which have summarized will be analyzed. From this analyzed, the correlations between data summary and the management disaster will be find and this correlations will create the measures which representatives the management of disaster to overcome the flood problem in north Semarang City.
3. Election of non structural measures which could be applied to overcome flood in North Semarang

   From the analysis, the measures will be selected furthermore applied to overcome flood problems in north Semarang.

3.7. Analysis of Structural Method as an Alternative Solution

As shows on conceptual approach, the successful of flood coping was depend on the implementation of Structural and Non Structural method. Structural method has many types, for this final assignment will analysis river normalization. The river normalization is a method for improving the river's capacity discharge. Semarang river has been selected to be improved, because this river was passing the flood prone area. Semarang river's 5 years return discharge was higher than river's capacity. Therefore, it needs to be normalized, for Semarang River's normalization. It will use single trapezoidal channel design.