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**INTERACTIVE WATER RESOURCES MANAGEMENT IN THE
IMPLEMENTATION OF THE *SUMUR RESAPAN* SYSTEM
IN REMBANG REGENCY**

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Forewords

Water security is principal concern for sustainable development regarding the multi purposes of water that makes life possible. For many years the local government has prompted many efforts to overcome water crisis but it is still viewed as mitigation effort. The recurrence of water crisis particularly in Rembang Regency encourages me to figure out the best practice of water resource management in the local context.

The introduction of infiltration wells or *sumur resapan* in local terms bring new optimism in practicing the principles of sustainable water resources management. The *sumur resapan* is recommended for groundwater conservation due to technical and cost effectiveness. Nevertheless, disseminating invention often emerges gap between government objectives and community expectations that is probably influenced by perception, knowledge and awareness of the local community.

This research attempted to figure out the practice of the interactive process in the implementation of the *sumur resapan* that is promoted to be a bridge between local government and community. Through partnership mechanism, it is expected improving awareness and participation of the local community that is stimulated by intensive communication and sufficient transfer of knowledge.

Overall, the implementation of the *sumur resapan* still needs large improvements to be wide accepted by the community, especially in establishing legal framework for adapting the diversity of socio-cultural dimension. Considering other findings, it is interesting to next research to know how local knowledge can be used for coping water crisis.

Table of Contents

Forewords	2
Table of Contents	3
List of Figures	5
List of Tables	6
List of Boxes	7
Summary	8
Acknowledgements	9
Chapter I. Introduction	
1.1. Background	10
1.2. Problem Statement	10
1.3. Research Objectives	11
1.4. Research Questions	11
1.5. Scope of the Research	11
1.6. Methodology	12
1.7. Glossary	12
Chapter II. Theoretical Background	
2.1. Sustainable Water Resource	13
2.1.1. Water Crisis Perception and Reality	13
2.1.2. Water as an economic resource	14
2.1.3. Water Utilization	14
2.2. Integrated Water Resource Management	16
2.2.1. Interactive Policy on Groundwater Resource Management	16
2.2.2. Conserving Groundwater Resources	17
2.2.3. Pattern of Groundwater Use	17
2.3. Artificial groundwater Recharge System	18
2.4. Social Acceptability on The <i>sumur resapan</i> system	21
Chapter III. Description of Research Area	
3.1. General Condition of Rembang Regency	23
3.2. Hydrological condition	25
3.3. Water Crisis in Rembang Regency	27
3.4. Water Crisis Mitigation	28
Chapter IV. Research Method	
4.1. Type of Research	30
4.2. Research Variable and Indicator	31
4.3. Data Collection	31
4.4. Units of Information	32
4.5. Data Analysis and Interpretation	33

4.6. Research Design	33
4.7. Time Frame	34
Chapter V. Result	
5.1. The Water Resource Management in Rembang Regency	35
5.1.1. Institution and Regulation	35
5.1.2. Water Resource Conservation	36
5.2. The Interactive Management in The implementation of The <i>Sumur Resapan</i>	37
5.2.1. Case of Sendangmulyo Subdistrict	40
5.2.2. Case of Sendangwaru Subdistrict	40
5.2.3. Case of Ngasinan Subdistrict	41
5.3. Community Perception on The <i>Sumur resapan</i>	42
5.4. Community Involvement in the Implementation of the <i>Sumur Resapan</i>	46
5.5. Discussion	51
5.5.1. Legal framework on Water resource management	51
5.5.2. Environmental Knowledge for Local community	53
5.5.3. Problem of Participation	54
Chapter VI. Conclusions and Recommendations	
6.1. Conclusions	56
6.2. Recommendations	56
References	58
Annexes	61

List of Figures

2.1.	The Tree Dimension of Integrated Water Management	15
2.2.	Interactive Water Management	17
2.3.	Groundwater Recharge System	18
2.4.	The Design of <i>sumur resapan</i>	20
2.5.	Interactive process of the <i>sumur resapan</i> System	21
2.6.	The Reinforcing Communication Loop	22
3.1.	Economic growth of Rembang Regency	24
3.2.	Dry zone in central Java province	25
3.3.	Average rainfall in Rembang Regency	26
3.4.	Droughts zone in Rembang Regency	27
3.5.	Water aid dropping by water tank truck	28
4.1.	Logical Framework	30
4.2.	Triangulation Method	33
4.3.	Research Location	34
5.1.	The implementation of the <i>sumur resapan</i> projects	38
5.2.	Existing Condition of the <i>Sumur Resapan</i> in Kragan District	39
5.3.	Interactive process in Sendangmulyo sub-district	40
5.4.	Interactive process in Sendangwaru sub-district	41
5.5.	Interactive process in Ngasinan sub-district	42
5.6.	Class of Age and The level of education in Sedangmulyo Sub district	43
5.7.	Class of Age and The level of education in Sendangwaru Sub districts	43
5.8.	Class of Age and The level of education in Ngasinan Sub districts	43
5.9.	The Condition of groundwater wells after the <i>sumur resapan</i> construction	44
5.10.	The Chart of the Respondent Opinion in Sendangmulyo sub district	45
5.11.	The Chart of the Respondent Opinion in Sendangwaru sub district	46
5.12.	The Chart of the Respondent Opinion in Ngasinan sub district	46
5.13.	The Occupation and expenditure of the respondent in Sedangmulyo Sub district	47
5.14.	The Occupation and expenditure of the respondent in Sedangwaru Sub district	47
5.15.	The Occupation and expenditure of the respondent in Ngasinan Sub district	48
5.16.	The chart of the level participation and motivation of respondent in Sendangmulyo sub district	49
5.17.	The chart of the level participation and motivation of respondent in Sendangwaru sub district	50
5.18.	The chart of the level participation and motivation of respondent in Ngasinan sub district	50
5.19.	Four Compartments Water Resource Management Model	52
5.20.	Netherlands water institution	53
5.21.	Groundwater flow system	54

List of Tables

2.1.	Total availability of surface water and groundwater in Java and Indonesia	13
3.1.	The Land Use Pattern of Rembang Regency 2004	23
3.2.	Population Growth in Rembang Regency 2001 – 2005	24
3.3.	<i>Jratun-Seluna</i> River Complex	26
3.4.	Vulnerable Sub districts to Water Scarcity in Rembang Regency 2005	27
3.5.	Number of water aid in Rembang Regency 2004	29
4.1.	Variable and Indicator	31
4.2.	List of Respondent	32
5.1.	Competent institution for water resources management in Rembang Regency	36
5.2.	Soil and Water Conservation Building in Rembang Regency 2005	37
5.3.	Construction of the <i>sumur resapan</i> (unit)	39
5.4.	Respondent opinion on the <i>sumur resapan</i>	44
5.5.	Number of Respondent giving opinion in Sendangmulyo subdistrict	45
5.6.	Number of Respondent giving opinion in Sendangwaru sub district	45
5.7.	Number of Respondent giving opinion in Ngasinan subdistrict	46
5.8.	Level of involvement based on Respondent opinion	48
5.9.	Level of involvement in Sendangmulyo subdistrict	49
5.10.	Level of involvement in Sendangwaru sub district	49
5.11.	Level of involvement in Ngasinan subdistrict	50

List of Boxes

2.1	The Ladder of Participation	16
2.2	Managing Groundwater Needs Suitable Models	18
2.3	Regulation on the <i>Sumur Resapan</i> in Jakarta	19

Summary

Rembang regency has experienced water crisis for years. Given hydrogeology condition and poor water resources management constitute the constraint dealing water problem within this area. The local government has simultaneously attempted to improve water infrastructures and insisted local policies on water retention. The infiltration wells (*sumur resapan*) have been disseminated through partnership program regarding groundwater conservation within local community that allows interactive process in decision making.

This research is meant to figure out the best practice of water resources management in the implementation of the *sumur resapan* system. Field observations and interviews are conducted in order to assess the local policy and regulation on the water resources management in particular the community perception, knowledge, awareness and participation toward the implementation of the *sumur resapan* system. The unit of analysis is chosen purposively in three sub districts within Kragan district which has applied the *sumur resapan* system.

The research found that the local authority lack of regulation on water resources management reflecting improper legal and institutional framework. The interactive process was articulated differently in cases of three sub districts that revealed bottom-up approach would lead proper performance in the implementation. Inadequate transfer of information within interactive process resulted in the limited knowledge that also influenced by socio cultural background of the community. It is noticed that poor social economic condition was economic reason in the most motivation in participation. Overall, the implementation still needs improvement in regard establishment of local water authority institution, adopting local environmental knowledge and intensifying environmental education and communication.

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Chapter I. Introduction

1.1. Background

Water crisis is still a major concern in Rembang regency. For years, the local authority has experienced a crucial problem in water provision due to water scarcity. In depth view, the availability of water resources within a region can be linked with its hydrogeological characteristics. Geographical and climate factors are profoundly influenced hydrogeological pattern in an area. Rembang area is part of greater *Jratunseluna* river basin system but there is no large sub basin for supporting proper water system. Rembang only has small rivers which are almost dry on droughts. This condition is also worsened by insufficient average annual rainfall. Statistical data in 2003 denoted the average annual rainfall only reach 1,118 mm with 61.83 days of rain. This rainwater level could be further reflected in surface and groundwater potentials. Based on these factors, Rembang is categorized as a vulnerable area to droughts. Therefore, for optimal use and sustainability, the existing water resources should be supported by appropriate water system that will regard to the proper water resource management.

Along with the acceleration of population growth, groundwater is the most exploited water source in Java which has over 100 million inhabitants because people has relied on groundwater as water source. Hence, groundwater is very sensitive for environmental threat due to over exploitation. The land use change is also alleged giving contribution of groundwater depletion. The occurrence of deforestation, farmland conversion and built environment could reduce water infiltration in the soil. In the monsoon, the process of water infiltration (*run-in*) is not balance with rainfall level in other word the level the soil cannot store excess storm water run-off. Empirically, the groundwater depletion could initiate environmental problem such as groundwater intrusion, salt-water intrusion and land subsidence. For this reason, it is necessary to develop engineering design to replace the function of recharge area if the need of extension of built up area is increasing particularly in settlement areas.

Considering in Indonesian law number 7/2004 on water resources, it is mentioned that local government has responsibility to manage and conserve water resources within its jurisdiction. Although Rembang regency lacks of regulation, the local government has attempted to improve water resources management beginning with concern to water resources conservation. In regard, the local government has carried out significant effort in disseminating the artificial groundwater recharge system through constructing infiltration wells (*sumur resapan*) for local community since 1998.

The *sumur resapan* system is an engineering design intended for maintaining groundwater table using the potent of rain catchments system. The use of *sumur resapan* system to store surplus surface water underground can be expected to the increase demand of water due to growing populations instead developing the number of dam sites that is costly. Technically, the artificial groundwater recharge may be used to store potential water from rainfall, treated sewage and excess storm water runoff for later use. Groundwater recharge may also be used to mitigate or control saltwater intrusion into coastal aquifers regarding Rembang region is coastal area.

1.2. Problem statement

The *sumur resapan* system is technically recommended as an alternative solution for preserving water resource in Rembang regency. Consequently, the local government has considered the *sumur resapan* system for managing water resource within community level implemented through block grant project scheme distributed in

several sub-districts which are vulnerable to droughts. The scheme is intended to improve community participation in the implementation by encouraging interactive process and promoting partnership between local authority and local community. In the future, the *sumur resapan* system is expected giving positive impacts in managing water problem within Rembang Regency, moreover raising self-supporting effort of the local community. Nevertheless, the program has not yet been supported by proper regulation as legal framework for sustaining water resource management in Rembang Regency.

Nowadays, the implementation of the *sumur resapan* system is facing challenges on its sustainability. Along with the implementation of the *sumur resapan* system, factual conditions in the field are not indicating significant development. Even though the *sumur resapan* system has been implemented for years, people are still not motivated by self-supporting effort to build *sumur resapan*, assumed they still rely on the stimulus from the local government. In practice, the interactive process that has been developed for community empowerment was implemented in various ways. This condition is wondering how extent this system influence the community acceptance. The acceptability by the community is empirically related to perception and awareness. The sufficient knowledge and information about the *sumur resapan* system for the community might influence toward the perception of the community. Therefore, the analysis of implementation and the community perception are necessary to figure out the achievability of the implementation of the *sumur resapan* system also improving further implementation.

1.3. Research Objective

The objective of this research is to understand the factors that make the community involved in the implementation of the *sumur resapan* system in Rembang regency. Furthermore, this research will offer recommendations for local government regarding the improvement of local policy related to sustainable water resources management in Rembang regency.

1.4. Research Question

Based on the factual condition of the implementation of the *sumur resapan* system, this research will be intended to answer main question:

Which are the main factors that influence the implementation of the *sumur resapan* system in the community within Rembang regency?

- What is the local policy on water resources management in Rembang regency?
- How extent is the interactive process in the implementation of the *sumur resapan* system in Rembang regency?
- How do people perceive the implementation of the *sumur resapan* system in Rembang regency?
- To what extent is community involved in the implementation of the *sumur resapan* system in Rembang regency?

1.5. Scope

This research will be conducted in Rembang Regency, Central Java Province-Indonesia. It will be emphasized on implementation of the *sumur resapan* system through development project. Accordingly, the unit analysis of this research is community in three sub districts within *Kragan* district covered by the *sumur resapan* project which are selected purposively based on the largest number of implementation.

1.6. Methodology

This research will employ descriptive method to analyse empirical data that will be collected through literature review, field observation and interview to key respondent and local community, for detail in chapter 3.

1.7. Glossary

Aquifer	: A geological formation that has sufficient water-transmitting capacity to yield useful water-supply in wells and springs.
<i>BPD</i>	: <i>Badan Perwakilan Desa</i> – Local representatives body
<i>LPMD</i>	: <i>Lembaga Pembangunan Masyarakat Desa</i> – Local community development institution
<i>SPKS</i>	: <i>Sistem Pelaksanaan Kerja Sama</i> – Partnership system
<i>DAS</i>	: <i>Daerah Aliran Sungai</i> – River Basin, integrated area between land and river that has function as reservoir, storage and natural water flow from rainfall to lake or sea
Water stress	: Annual renewable water supplies below approximately 2,000 m ³ per person
<i>Sumur Resapan</i>	: Infiltration wells - engineering systems where surface water is flowed on or in the ground or infiltration and subsequent movement to aquifers to augment groundwater resources
Water Scarcity	: Unbalance condition between potential water availability and demand of water
Hydrogeological zone	: The unity of aquifer system with specific hydrogeological condition
Local knowledge	: The systematic body of knowledge acquired by local people through the accumulation of experiences informal experiments, and intimate understanding of the environment in a given culture.

Chapter II. Theoretical Background

2.1. Sustainable Water Resources

Sustainable development is concerning about the environmental implications of human activities. The concept of sustainable development has emerged in recent years in an effort to address environmental problems caused by economic growth. Although there are several different interpretations and ambiguities, sustainable development has been simply described as development that meets the needs of present without compromising the ability of future generation to meet their own needs¹ considering three pillars i.e. ecological, social and economic sustainability.

Water is one of the most essential requisites of the natural resources sustaining life for plants, animal and human. Hence, managing water is a starting point of managing environment. Refer to Stumm in McDonald & Kay (1988), the total quantity of fresh water on the earth could satisfy all the needs of the human population if it were evenly distributed and accessible. Nevertheless, the raising water exploitation has initiated environmental externalities in many places that should be handled wisely.

To be sustainable, water resource systems must perform reliably as they change. The transition to new technologies, new management practices, and new institutions (or institutional leadership) must proceed in an orderly and equitable manner. Continuity and confidence in the new systems are prerequisites for sustainability, as are a proper respect for operation rules and for maintenance of the physical infrastructure. In the context of water resource management, the three pillars of sustainability will be elaborated as following.

2.1.1. Water Crisis Perception and Reality

Indonesia has faced water crisis for long period. According to Surjadi et.al (1994), residents are still facing great variety of problems in regard to water and sanitation. These problems imply that water management in Indonesia is very urgent to be improved particularly in provision and sanitation. Water scarcity can be approached from physical and perceived perspectives. Physical water scarcity is determined not only by hydroclimatic factors that determine partitioning of rainfall into blue and green water flows.² Perceived water scarcity is related to human need and demand for water. Population pressure and socioeconomic development increase needs and demands for certain water flows. High human demand for water combined with environmental degradation will reduce access to blue water flow. For instance, deforestation can result more storm surface flow and less groundwater recharge. Data on table 2.1 illustrated current condition of the availability of surface and groundwater in java and Indonesia considering water potential and demand.

Table 2.1. Total availability of surface water and groundwater in Java and Indonesia

Island	Area (million km ²)	Population (million)	Water potential (MCM/yr)	Water demand (MCM/yr)	Water potential	
					Per km ² (MCM/yr)	Per capita (1,000 m ³ /yr)
Java	0.133	121.4	187,000	83,378	1.411	1.54
Indonesia	1.894	206.3	3,221,000	156,850	1.700	15.62

Source: Machbub (2000); WRI (2003).

¹ Bruntland report -World Commission on Environment and Development, 1987

² Falkenmark and Rockstrom (2004) described blue water flow as the liquid route to sea and green water flow as vapour water.

As mentioned on table 2.1, Java Island has which contains 121.4 million inhabitants, has a lowest availability of water. The extent of water scarcity can be valued considering the ratio of potential water availability to demand. It is predicted that ten years after the ratio will be less than one during many periods. Deverill (2001) The impact of water scarcity is the combined effects of population pressure, economic growth, deteriorating water quality and the competing demands of agriculture, industry and domestic users. Therefore, promoting the sustainable water resource management is significant strategy aimed to make certain adequate supplies of water in good quality over the time. In the practice, it can be implemented by improving policy in water management that is more adaptive with current situation.

2.1.2. Water as an economic resource

The economic and demographic development has been raising problems regarding water supply and demand. Water has already scarce resources but it is still treated as though it is available in unlimited quantity. Winpenny (1994) noticed the symptom of water stress³ that became widespread due to mismatch between resource capacity and consumption level. This symptom is an obvious indication that supply system and consumption behaviour have generally failed to adapt the increasing pressure of demand on the water resource.

Moreover, he argued that the root cause of water crisis is the failure to treat water as a scarce commodity with an economic value.⁴ In detail, there are three causes of the problem; the fact that water is under priced compared to its real cost of provision, water is often considered as a public good which makes difficulty to extract an economic price, and the existence of environmental externalities in use of water which are not included in its price. In elementary economics, a commodity which is supplied too cheaply need to be rationed by arbitrary means.

The acceptance of market force is necessary for and efficient and equitable solution to the future problems of the water sector. Winpenny (1994) described that action is required at a number of levels to promote the more efficient use of water that can be categorized in such measures i.e.: a) enabling condition – action to change institutional, legal and economic framework which water is supplied and used, b) incentives – policies to influence the behaviour of users directly by providing with incentives to use resources more wisely including market-based or non-market devices, c) direct interventions – through investment, spending programmes to encourage the use of water efficient and water-saving implements.

2.1.3. Water Utilization

Water resources must be managed wisely and sustainably to secure the greatest benefit for the welfare of existing and future generations. However, water scarcity has the potential to create conflict among beneficiaries and between communities of users. Therefore, sustainable water management is considered a strategic task, essential in sustaining national development and requiring a national commitment. In the past, water resource development strategies tended to emphasize the supply side. Water was treated as a free good, and stakeholder participation was quite limited. In many basins, the current strategy for the development and management of water resources is now focusing on the demand side.

³ Falkenmark in Winpenny (1994) argued that societies suffer water stress when annual renewable supplies fall below approximately 2,000 m³ per person at time when demands for water are increasing in the process of development.

⁴ Winpenny (1994) promoted conception on managing water as economic resource.

Water was identified as a gift of the Almighty and everyone has a right to its use, although certain uses require permission and others do not. The 1974 Water Law required corporations, associations, and individuals to obtain government approval and assigned the primary responsibility to the central and local governments to ensure that water and water resources are used beneficially. The water law also required that water allocation be subject to established priorities. Government Regulation No. 22/1982 established the principles and the basis for water management. In water management regulations, the principles of public utility, harmony, and conservation should be applied. Moreover, the regulation stated that everyone has a right to use water for their basic needs in daily life, for domestic purposes, and for domestic livestock.

2.2. Integrated water resources management

The concept of integrated water management was initially introduced in Netherlands used for communicating water management and policy practices. As promoted by Van Rooy (1995), the conception of integrated water management developed from three dimensions i.e.: water elements, water uses and water management. To meet the needs and aims of water policy and management, the three dimensions should be integrated as a cohesive system.

The first dimension related to the need of water that consists of four elements: ground water, surface water, water quantity and quality. Within water system, these four elements interact in a single dimension. The second dimension deals with different functions and uses for water system. Water use has specific value to be viewed as natural resources, which should be protected for long-term utility. The third dimension is particularly directed at areas of water control. The main responsibility is prioritization of water use to reconcile all the demands and interests for the same resources within a limited area and time.

The framework of integrated water management become new way of thinking to assure the rational water use decisions. In the practice, this framework must be flexible in balancing the use and function of water source, quality and quantity. Shown on figure 2.1, the framework of integrated water management is created as a three dimensional water cube⁵ that should be used to communicated water management and policy practices.

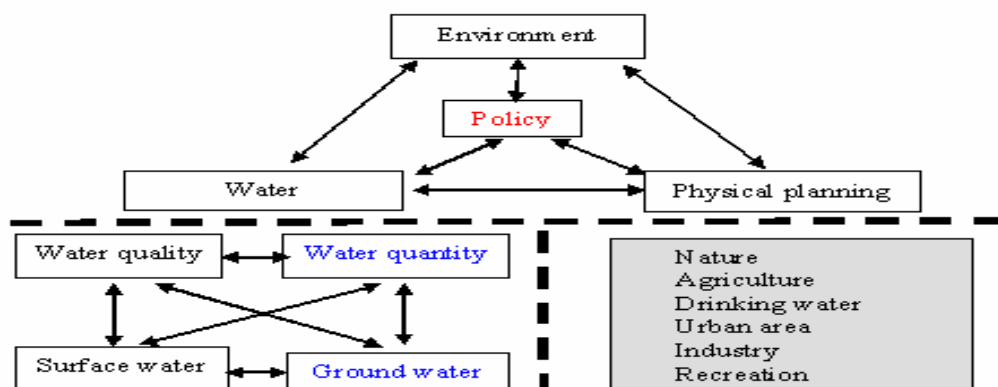


Figure 2.1. The Tree Dimension of Integrated Water Management

Source: Hans van Engen (ed), 1995:267


⁵ The water cube has been successfully used in implementation of governmental policy in Netherlands and in part of USA.

Adapting from the three dimensions of water cube, it can be pointed out interactive process in water policy, groundwater conservation and groundwater utilization to make framework in regard groundwater as the most important water resources in Java.

2.2.1. Interactive Policy on Groundwater Resource Management

Along with democratic governance, the government should encourage the policy making process to be more participative. Governmental agencies can play roles in the participation process that has its own interaction degree of interaction in each role. According to Popper and Steenbeek ⁶ (1999) those role can be delineated as step on a ladder of participation. (Box 2.1)

Box 2.1. The Ladder of Participation

Step	Type of Governance	Role of Participation		Increasing interaction 
6	Facilitative	Initiator	Interactive	
5	Co-operative	Co-operating partner		
4	Delegating	Co-decision maker		
3	Participating	Advisor	Non interactive	
2	Consultative	Consultant		
1	Open authoritative	Target group of information		
0	Closed authoritative	None		

Source: Popper and Steenbeek, 1999

The ladder of participation is an indicator of the government's attitude toward participation. With every step up the ladder, interaction becomes more intense. The second column of figure above defines the style of governance and the third column the role of participating actor in the policy-making process.

At the bottom of ladder there is no participation. Here societal actors do not interact with water managers in the decision making-process. The smallest degree of participation can be found at the first level on the ladder, in which the position of the government can be characterized as open authoritative governance and the actor is just a target group of research information. At the second level the government is consultative, and society principally asked about possible actions to be taken by the government. From the second step down one cannot really speak of interactive policy-making. The third step of the ladder can be called participative governance. Here society takes on a role as advisor. At the fourth level, the government delegates task and actors become co-decision makers. At the fifth level of the ladder, with a co-operative government, social actors are partners in policy making. At the highest, sixth degree of interaction the government plays as a facilitative role. In this situation, societal actors take the initiative.

Source: Van Ast and Boot, 2003

Regarding regional development, the local government can employ integrated water management in development policy. Van Ast and Boot (2003) distinguished types of interactive policy making, the first is pluralist type that involves the broad public in decision making process in non-organised way, and the second is corporatist type that involves stakeholders related to specific policy issue in the decision making process. The main advantages of both types are first the quality of decision that is potentially higher due to different view and consideration, and second the exchange of

⁶ Quoting from Participation in European Water Policy, Jacko Van Ast and SP. Boot, 2003

information by interaction that can lead better understanding of the specific situation and contribute to public acceptance and support.

Moreover, they promoted interactive management in the water system as illustrated on figure 2.2. They noticed that governmental policy could be improved through process of interaction with the public and different stakeholders. They evaluated that the policy-making process is not linear but it should be interactive process. This approach may be more adaptive toward local circumstance due to public involvement.

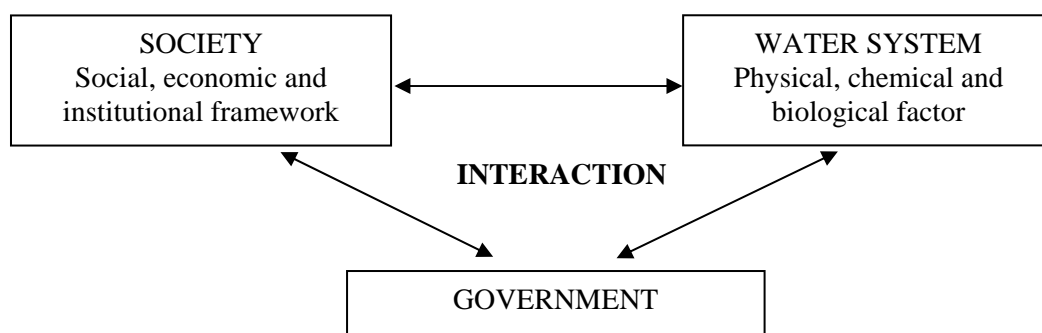


Figure 2.2. Interactive Water Management
Source: Van Ast and Boot, 2003

2.2.2. Conserving Groundwater Resources

The dominant threats to groundwater resources are created by human activity depending on duration, type and intensity that will determine the degree of risk of groundwater quality and quantity. According to Jaffe and Dinovo (1987), the quantity of groundwater available for use within local areas depends upon the relationship between the flow of water into and out of aquifer. Under natural conditions, aquifers exist in a state of dynamic balance between recharge, evaporatranspiration, leakage to or from other aquifer and discharge to surface groundwater levels and flow patterns.

Reduced recharge occurs when water that would otherwise filter into the aquifer is diverted to surface water bodies or taken out of the groundwater recharge basin. This happens when the impermeable surface in an aquifer recharge area is increased, resulting in higher rates run-off and consequently lower rates of recharge. Withdrawals of water from an aquifer that are not returned, or are otherwise lost; also have the effect of lowering groundwater levels.

The potential impacts of land use activities on the balance of the groundwater recharge, withdrawal and discharge must be evaluated to protect ground and surface water resources and to prevent destructive change in groundwater levels.

2.2.3. Pattern of Groundwater Use

Most people rely on groundwater as a primary source of supply for domestic uses. Reliance shifts to dependency in drought years when groundwater plays its critical role in buffering water supply availability. In many countries, including Indonesia, groundwater extraction has increased exponentially with the spread of energized pumping technology for irrigation for agriculture. Expansion of pumping technology has often resulted in dramatic declines in the water table in areas of low recharge.

Declining water level represents direct threats to the sustainability of environmental, domestic, agricultural and industrial uses dependent on groundwater.

The proximate causes of groundwater depletion are rooted in population growth, economic expansion, the distorting impact of subsidies and financial incentives and the spread of energized pumping technology. Emerging problems relate more to management issue, use efficiency an allocation.

The lack of awareness and understanding of aquifer system combined with the common pool nature of the resources perpetuates chronic under valuation of the resource base. Because few understand the complex nature of groundwater flow, the vulnerability of the resource base to irreversible damage through unconstrained use is rarely appreciated.

2.3. Artificial Groundwater Recharge System and *The Sumur Resapan*

According to Bouwer (2002) artificial recharge systems illustrated on figure 2.3 are engineering systems where surface water is flowed on or in the ground or infiltration and subsequent movement to aquifers to augment groundwater resources. The aims of artificial recharge are mainly to store water, to decrease seawater intrusion or land subsidence, to improve the quality of the water through soil-aquifer treatment or geo-purification, to use aquifers as water conveyance systems, and to make groundwater out of surface water where groundwater is traditionally preferred over surface water for drinking.

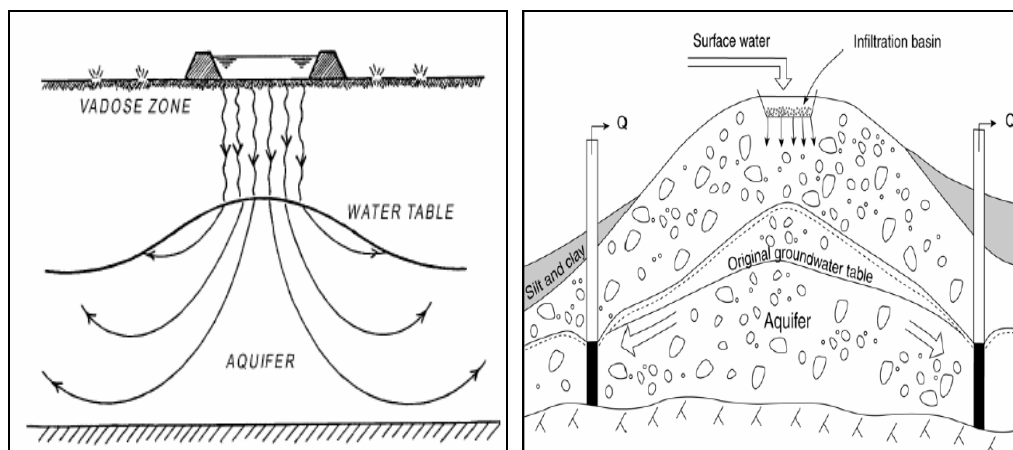


Figure 2.3. Groundwater Recharge System

Source : Bouwer (2002)

With heavy groundwater exploitation, the water table has been declining at a faster rate than recharge. Extraction of water from the deeper aquifer has posed an even more serious problem since recharge rates are slower than in the shallow, unconfined aquifer. Rainfall is a principal source of groundwater recharge-shallow, unconfined aquifers are recharged every monsoon, although deeper aquifers are not. However, some are recharged very slowly.

In order to accomplish the uses without deleterious environmental consequences, the optimum combination of treatment methodologies before recharge and after recovery from the aquifer must be identified. It will also be necessary to consider the sustainability of soil-aquifer treatment and health effects of water reuse when using treated wastewater as the recharge medium. In regard, Kusumayudha (2003) offered models for managing groundwater particularly in Java based on its hydrogeological profiles. (Box 2.2).

Box 2.2. Managing Groundwater Needs Suitable Models

The potential groundwater is usually controlled by surrounding environment which is conducive to the geological setting. The unity of aquifer system with specific hydrogeological condition is recognized as hydrogeological zone. For sustainable groundwater utilization, this system should be managed well because each hydrogeological zones have different characteristic. Java Island consists of four hydrogeological zones i.e. northern coast, quarter volcanic, tertiary volcanic and kars. The northern coast hydrogeological zone lies on northern part of Java Island spreading from west to east. Each hydrogeological zone has specific strengths and weaknesses. The northern coast hydrogeological zone generally has shallow groundwater, high water debit, salty taste, and low capacity of aquifer. This area is usually vulnerable for flood because its elevation closes to sea.

As water reservoir with its strengths and weaknesses, each hydrogeological zone in Java needs well management through promoting suitable model. It is aimed for optimal utilization and sustainability without environmental problem. For northern coast hydrogeological zone, those models are offered as following:

1. Controlling and regulating groundwater exploitation through deep wells for preventing salt intrusion and land subsidence.
2. Constructing infiltration wells in each household and artificial recharge in each sub-district for supporting water balance. It needs supervising in the implementation.
3. Preserving function and extent of catchments area with protecting soil permeability, not covering land with impermeable physical structure (concrete, asphalt etc.).
4. Strict control for industrial and domestic water disposal.

Source: Kusumayudha, 2003

The *sumur resapan* is one form of artificial groundwater devices disseminated in Indonesia. The device has simple design that function infiltrating rain water through water filtration treatment into soil. Department of public work recommended a sample design of the *sumur resapan* as seen on figure 2.4. The current implementation of the *sumur resapan* system in Rembang Regency still refers to the Minister of Forestry Regulation number P.03/Menhut/V/2004 on National Movement of Forest and Soil Rehabilitation (*GNHRL*) that further adapted by the local government to encourage local community. Comparing with the regulation in several municipalities in Indonesia, the *sumur resapan* is obligatory to be constructed inherently within the regulation on building permits such as the case of Jakarta (Box 2.3). Nevertheless, this regulatory instrument is still not practiced properly in the field due to weak commitment of local government.

Box 2.3. Regulation on the *Sumur Resapan* in Jakarta

The construction of *sumur resapan* or infiltration wells has become obligatory for citizens in several big cities in Indonesia such as Jakarta. The construction of the *sumur resapan* has been regulated by the governor regulation number 115/2001. It is stated in third article that building authority has responsibility to construct *sumur resapan* within certain volume and size. It mentioned that:

1. Citizens who will propose building permit (*IMB*) are obliged to plan *sumur resapan*.
2. In the process of building usage permit (*IPB*), if the building owners have not constructed *sumur resapan*, they are obliged to construct *sumur resapan*.
3. Each building that have not had *sumur resapan*, it is obliged to construct *sumur resapan*

Source: Regional Environment Agency, The province of DKI Jakarta, 2004

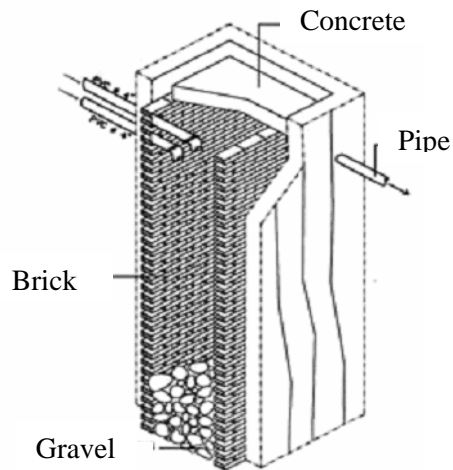
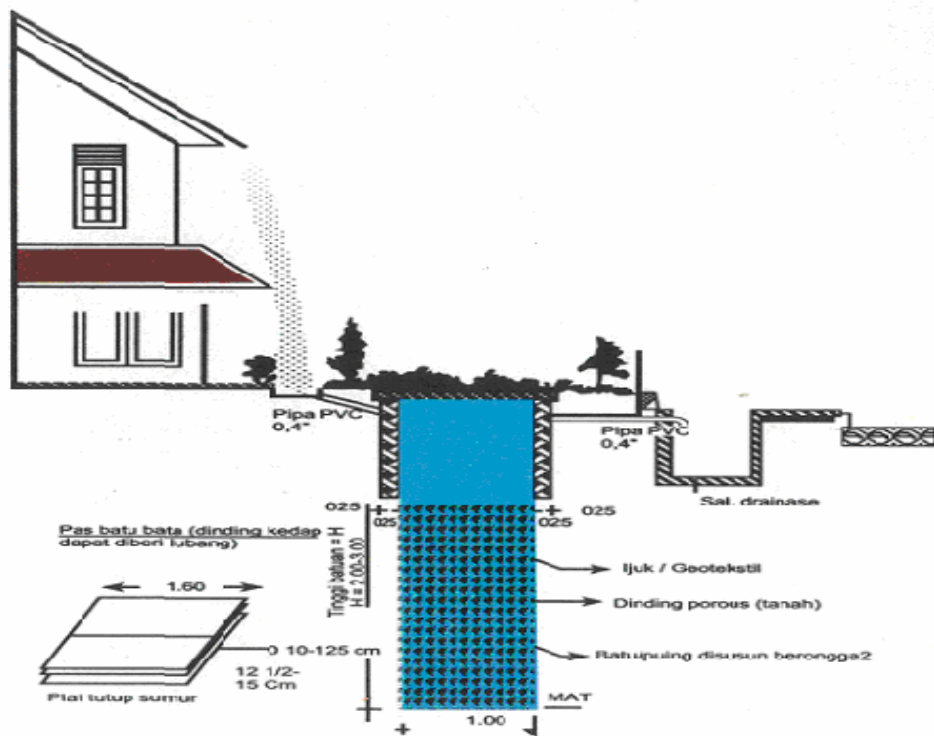


Figure 2.4. The Design of *sumur resapan*
 Source: Department of Public work, Republic of Indonesia

Considering democratic governance, the local government of Rembang Regency encouraged an interactive process in the implementation in order to raise participation from the local community. In implementation, the local government principally offered options within conservation program and function in facilitation. For

illustration, figure 2.5 shows the steps of the operationalisation based on the ideal implementation of the *sumur resapan* system Rembang regency.

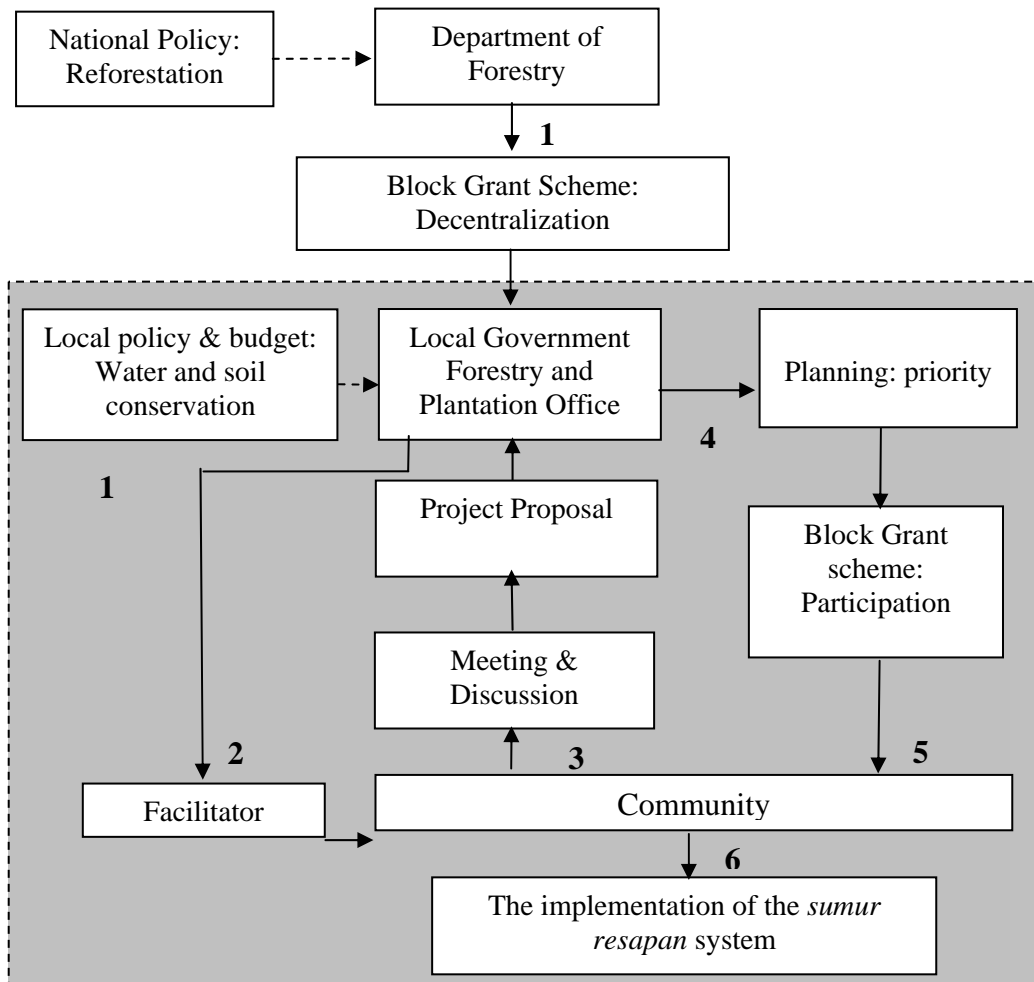


Figure 2.5. Interactive process of the *sumur resapan* System
 Source: Forestry and Plantation Office, Rembang Regency

2.4. Social Acceptability on The *sumur resapan* system

The social acceptability concept in natural resource management can be traced to the work of rural sociologist Walter Firey (1960). He wanted to know why certain resource policies persisted in different societies while others did not. He concluded that the adoption and retention of any particular program or policy depends on the extent to which it satisfies three requisites: It must be 1) physically possible, consistent with ecological processes; 2) economically feasible, generating revenue in excess of costs; and 3) culturally adoptable, consistent with prevailing social customs and norms.

Brunson (1996) defined *acceptability* as a condition that results from a judgmental process by which individuals 1) compare the perceived reality with its known alternatives; and 2) decide whether the real condition is superior, or sufficiently similar, to the most favorable alternative condition. Thus judgments about acceptability are made at the individual level, but they evolve in response to a host of external

influences. Accordingly, Brunson (1996) reserved the terms of social acceptability to refer to aggregate forms of public consent whereby judgments are shared and articulated by an identifiable and politically relevant segment of the citizenry.

For water management, social acceptability defines the driving forces to have a stable structure, be socially functioning and subject for improvements. Social acceptability requires that the *sumur resapan* system meets the needs of the local community that will be served and reflects the values and priorities of that society. Together with the sustainable development concept, social acceptability had been realized that in order to be successful a water management scheme relies heavily on people's willingness to participate in it.

The *sumur resapan* system needs a high involvement (participation) of the targeted community and, therefore, they require an adequate behavior. Therefore, it can be argued that this water management system requires certain behaviors, which are reflected in the degree and performance of participation in the scheme. Furthermore, participation in the scheme is considered to be an indicator of social acceptability, as it shows how and whether a water management system fits the reality of the local community in which it operates.

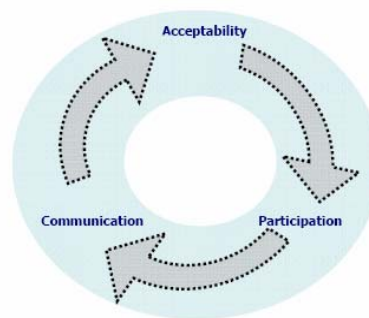


Figure 2.6. The Reinforcing Communication Loop

Source: Nilsson-Djerf & McDougall 2000

Referring the reinforcing communication loop of Nilsson-Djerf and McDougall (2000) as illustrated on figure 2.6, participation was identified to actually be an indicator of behavior. Therefore, it was replacing behavior in the scheme. Additionally, it was considered that communication is not the only factor leading to acceptability, but it is the entire water management system, which includes, besides communication, facilities and economic instruments.

Many factors potentially influenced the implementation of the *sumur resapan* system in local community. Hence, it is necessary to know human-dimension factors that can be assessed through perception, knowledge, awareness and attitude. Perception can be defined as ability to perceive issues in the real world, based on memory and influenced by prior experience (Lindamood, 2001). Knowledge is a body of facts and principles concerning any issues that have been accumulated by mankind through study (Clarke, 1999). Awareness is defined as the attention, concern (mindful or heedful) and sensitivity of the respondents (McHenry, 1992; Soukhanov, 1992). By knowing the perception, knowledge, and awareness of the community, it can be drawn better understanding about factors influencing implementation of the *sumur resapan* system for program improvement.

Chapter III. Description of Research Area

3.1. General Condition of Rembang Regency

Based on administrative boundary, Rembang regency borders on three regencies; Pati regency on the western part, Blora regency on the southern part, and Tuban regency on the eastern part. Meanwhile, on the northern part is Java Sea lying on lies on 111°00' - 111°30' west longitude and 6°30' - 7°00' south latitude. The total area of Rembang regency is 1.014,08 km² with diagonal range from west to east 50,5 km and north to south 34 km. Rembang regency is divided into 14 districts.

The land use pattern of Rembang regency can be classified into several categories. The detail number of land use is delineated on table 3.1. As mentioned in table, more than half areas of Rembang regency form agricultural areas. The use of land for can be associated with type of water consumption that means most of water resources in Rembang are used for irrigation scheme. Changes in land use affect the regional hydrological condition, which in turn causes a social response. With increasing urbanization, more area comes under construction, which may be reducing the permeable area. As a result, less rainwater probably infiltrates into the ground, thereby reducing groundwater recharge. In addition, with an increase in impermeable areas, more runoff is generated when it rains, probably further reducing groundwater recharge.

Table 3.1. The Land Use Pattern of Rembang Regency 2004

Land use	Width (Ha)	Percentage (%)
Dry field	34.798	34,3
Paddy field	28.652	28,3
Forest	23.556	23,2
Embankment	1.276,3	1,3
Swamp	70,9	0,07
Fishpond	30,4	0,03
Plantation	517,1	0,5
Building & settlement	9.050,2	8,9
Others	3.457,2	3,4
Total	101.408	100

Source : BPS Rembang Regency 2004

In 2005, the number of population in Rembang Regency reaches 584,020 inhabitants; consist of male 291,121 and female 292,899. The population growth is 0.84%. In this year, the population density per km² is 558 inhabitants / km². The number households in Rembang regency are 291,121 inhabitants; with average household size are five, for detail description in table 3.2. From all districts in Rembang regency, Rembang district has the largest population and the densest district serving as capital city of Rembang Regency. Increasing population will increase the needs of water whether domestic or industrial purposes.

Table 3.2. Population Growth in Rembang Regency 2001 – 2005

Year	Household	Population		Total	Sex ratio	Growth (%)
		Male	Female			
2001	145,078	278,234	281,053	559,287	99.0	-
2002	146,147	282,844	283,016	565,860	99.9	1.18
2003	147,149	286,172	286,566	572,738	99.9	1.22
2004	148,042	289,199	289,954	579,153	99.7	1.12
2005	291,121	291,121	292,899	584,020	99.4	0.84

Source: BPS of Rembang Regency, 2006

The agriculture is still dominant sector in regional economic. The Economic growth in Rembang Regency period 2001 – 2004 shown a significant graphic shift with average level of growth is 3.83%. In year 2001 economic growth of Rembang Regency was 3.98% and decreased to 3.77% in year 2002. In year 2003, the growth increased up to 3.82% and in year 2004 decreased again to 3.80%. The economic growth of Rembang Regency can be illustrated in the chart on figure 3.1.

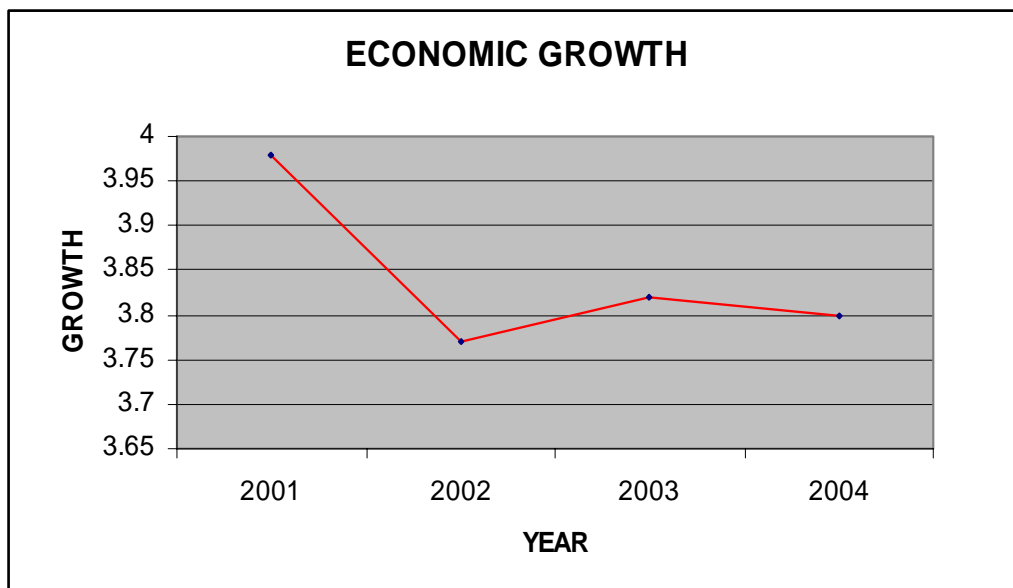


Figure 3.1. Economic growth of Rembang Regency

Source: BPS of Rembang Regency, 2006

Agricultural sector needs adequate water resources to be well developed. Due to unfavorable climatic and geographical factor also poor infrastructure, the agriculture sector in Rembang regency profoundly relies on rainwater for cultivation (*tadah hujan*). Meanwhile, the population and economic growth also increases water demand for domestic and industrial purposes. It is complicated circumstance that the awareness of water crisis stimulates the local authority prioritizing water policy for domestic purpose rather than agriculture and industry. It is reason why agricultural sector as the major contributor in regional economic is not growing well compared with neighboring region that also happen for industry. So that water resources is perceived as constraint for economic development in Rembang Regency that should be handled well.

3.2. Hydrological condition

The existing of water resources will enormously depend on surrounding hydrological condition that is influenced by climatic and geologic factors. Climate and soil characteristics influence hydrological condition within Rembang area. Oldeman in syahbudin (2004) determined monthly rainfall zone based on the sufficiency of paddy field. Zone classification of monthly rainfall by Oldeman is divided into wet month period (average rainfall > 200 mm/month), humid month (200 mm/month > average rainfall > 100 mm/month) and dry month (100 mm/month < average rainfall). Nevertheless, Oldeman did not consider soil condition. But actually, there are two biophysical characteristics to determine hydrological zone that are soil and climate. Soil has function to store and flow water. Whereas climate through its variables such as rainfall, temperature, solar radiation, win speed and humidity has each function related to availability and loss of water.

According to Syahbudin (2004), Climatic parameters are important to determine water availability entire of a year. Climatic parameters are also used to determine dry day opportunity, available water capacity, water losses, evaporation, water balance an dry index (Palmer's index). As shown on figure 4.2, within Central Java province, dry index consists of very wet, wet, mediocre and dry. 59 percent of this area is classified as critical area to water scarcity. Almost this area (I1,I2 and I3 pattern) is lied on northern coast and southern coast of Central Java province, mainly Blora and Rembang regency.

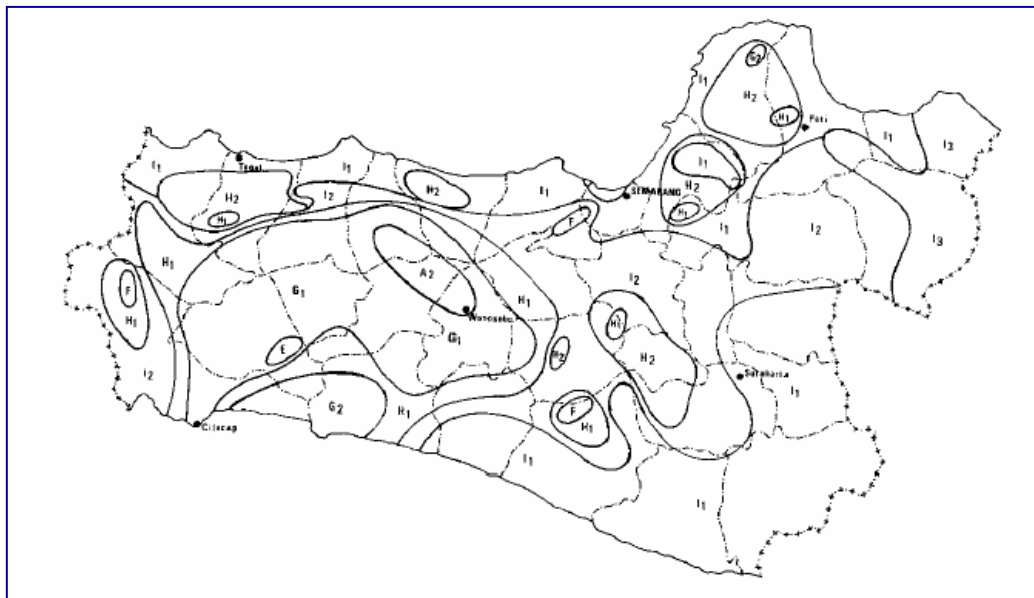


Figure 3.2. Dry zone in central Java province
Source: Syahbudin, 2004

Furthermore, Rembang Regency also has different average annual rainfall level across the area. Regarding to Oldeman, Almost area is classified as humid. Only little part in the south Rembang region is wet and the rest area in the north coast is dry. This condition can be presented more detail at figure 3.3.

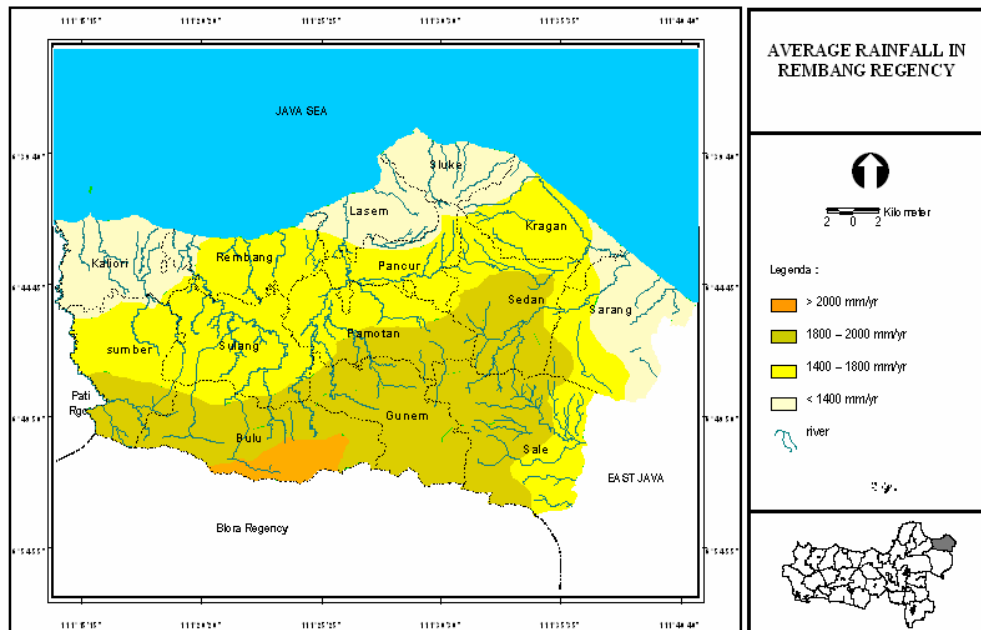


Figure 3.3. Average rainfall in Rembang Regency
 Source : Regional planning Board, Rembang Regency

The given geological condition also makes complicated water problem within Rembang regency. As mentioned before, Rembang regency has no large basin to support proper water system. Rembang area is included into *Jratun-Seluna* river system. According to Gunatilaka et al. (2006), the river basins in the *Jratun-Seluna* river basin complex are relatively steep, short, and most of the wet season water runs unused into the sea. The reservoirs in the catchment can hold very little of the total river flows. During the last three decades of rapid economic development, this limited resource has been subjected to multiple and frequently conflicting demands. There is a need for the reduction of groundwater use, as the aquifers in central Java close to rapidly growing urban centers are already suffering from over-extraction, resulting in lowering the groundwater level, salt-water intrusion and land subsidence (e.g. Semarang). This can be achieved only through rational and conjunctive use of river water and groundwater. Table 3.3 presents general characteristics of *Jratun-Seluna* River system.

Table 3.3. *Jratun-Seluna* River Complex

River system	Length (km)	Catchment area (km ²)	Average rainfall (mm)	Run-off (m ³ /sec)	
				Max	Mean
Jragung	75	354	2486	7.28	4.75
Tuntang	107	831	2546	43.80	28.43
Serang	233	1343	2497	119.00	130.00
Lusi	170	2057	1812	35.72	15.77
Juana	62	1269	2060	89.24	30.00

Source: Department of Public Work

Based on facts above, It can be concluded that Rembang regency is experienced water problem due to given condition. Therefore, the local authority should be aware that the water scarcity will emerge excess impact in social live. Mursito (2003) identified several impact of water scarcity i.e.:

1. Social Impact, the water scarcity will stimulate social problem. Water necessity for drinking, bathing and washing are primary need for human. Due to water scarcity, people must pay for water fulfilment that becomes burden for people. Insufficient Water for agriculture may cause starvation.
2. Agricultural Impact, water is essential for cultivation; the inadequate water may cause loss of production for agricultural activity.
3. Health Impact, skin disease may occur due to rarely bath in tropical area. Also dust may cause respiratory disease.

3.3. Water Crisis in Rembang Regency

Considering climatic and soil parameters, it can be predicted that Rembang regency would experience water scarcity in several places within area. Marsono et al. (2003) explained that drought means insufficient water to fulfill its necessity because water supply is under expected level. Droughts can initiate disaster and complicated problem for people. The spread of water scarcity can be predicted by dry zone. As shown on figure 3.4, almost part of Rembang area is vulnerable to water scarcity occurred in northern coast area concentrated in Kragan and Sarang district and in the middle of west area concentrated on kaliore, Sumber, Sulang and Bulu district.

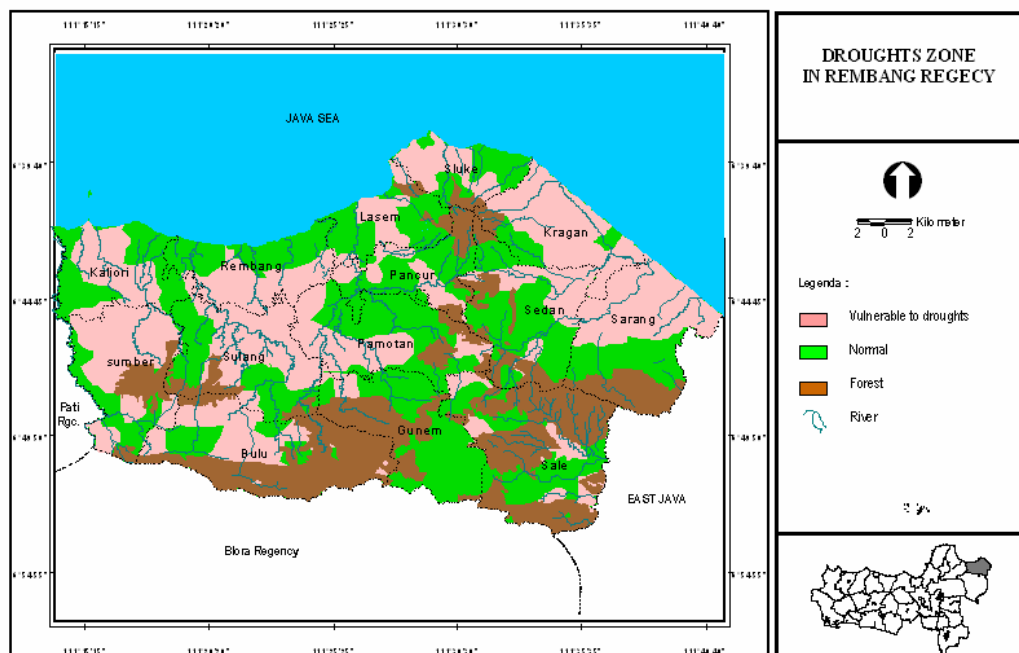


Figure 3.4. Droughts zone in Rembang Regency
 Source : Regional planning Board, Rembang Regency

Furthermore, the local government has identified potential water crisis in each district as seen on table 3.4. Almost of 14 districts within Rembang Regency has experienced water crisis for years mainly in the drought. As shown on table below, approximately 40 percent of Rembang inhabitant is vulnerable to water scarcity in

2005. Based on the location, several districts have extreme condition for water scarcity such as Kragan district that 25 out of 27 sub districts are vulnerable to water scarcity.

Table 3.4. Vulnerable Sub districts to Water Scarcity in Rembang Regency 2005

No	District	Number of sub district		Number of household	Number of people
		total	vulnerable		
1	Rembang	34	16	7060	29374
2	Kaliori	23	8	2656	8468
3	Sulang	21	16	5085	18088
4	Sumber	18	14	6747	23822
5	Bulu	16	12	3876	13871
6	Lasem	20	8	3191	12808
7	Pancur	23	10	2284	8421
8	Sluke	14	10	3630	13088
9	Kragan	27	25	5910	22863
10	Sarang	23	18	10066	40982
11	Sedan	21	9	4191	16105
12	Pamotan	23	12	3629	14709
13	Gunem	16	3	697	2702
14	Sale	15	5	2910	10416
	Total	294	166	61932	235717

Source: Social welfare division Secretariat of The local government of Rembang Regency

3.4. Water Crisis Mitigation

The water provision is main issue for Rembang Regency over decades. The water distribution served by Water Company (*PDAM*) can not overcome water crisis due to limited pipe network. In 2005, the *PDAM* only served 12,997 costumers and consumed 304,875 M³ per month that means only covering 2 percent of Rembang inhabitant. For year, the local government has to spend budget for mitigating water scarcity in Rembang Regency. The mitigation policy was emphasized on water provision primarily in droughts. It was realized as clean water aid for basic domestic purposes distributed by water-tank truck as illustrated on figure 3.5. For detail, data on table 3.5 mentioned that Kragan and Sarang district absorbed biggest number of this aid.



Figure 3.5. Water aid dropping by water tank truck

Table 3.5. Number of Water aid in Rembang Regency 2004

No	Districts	Number of sub Districts	Number of water aid (tank truck)
1	Rembang	10	115
2	Kaliori	8	70
3	Sulang	12	114
4	Sumber	12	102
5	Bulu	7	47
6	Lasem	6	48
7	Pancur	10	56
8	Sluke	7	63
9	Kragan	8	134
10	Sarang	18	170
11	Sedan	11	90
12	Pamotan	6	48
13	Gunem	4	54
14	Sale	4	24
	Total	123	1,135

Source: Social welfare division Secretariat of The local government of Rembang Regency

Dealing with water problem in Rembang Regency can not be overcome only with mitigation effort. It is necessary for the local authority to anticipate this condition wisely in coping with natural constraint that is given and the recurrent water problem almost every year. Therefore, it will need strong effort and willingness to find the best solution upon those challenges. It becomes challenges to develop the best practices of effective water resources management that is responsive to actual problem.

Chapter IV. Research Method

4.1. Type of Research

Regarding the research question, this research can be categorized as a descriptive empirical research. The sustainable water management, interactive management and community perception which are the main topic of this research can be drawn from the literatures to develop the logical framework as delineated on figure 4.1. Based on these concepts, the variables and indicators were determined in order to answer the research questions.

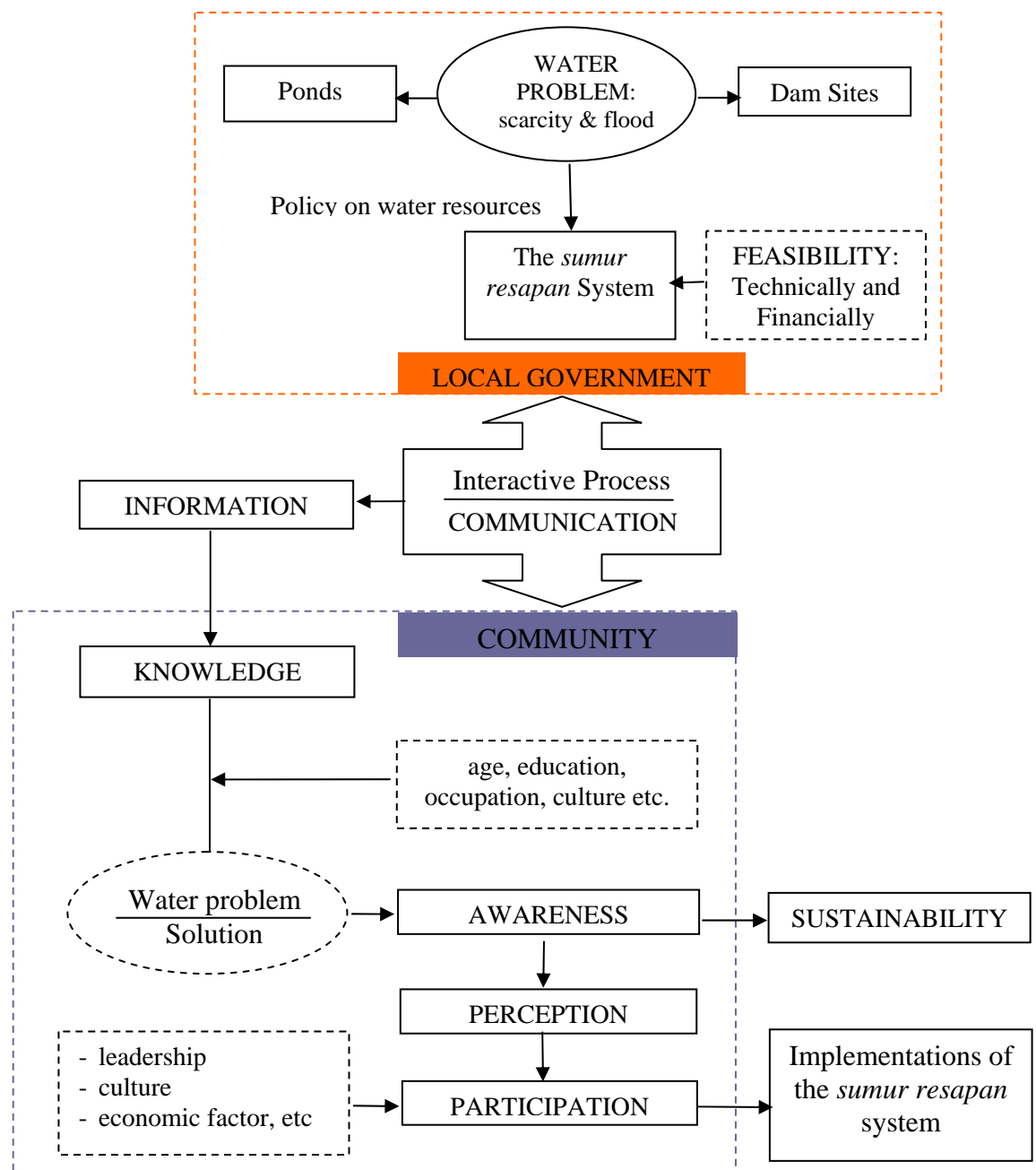


Figure 4.1. Logical Framework

4.2. Research Variable and Indicator

From the concept and logical framework, several variables drawn for the analysis were:

- Local policy. The policy of the local government for managing water resources in utilization and preservation supported by proper regulation and policy instrument that must be obeyed.
- Interactive process. Interaction among the local government, community and water system will determine sustainability of the program.
- Community perception of the *sumur resapan*. The ability of the community to perceive the *sumur resapan* system based on their memory and influenced by prior experiences
- Level of community participation. The degree of the community participation in the implementation of the *sumur resapan* program.

To gain proper information in the research, several indicators were needed to assist the process of data collection in the field. Those variables is elaborated on table 4.1

Table 4.1. Variable and Indicator

Research Questions	Variables	Indicators
<ul style="list-style-type: none"> ▪ What is the local policy on water resources management in Rembang regency? 	<ul style="list-style-type: none"> - Local policy 	<ul style="list-style-type: none"> - Water resources policy - Law and regulation on water resources management - Policy instruments for water resources management
<ul style="list-style-type: none"> ▪ How is the interactive process of the <i>sumur resapan</i> system in Rembang regency 	<ul style="list-style-type: none"> - Interactive process 	<ul style="list-style-type: none"> - Decision making process - Attitude of community - The role of local government - Stakeholders inclusion
<ul style="list-style-type: none"> ▪ How do people perceive the implementation of the <i>sumur resapan</i> system in Rembang regency? 	<ul style="list-style-type: none"> - Community perception 	<ul style="list-style-type: none"> - Perception on the <i>sumur resapan</i> - Knowledge of the <i>sumur resapan</i> - Awareness toward the <i>sumur resapan</i> - Attitude
<ul style="list-style-type: none"> ▪ To what extent is community involved in the implementation of the <i>sumur resapan</i> system in Rembang regency? 	<ul style="list-style-type: none"> - Community participation 	<ul style="list-style-type: none"> - People involved - Level of participation - Motivation to be involved

4.3. Data Collection

Data needed in this research were primary data and secondary data. Data and information were gained through the field observation and interviews with respondent.

a. Primary data

The primary data were collected from the field observation and interview toward competent respondent in the implementation of the *sumur resapan* i.e.: the government official and the local community in three sub districts covered by the *sumur resapan* project. The list of respondent can be seen on table 4.2.

Table 4.2. List of Respondent

Instrument	Respondent
<ul style="list-style-type: none"> ▪ interview guideline 	<ul style="list-style-type: none"> ▪ Official of Regional development planning board (<i>BAPPEDA</i>) <ul style="list-style-type: none"> - Head of facility and infrastructure division ▪ Official of Environment and mining office <ul style="list-style-type: none"> - Head of groundwater section ▪ Official of the Forestry and plantation office <ul style="list-style-type: none"> - Head of forestry and plantation office - Head of protection and conservation division - Project manager - Field officer - Facilitator (<i>penyuluh</i>)
<ul style="list-style-type: none"> ▪ interview guideline ▪ semi structured questionnaire 	<ul style="list-style-type: none"> ▪ Head of 3 sub-districts ▪ Local institution (<i>BPD</i> and <i>LPMD</i>) in 3 districts ▪ Local NGO ▪ Community in 3 sub-districts : 90 respondents

b. Secondary data

The secondary data were collected through literature review and documents analysis related to the implementation of the *sumur resapan* system also water management. Those data were:

- Water policies issued by the Local Government of Rembang Regency,
- Annual programs of the government institutional within the Rembang Regency, which has a responsibility in protecting water resources and dealing with water scarcity.
- Annual reports of the Forestry and plantation office in dealing with water resource conservations.
- Data related to the hydrology condition in Rembang Regency.
- Thematic map and statistical data related to implementation of the *sumur resapan* system

4.4. Units of Information

Units of information are sources where data can be collected. In the units of information, it looked for informants that could provide data and information that were needed for the research. The informants are respondent that can give important data and information on the implementation of *sumur resapan* system in Rembang Regency. Units of information for this research were:

- Local government. The Local Government has an important role in conserving water resource. The role of the Government is not only formulating laws and regulations, but also implementing water resource management through developing infrastructures and delivering development program. From this unit of information, the policy instruments that have been issued and the performance of the program

delivered by Local Government in implementing the *sumur resapan* system can be identified.

- Local community in the sub-district. The local community is the main stakeholder of the implementation of the *sumur resapan* system. The successful of the program will be relied on the community acceptance and participation. Through interview, the perception, knowledge, awareness and the level of participation can be formulated.

4.5. Data Analysis and Interpretation

To analyze the data, this research uses descriptive method. The descriptive method is explanatory of observation data that was collected during the research. The explanation of observation data was verified based on literature analysis. In the qualitative analysis, it is required to validate the data. One of techniques used was triangulation method. The method is presented on figure 4.2.

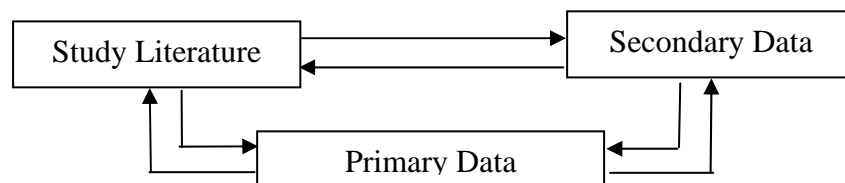


Figure 4.2. Triangulation Method

Figure 4.2 depicts that between three data sources is verified in order to get interrelations one another. The analysis will cover:

- Water resource management. This will analyze policies and regulations which are issued by the Local Government in managing water resources.
- Interactive process. The mechanism of the *sumur resapan* program will be assessed for understanding interactive process during implementation.
- Implementation of the *sumur resapan* system. The ongoing implementation of *sumur resapan* system will be evaluated to find out the performance of the program.
- Community perception. The perception of community toward the implementation of the *sumur resapan* system will be explored for understanding factors influencing the involvement of the community.
- Community participation. The analysis will asses level of community participation in the implementation of the *sumur resapan* system in Rembang Regency.

Based on the analyses listed above, this research draw conclusion and eventually in the closing stage of this research, several recommendations for improving water resources management will be formulated in order to cope with water scarcity in Rembang regency.

4.6. Research Design

This research was conducted largely through field survey employing several instruments such as interview using semi-structured questionnaire and interview guideline. Regarding implementation of the *sumur resapan* system, this research interviewed key respondents who had involved in the project such as project manager facilitator (*penyuluh*) and community leader. Furthermore, the observation and the data collection

was carried out with interview using interview guideline over community in three sub-districts within Kragan districts.

Kragan district considered as a vulnerable area to drought⁷ was chosen purposively as research location where the *sumur resapan* mostly allocated. The three sub districts within Kragan district i.e.: Sendangmulyo, sendangwaru and Ngasinan were the unit of analysis considering the existing project of the *sumur resapan* that had been implemented since 2004⁸ assumed have impact to the local community. The map of Kragan district and the three sub districts as unit of analysis is delineated on figure 4.3.

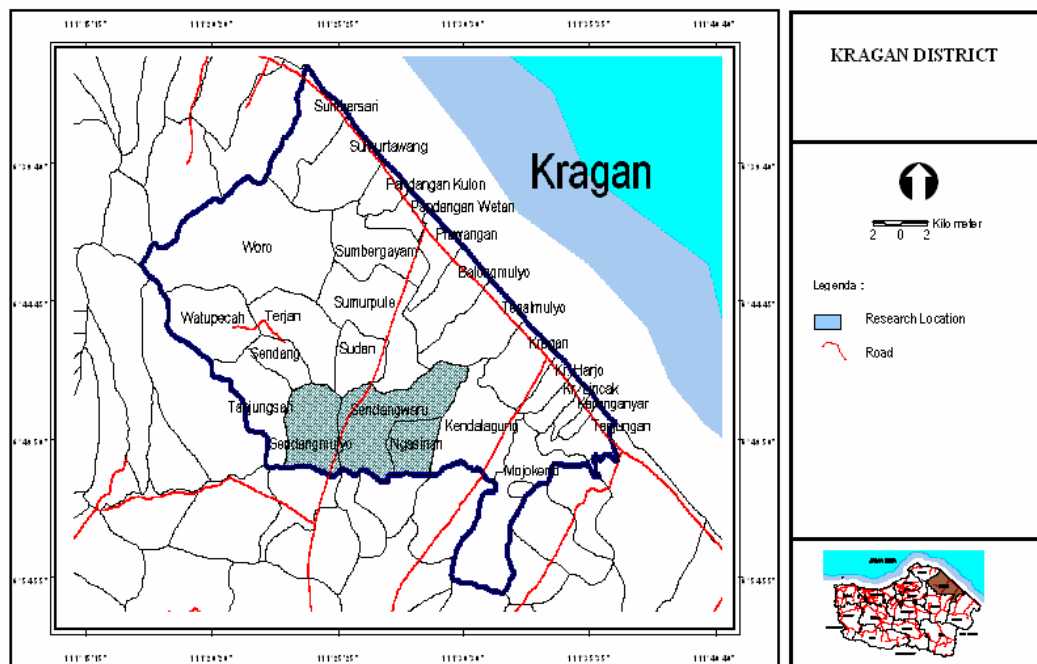


Figure 4.3. Research Location

4.7. Time Frame

Stage	Month	March	April	May	June	July	Aug	Sept
proposal								
literature review								
instrumentation								
data collection								
analysis and report writing								
submission								

⁷ Preliminary data collected from Regional Planning Board, Rembang Regency, 2005

⁸ Preliminary data collected from Forestry and Plantation office, Rembang Regency, 2006

Chapter V. Results and Analysis

5.1. The Water Resources Management in Rembang Regency

The local government simultaneously attempts to overcome water crisis in Rembang regency. The water crisis has strong relation to the capacity of water resources producing freshwater. Rembang is not supported by significant basin system whereas basin system has widespread impact for human life as stated by Falkenmark (2005) that most civilization developed upon dominant basin system for gaining welfare. Therefore, the local government has to carry out best water resource management in dealing with water crisis. The momentous shift of water policy was initiated by elected-regent last year. The new regent has concerned to improve infrastructure related to water provision. Besides mitigating the impact of droughts, the local government has been concerning important program to prevent water scarcity in Rembang Regency through water resource conservation. Water resources conservation is considered more sustainable steps to cope with water problem. This policy implemented in two kinds of development project i.e. civil engineering and vegetation for water and soil conservation. Overall, the local government should consider the improvement of water resource management in Rembang regency supported by proper legal framework.

5.1.1. Institution and Regulation

Indonesian law Number 7/2004 on water resources (*UU-SDA*) is the main umbrella of water management in Indonesia. Article 16 mentioned that the local government or municipality has authority and responsibility to issue policy, pattern, and plan for water resource management, regulate permit for water usage and establish water resources board for managing water resource within jurisdiction or basin area. This statement means that the local government has opportunity to manage water resource based on local situation.

The most essential of this law is the establishment of water authority institution within local government/municipality as independent institution. In practice, water authority institution in local government/municipality level does still not exist. Until now, the most responsibility of the water resources management is still handled by central government institution- *Badan Pengelola SDA* (water resources manager body) and *Badan Pengelola DAS* (river basin manager body) for *Jratun-seluna* basin system. The centralistic management seems as constraint for policy integration in the local context. The local government of Rembang Regency has at least four institutions deals with water resource management such as Public work office, environment and mining office, forestry and plantation office, and regional development board. This situation becomes complicated because each institution has no specific function in the water management that makes inefficiency in coordination and often overlapping each other particularly for issuing regulation.

Based on observation, the local authority is lack of regulation on water resource management. There is no regulation in water resource utilization and conservation in Rembang Regency although the local government has responsibility based on law to control water resources within its jurisdiction. Actually, the local government could extent regulatory instruments implementing water resources policy. For example, several municipalities in Java have been giving prerequisite to construct the *sumur resapan* in issuing building permit but it can not be adapted generally and should consider the diversity of socio-cultural characteristics.

Interview toward local government official in four competent institutions for water resources management revealed that the local authority have no strong commitment to environmental regulation. During observation, the local government is only issuing one by-law regarding water resource management for managing the utilization and abstraction of Kajar water spring. The regulation was initiated by emerging conflict among community, wells owner and water vendor in utilizing freshwater. It is ironic situation that the local government has no proper regulation in water resource management while Rembang regency has experienced water crisis for many years. Even the competent institutions are never proposing specific regulation for water resource management. Table 5.1 illustrates current competent institution for water resources management.

Table 5.1 Competent institutions for water resources management in Rembang Regency

Institutions	Main task
Central government	
▪ <i>Badan Pengelola SDA & DAS</i> (Water resources and river basin manager body)	Managing <i>Jratun-Seluna</i> river system
Local Government	
▪ <i>Badan Perencanaan Pembangunan Daerah - Bidang Sarana Prasarana</i> (Regional development planning board – facility and infrastructure division)	Planning the need of facilities and infrastructures
▪ <i>Dinas Pekerjaan Umum - Bidang Pengairan</i> (Public work office- irrigation division)	Constructing irrigation scheme
▪ <i>Dinas Kehutanan dan Perkebunan – Seksi Konservasi Tanah dan Air</i> (Forestry and plantation office-soil and water conservation)	Conserving soil and water resources
▪ <i>Dinas Lingkungan Hidup dan Pertambangan – Seksi Air tanah</i> (Environment and mining office- groundwater section)	Controlling groundwater utilization
▪ <i>PD-AM</i> (Local water company)	Clean water provision

Source : field observation

In practice, the poor regulation in water resource management means the lost of government control toward water utilization that has impact on water depletion and environmental degradation. For illustration, the local government does not regulate tariff for raw surface water. Water tariff is important management tool for water consumption. Until now, raw water for irrigation, even for water company is not valued. No tariff for raw water surface would emerge over exploitation toward water resource. Similar treatment also happens in groundwater utilization, there is no regulation for groundwater use even more for conserving water resources. In regard, sustainable water resource management, it should start to articulate policy with regulation to prevent the negative impact of over consumption on water resources.

5.1.2. Water Resource Conservation

Water resource conservation is important effort to overcome water crisis in sustainable way. Due to geological and climatic condition in Rembang regency, the strategy to cope with water crisis in this area is optimizing rainfall catchment capacity

for water retention. The local policy is focused on issue how to store potential rainfall so that it can be used over the entire year. The main emphasis is to construct surface water reservoirs to store excess water. Reservoirs and dams may provide water storage from season with water surplus to season with deficiency. Until now Rembang has 16 *embungs* (small dams) that have function for irrigation and providing raw water. The new regent has mission to develop big dam with high capacity to store rainfall potential by developing two dams with flooded area more than 50 ha. Although it is expected to give regional impact for triggering economic growth, the on going project is very costly and facing crucial problem in land clearance.

The local government also has been constructing low-cost water conservation building in community scale such as check dam, ponds and infiltration wells. As shown on table 5.2, check dams, ponds and the *sumur resapan* have been constructed dispersedly in almost districts within Rembang Regency. The dams, ponds and the *sumur resapan* system are aimed to control water flow and to increase the rainwater storage. Currently, the local government also has been disseminating underground storage that technically has more advantage than surface storage. Considering technical feasibility and cost-effectiveness, the local government has emphasized on the implementation of the *sumur resapan* system for water resources management. In period 1998-2005, the local government has constructed 248 units of the *sumur resapan* building through block grant scheme. The *sumur resapan* is technically recommended reducing evaporation, one major loss from reservoir and considered as a low-cost investment for construction.

Table 5.2. Soil and Water Conservation Building in Rembang Regency 2005

No	Districts	Building (Unit)		
		Check dam	<i>Sumur Resapan</i>	Ponds
1.	Sumber	2	34	6
2.	Bulu	10	6	-
3.	Gunem	4	6	1
4.	Sale	-	-	-
5.	Sarang	1	41	2
6.	Sedan	2	33	-
7.	Pamotan	-	20	-
8.	Sulang	-	28	-
9.	Kaliori	-	-	-
10.	Rembang	-	3	3
11.	Pancur	2	21	-
12.	Kragan	2	48	1
13.	Sluke	2	3	-
14.	Lasem	2	5	-
	Total	27	248	13

Source: Forestry and Plantation Office of Rembang Regency, 2005

5.2. The Interactive Management in The implementation of The *Sumur Resapan*

For a long period, the majority inhabitants in Rembang rely on groundwater resource for domestic purposes. The problem has emerged when the droughts happened. As mentioned above, water scarcity occurred in more than a half of total sub-districts within Rembang Region. Due to its recurrence, the local government has initiated disseminating the *sumur resapan* system for maintaining groundwater

resource in the community level. The *sumur resapan* is designed as a simple construction that was handled well in the community level. The community involvement in the implementation of the *sumur resapan* is expected to trigger self-supporting effort and raising awareness to the local community.

The local government allocated budget for constructing the *sumur resapan* system in several sub-districts based on proposal and priority. The community proposed budget allocation for the *sumur resapan* construction and the local government prioritized based on technical and financial feasibility. The implementation of the *sumur resapan* allowed interactive process between local government and local community. The interactive water resources management is basically interaction process between government, society and water system. The interactive management means reducing government intervention and increasing community participation in the implementation of development program. In regard with water resource management, the process can be categorized as interactive if at least community play role as an advisor in the policy making.

Hoofsteede in Khairuddin (1992) distinguished participation into three levels: 1) Initiative participation is inviting initiative from local leader, whether formally or informally, or from community about project which further become necessity for community. 2) Legitimizing participation is participation in the level of discussion or decision making about the project. 3) Executive participation is participation in the project implementation. From the three level of participation, initiative participation is the best practice of participation compared with two others that people are not merely development object but they could decide and propose particular plan to be implemented. The result will be different if people only participated in legitimating or executing certain project.



Figure 5.1. The implementation of the *sumur resapan* projects

Data on table 5.3 denote the construction of the *sumur resapan* each district within Rembang Regency in period 1998-2005.

Table 5.3. Construction of the *sumur resapan* (unit)

No	Districts	The <i>sumur resapan</i> (Unit)								Total
		1998	1999	2000	2001	2002	2003	2004	2005	
1	Sumber	16	-	9	4	5	-	-	-	34
2	Bulu	-	-	3	-	3	-	-	-	6
3	Gunem	-	-	-	-	-	6	-	-	6
4	Sale	-	-	-	-	-	-	-	-	-
5	Sarang	-	-	-	-	-	-	17	24	41
6	Sedan	-	-	-	-	-	18	15	-	33
7	Pamotan	10	-	4	-	-	6	-	-	20
8	Sulang	17	-	3	8	-	-	-	-	28
9	Kaliori	-	-	-	-	-	-	-	-	-
10	Rembang	3	-	-	-	-	-	-	-	3
11	Pancur	18	-	3	-	-	-	-	-	21
12	Kragan	-	-	4	-	-	-	18	26	48
13	Sluke	-	-	3	-	-	-	-	-	3
14	Lasem	-	-	5	-	-	-	-	-	5
		64	0	34	12	8	30	50	50	248

Source : Forestry and Plantation Office of Rembang Regency, 2005

Through field observation, it seems that the *sumur resapan* is not significant developed. It wonders what reason actually people had been motivated to implement *sumur resapan* in their neighborhood or merely expecting subsidies from the government. Based on observation in three sub districts, in practice the *sumur resapan* was implemented in the different interactive process. The different interaction might be assumed has impact on the community acceptability. The community perception can reveal the practice of interactive processes that can be concluded and recommended for further improvement.



Figure 5.2. Existing Condition of the *Sumur Resapan* in Kragan District

5.2.1. Case of Sendangmulyo Subdistrict

The interactive process in Sendangmulyo sub district was initiated by bottom up planning mechanism through *Musdes - musyawarah desa* (community meeting and discussion) in sub district level. The community aspiration is proposed officially to the district government and coincidentally to the forestry and plantation office. In Sendangmulyo case, stakeholder inclusion is relatively on right track. *LPMD* (local institution for development), *BPD* (local representative) and local NGO participated actively to ensure the success of implementation. At the same condition, the local community was also involved actively by *gotong royong* (self-help) that is considered as social capital supporting development process. The local community still faced constraint in the implementation of community partnership mechanism (*SPKS-sistem pelaksanaan kerja sama*) between local community and local government. The role of local government through facilitator was not optimally practiced because the facilitator did not give sufficient guidance to the local community in regard the transfer of information and technical supervision.

In general, the implementation of the *sumur resapan* in Sendangmulyo sub district can be categorized as proper interactive management. Figure 5.3 illustrates the interactive process among stakeholders in Sendangmulyo sub district.

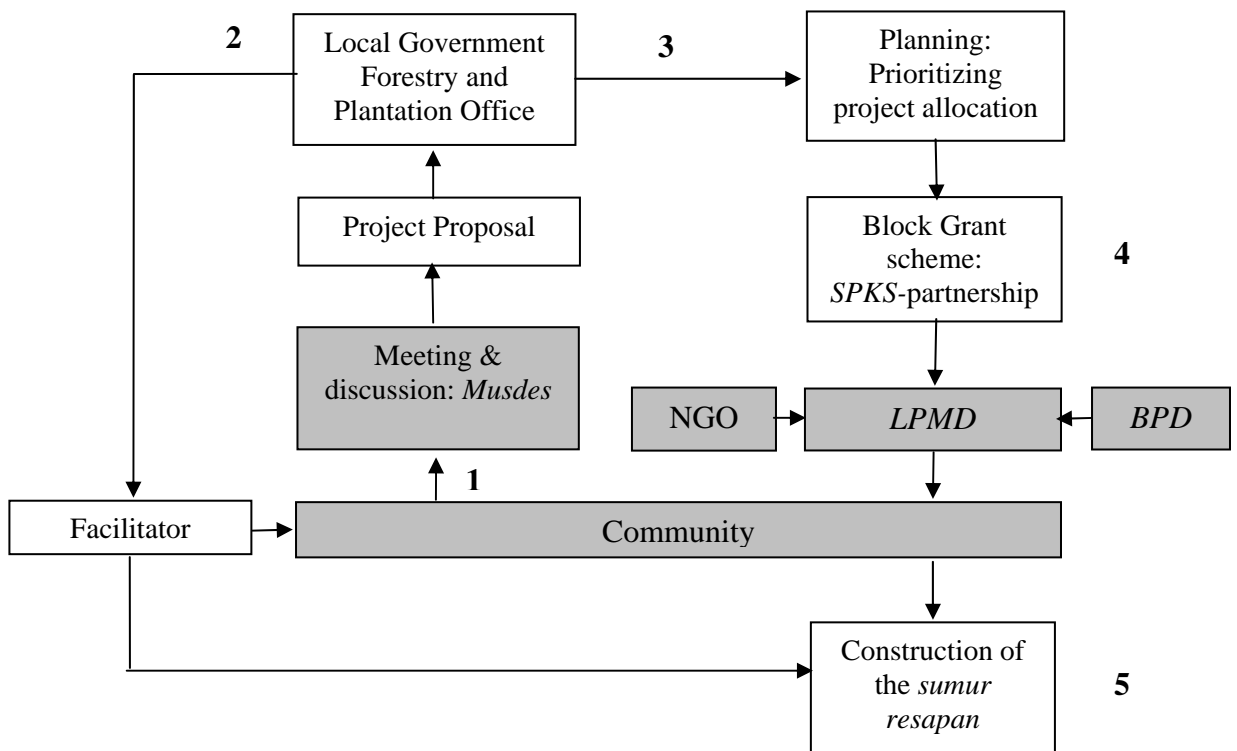


Figure 5.3. Interactive process in Sendangmulyo sub-district
Source: interview

5.2.2. Case of Sendangwaru Subdistrict

Employing the same mechanism (*SPKS*), the interactive process in Sendangwaru sub district was implemented in different way. The head of sub district was dominating the implementation of the *sumur resapan* whether in planning stage or

in execution. The local leader took control every single part of implementation. This domination happened due to the inactivity of stakeholder. The local NGO, *LPMD* and *BPD* as local institution did not give contribution properly in the development process. In interview, they told that local institution was never included in the decision making process.

The improper practice of community involvement is also experienced in Sendangwaru sub district. The local community only involved due to instruction and interested to get additional wages from the project. In interview, the community seemed skeptic to the implementation of the *sumur resapan* because they felt not involved in the planning.

This condition is perhaps as a consequence of the interaction pattern between facilitator and local community. The facilitator merely gives information through socialization in the head of sub district meeting held by district government. Often facilitator did shortcut through direct interaction only with head of sub district for simplicity. In interview, facilitators confirmed that they often preferred to contact head of sub district due to the target of implementation and simplicity. The process of interaction in the implementation of the *sumur resapan* in Sendangwaru sub district is presented on figure 5.4.

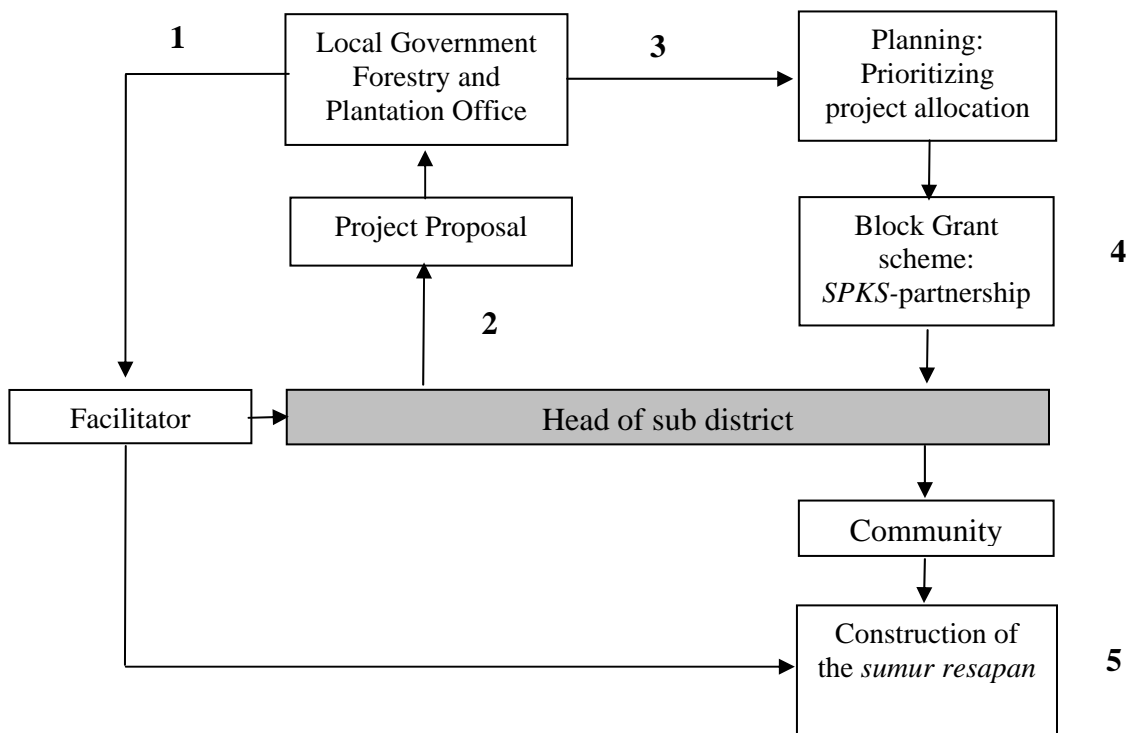


Figure 5.4. Interactive process in Sendangwaru sub-district
Source: interview

5.2.3. Case of Ngasinan Subdistrict

Similar situation also happened in Ngasinan sub district. The implementations of the *sumur resapan* in Ngasinan sub district is dominated by local elites that have strong influence in the development process although remain including local

institutions. The head of sub district was initiated the idea of *sumur resapan* construction stimulated by information from other sub district. Through short discussion with local elite and approval from *BPD*, the official proposal from Ngasinan sub district was responded by facilitator by giving short technical information related the project implementation. Further, the *SPKS* was delegated to *LPMD* to be executed.

The local community was interested to be involved due to additional income through wages for people giving contribution in the construction. Through interview, the local community mentioned that the quality of construction is poor. Many of the *sumur resapan* is broken short after project ended. Even the facilitator is rarely come to verify the damage. Overall interactive implementation of the *sumur resapan* in Ngasinan sub district is illustrated on figure 5.5.

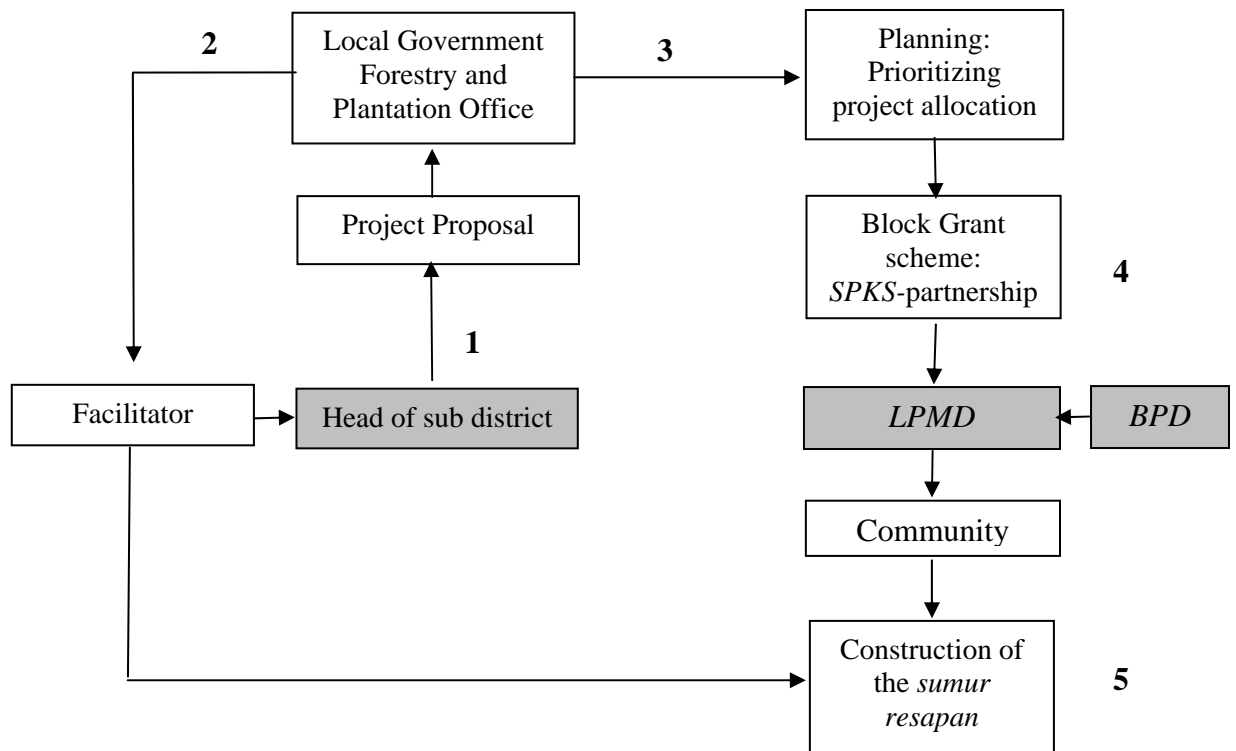


Figure 5.5. Interactive process in Ngasinan sub-district
Source: interview

5.3. Community Perception on The *Sumur resapan*

Trough field observation within three sub-districts could be identified the social economic characteristic of the community supporting further analysis. Those districts constitute agrarian regions reflected by the major occupation as a farmer and the most of area is used for crop production. The stereotypes of agrarian region in developing country are low education level and poor income. These factors might influence to their opinion on the *sumur resapan* system. This statement is empirically proven in many researches such as done by Sudarmadi et al. (2000). In a research toward environmental problem, it is analysed that the characteristics of the respondents such as level of education and age could influence toward perception, knowledge and

awareness. He concluded that the educated people had better perception, more detailed knowledge, and greater awareness. Moreover, the older people have more experiences than young people.

Data collected from respondent in three sub district revealed that Sendangmulyo sub district has relatively more educated people than two other. Meanwhile, Sendangwaru sub district is predominantly young age class compared with two other sub districts. Figures 5.6, 5.7, and 5.8 are the chart of age class and the level of education characteristic in three sub districts.

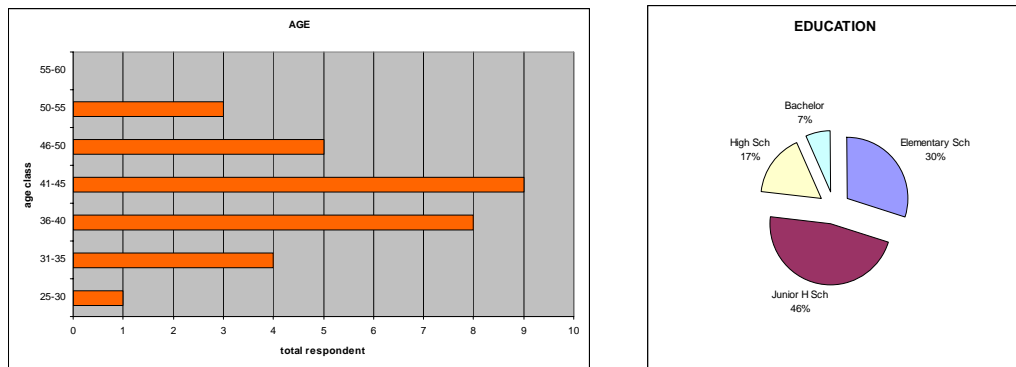


Figure 5.6. Class of Age and The level of education in Sedangmulyo Sub district

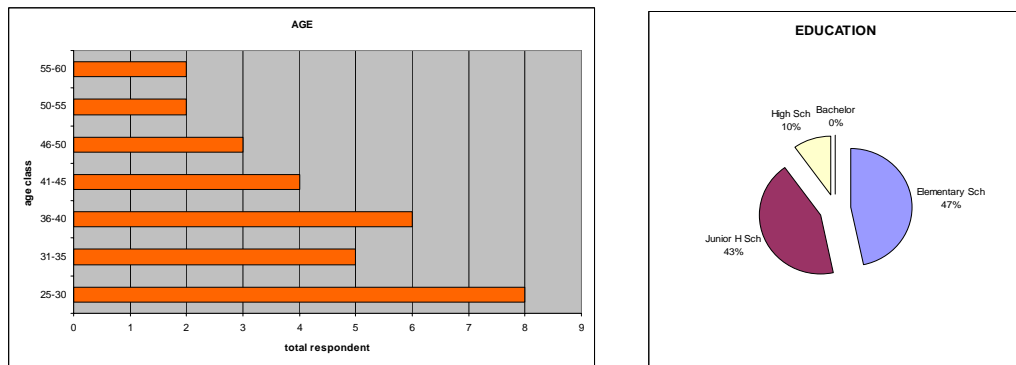


Figure 5.7. Class of Age and The level of education in Sendangwaru Sub districts

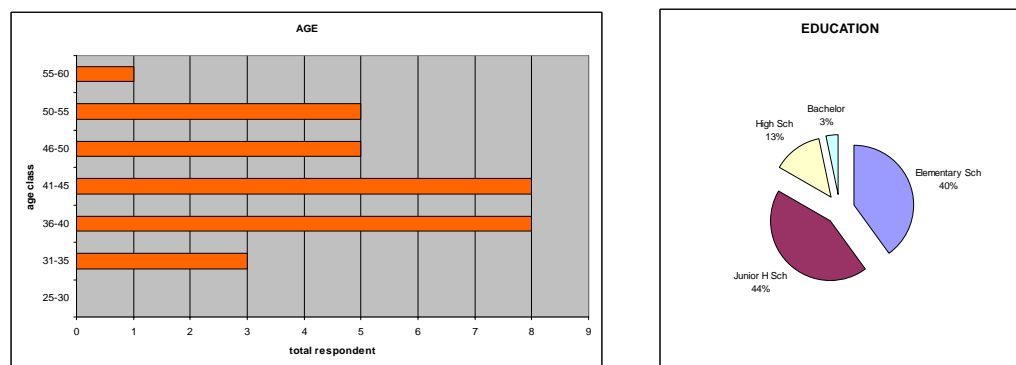


Figure 5.8. Class of Age and The level of education in Ngasinan Sub districts

Data collected from respondent is simplified by clustering opinion into simple categories. Respondent opinion can be classified into community perception, knowledge and awareness. Table 5.4 describes the variety opinion from respondent about the *sumur resapan*. The data analysis from three sub district reveals the different perception, knowledge and awareness.

Table 5.4. Respondent opinion on the *sumur resapan*

No	indicator	cluster	opinion
1.	Perception	Positive	<ul style="list-style-type: none"> ▪ <i>Sumur resapan</i> is well function. ▪ Groundwater is available in drought ▪ increasing Water pump debit ▪ Easier to collect water
		Negative	<ul style="list-style-type: none"> ▪ No difference before and after construction. ▪ <i>Sumur resapan</i> is not function ▪ Water did not infiltrate ▪ <i>Sumur resapan</i> is useless ▪ weak construction/poor quality
2.	Knowledge	sufficient	<ul style="list-style-type: none"> ▪ Rainfall reservoir ▪ Water retention ▪ Groundwater recharge
		Insufficient	<ul style="list-style-type: none"> ▪ Septic tank ▪ water processing ▪ ordinary wells
3.	Awareness	Necessary	<ul style="list-style-type: none"> ▪ Believed that <i>Sumur resapan</i> has impact in long period ▪ More attention from local government ▪ Additional wages
		Not necessary	<ul style="list-style-type: none"> ▪ Not effective effort ▪ Other project expectation ▪ Need artesian water ▪ Prefer to pipe installation ▪ Danger for cattle

Source : interview



Figure 5.9. The Condition of groundwater wells after the *sumur resapan* construction

Respondents from Sendangmulyo sub district perceived that the *sumur resapan* gives positive impact to overcome water scarcity in their place. 77 percent of respondent said that *sumur resapan* functioned well. They perceived there is different impact after the *sumur resapan* construction in their environment. 63 percent of respondent has sufficient knowledge about the *sumur resapan*. This phenomenon reflected that there is information transfer to the community that could be developed from the interactive process or embedded capacity of the respondent. 87 percent of respondent assumed that the *sumur resapan* is still necessary for the community. The community also asks for better water provision such as pipe network provided by local government.

Table 5.5. Number of Respondent giving opinion in Sendangmulyo subdistrict

No	indicator	cluster	Number of respondent	
			total	Percentage (%)
1.	Perception	Positive	23	77
		Negative	7	23
2.	Knowledge	Sufficient	19	63
		Insufficient	11	37
3.	Awareness	Necessary	26	87
		Not necessary	4	13

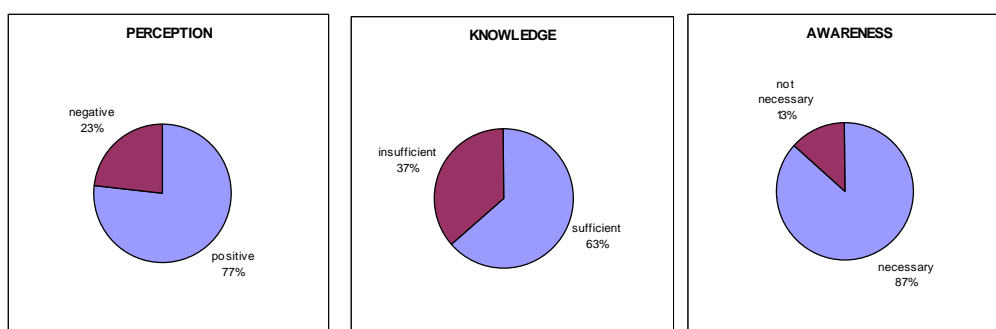


Figure 5.10. The Chart of the Respondent Opinion in Sendangmulyo sub district

Respondent from Sendangwaru subdistrict even gave negative perception toward the *sumur resapan*. 57 percent of respondent told that the *sumur resapan* did not function well. Even they had to drill their wells deeper to get water. 53 percent of respondent has sufficient knowledge about the *sumur resapan*. At last, 63 percent of respondent assumed that the *sumur resapan* is still needed for their community. The community also was also asking artesian wells for water provision in their place.

Table 5.6. Number of Respondent giving opinion in Sendangwaru sub district

No	indicator	cluster	Number of respondent	
			total	Percentage (%)
1.	Perception	Positive	13	43
		Negative	17	57
2.	Knowledge	Sufficient	14	53
		Insufficient	16	47
3.	Awareness	Necessary	19	63
		Not necessary	11	37

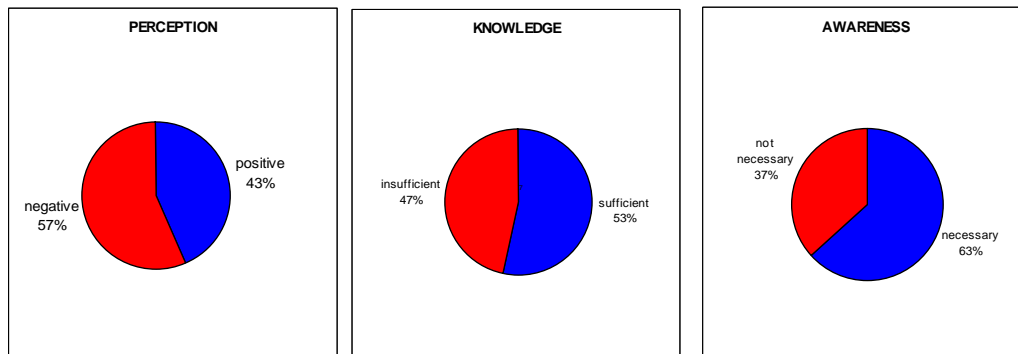


Figure 5.11. The Chart of the Respondent Opinion in Sendangwaru sub district

Respondent from Ngasinan gave better perception than Sendangwaru. 63 percent of respondent perceived that the *sumur resapan* work properly to increase groundwater table. 60 percent of respondent had sufficient knowledge toward the *sumur resapan* system. 70 percent of respondent assumed that the *sumur resapan* is still needed by local community in their place.

Table 5.7. Number of Respondent giving opinion in Ngasinan subdistrict

No	indicator	cluster	Number of respondent	
			total	Percentage (%)
1.	Perception	Positive	19	63
		Negative	11	37
2.	Knowledge	Sufficient	18	60
		Insufficient	12	40
3.	Awareness	Necessary	21	70
		Not necessary	9	30

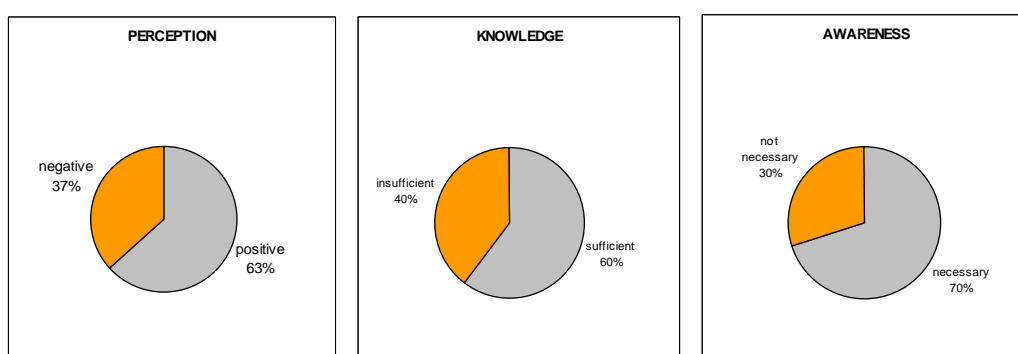


Figure 5.12. The Chart of the Respondent Opinion in Ngasinan sub district

5.4. Community Involvement in the Implementation of the *Sumur Resapan*

Godschalk in Sumitra (1996) stated that community participation is influenced by social, cultural and economic condition. The higher socio cultural value and economic capability in the community will be the higher participation in development. People have various motivations that will make different meaning of participation

although the same form. Motivation is factor stimulated people to do particular activity. Therefore, motivation is meaning stimulation factor for human behavior. It is also affirmed by Gitosudarmo and Mulyono (1996) that any human activity has stimulation factor. Further, the research of community participation and attitude in the rainfall infiltration wells construction, Sari et al. (1999) came up with conclusion that knowledge, age, formal education, occupation, dwelling time and construction cost are the factors influencing community participation.

The social economic characteristics of the respondent in three sub districts are represented by occupation and average monthly expenditure. Three sub districts shows similar category of occupation and expenditure level. The occupation is largely in farming sector with low average expenditure. Thoroughly, Sendangmulyo sub district has more various occupation and better income than two other sub districts meaning more heterogenic community. Trading and service sector empirically is contributing better income for community than farming sector. From field observation, the three sub districts seemed mostly subsistent farming practice due to drought. For illustration, figures 5.13, 5.14, and 5.15 show the chart of different socio economic characteristics in three sub districts.

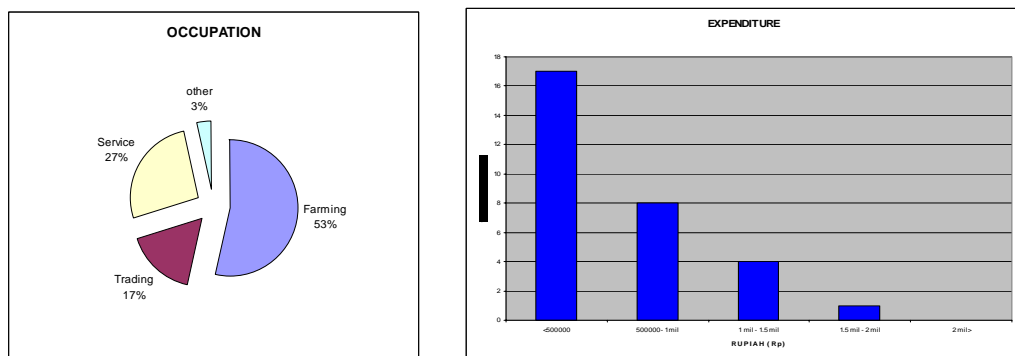


Figure 5.13. The Occupation and expenditure of the respondent in Sedangmulyo Sub district

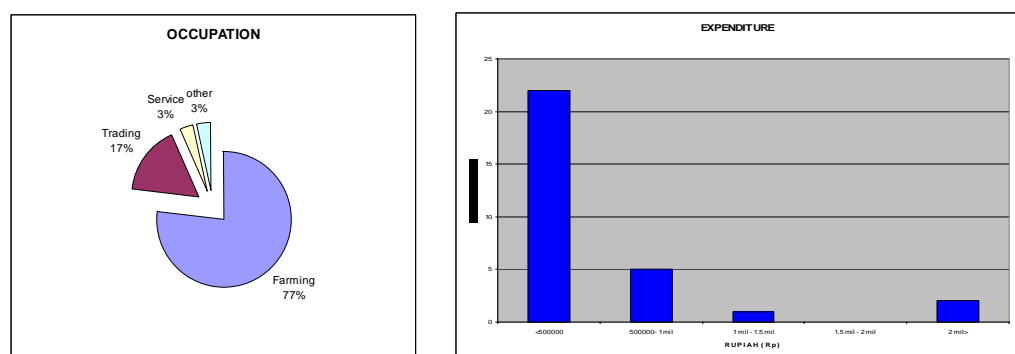


Figure 5.14. The Occupation and expenditure of the respondent in Sedangwaru Sub district

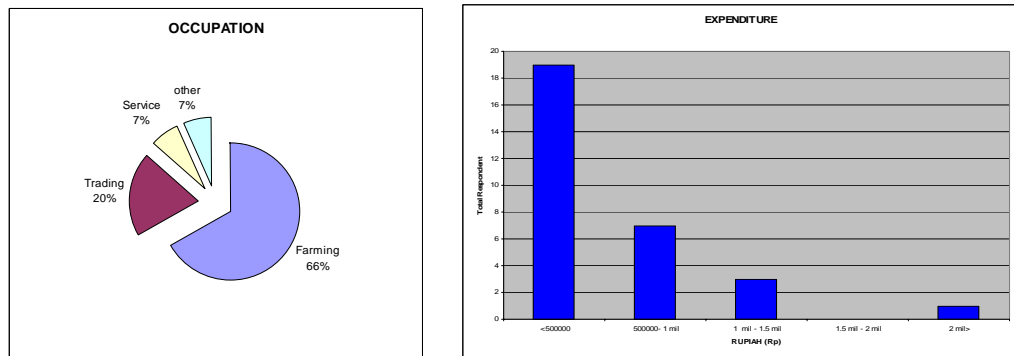


Figure 5.15. The Occupation and expenditure of the respondent in Ngasinan Sub district

Moreover, using similar method, the respondent opinion about involvement is clustered into simple categories. Table 5.8 describes the variety of opinion toward involvement and motivation to involve.

Table 5.8. Level of involvement based on Respondent opinion

No	indicator	cluster	opinion
1.	Involvement	Involved in planning	<ul style="list-style-type: none"> ▪ Propose project in meeting ▪ Discuss with local elite ▪ Deciding location
		Involved in construction	<ul style="list-style-type: none"> ▪ Digging hole ▪ Constructing the <i>sumur resapan</i>
		Not involved	<ul style="list-style-type: none"> ▪ Don't know about construction planning ▪ No time to involve ▪ Work in other place ▪ Low wages ▪ Skeptic with the function of the <i>sumur resapan</i>
2.	Motivation to involve	Instruction	<ul style="list-style-type: none"> ▪ Instruction from <i>perangkat desa</i> (community leader) ▪ Instruction from Head of sub-district
		Economic reason	<ul style="list-style-type: none"> ▪ Paid for their contribution ▪ Additional wages
		voluntary	<ul style="list-style-type: none"> ▪ <i>gotong royong</i> (self-help) ▪ invited to be involved

Source : interview

By clustering information from the respondent opinion, the community involvement in Sendangmulyo sub district is initiative participation where the local leader and the community directly initiate idea about the *sumur resapan* construction. The community involvement dominated by voluntary reason. 47.6 percent of respondent involved in the construction said that they do *gotong royong* to create the *sumur resapan*. And the rest was involved due to economic reason and instruction from leader. This empiric condition is shown on table 5.9 below.

Table 5.9. Level of involvement in Sendangmulyo subdistrict

No	indicator	cluster	Number of respondent	
			total	Percentage (%)
1.	Involvement	Involved in planning	7	23
		Involved in construction	16	53
		Not involved	7	23
2.	Motivation to involve	Instruction	7	33.3
		Economic reason	6	28.6
		voluntary	10	47.6

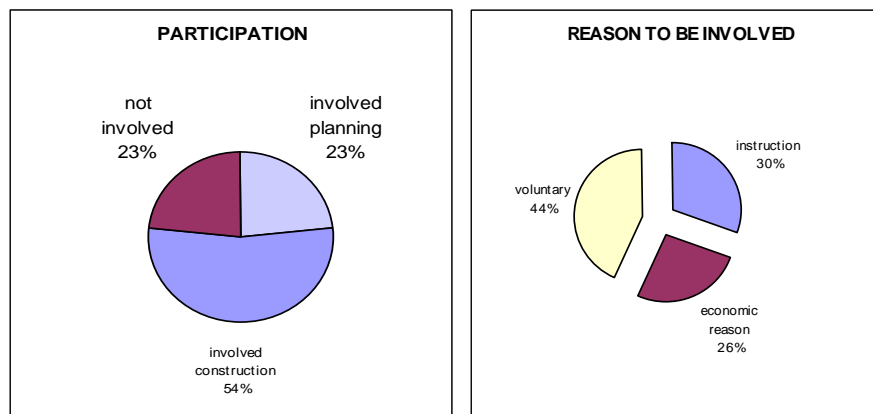


Figure 5.16. The chart of the level participation and motivation of respondent in Sendangmulyo sub district

The different condition is revealed from Sendangwaru sub district. The participation is classified as initiative participation even though only the local leader initiates the *sumur resapan*. The majority of respondent said that they were involved because of economic reason. 68.8 percent of respondent told that they receive additional money from the project as wages for their contribution. The rest of respondent told they were involved due to instruction from leader and voluntary reason.

Table 5.10. Level of involvement in Sendangwaru sub district

No	indicator	cluster	Number of respondent	
			total	Percentage (%)
1.	involvement	Involved in planning	-	-
		Involved in construction	16	53
		Not involved	14	47
2.	Motivation to involve	instruction	4	25
		Economic reason	11	68.8
		voluntary	1	6.3

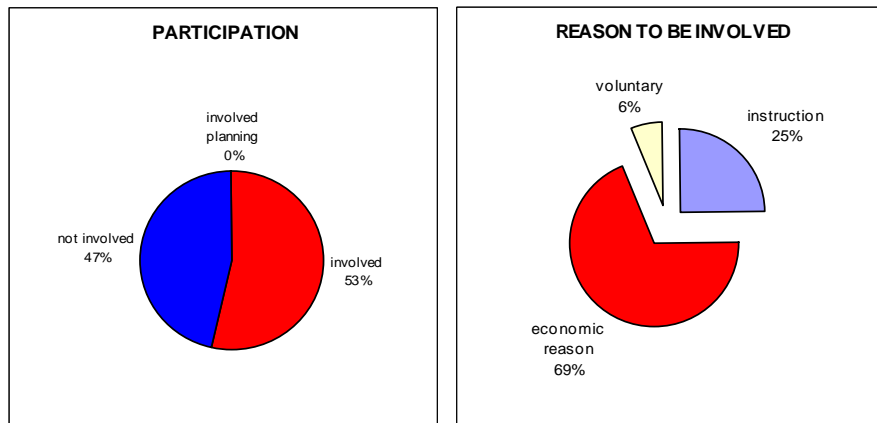


Figure 5.17. The chart of the level participation and motivation of respondent in Sendangwaru sub district

Similarly, the condition above is also revealed from Ngasinan sub district. Majority of respondent said that they take economic advantage from this project. 59.1 percent of respondent was paid for their contribution in construction though below normal wage. Instruction from local elite and voluntary is the rest motivation to involve in the project.

Table 5.11. Level of involvement in Ngasinan subdistrict

No	indicator	cluster	Number of respondent	
			total	Percentage (%)
1.	involvement	Involved in planning	5	17
		Involved in construction	17	57
		Not involved	8	27
2.	Motivation to involve	instruction	7	31.8
		Economic reason	13	59.1
		voluntary	2	9.1

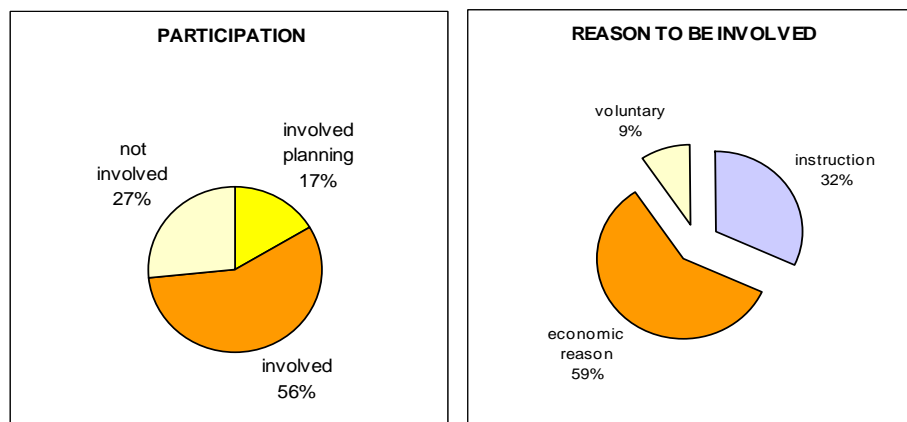


Figure 5.18. The chart of the level participation and motivation of respondent in Ngasinan sub district

The participation and motivation of the respondent in three sub districts empirically exposed different result. In article on low income community participation, Prabatmodjo (1994) concluded that the influencing factors in the participation are strong leadership, incentive, supervision, government instruction, example from other project, urgent need, worry to be neglected, community consensus, direct benefit, obligatory contribution, and inclusion in the process. The community participation is also influenced by culture and value system. So that participation and motivation would be different between one place and another such as in Sendangmulyo, Sendangwaru and Ngasinan sub district which have different socioeconomic condition.

5.5. Discussion

5.5.1. Legal framework on Water resource management

The continued degradation of water resource would indicate ineffective initiative to manage water resources. The local government often lack of the political or enforcement instrument to control water use and abstraction directly. Moreover, the complexity of aquifer systems and large number and dispersed nature of water resource can limit conventional forms of regulation. The local government of Rembang regency have no strong commitment in water resources management. For evidence, there is no proper regulation issued by local government about water usage and abstraction. The local government only regulate water provision related to Water Company and still neglecting water use by private. For freshwater resources, the symptoms of poor governance include over-pumped groundwater sources, depleted and degraded river flows, inefficient water use, excessive demand, and inequitable access. Governance includes the complex connections among institutions, including formal constraints such as rules, laws, constitutions, and informal constraints such as norms of behavior, conventions and self-imposed codes of conduct (Berkes and Folke 1998).

This prevailing circumstance is common for water resources management in the local level due to improper legal and institutional frameworks within local authority. In regard, Huppes and Simonis (2001) stated that the broader effects of policy instruments in society heavily depend on already established institution. The information collected from interview toward government official revealed that four competent institutions have no specific functions and authorities in water resources management. It means they have too broad responsibility causing inefficiency in their performance. The institutional incapability in managing water resources was also caused by the limited personnel and knowledge incapacity.

Therefore, considering the principle of sustainable development, the legal and institutional frameworks are needed in response to differences in physical management option and needs. The specific frameworks for water resources management have to undertaken that can be through formal or informal scheme based on rowing situation. Formal regulation can only be expected to be successful when the need of apparent and a stage when there is clarity in water rights. Equally, informal mechanism of regulation through customary practice may be effective enough so long as pressures of development do not accelerate significantly.

Adapted from Gunatilaka et al. (2006), the legal and institutional framework of water resources management can employ different operational levels model consisted of operational management, planning, analytical support and the necessary

institutional frameworks schematically presented in figure 5.19. As indicated, only the operational management affects water resources and users directly. This involves the application of regulatory, economic and communicative policy instruments and concrete activities such as infrastructure management and development. Planning is required to improve and support operational management. For both operational management and planning, accurate data (through monitoring networks) is a prerequisite and to make them useful, objective oriented analytical support is a necessity (through information technology and hydroinformatics). Simultaneously, all these three levels to function they are to be influenced by a legal and institutional framework (fourth level). As shown in Figure 5.19, to put the water resources management into practice and for its smooth and effective functioning, the integration of all four levels under a solid institutional framework is a vital necessity. The presented model roughly depicts the functional principles of the water resources management system under an institutional framework.



Figure 5.19. Four Compartments Water Resource Management Model
 Source: adapted from Gunatilaka (2006)

The establishment of local water institution is expected to improve the capacity in water resources management and to enforce regulation. The central institution such as *BP-SDA* and *BP-DAS*, could share part of its authorities and the local government could unify water-related authority become a single water authority institution in the local/municipal level. In regard, it can be developed such model of water institution in Netherlands which has proper water institution in the local level as presented on figure 5.20.

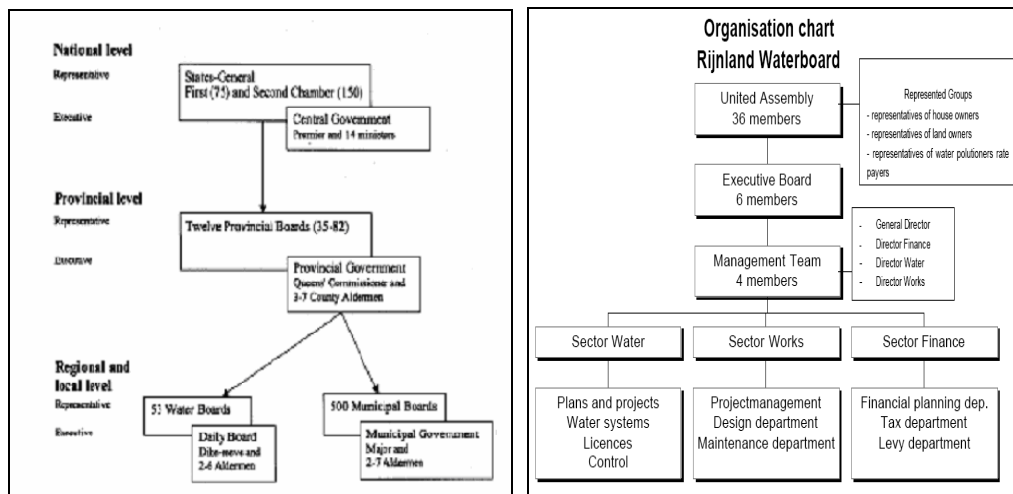


Figure 5.20. Netherlands water institution

Source: Huisman; witteveen, 2002

Because water is public flow resource, a scarce one and prone to negative externalities, proper management of water and water related activities are crucial to the implementation of successful and sustainable processes of water management and conservation. However, the role of institutional and legal arrangements is not limited to water management and regulation of water related activities. The legal institutional design determines the framework which private sector is prompted to invest in water development and conservation. Performing structural function of socioeconomic engineering determine the manner in which economic agent relate to economic resources. The structural element primarily relate to ownership of water resources, legal nature and stability of rights on water, effective and beneficial use, transferability of water right and recognition of existing use. Therefore, the political will from local actors in the legislation scheme is also needed in order to secure water framework working properly.

5.5.2. Local Environmental Knowledge

Classical problem for local community is insufficient understanding toward environmental problem in their surrounding. In regard with water crisis in Rembang regency, people perceived that nowadays have emerged environmental degradation in their surrounding but the local community could not explain what the cause is. So that it is urgent to transfer knowledge essentially about aquifer system and sustainable water resources management.

Aquifer is a geological formation that has sufficient water-transmitting capacity to yield a useful water supply in wells and springs. Seen on figure 5.21, all aquifer has fundamental characteristic in capacity for groundwater storage and flow. Sufficient knowledge of aquifer system perhaps would increase community awareness to preserve groundwater as valuable resources in their environment that should be integrated into the local environmental knowledge.

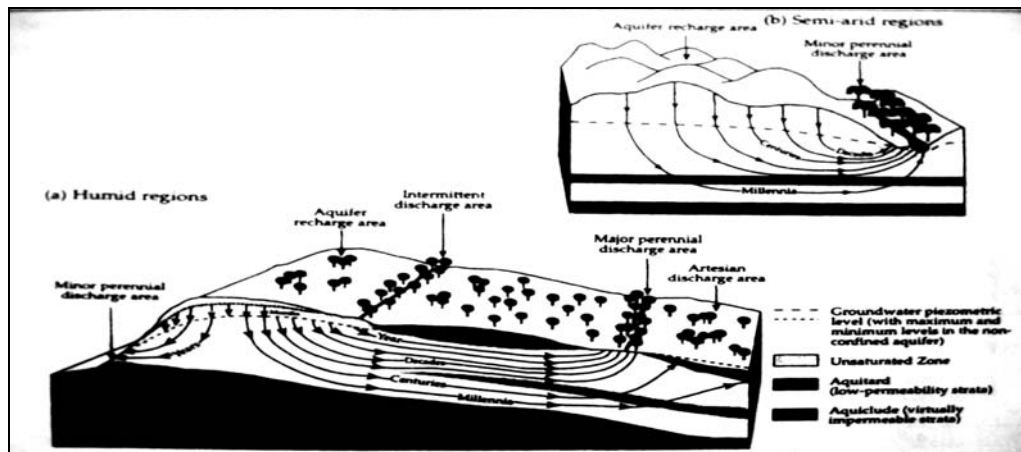


Figure 5.21. Groundwater flow system

Source: Salman, 1999

Local knowledge can be described as the systematic body of knowledge acquired by local people through the accumulation of experiences informal experiments, and intimate understanding of the environment in a given culture. From interviews toward respondent, the local community actually told about their knowledge for groundwater retention. They mentioned that vegetation is effective for groundwater retention. From experience, they cultivated crop such as banana for preserving groundwater. They also built wells near the natural dell that is assumed rich of groundwater flows. The attention and implementation of local knowledge is the important factor in the grass-root participation approach expected could lead sustainable development.

In regard, the role local government is translating knowledge of aquifer system into local perspective. Vegetation actually can prevent excess run-off water meaning increasing the capacity of groundwater infiltration. Cultivating crop on the surrounding environment is expected widen the groundwater recharge area. So that conserving groundwater also can be carried out by vegetation scheme that easier to be adapted for local community that majority is farmers.

5.5.3. Problem of Participation

There tendency on the development project that participation was only viewed as community involvement. The project seems only oriented to physical or economic development and not giving proper attention toward social dimension. In consequences, Tjokrowinoto (2004) argued that the social impact of current development is manifested such in the emerging community dependence on the bureaucracy and project. Regarding the implementation of the *sumur resapan*, the community was mostly depended on the project that could be reflected obviously in community participation and motivation. The community was predominantly participated in the project execution and motivated by economic reason.

Too many factors are influencing the participation and many researches reveal the relation of social, economic and cultural dimension toward participation. One factor elapsed in the development approaches that the government neglecting the role of social capital as valuable factor in accelerating development. Many scholars argued that to strengthen the basic community participation, the revitalisation of social capital is needed. Coleman in Sutoro (1994) stated that social capital is human

capability to cooperate, common knowledge, common comprehension, common value and interaction pattern in order to reach common goals in the institution or organisation based on mutual trust principles. This argument is supported by Fukuyama in Sutoro (1994) that social capital denotes capability that emerged from common trust in the social groups. People can share common interests or problems often join together to agree and implement a solution

Regarding the implementation of the *sumur resapan*, the social capital seems improperly articulated perhaps it was because the program framework based on contractual regulation and formal relationship between local government and local community. In case of Sendangwaru and Ngasinan sub district, it seems that the project of the *sumur resapan* is merely government project that only needs execution in the field. So that participation is only mean public involvement to take apart for supporting government policy. It is obvious in the observation that economic reason is more interesting to trigger participation than awareness toward environmental preservation particularly groundwater conservation. If the environmental awareness have become common goal for the community and the *sumur resapan* is minded as practical solution for water crisis, the participation will be triggered it self by social capital.

Participation should be comprehended as local initiative. The substances of participation are voice, access and control. Voice is right or action to deliver aspiration, idea, need, interest and request to the community or government policy aimed to find consensus for collective livelihood. Access is arena to deliver voice that people can be included an involved. Control capacity of the community to supervise on the policy implementation. In case of three sub district, Sendangmulyo sub district is relatively advance to deliver voice and get access compared with two other districts. But all cases were articulated weak performance in controlling policy implementation.

Chapter VI. Conclusions and Recommendations

6.1. Conclusions

Based on the finding and discussion presented previously, several central conclusions could be drawn from this research. They are as follows:

1. Rembang regency has inadequate legal and institutional framework in water resources management. From observation toward four competent institutions for water resources management, it reveals that the local government is lack of regulation in water resources utilization and conservation. This circumstance can be viewed as the consequence of a weak commitment from local authority toward environmental issues particularly in water management due to incapacity of human resources and institutions. The local authority has limited personnel and expertise in water resource management which has not been institutionalized yet into the local water authority organization.
2. The interactive water resources management is basically interaction process between government, society and water system through reducing government intervention and increasing community participation in the implementation of development program. The cases of the implementation of the *sumur resapan* in three sub districts, the interactive process were articulated in different ways. The differences lie on the intensity of stakeholder inclusion within the process. The bottom-up approach tends could lead better participation in the implementation such the model of Sendangmulyo sub district than the model of Sendangwaru and Ngasinan sub district.
3. The implementation of the *sumur resapan* system is responded variously by local community. The gap between government objectives and community expectation is explored through perception, knowledge and awareness of the local community. From data analysis, it seems that the limited knowledge is empirically as the dominant factor influencing the community perception toward implementation the *sumur resapan* system. The inadequate transfer of information within the interactive process is alleged affecting community perspective toward the *sumur resapan* system as well the socio cultural factor.
4. Clustering opinion of the local community, the economic reasons empirically were the important factor motivating people participating in the *sumur resapan* development. Most people were interested to be involved due to additional income that would be obtained through the project. The social economic background of the community that majority have low income was the constraint in the dissemination of the *sumur resapan* system toward local community.

6.2. Recommendations

This research recommends some points to improve water resources management in Rembang regency:

1. Establishment of local water authority institution
The institutional overview suggests that management of water resources is in need of institutional reform. As mandated in the law 7/2004, the local government should establish local water institution that have main task to managing water resources in the local level. The establishment of local water authority institution is expected will improve institutional capacity on controlling water resources utilization and ensuring water resources conservation. This effort also should be supplemented by improving the capacity building for competent stakeholders.

2. Adopting local environmental knowledge

Local environmental knowledge refers to adaptive skills of local people related to environment, usually derived from many years of experience, which have often been communicated through oral traditions and learned through family members and generations. Field experience recognizes the active roles of local people in problem definition and in the search for their solution through local-level experimentation and innovation. It can be recommended that adopting local environmental knowledge in program delivery is more acceptable than employing conventional way particularly for complicated environmental issues such as water resources conservation. Nevertheless, this effort is still necessary to be supported by subsidies from local government considering low economic capacity of the local community.

3. Intensifying environmental education and communication

Environmental education has a very strategic and important role in preparing people to solve environmental problems because almost every decision we make has an environmental component. Through environmental education people can develop a sense of concern for what is happening in their surrounding environment and be encouraged to take appropriate action. The dimensions and implications of environmental education not only cover the process of development awareness but also should be followed by action. Environmental education should be taught intensively and comprehensively through all education avenues, formal, informal and non-formal. In regard, the local government should revitalize the role of facilitator as leading actor in the field in communicating environmental problem and solution with local community.

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Annexes

Questionnaire for Local Government

Name of interviewed person : male/female
Institution/position :
Date of interview :
Interviewers :

The question is my research instrument on *sumur resapan* development, which tries to know the water resource policy and evaluate program delivery of the *sumur resapan* toward community. All information will be analyzed collectively and treated confidentially for academic purpose only.

Competent Institutions

1. What are regulations on water resource management in Rembang Regency?
2. What are policy instruments employed by your institution related to water resource management?
3. What reasons are considered to implement the *sumur resapan* in Rembang Regency?
4. How is the program performance of the *sumur resapan* system in Rembang Regency?
5. Are there a benchmark of the impact of the implementation of the *sumur resapan* system in Rembang Regency?
6. What are general problems faced in the implementation of the *sumur resapan* system?
7. What are significant efforts for the program delivery improvement of the *sumur resapan* system?

Project Manager

1. How much budget allocation for the implementation of the *sumur resapan* project?
2. Where is the distribution of the *sumur resapan* within Rembang Regency?
3. How is the mechanism of the implementation of the *sumur resapan* in the community?
4. How far is the interactive process in the implementation of the *sumur resapan* in the community?
5. What reasons are considered in prioritising the project allocation for the community?
6. How is the community to be involved in the project?

Facilitator

1. How is the manner for program introduction of the *sumur resapan* to the community?
2. How is the frequency and effectiveness of program introduction?
3. What are problems faced in the introduction stage?
4. What are problems faced in the execution stage?

Local leader/institution

1. How is the process of the implementation of the *sumur resapan* planned and executed?
2. Does the implementation of the *sumur resapan* involve stakeholders?
3. What is problem perceived in the implementation of the *sumur resapan*?

Questionnaire for The community

Name of interviewed person : male/female
Address :
Date of interview :
Interviewers :

The question is my research instrument on *sumur resapan* construction, which tries to examine the factors influencing the implementation of the *sumur resapan* on local community. All information will be analyzed collectively and treated confidentially for academic purpose only.

I. Respondent's profile

- 1.1. where you was born?.....what is your age?.....
- 1.2. What is your main occupation?
[farmer] [fisherman] [small trader] [civil servant] [unemployment]
[others (please specify:.....)]
- 1.3. Marital status: [single] [married]
- 1.4. Education (highest):
[primary school] [secondary school] [high school] [higher than high school]
- 1.5. How many members of family stay in your house?
.....personsmale(s)female(s)
- 1.6. How much average expenditure per month of your family? (for all members of family)
Rp. [<500,000] [500,000 - 1 million] [1 million – 1.5 million] [1.5 million – 2 million]
[2 million >]
- 1.7. Since when have you stayed in this neighbourhood?
[since born] [twenty - ten years ago] [ten - five years ago] [five - one year ago]
[one year - six month ago] [< six month ago]

II. Respondent's opinion on the *sumur resapan* system

- 3.2. Where do you obtain water to fulfil your domestic purposes? How do you obtain?
(please specify).....
- 3.3. Do you feel difficulty to obtain water in your neighbourhood?
[yes] [no] [I don't know] please explain
Do you think your neighbours are facing the same problem?
[yes] [no] [I don't know]
- 3.4. What do you do dealing with this problem?
please explain
- 3.5. Is there any difference(s) to obtain water after the *sumur resapan* construction?
[yes] [no] [I don't know]
If yes, what: (please specify)
- 3.6. In your opinion what have/has caused the difference(s)?
Please explain
- 3.7. Do you know the function of the *sumur resapan* system?
[yes] [no] [I don't know]
If yes, please explain
- 3.8. How do you get the information of the *sumur resapan* system?
Please explain
- 3.9. Do the difference(s) make benefit for you?
[yes] [no] [I don't know]
If yes, why: (please explain)

III. Respondent's opinion on the *sumur resapan* development

- 2.1. When the *sumur resapan* was constructed in your neighborhood?
- 2.2. Do you know the local government planning about the *sumur resapan* before it was developed?
[yes] [no]
If yes, from whom you got that information? (please specify)
- 2.3. Is there community involvement when the the *sumur resapan* was developed?
[yes] [no]
If yes, what kind of involvement? (please specify)
- 2.4. Do you have expectation toward the *sumur resapan* development?
[yes] [no]
If yes, what are your expectations about the *sumur resapan* development in your neighbourhood?
please specify.....
- 3.5. Do you think the *sumur resapan* development in your neighbourhood has fulfilled your expectation?
[yes] [no] : why? Please explain
- 3.6. Is the *sumur resapan* development gives you the advantages/disadvantages?
[yes] [no]
If yes, what kind of advantages/disadvantages: (please specify).....
- 3.7. Is the *sumur resapan* development is still necessary in your community?
[yes] [no]
If yes, why? Please explain
- 3.8. What are your expectations in the future about the *sumur resapan* development?
please specify.....

IV. Community Participation in the implementation of the *sumur resapan*

- 4.1. Were you involved in the the *sumur resapan* development?
[yes] [no] why?
- 4.2. How many people did participate in the implementation of the *sumur resapan*?
[.....person] [I don't know]
- 4.3. In what level are you involved in the implementation of the *sumur resapan*?
[Planning level] [Implementation level] [I don't know] (Please explain)
- 4.4. What did make you interested to be involved in the implementation of the *sumur resapan*?
please specify.....
- 4.5. Who was deciding the implementation of the *sumur resapan* in your community?
a. leader b. community c. personal d. other.....
- 4.6. In your opinion, is the community involvement in the implementation of the *sumur resapan* important?
[yes] [no] [I don't know] please explain.....
- 4.7. Do you know that the budget owned by the local government is very limited to finance the *sumur resapan* construction?
[yes] [no] [I don't know] please explain.....
- 4.8. Do you agree if the community give contribution to fund the construction of the *sumur resapan* in your neighbourhood?
[yes] [no] [I don't know] please explain.....
will you finance the *sumur resapan* construction by your own budget?
[yes] [no] why? please explain.....
- 4.9. Did the facilitator assist you in the implementation of the *sumur resapan*?
[yes] [no] [I don't know] please explain.....

Diary of Research

Date	Fieldwork
07/07/06	proposing research permission to the local government of Rembang regency
12/07/06	collecting secondary data at <i>BAPPEDA</i> office, <i>SETDA</i> office, Forestry and plantation office
13/07/06	interview with Ir. HS, Msi – Head of facility and infrastructure division <i>BAPPEDA</i>
14/07/06	interview with Ar, SP – Planning staff at Forestry and plantation office
15/07/06	collecting secondary data at Environment and mining office and Public work office
17/07/06	interview with Ir. Jum - commitment officer at <i>GNRHL</i> project/ Head of Production Section at Forestry and plantation office
18/07/06	field survey in Kragan District
19/07/06	interview with Drs. AZ, MM – Head of Protection and conservation division at Forestry and plantation office
20/07/06	interview with mr. Yar - field officer <i>GNRHL</i> project
23/7/06	interview with mr. DI - facilitator of Kragan sub district
25/07/06	interview with mr. HK – coordinator of LIPPOM- local NGO
27/07/06	interview with Ir. Su, MM - Head of forestry and plantation office
29/7/06	interview with mr. Ruk – Head of Sendangmulyo sub district interview with mr. Wah – member of <i>LPMD</i> of Sendangmulyo sub district interview with mr. Sug – member of <i>BPD</i> of Sendangmulyo sub district
31/8/06	interview with mrs. Rat - Head of Sendangwaru sub district interview with mr. Jan – member of <i>LPMD</i> of Sendangwaru sub district interview with mr. Rah– member of <i>BPD</i> of Sendangwaru sub district
01/08/06	interview with mrs. Tas - Head of Ngasinan sub district interview with mr. Rus – member of <i>LPMD</i> of Ngasinan sub district interview with mr. Ans– member of <i>BPD</i> of Ngasinan sub district
02/08/06	Interview using questionnaire to 8 respondents in Sendangmulyo sub district
03/08/06	Interview using questionnaire to 9 respondents in Sendangmulyo sub district
04/08/06	Interview using questionnaire to 5 respondents in Sendangmulyo sub district
05/08/06	Interview using questionnaire to 8 respondents in Sendangmulyo sub district
07/08/06	Interview using questionnaire to 11 respondents in Sendangwaru sub district
08/08/06	Interview using questionnaire to 12 respondents in Sendangwaru sub district
09/08/06	Interview using questionnaire to 7 respondents in Sendangwaru sub district
12/08/06	Interview using questionnaire to 8 respondents in Ngasinan sub district
14/08/06	Interview using questionnaire to 12 respondents in Ngasinan sub district
15/08/06	Interview using questionnaire to 10 respondents in Ngasinan sub district
16/08/06 s/d	Data compilation
22/08/06	
23/08/06	Interview with Ir. AA – Head of Groundwater section at Environment and mining office

Log Book

Name of interviewed person : Ir. HS, Msi – Head of facility and infrastructure division *BAPPEDA*
Date of interview : 13/07/06

Bagaimana kebijakan manajemen sumber daya air di Kabupaten Rembang saat ini?

Kalau berbicara manajemen sumberdaya air di Kabupaten Rembang mungkin bisa langsung dikaitkan dengan upaya penyediaan air. Biasa diberitakan lewat media, dari dulu Rembang selalu bermasalah dengan air, kalau musim hujan bisa terjadi banjir seperti di Kecamatan Pamotan dan Sluke tahun lalu, kalau musim kering ya kekeringan sampai harus ada droping air bersih di sebagian besar kecamatan terutama wilayah pantura seperti Sarang dan Kragan. Sesuai kebijakan Bupati yang baru, saat ini pemerintah Kabupaten Rembang memiliki empat pilar program pembangunan. Salah satu issue pokoknya adalah peningkatan infrastruktur dan penyediaan air. Jadi intinya pemkab sudah mengambil langkah dalam upaya peningkatan penyediaan air caranya dengan meningkatkan kapasitas tampungan air hujan sebagai cadangan air baku pada waktu musim kering. Proyek yang sudah dilaksanakan adalah pembangunan embung-embung besar dan kecil atau bangunan konservasi air lainnya seperti sumur resapan.

Apa latar belakang kebijakan tersebut?

Untuk menentukan kebijakan harus digali akar permasalahannya dulu, apa yang menjadi faktor utama terjadinya masalah kekeringan disini, pertama adalah karakter iklim dan kondisi geografis yang menurut saya kurang menguntungkan. Curah hujan relatif rendah ditambah sistem DAS yang tidak mendukung, Rembang tidak dilalui DAS yang cukup besar. Sistem DAS yang ada – Jratun-Seluna tidak sampai melewati wilayah Rembang, berhenti di wilayah Juana, kalau Rembang dilalui sungai yang besar seperti Brantas atau Bengawan solo mungkin Rembang akan lebih maju. Yang kedua kemungkinan besar akibat daya dukung lingkungan yang semakin rendah seperti kerusakan hutan yang semakin parah, memang illegal logging sudah menghabiskan hutan-hutan di Rembang. Maka kalau dilihat masalahnya, kebijakan pemkab dalam manajemen sumberdaya air harus lebih ditekankan untuk meningkatkan kapasitas tangkapan air hujan, ya seperti pembangunan embung-embung tadi.

Bagaimana langkah strategis dalam pelaksanaan kebijakan tersebut?

Pemkab sekarang sudah melaksanakan langkah-langkah strategis dengan membangun embung besar seperti embung Grawan dan Panohan. Kapasitas luas genangan yang direncanakan 50 Ha yang tujuannya untuk meningkatkan volume tangkapan air hujan. Pembangunan dua embung ini untuk mencukupi sumber air baku air minum dan irigasi pertanian di wilayah Rembang selatan. Langkah strategis lain adalah program konservasi berupa gerakan penghijauan untuk memperbaiki kondisi sumberdaya tanah dan air di Rembang.

Apakah kebijakan tersebut sudah ditindaklanjuti oleh dinas teknis?

Untuk pembangunan embung Grawan sudah terlaksana, sekarang yang dalam kemajuan adalah pembangunan embung panohan yang ditangani oleh dinas pekerjaan umum. Untuk program konservasi ditangani oleh Dinas Kehutanan dan Perkebunan sebagai pelaksana program GNRHL yang didalamnya ada kegiatan penyaluran bibit, pembangunan checkdam, dam pengendali dan sumur resapan.

Sejauh ini apakah ada regulasi khusus tentang manajemen sumber daya air di Kabupaten Rembang.

Memang diakui pemkab belum maksimal dalam mengeluarkan aturan, khususnya untuk sumber daya air. Sejauh ini hanya ada aturan yang sifatnya masih parsial dan belum menyeluruh seperti contohnya hanya menyangkut besar tarif air PDAM atau masalah yang sifatnya mendesak untuk diperdakan seperti kasus pemanfaatan sumber air Kajar. Dan kewenangan kami hanya sebatas merencanakan kebutuhan infrastruktur dan fasilitas seperti penambahan jumlah embung atau sistem irigasi.

Name of interviewed person : mr. Ar, SP – Planning staff at Forestry and plantation office
Date of interview : 14/07/06

Apa urgensi penerapan sumur resapan di Kabupaten Rembang?

Sebenarnya penerapan sistem sumur resapan di Rembang sudah berlangsung lama hanya berbeda sumber pendanaan saja. Sumur resapan adalah bangunan sipil teknis untuk tujuan konservasi tanah dan air terutama untuk daerah-daerah kritis seperti Rembang yang tiap tahun mesti kekeringan. Jadi urgensinya adalah untuk menjaga kelestarian sumberdaya air atau tepatnya air tanah.

Bagaimana proses perencanaan kegiatan pembangunan sumur resapan di Kabupaten Rembang?

Pada awalnya kegiatan pembangunan sumur resapan bertumpu pada kebijakan pusat yakni Departemen Kehutanan yang lebih bersifat top-down. Dalam artian dinas teknis, pada saat itu, Dinas Perhutanan dan Konservasi Tanah (PKT) menentukan seluruh alokasi kegiatan pada masyarakat. Sekarang pelaksanaan agak berbeda, dengan lebih memperhatikan faktor bottom-up dalam perencanaan dan pelaksanaan kegiatan. Jelasnya, pembangunan sumur resapan akan dialokasikan berdasarkan usulan masyarakat yang diajukan ke dinas.

Bagaimana penetapan prioritas alokasi kegiatan di daerah rawan kekeringan?

Usulan yang masuk ke Dinas Hutbun sangat banyak dan tidak mungkin bisa dicukupi semua mengingat keterbatasan anggaran. Sehingga usulan-usulan tersebut kita survey dulu tingkat kerawanan kekeringannya baru kemudian lokasinya ditetapkan. Menurut petunjuk teknisnya, penetapan lokasi pembuatan sumur resapan sendiri memiliki beberapa ketentuan seperti; mudah dilihat, tempat-tempat umum, dan tanahnya porous. Tim survey adalah petugas teknis dinas yang kemudian diverifikasi oleh BP-DAS.

Bagaimana upaya pelibatan masyarakat dalam kegiatan ini?

Peran dinas disini hanya mengusulkan dan menetapkan alokasi anggaran kegiatan. Ketika anggaran sudah disetujui pusat, melalui program GNRHL, kegiatan langsung dilaksanakan oleh masyarakat melalui LPMD. Setelah pelaksanaan fisik selesai dana langsung dikirim ke rekening LPMD. Jadi seluruh kegiatan pelaksanaan adalah tanggung jawab masyarakat secara langsung. Harapannya model ini akan mampu memberdayakan masyarakat dan meningkatkan peran serta masyarakat dalam pelaksanaan kegiatan. Ya meskipun dalam prakteknya memang ada yang diluar harapan, nanti anda bisa ketahui di lapangan.

Name of interviewed person : Ir. Jum - commitment officer at *GNRHL* project/ Head of Production Section at Forestry and plantation office
Date of interview : 17/07/06

Bagaimana mekanisme pelaksanaan kegiatan pembangunan sumur resapan di Kabupaten Rembang?

Pelaksanaan kegiatan sumur resapan mengacu pada kebijakan departemen kehutanan dan diadopsi oleh Dinas Kehutanan dan Perkebunan Kabupaten Rembang. Pembangunan sumur resapan adalah salah satu kegiatan dari program *GNRHL* yang terdiri dari kegiatan vegetatif dan kegiatan sipil teknis. Sumur resapan termasuk kegiatan sipil teknis yang harus dilaksanakan oleh LPMD (lembaga pembangunan masyarakat desa). Mekanisme pelaksanaannya menggunakan model SPKS (sistem pelaksanaan kerja sama). Jadi setelah selesai pekerjaan fisiknya anggaran baru bisa dicairkan secara langsung melalui rekening LPMD oleh KPPN.

Bagaimana interaksi stakeholder dalam perencanaan dan pelaksanaan kegiatan?

Pelaksanaan kegiatan pembangunan sekarang ini memang terasa lebih interaktif, dimana banyak stakeholder yang mulai peduli untuk terlibat dalam pelaksanaan kegiatan terutama masyarakat dan LSM. Untuk kegiatan sumur resapan ini, prosesnya dimulai dari musyawarah desa (musdes) kemudian mengajukan usulan resmi kepada Dinas melalui pinlak, PKP atau langsung kepada bidang perencanaan. Petugas teknis akan melaksanakan survey lapangan terlebih dahulu sebelum penetapan lokasi dibantu oleh petugas dari BP DAS. Setelah bidang perencanaan Dinas menetapkan alokasi anggaran dan kegiatan maka akan ditindak lanjuti dengan bimbingan teknis oleh petugas teknis yaitu pemimpin pelaksana (pinlak) dan Penyuluh Kehutanan dan Perkebunan (PKP). Pelaksanaan pembangunan sumur resapan di lapangan sepenuhnya merupakan tanggungjawab dari LPMD yang akan didampingi oleh LSM dan petugas teknis. Pelaksanaan program *GNRHL* di Rembang melibatkan LSM dalam mewujudkan kemandirian kelembagaan di tingkat desa melalui pembimbingan kelembagaan. Kami mencatat 5 LSM lokal terlibat dalam pelaksanaan kegiatan sumur resapan; Perhimpunan pencinta tanaman (PPT) – diketuai Suryo kusmin, LIPPOM- Heri kiswanto, Lembaga keuangan mikro (LKM) bahari bangkit – Supriyanto, FMPR forum masyarakat peduli Rembang –siswanto,GP. Anshor- Drs ismail.

Bagaimana struktur organisasi kegiatan di tingkat dinas?

Struktur organisasi kegiatan ini berdasar pada program *GNRHL* yang terdiri dari Kepala Dinas Kehutanan dan perkebunan selaku kuasa pengguna anggaran membawahi PPK/pejabat pembuat komitmen, Pinlak/pemimpin pelaksana dan Petugas teknis/PKP.

Apa kendala utama dalam upaya diseminasi sumur resapan di Rembang?

Biasa, kendala klasiknya ya keterbatasan dana, tapi kami sudah berupaya optimal dalam memanfaatkan dana yang tersedia untuk bisa menjangkau daerah-daerah yang rawan kekeringan. Ya memang diharapkan bisa tumbuh swadaya masyarakat untuk membuat sumur resapan sendiri. Yang kedua yang kami evaluasi adalah dampak sumur resapan yang bersifat jangka panjang sehingga masyarakat masih skeptis terhadap manfaat yang akan diperoleh.

Bagaimana pelaksanaan kegiatan saat ini?

Pembangunan sumur resapan yang kami tangani melalui program GNRHL sudah terlaksana pada tahun 2004 dan 2005 sejumlah 100 unit. Alokasi terbesar di kecamatan Kragan sebagai daerah prioritas rawan kekeringan di kabupaten Rembang. Sedangkan desanya meliputi Ds. Sendang mulyo, Ds. Ngasinan, Ds Sendang waru, ds. Narukan, ds.Kendalagung, dan ds. Mojokerto. Anda bisa melakukan observasi di desa-desa ini.

Name of interviewed person : Drs. AZ, MM – Head of Protection and conservation division at Forestry and plantation office

Date of interview : 19/07/06

Apa upaya dinas hutbun dalam manajemen sumberdaya air khususnya terkait masalah konservasi?

Sesuai kewenangannya, dinas hutbun lebih tertuju pada kegiatan konservasi tanah dan air. Disini ada satu seksi yang menangani konservasi tanah dan air. Untuk masalah konservasi sumber daya air, bentuk-bentuk kegiatan yang sering ditangani seperti pembuatan dam penahan, embung, dan sumur resapan untuk sipil teknis. Ada juga penanaman bibit jati dan mahoni secara vegetasi. Selama dua tahun terakhir, kegiatan-kegiatan tersebut termasuk dalam proyek GNHRL yang dibiayai dari APBN dan ada pendampingan dari APBD.

Terkait dengan penerapan sumur resapan, apakah ada aturan khusus tentang pelaksanaan kegiatan ini di Kabupaten Rembang?

Penerapan sumur resapan di Rembang masih dalam tahap diseminasi kepada masyarakat, jadi belum ada aturan khusus dari pemerintah kabupaten. Memang menurut saya, untuk mengatasi masalah kekeringan, sumur resapan lebih layak untuk dilaksanakan di lapangan karena konstruksinya sederhana dan biayanya relatif murah sehingga dapat dijangkau masyarakat.

Name of interviewed person : Mr. Yar - field officer GNRHL project

Date of interview : 20/07/06

Bagaimana pelaksanaan pembangunan sumur resapan di lapangan?

Kalu dilihat kinerjanya bisa dikatakan kegiatan sumur resapan di lapangan umumnya sudah terlaksana sesuai rencana, dalam arti sudah memenuhi target pelaksanaan. Sudah dilaksanakan di beberapa tempat dan pekerjaan fisiknya sudah rampung.

Bagaimana tanggapan masyarakat terhadap pembangunan sumur resapan?

Sekarang ini masyarakat mulai kritis terhadap kegiatan-kegiatan pembangunan sehingga tanggapannya macam-macam. Tapi kebanyakan masyarakat mendukung pembangunan sumur resapan, ada juga yang kurang setuju karena lebih memilih bentuk kegiatan yang lain seperti pipanisasi. Kalau tanggapannya positif tandanya banyak yang berpartisipasi dalam pembangunan sumur resapan dengan gotong royong, sampai ada usaha swadaya desa untuk menambah jumlah bangunan sumur resapan. Untuk mudahnya, biasanya saya menggunakan peran kepala desa dalam melakukan pendekatan kepada warga, karena menurut pengalaman di lapangan keikutsertaan masyarakat banyak dipengaruhi oleh kepala desanya. Biasanya kalau kepala desanya antusias dan didukung warganya maka kegiatan akan berjalan dengan baik.

Apa kendala yang selama ini terjadi di lapangan?

Kendala di lapangan terus terang dana, karena sistem kerjasama melalui dana block-grant yang diterapkan mengharuskan penyelesaian pekerjaan fisik di lapangan terlebih dahulu, jelasnya masyarakat membuat sumur resapan dahulu baru biaya diganti setelah bangunan fisik selesai. Bagi masyarakat desa jumlah dana sekitar dua juta per unit itu dirasakan cukup memberatkan. Sekali lagi peran kepala desa dan LPMD dalam mengupayakan dana untuk talangan sangat membantu kelancaran pembangunan sumur resapan.

Name of interviewed person : mr. DI - facilitator of Kragan sub district

Date of interview : 23/7/06

Bagaimana upaya pengenalan sumur resapan kepada masyarakat di wilayah binaan anda?

Ada kegiatan sosialisasi berkala dalam bentuk pertemuan kepala desa kadang secara khusus ada penyuluhan di desa tertentu yang dalam paket program GNRHL. Bagi desa-desa yang mengajukan usulan didatangi dan didata. Usulan-usulan tersebut selanjutnya kami ajukan pada tingkat Dinas Hutbun. Ada juga yang secara langsung mengusulkan ke dinas atau pimpinan pelaksana.

Bagaimana respon masyarakat terhadap sumur resapan?

masyarakat menerima tapi mungkin karena pengetahuan masyarakat yang belum memadai sehingga kegiatan pembangunan sumur resapan baru dalam tahap percontohan kepada masyarakat. Secara umum masyarakat menerima kegiatan tersebut, tetapi tingkat swadaya masih tergolong rendah karena faktor biaya.

Apa kendala yang dihadapi dalam upaya pengenalan sumur resapan?

Yang saya amati menjadi kendala di lapangan adalah tingkat pemahaman masyarakat yang berbeda-beda. Ada yang sudah paham, ada yang ragu-ragu sebab belum merasakan manfaat sumur resapan secara langsung. Kalau ada masyarakat yang antusias biasanya mereka yang sudah mendapat cerita dari desa-desa sekitar yang sudah merasakan manfaatnya.

Name of interviewed person : mr. HK – coordinator of LIPPOM- local NGO

Date of interview : 25/07/06

Apa peran LSM anda dalam kegiatan pembagunan sumur resapan di Kabupaten Rembang?

LSM kami mempunyai tugas pendampingan kepada lembaga-lembaga di tingkat desa dalam melaksanakan kegiatan pembangunan. Kalau pembangunan sumur resapan sendiri adalah bagian dari program penghijauan, LSM kami sebetulnya tidak secara lansung mendampingi pembangunan sumur resapan, tetapi lebih kepada membantu meningkatkan kemandirian kelembagaan di tingkat desa, dalam hal ini LPMD terutama administrasi dan pembukuan keuangan. Harapannya supaya kegiatan bisa terlaksana secara transparan dan sesuai tujuan. Ya dimasa otonomi desa saat ini, ada preseden dana bantuan tidak digunakan sebagaimana mestinya dan tidak transparan. Yang menjadi perhatian adalah masalah administrasi kegiatan pembangunan yang dulu sangat bergantung pada kantor kecamatan sekarang mulai dibenahi.

Apa pendapat anda tentang pembagunan sumur resapan di Rembang?

Menurut kebutuhannya, Kabupaten Rembang butuh waduk besar untuk mengatasi masalah air. Untuk aspek konservasi yang cocok memang sumur resapan ini apalagi di Rembang yang termasuk daerah langganan kekeringan dan bergantung pada air tanah. Menurut saya,

ya sudah pas lah sumur resapan ini yang dibuat mengatasi kekeringan di Rembang terutama untuk daerah pemukiman. Bisa dibayangkan kalau tiap rumah punya sumur resapan berarti berapa volume air hujan yang dapat tersimpan. Apalagi tingkat resapan air laut di sepanjang pantai Rembang sudah semakin masuk ke daratan bisa sampai 3-4 km dari tepi pantai, dampaknya banyak sumur warga yang terasa asin. Sayangnya sumur resapan ini belum begitu tersosialisasikan dengan baik.

Apa harapan dan upaya anda selanjutnya terkait pemasyarakatan sumur resapan di Rembang?

Kami dengan senang hati akan membantu penyebaran informasi tentang sumur resapan pada setiap kesempatan. Apalagi melalui program penghijauan dimana kami terlibat didalamnya, kami akan terus mendampingi. Harapan kedepan mungkin masyarakat mempunyai kesadaran secara mandiri membangun sumur-sumur resapan di rumah mereka. Hanya saja menurut saya perlu peraturan yang lebih baku dari Pemkab misalnya melalui Perda dan ada sanksinya mungkin akan lebih bagus.

Name of interviewed person : Ir. Su, MM - Head of forestry and plantation office
Date of interview : 27/07/06

Bagaimana kebijakan dinas Hutbun dalam manajemen sumberdaya air di Kabupaten Rembang?

Sebetulnya dinas kami tidak secara khusus menangani manajemen sumberdaya air, tetapi lebih menekankan pada masalah konservasi sumberdaya air. Karena disini ada bidang proteksi dan konservasi termasuk masalah sumberdaya air. Pemkab Rembang sendiri sudah mempunyai target untuk meningkatkan infrastruktur dan penyediaan air seperti pembangunan embung dan dam. Menurut batas kewenangan dalam tupoksi Dinas Hutbun hanya menagani pembangunan embung-embung kecil, check-dam, dam pengendali dan sumur resapan. Semua kegiatan ini sudah tercover dalam renstra dinas dan RPJM dinas tahun 2006-2010.

Apa pertimbangan penerapan sumur resapan di Kabupaten Rembang?

Penerapan teknologi sumur resapan sangat terkait dengan program konservasi sumberdaya tanah dan air di kabupaten Rembang. Program ini sudah menjadi salah satu program utama dalam rencana strategis dinas Hutbun, yang dimaksudkan sebagai upaya untuk mengatasi masalah kekeringan yang tiap tahun terjadi di sebagian besar wilayah Kabupaten Rembang. Sumur resapan menjadi begitu penting karena sebagian besar masyarakat menggunakan air tanah sebagai sumber air utama bagi kebutuhan mereka. Dan permukaan air tanah sangat menurun drastis dengan rusaknya hutan-hutan di wilayah rembang, sehingga kapasitas tangkapan air hujan alami menjadi berkurang. Akibatnya sekarang yang dirasakan, sumur kering pada saat kemarau dan banjir saat hujan. Karena itu sumur resapan diprioritaskan untuk dibangun disekitar sumur-sumur penduduk pada daerah yang rawan kekeringan dengan meresapkan air hujan pada saat musim hujan. Tujuannya meningkatkan permukaan air tanah.

Bagaimana regulasi pemerintah kabupaten mengenai sumur resapan?

Pemkab belum mempunyai regulasi khusus untuk sumur resapan seperti perda karena sifatnya masih diseminasi dan percontohan, karena masyarakat belum sepenuhnya tahu manfaat sumur resapan. Mungkin nanti akan diperdakan seperti di kota-kota besar. Untuk

saat ini, kami melalui petugas-petugas lapangan terus dilakukan penyuluhan dan sosialisasi kegiatan sumur resapan. Hasilnya sudah banyak usulan yang masuk untuk pembangunan sumur resapan dari desa-desa yang rawan kekeringan.

Bagaimana keterlibatan stakeholder dalam penerapan teknologi sumur resapan di Rembang?

Dinas hutbun ingin melibatkan banyak pihak untuk mendukung penerapan sumur resapan seperti LSM untuk membina kelembagaan di tingkat desa, juga dalam penentuan lokasi kita dibantu oleh tim dari BP DAS yang lebih ahli secara teknis hidrologi. Juga dalam pelaksanaannya kami lebih memperhatikan aspirasi dari bawah dengan harapan upaya penerapan sumur resapan akan lebih diterima oleh masyarakat dan menjadi kesadaran mereka untuk mengupayakan sendiri pembuatannya.

Apa yang menjadi kendala penerapan teknologi sumur resapan kepada masyarakat?

Menurut amatan kami selama ini, kendala klasiknya adalah keterbatasan dana, kendala berikutnya adalah dampak sumur resapan yang tidak kelihatan langsung. Masyarakat masih skeptis dengan fungsi sumur resapan karena dampaknya jangka panjang.

Apa harapan dinas Hutbun ke depan dalam upaya penerapan sumur resapan di Rembang?

Saya masih optimis terhadap dampak bangunan sumur resapan, dalam jangka panjang sedikit demi sedikit akan mampu mengatasi masalah kekeringan di Rembang. Dinas hutbun akan terus mengupayakan kegiatan sumur resapan setiap tahunnya serta meningkatkan kegiatan penyuluhan pada masyarakat, ya diharapkan dapat membangkitkan kesadaran masyarakat supaya bisa berswadaya.

Name of interviewed person : mr. Ruk – Head of Sendangmulyo sub district
Date of interview : 29/7/06

Bagaimana proses pengajuan usulan kegiatan pembangunan sumur resapan di desa anda?

Adanya pembangunan sumur resapan di desa bermula dari musyawarah desa atau musdes yang menyepakati usulan pembangunan sumur resapan di desa kami, hasil musdes ini, yang telah disetujui oleh BPD diajukan kepada dinas melalui surat usulan resmi desa yang ada tembusannya disampaikan ke kecamatan. Kalau dalam usulannya warga tidak hanya mengusulkan sumur resapan saja banyak juga yang minta air ledeng masuk desa tapi belum terwujud sampai sekarang.

Bagaimana tindak lanjut atas usulan pembangunan sumur resapan di desa anda?

Sumur resapan yang ada disekitar sini sudah dibangun tahun yang lalu, tahun 2005, yang dilaksanakan oleh LPMD dan masyarakat sekitar. Sebelumnya ada petugas yang datang kesini melihat kondisi desa, melihat tempat-tempat yang akan dibangun sumur resapan. Setelah ada keputusan dari dinas di Kabupaten, masyarakat disuruh membangun dulu dengan biaya sendiri. Kalau tenaga mungkin tidak jadi masalah, yang sempat jadi kesulitan masyarakat untuk mengadakan material sendiri, LPMD terpaksa pinjam dulu material bangunannya.

Apa hambatan yang dirasakan dalam pembangunan sumur resapan di wilayah anda?

Untuk masyarakat sini kelihatannya tidak ada hambatan yang berarti, mungkin cuma masalah biaya untuk membeli material tadi yang jadi kesulitan tapi masih bisa diatasi. Kalau masih ada jatah kegiatan lagi di sini masyarakat pasti mau. Saya pastikan juga ada swadaya masyarakat.

Name of interviewed person : mr. Wah – member of *LPMD* of Sendangmulyo sub district
Date of interview : 29/7/06

Bagaimana pelaksanaan pembangunan sumur resapan di desa anda?

Sesuai dengan aturannya *LPMD* memang yang bertanggungjawab untuk pelaksanaan pembangunan fisik di tingkat desa. ada *LSM* yang mendampingi tugas *LPMD* untuk pembukuan dan *SPJ*. Untuk pembangunan sumur warga mau gotong-royong mulai dari menggali lubang sampai membuat beton penutup. Bahkan desa sini bisa swadaya membuat lebih dari jatah yang dianggarkan dinas. karena kebutuhan material seperti batu kali mudah didapat dan semen bisa pinjam dulu, sebab biaya dari dinas baru turun kalau bangunanya sudah jadi.

Bagaimana upaya pelibatan masyarakat dalam pembagunan sumur resapan?

Masyarakat sini kesadarannya masih tinggi, kalau ada kegiatan yang sifatnya untuk kepentingan umum masyarakat masih mau bergotong royong, paling hanya menyediakan konsumsi untuk yang bekerja, warga sudah jalan sendiri. Apalagi masyarakat sini merasakan kesulitan air sejak lama, adanya sumur resapan sangat diterima masyarakat dan nyatanya fungsinya sekarang bisa dirasakan masyarakat. Seperti sekarang sumur-sumur masih keluar airnya, yang biasanya tahun-tahun lalu kering.

Apa kendala dalam melibatkan masyarakat?

Kalau melibatkan masyarakat sini dirasakan tidak ada masalah, karena yang mengusulkan warga sendiri. Mungkin memang ada yang masih belum tahu gunanya sumur resapan sehingga enggan untuk ikut kerja bakti. Tapi memang ada yang belum bisa dirasakan manfaatnya, mungkin masih butuh waktu agak lama.

Name of interviewed person : mr. Sug – member of *BPD* of Sendangmulyo sub district
Date of interview : 29/7/06

Apa peran BPD dalam pelaksanaan pembagunan sumur resapan di desa anda?

Aturannya *BPD* tugasnya menampung dan memperjuangkan aspirasi warga serta mengawasi pelaksanaan semua kegiatan pembangunan di tingkat desa, ya tidak hanya sumur resapan saja. Untuk pembangunan sumur resapan tahun lalu diadakan musyawarah desa, *BPD* menyetujui apa yang diusulkan masyarakat karena memang dibutuhkan dan bermanfaat bagi masyarakat. Untuk pelaksanaanya *BPD* hanya memantau proses pembagunannya, sebenarnya sudah ada *LSM* yang membantu *LPMD* untuk administrasi dan pembuatan laporan pertanggungjawaban atas pelaksanaan kegiatan pembangunan di desa sendangmulyo.

Apakah ada ketidaksesuaian dalam pelaksanaan pembangunan sumur resapan?

Dari usulan masyarakat sini, banyak juga meminta sambungan air ledeng untuk kebutuhan air bersih, namun sampai saat ini tidak ada tindak lanjutnya. Begitu ada penyuluhan sumur resapan, warga langsung mengusulkan. Sebagian besar warga sini memang sudah mendengar dari desa tetangga kalau ada proyek sumur resapan sehingga ada keinginan untuk mencoba. Kalau dalam pelaksanaannya, untungnya warga sini masih biasa gotong royong untuk kepentingan umum. Kalau tidak ada gotong royong masyarakat ya mungkin agak berat pelaksanaannya.

Name of interviewed person : mrs. Rat - Head of Sendangwaru sub district
Date of interview : 31/8/06

Bagaimana proses pengajuan usulan kegiatan pembangunan sumur resapan di desa anda?

Saya hanya mengetahui secara umum saja tentang pembangunan sumur resapan. Pembangunan sumur sudah dilaksanakan tahun 2004 oleh kepala desa yang lama. Semua kegiatan pembangunan banyak di tangani oleh mantan kepala desa karena hingga tahun 2005 LPMD tidak berjalan sebagaimana mestinya. Setahu saya usulan semua yang mengajukan pak mantan, masyarakat hanya diberitahu dan diminta persetujuannya untuk tempatnya dibangun sumur resapan.

Bagaimana tindak lanjut atas usulan pembangunan sumur resapan di desa anda?

Saya tidak tahu jelasnya, sepengetahuan saya dulu memang ada tinjauan petugas penyuluh dari dinas kehutanan kesini sebelum sumur resapan dibangun. Kemudian pembangunannya ditangani pak mantan semua.

Menurut anda apa kendala yang dirasakan dalam pembangunan sumur resapan?

Kalau dalam pembangunannya saya rasa tidak ada masalah, hanya saja dulu yang menangani pak mantan semua jadi masyarakat tidak begitu jelas maksudnya dibangun sumur resapan.

Name of interviewed person : mr. Jan – member of LPMD of Sendangwaru sub district
Date of interview : 31/8/06

Bagaimana pelaksanaan pembangunan sumur resapan di desa anda?

LPMD desa sendangwaru baru mulai aktif setahun ini karena ada pergantian kepala desa. Sejak dulu LPMD tidak pernah terlibat urusan pembangunan disini termasuk sumur resapan. Setahu saya, sumur resapan semuanya yang mengurusinya pak mantan kepala desa.

Apakah melibatkan masyarakat dalam pembangunan resapan sumur di desa anda?

Masyarakat hanya diberitahu akan dibangun sumur resapan disekitar rumah kemudian ada yang diupah tenaganya atau ada tukang yang disuruh untuk membangun sumur resapan. Ya sebatas itu saja.

Name of interviewed person : mr. Rah– member of *BPD* of Sendangwaru sub district
Date of interview : 31/8/06

Apa peran BPD dalam pelaksanaan pembagunan sumur resapan di desa anda?

Saya tidak tahu persis ada pembagunan sumur resapan di sini, mulanya bagaimana saya juga tidak tahu. Sebelumnya saya kira bangunan apa, gunanya apa, kok sudah ada di beberapa tempat.

Apakah ada ketidaksesuaian dalam pelaksanaan pembangunan sumur resapan?

Kalau bentuknya seperti itu, biayanya berapa, anggaran dari pemerintah berapa, juga tidak pernah dibicarakan. Seharusnya perlu ada keterbukaan. Daripada sudah dibangun tetapi tidak dirasakan manfaatnya, buat apa dibangun. Lebih baik dibuatkan sumur artesis atau bantuan pompa air. Pasti warga banyak yang mendukung

Name of interviewed person : mrs. Tas - Head of Ngasinan sub district
Date of interview : 01/08/06

Bagaimana proses pengajuan usulan kegiatan pembangunan sumur resapan di wilayah anda?

Kami mendapat informasi sumur resapan dari desa tetangga waktu ada konfrensi kades di kecamatan, kemudian kami mengusulkan melalui petugas dari dinas hutbun yang saat itu ada disana dan baru terealisasi tahun kemarin.

Bagaimana tindak lanjut atas usulan pembangunan sumur resapan di wilayah anda?

Ada tinjauan dulu dari petugas dinas, selanjutnya kami diminta untuk membangun dulu baru dananya bisa dicairkan. Kebetulan ada dana di kas desa sehingga bisa dibangun dulu.

Apa hambatan yang dirasakan dalam pembangunan sumur resapan di wilayah anda?

Hambatanya untuk desa ngasinan terus terang dananya terbatas apalagi dana dari dinas tidak langsung cair. Akibatnya ada kegiatan yang lain tertunda karena dananya dipakai membangun sumur resapan ini.

Name of interviewed person : mr. Rus – member of *LPMD* of Ngasinan sub district
Date of interview : 01/08/06

Bagaimana pelaksanaan pembangunan sumur resapan di desa anda?

LPMD diminta pak kades untuk melaksanakan pembangunan sumur resapan. Karena dana kasnya terbatas ya dicukupkan utuk membangun sejumlah jatah dari dinas.

Bagaimana upaya pelibatan masyarakat dalam pembagunan sumur resapan?

Kami musyawarah dengan warga dulu untuk tempat-tempat yang akan dibangun sumur resapan. Akhirnya ditempatkan yang dekat sumur-sumur warga dan mudah dilihat supaya bisa dicontoh warga yang lain. Bagi warga yang ingin mengerjakan sendiri bangunanya atau diserahkan orang lain diberi kebebasan karena ada anggaran sedikit untuk mengganti tenaga.

Apa kendala dalam melibatkan masyarakat?

Masyarakat sini termasuk mudah diajak musyawarah atau ikut kerja bakti, saya kira tidak ada masalah untuk melibatkan masyarakat.

Name of interviewed person : mr. Ans– member of *BPD* of Ngasinan sub district
Date of interview : 01/08/06

Apa peran BPD dalam pelaksanaan pembangunan sumur resapan di wilayah anda?

memang diberitahu pak kades sebelum ada pembangunan sumur resapan. Pelaksanaanya semua LPMD, lha anggaranya cuma sedikit saja. Lebih baik disini ada proyek jalan desa, dari dulu tidak pernah terlaksana.

Apakah ada ketidaksesuaian dalam pelaksanaan pembangunan sumur resapan?

Anda lihat sendiri bangunannya sudah pada ambrol Salah rancangannya apa barangkali mutu bangunannya yang tidak bagus, materialnya yang diirit.

Name of interviewed person : Ir. AA – Head of Groundwater section at Environment and mining office
Date of interview : 23/08/06

Dengan pertimbangan Rembang merupakan daerah rawan kekeringan, bagaimana manajemen sumberdaya air dalam menghadapi masalah tersebut?

Mengatasi masalah kekeringan di Kabupaten Rembang harus dilihat secara menyeluruh. Banyak faktor yang berpengaruh dan harus ada keterpaduan sistem sebagai solusinya. Menurut pendapat saya, selama belum ada keterpaduan sistem masalah kekeringan masih akan terjadi. Seperti yang sudah dirasakan, penyebab utama kekeringan adalah faktor iklim dan kondisi geografis dan hal ini seharusnya di antisipasi dengan manajemen sumberdaya air yang baik. Kalau dinilai dari segi kapasitas institusi dan SDMnya, jelas kurang layak untuk melaksanakan manajemen yang baik. SDM terbatas jumlah dan kapasitasnya sedangkan institusinya juga hanya setingkat seksi untuk mengatasi masalah yang kompleks

Apakah ada peraturan daerah terkait manajemen sumber daya air?

Selama ini pemerintah daerah jarang sekali mengeluarkan peraturan daerah khusus tentang sumberdaya air. Mengeluarkan perda juga harus ada dukungan politis dari DPRD. Selama ini perda-perda yang terkait lingkungan hidup tidak banyak mendapat perhatian. Baru kalau muncul masalah, aturannya baru dibuat. Contohnya kasus terjadinya konflik pemanfaatan air kajar yang melibatkan masyarakat, penjual air dan pemilik sumur, kalau ditilik lebih dalam bukan menyangkut masalah pengelolaan sumber daya air tapi lebih dipicu oleh tuntutan kontribusi ekonomi kepada masyarakat sekitar.

Apa ada peraturan khusus tentang pengelolaan air tanah?

Belum ada aturannya, seksi air tanah sebenarnya mempunyai kewenangan mengeluarkan perijinan untuk pemanfaatan air tanah. Sampai sekarang seksi kami hanya memantau dan mengidentifikasi sumber-sumber air tanah potensial di Kabupaten Rembang.

Pernah mengusulkan rancangan perda air tanah?

Selama ini kami masih kesulitan membuat rancangan perda air tanah, nampaknya belum dianggap masalah mendesak. Di pihak lain, payung hukum tentang tata guna air di Indonesia juga belum dimengerti dengan baik seperti bagaimana hak guna air, kepemilikan air tanah semua belum jelas. Sehingga kami sendiri juga masih kesulitan untuk membuat rancangan perda.

List of Respondents in Sendangmulyo sub district

No	Name	Age	Education	occupation	monthly expenditure (Rp.)
1	Pramono	44	junior high school	Farmer	<500000
2	Sunhaji	42	bachelor	Teacher	500000-1000000
3	Budi	38	junior high school	Carpenter	1000000-1500000
4	Sadiq	53	elementary school	Farmer	<500000
5	Triatmi	38	elementary school	Farmer	<500000
6	Sarjono	37	bachelor	Teacher	500000-1000000
7	Diarto	31	high school	Trader	1000000-1500000
8	Supri	33	junior high school	Farmer	<500000
9	Lasidan	46	elementary school	Farmer	<500000
10	Suyanto	42	high school	Gov official	500000-1000000
11	Lasiminah	36	elementary school	Farmworker	<5000000
12	Jaswi	52	elementary school	Farmer	<5000000
13	Karmidi	39	junior high school	Carpenter	500000-1000000
14	Nursalam	43	elementary school	Trader	<500000
15	Kumaidi	27	high school	Trader	1000000-1500000
16	Turmudi	46	junior high school	Transport service	<500000
17	Daryono	34	high school	Trader	1500000-2000000
18	Panijan	49	elementary school	Carpenter	<500000
19	Kunadi	41	junior high school	Farmer	500000-1000000
20	Junedi	43	junior high school	Farmer	<500000
21	Sanusi	37	elementary school	Farmworker	<500000
22	Suparno	40	high school	Mechanician	500000-1000000
23	Radi	45	elementary school	Farmer	<500000
24	Sampurno	34	junior high school	Carpenter	500000-1000000
25	Kadiman	49	elementary school	Farmer	<500000
26	Dahlan	41	junior high school	Farmer	500000-1000000
27	Rosidi	39	junior high school	Farmer	<500000
28	Jasmani	55	elementary school	Farmer	<500000
29	Suwarni	45	elementary school	Farmer	<500000
30	Suhadi	46	elementary school	Trader	1000000-1500000

List of Respondents in Sendangwaru sub district

No	Name	Age	Education	occupation	monthly expenditure (Rp.)
1	Wardi	54	junior high school	Trader	500000-1000000
2	H. Juari	60	elementary school	Trader	2000000>
3	Dasrip	47	junior high school	Farmer	<500000
4	H. Padmi	57	elementary school	Farmer	2000000>
5	Kasran	38	junior high school	Farmer	<500000
6	Suwardi	37	junior high school	Farmer	<500000
7	Awid	26	high school	Transport service	500000-1000000
8	Asmani	25	junior high school	Farmer	<500000
9	Kardi	33	junior high school	Farmer	<500000
10	Dasimin	42	elementary school	Farmer	<500000
11	Musafak	35	elementary school	Farmer	<500000
12	Umini	44	junior high school	Trader	1000000-1500000
13	Kasdani	39	elementary school	Farmer	<500000
14	Kani	48	elementary school	Farmworker	<500000
15	Joned	26	junior high school	Farmer	<500000
16	Harto	28	high school	Trader	500000-1000000
17	Sukri	26	junior high school	Farmer	<500000
18	Darmono	34	elementary school	Trader	<500000
19	Dasrun	29	junior high school	Farmer	<500000
20	Kasturi	46	elementary school	Farmer	<500000
21	Sanaji	42	high school	Gov Official	500000-1000000
22	Suparman	37	junior high school	Farmer	<500000
23	Wagimin	55	elementary school	Farmer	<500000
24	Tamirin	31	elementary school	Farmer	<500000
25	Wiji	34	elementary school	Farmer	<500000
26	Asnawi	30	junior high school	Trader	500000-1000000
27	Sarni	40	elementary school	Farmer	<500000
28	Wasti	39	elementary school	Farmer	<500000
29	Jarsih	27	junior high school	Farmer	<500000
30	Ngatmini	45	elementary school	Farmworker	<500000

List of Respondents in Ngasinan sub district

No	Name	Age	Education	occupation	monthly expenditure (Rp.)
1	Tasmuni	46	high school	Gov. official	500000-1000000
2	Jasiran	52	junior high school	Trader	1000000-1500000
3	Sarkup	58	elementary school	Farmer	<500000
4	Maskup	43	junior high school	Carpenter	500000-1000000
5	Wardi	50	junior high school	Trader	1000000-1500000
6	Kasni	37	junior high school	Farmer	<500000
7	Srimadi	32	junior high school	Farmer	<500000
8	Samsudin	44	junior high school	Farmer	500000-1000000
9	Nasikun	53	elementary school	Farmer	<500000
10	Kadik	42	elementary school	Farmer	<500000
11	Daenuri	36	high school	Trader	2000000>
12	Wakidi	52	elementary school	Farmer	<500000
13	Suryanto	39	high school	Trader	500000-1000000
14	Yusup	43	junior high school	Trader	<500000
15	Kayami	37	elementary school	Farmworker	<500000
16	Kundari	45	junior high school	Farmer	<500000
17	Haryono	34	high school	Gov official	500000-1000000
18	Takim	49	elementary school	Farmer	<500000
19	Munawar	36	junior high school	Farmer	<500000
20	Sukiyah	43	elementary school	Farmworker	<500000
21	Sudarno	37	bachelor	Teacher	500000-1000000
22	Warijan	50	elementary school	Farmer	<500000
23	Wasiman	45	elementary school	Farmer	<500000
24	Rosidi	34	junior high school	Trader	1000000-1500000
25	Wasnadi	49	elementary school	Farmer	<500000
26	Wakip	41	junior high school	Farmer	500000-1000000
27	Sumani	39	junior high school	Farmer	<500000
28	Sukimin	40	junior high school	Farmworker	<500000
29	Kasni	51	elementary school	Farmworker	<500000
30	Rasmuji	53	elementary school	Farmer	<500000