

# **MODEL OF REGIONAL POLICY STRATEGY IN SUSTAINABLE IRRIGATION MANAGEMENT**

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## **ABSTRACT**

At present, Indonesia's regional economic growth strategy and related sectoral policies still do not adequately consider sustainable environmental management aspects. The empirical consequences of this condition are the emergence of negative impact in the form of ecosystem degradation due to increasing exploitation of natural resources. In the case of deforestation, excessive soil erosion and degradation of the watershed catchments area could decrease reliable river flows. Unstable landscape and rivers alignment increased risk of catastrophic landslides and, excessive sediment transport reduced irrigation conveyance capacity. All of those contribute to decreased water availability for irrigation and public utility as well as increased public goods losses. In the paddy fields, there is a tendency that productivity of irrigated lands becoming smaller over time.

This research aims to develop a strategic regional policy model for rice production through maintaining sustainability of local irrigation systems. The integrated model includes governmental functions as well as social institutions. This research uses the 'Soft System Methodology for Policy Research' to analyze current irrigation policies, applied Strategic Assumption and Surfacing and Testing (SAST) and Focus Group Discussion (FGD). Expert Survey was conducted to implement Interpretative Structural Modelling (ISM) technique and was supplemented with farming surveys and field observations.

The result of this study is expressed as conceptual model, which is the strategic policy for sustainability in regional irrigation management covering both rice cultivation and watershed areas. The model of sustainability development used Comhar principles which are Good Decision Making, Satisfaction of human needs by the efficient use of the resources, and Equity between countries and regions. The effective application of the model requires better regional regulation and supervision, as well as community participation supported by coordinated efforts of various technical departments in the region. Sources of various funding should be adequately available for infrastructure rehabilitation, re-forestation, irrigation maintenance costs and farm credits. Monitoring and evaluation activities will be carried out by local Irrigation Commission.

Keywords: Sustainable Irrigation Management, Regional Policy, and Soft System Methodology

## **BACKGROUND**

Developing an effective management framework for sustainable development requires addressing both decision makers and governance. The principle of sustainable development has received growing attention, but it is anew idea for many regional government officers. For most of them, the concept remains abstract and theoretical.

The following definition by International Institute for Sustainable Development (1992) is adopted as:

For the public policy makers, sustainable development means adopting economic strategies and activities that meet the needs of the stakeholders today while protecting, sustaining and enhancing the human and natural resources that will be needed in the future.

The definition of stakeholders includes shareholders, employee, costumers, suppliers, producers and communities who are affected by developmental activities. It is also recognized economics' dependence on people and natural resources.

At present, Indonesia's regional economic growth strategy and related sectoral policies still do not adequately consider sustainable environmental management aspects. The empirical consequences of this condition are the emergence of negative impact in the form of ecosystem degradation due to increasing exploitation of natural resources. In the case of deforestation, excessive soil erosion and degradation of the watershed catchments area could reduce irrigation conveyance capacity. All of those contribute to decreased water availability for irrigation and public utility as well as increased public goods losses. In the paddy fields, there is a tendency of the effective productivity of irrigated lands becoming smaller over time.

Nowadays, the government should then consider ways to narrow gap between the current state of environmental degradation and its sustainable objectives in the future. A strategy will be need to be developed, how and when policy makers expect to achieve stakeholder's expectation.

## **META-METHODOLOGY**

In public policy establishment, governance is increasingly important because of the growing accountability of the administration and its executives. Information and reporting system must support this need. Decision making at all levels has become more responsive to the issue arising from sustainable development.

This policy research used various techniques of Soft System Methodology (Midgley, 2000) beginning with stakeholders analysis for paddy-field irrigation system in line with farmers quality of living in rural areas. A stakeholders analysis is required in order to identify all the parties that are directly or indirectly affected by irrigated water operation. It sets out the issues, concerns and information needs of the stakeholders with respect to sustainable development activities. The key is to analyze how the policy strategies affect each set of stakeholders, either positively or negatively.

Originally, we used to study problem on rice field irrigation practices as exclusive engineering system designed by humans having production economic purpose. But after preliminary observation through case studies, it was found that community, especially farmers element, have a decisive place in the irrigation system. Therefore, this study aims

to develop a socio-technical model to support policy initiatives at regional level. In model building, we used SAST (Mason, and Mitroff, 1981) and Interpretative Structural Modelling-ISM (Warfield, 1994). Focus Group Discussion and field observation was conducted to acquire stakeholders knowledge as well as empirical evidences.

### **SITUATIONAL ANALYSIS**

Natural resumes initialization in Indonesia is in dangerous zone due to accelerated economic growth and increasing settlement. The degradation of forest area reach about 2 million hectare per year, induced by forestry products industry such as pulp and paper. Huge amount of natural forest were gone, replaced by estate crops, mostly palm oil. Reforestation in upper land was not successful, so that water catchment area deceased substantially. Therefore, water availability for irrigation and public usage is also becoming less and less each year, especially in Java Island.

Water resource availability in Indonesia is 1,957 billion m<sup>3</sup> per year, while in Java is 1750 m<sup>3</sup> per capita per year. If there is no special conservation projects, by 2020 Java will only have 1200 m<sup>3</sup> per capital per year. This condition is not suitable for irrigated rice production area. Furthermore, there are conversions from irrigated land use to non farming function with an alarming rate of 807.500 hectare projected farm 1990 to 2020.

Beside water resources, there are serious problems in the operation of irrigation infrastructures. Recent survey by Ministry of Public World found that from total 6.7 million hectare irrigated rice fields, 23-45 % is damaged and about 36.06% is dysfunction since it could heavily affect national food security, such of integrated public policy must be established to sustain irrigation network for local paddy fields.

To understand the root of the problem, case study was carried out in Cianjur District- West Java Provinces. This district is known as rice production center which have wide catchment area in the upper land. It is reliable study area for sustainable development efforts covering both farming activities and natural resources conservation. Through FGD and field observations, we found there are two main obstacles in irrigation system:

- Public policy for irrigation management was not effective and poorly coordinated, especially in the matter of operation and maintenance.
- Capacity building for community based organization related to irrigated paddy field and water resources conservation was not well-funded or sometimes not-existed

### **POLICY MODEL BUILDING**

Basic assumption and variables identification of the intended policy model was started through SAST procedures to ensure that:

- Important variables that are likely to influence the problem situational are not left out of the study

- A cleared idea emerges as to what variables would be most important to consider
- The problem statement can be made with clarity
- The policy implication is perceived by the scientific community as well as stakeholders as relevant and significant

After in-depth investigation, basic assumption was found the interlinked between three major aspects must be designed properly to achieve the system adjectives. (see Figure 1). Holistic synchronization should be the essential part of model building problem.

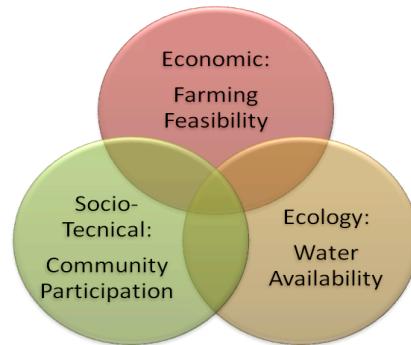


Figure 1. VENN Diagram: Irrigation Management System

This study found that the interrelated junction among three aspects is expressed in the stakeholders engagement and consultation. It is main issue according to Mc Naughton and Stephens (2004) in order to eliminate inherent tensions exist between three aspects. The overleaping sustainable development objectives are (1) economic program for poverty alleviation, (2) protection of natural environment and (3) social such as food as health.

## THE POLICY STRATEGY

The policy strategy was set up after stakeholders analysis and technical investigation in the Cianjur district. The legal is refer to law no 26/2007 concerning land use planning earthier the region and law no 27/2004 with regard to water resources management. In disked level, the **Bupati** (regional CEO) has autonomous authority to handle planning and controlling policy for sectoral agency. Hence, there are complexities when there is conflict of interest among sectoral programs. However, this study found that regional policy strategy for irrigation management must treated as **multiple goals** decision making procedures under supervision of the Bupati as head of district administration.

This strategy implementation was not performed well in Cianjur district so that averagely 60 percent of irrigation infrastructures were severely damaged. In upper land also, there is few forest rehabilitation project be connected to water supply for irrigation

intake. The watershed area was not linked operationally with farming area for a long time. So that critical dry land was increased year by year.

Consequently, the current policy strategy must be changed and improved. With ISM technique to identify key element and driver power, the policy strategy was established as follows.

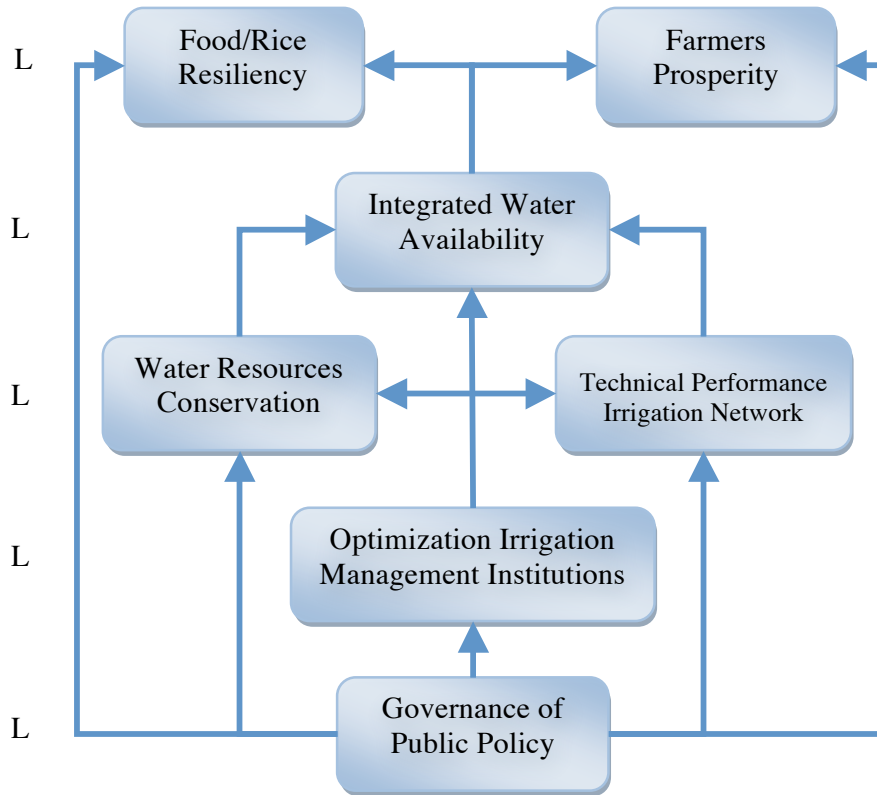


Figure 2. Multiple Goals: Sustainable Irrigation Policy Strategy (ISM Results)

### THE POLICY MODEL

The policy model was developed based on COMHAR sustainable principles which are good decision making, satisfaction of human needs by the efficient use of research and equity between regions.

Referring to ISM–results, the policy model was constructed as institutional functional and structural adjustment. There are three sub-systems which are inter-linkage: 1) water resources conservation, 2) irrigation network operation and maintenance and 3) farming business. The policy model was named **PKASARI** (Sofjan Bakar, 2008), which already introduced to policy makers at provincial and district level.

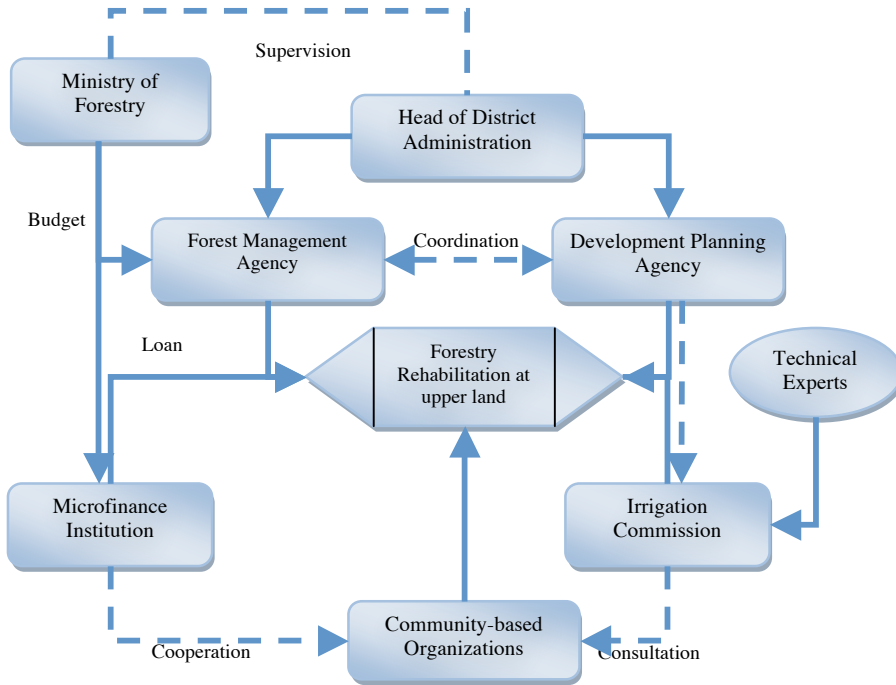


Figure 3. Water Resources Conservation Subsystem, District-Level

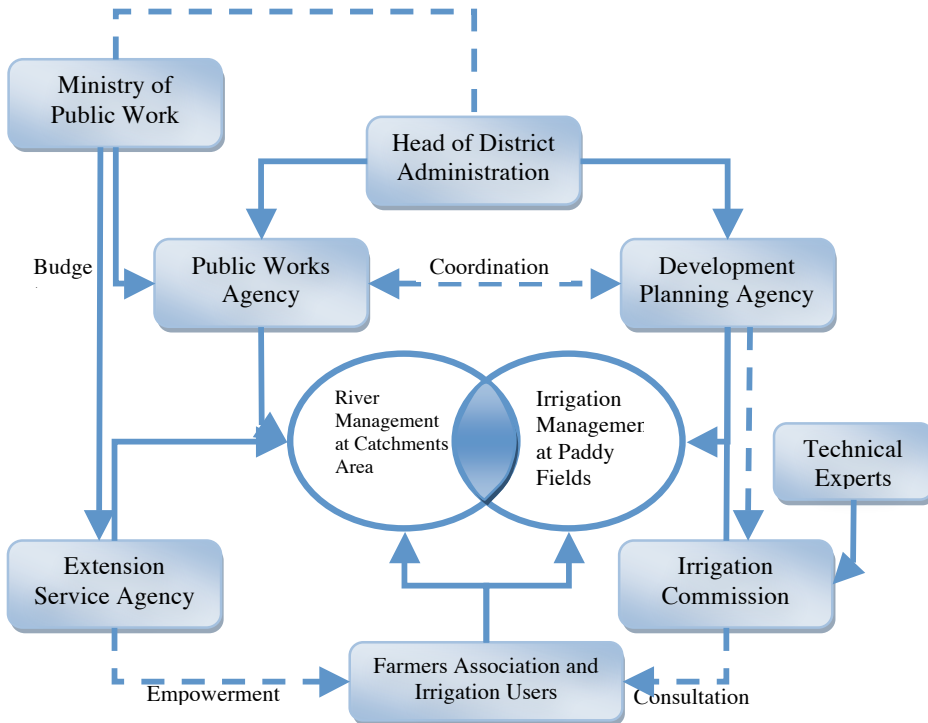


Figure 4. Irrigation Network Operation and Maintenance Subsystem, District Level

In Figure 3 dan 4, we can observe the new and important role of the Irrigation Commission as monitoring and evaluation agents for multi-goals subsystems. Therefore the local commission must be supported by technical experts to develop general rules or methodology so to avoid the necessity of repeating the same thought processed when faced with similar goal seeking activities (Karvalem, 2004).

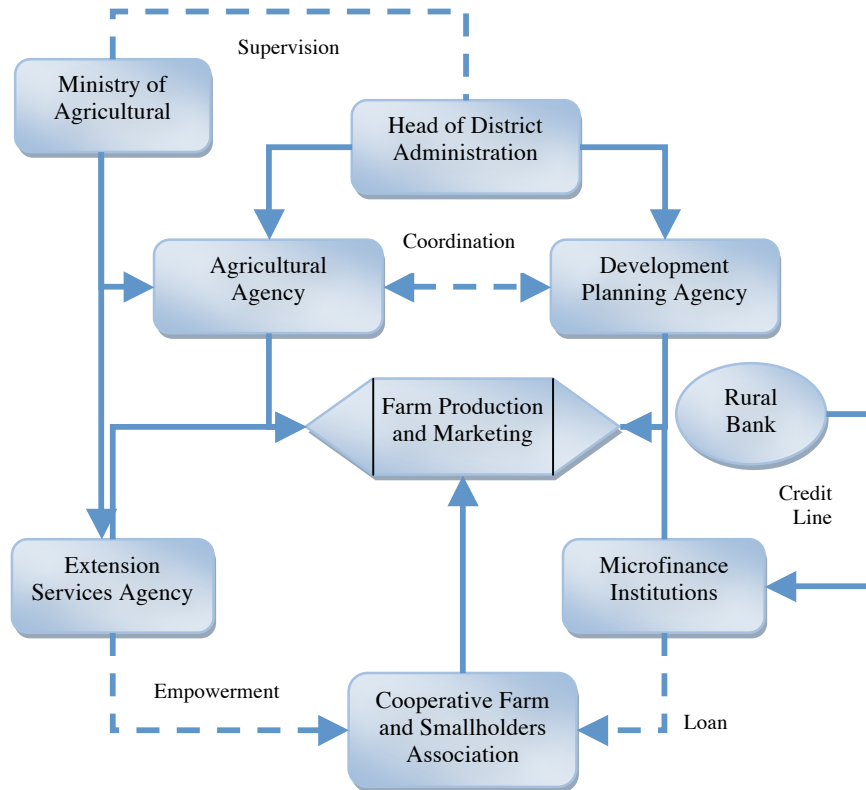


Figure 5. Farming Business Subsystem, District Level

The policy implication recommend better regulation and supervision by **Irrigation Commission** with full participation of stakeholder, as well as strengthening community based organization at rural level.

The validation of PKSARI model was performed quit intensively through round table discussion in the national level down to district level. There are long debates when it comes to prioritizing among three subsystem. Hence, we conducted knowledge acquisition using Exponential Comparison Method and come into several conclusions:

- Incoming provincial regulation must be rely on the government Decree no 20/2006 about the development and management of participatory irrigation system
- Establishment of Irrigation Commission by **Bupati** decree should be referring to the Ministry of Public Works decree no 31/2007 concerning the Irrigation Commission.
- Coordination between Ministry of Forestry, Ministry of Agriculture and Ministry of Internal Affairs is needed to blend various developmental budgets for water catchment area rehabilitation.

## CONCLUSION REMARKS

The PKSARI Policy Instruments is ways to model the relations between the different elements of the socio-technical systems, as mentioned by Kroes (2006). It was found useful for the purpose of explaining and understanding the interaction between hardware components and the human agent in their various roles.

Coordinated efforts of various sectoral agency is in the district level should be done through Irrigation Commission as non government organization supported by several technical experts. Sources of development fund, either from private or government institutions, must be adequately available for infrastructure rehabilitation, reforestation, irrigation maintenance costs and farm credits.

The policy instruments may be effective with assumption that there is an effective regulatory and enforcement framework already in the district office, and that legal resource, in cases of non-compliance, is feasible. Where sufficient resources are not available, independent NGO, trusted both by the government and the community, could be employed to monitor environment management performance targets.

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