

Implementation of Irrigation Management Reform Policy under External Support: Sustainability Question A Preliminary Observation in West Sumatra, Indonesia¹

Yonariza²
Andalas University, Padang - Indonesia

Abstract

The paper critically analyzes the sustainability of externally funded projects for the implementation of irrigation management reform policy in Indonesia. Implementation aspects analyzed are project management, individuals within the project, external funding assumption, previous experience, and policy ambiguity. Data were drawn primarily from West Sumatra Province, where irrigation management reform multi-projects are located. The paper concludes that these projects will not be able to empower the Water User Associations and the district or provincial government to continue project implementation when external funding source is withdrawn. Hence, an alternative course of implementation which mainly relies on local capacity is proposed.

Keywords: tenure reform, irrigation management transfer, Indonesia, West Sumatra.

INTRODUCTION

Background

The Government of Indonesia (GOI) substantially reformed its irrigation management policy in 1999 with the World Bank-funded Irrigation Management Reform Policy or *Pembaharuan Kebijakan Pengelolaan Irigasi* (PKPI). The World Bank through the Water Sector Adjustment Loan (WATSAL)³, also known as the Water Sector Adjustment Program (WATSAP) helped the

¹ Paper prepared for RCSD Conference "Politics of the Commons: Articulating Development and Strengthening Local Practices, July 11-14, 2003, to be held by Regional Center for Social Science and Sustainable Development (RCSD), Faculty of Social Sciences, Chiang Mai University Chiang Mai, Thailand.

² Research Associate, **Center for Irrigation, Land and Water Resources and Development Studies, Andalas University**, Padang, Indonesia. Email: psi-ua@indosat.net.id, yonariza@hotmail.com

³ The severe economic crisis that hit Indonesia and political turmoil that followed in 1997 brought significant socio-economic and political change in the country. On political and administrative aspects, Indonesia Government launched decentralization policy and financial rearrangement in many aspects of socioeconomic and political. In resource management sector, former centralized management policies were no longer applicable and much of adjustment should be made, including water sector management. With the enactment of Act No. 22/1999 on decentralization policy and Act No. 25/1999 on financial balances, water sector management responsibility was decentralized to lower government unit. This is what sector adjustment means all about (for detail see the World Bank document entitled Report and Recommendation of The President of The International Bank For Reconstruction And Development to The Executive Directors On A Proposed Water Resources Sector Adjustment Loan to The Republic Of Indonesia 1999).

Government to develop the framework for this reform. PKPI was intended to transfer irrigation management to local government units (LGUs) which would then transfer it to water user associations (WUAs). This policy adopts a participatory irrigation management and water user association empowerment. This is in line with decentralization all over the country. The LGU is now responsible to deliver services for irrigation management such as the operation, maintenance, rehabilitation and upgrading of irrigation facilities⁴.

The Irrigation Management Reform Policy has been legalized through the enactment of Government Regulation No. 77/2001. The five principles being followed in this policy are:

- 1). Redefinition of responsibilities of irrigation institutions to ensure a larger role for farmers in decision-making;
- 2). Empowerment of farmers through autonomous, self reliant WUAs, including the formation of WUA Federations (WUAF) at Scheme level, and their representation in Basin Water Resources and Irrigation Committees, and formal regulation of water rights to scheme level WUAFs;
- 3). Transfer of authority of irrigation management to the WUAs, under the “one system, one management” principle;
- 4). Finances to pay for the operation, maintenance, rehabilitation and development of irrigation systems will be collected and managed by the WUA;
- 5). Sustainability of irrigation systems through a general policy of water resources conservation and controlled conversion of irrigated land.

Unfortunately, the GOI has limited funds to implement this bank-supported policy reform. Thus external support was sought from various foreign institutions, such as the Asian Development Bank (ADB), Japan Bank for International Cooperation (JBIC), the Government of Netherlands, and the European Union (EU). Under these foreign supports various implementation programs and projects are being carried out.

During the earlier stage of policy implementation, the World Bank through the Java Irrigation and Water Resources Management Project (JIWMP) piloted the policy implementation in Java and Sumatra covering 263 irrigation systems from year 1997-2001. However, considering the significant number of government-managed irrigation systems in the country, i.e. 18,993 units (Annex 1) to be transferred, and the limited capacity of the World Bank to cover all irrigation systems, other donors were invited. JIWMP was continued by other projects, namely, the Indonesia Water Resources and Irrigation Reform Implementation Program (IWIRIP) funded by the Government of Netherlands from 2002-2003 and the ADB-supported projects Participatory Irrigation Sector Project (PISP) and the Northern Sumatra Irrigated Agriculture Sector Project (NSI-ASP). NSI-ASP is being implemented in Sumatra, western Indonesia while PISP is being implemented in Java and Eastern Indonesia (see Map on Annex 2). The WB continues its support through the Water Resources and Irrigation Management Program (WISMP) for a period of

⁴ Since the severe crisis of 1997 it became clear that extensive institutional reforms were necessary. Main focus was on increasing the role of the beneficiaries, and changing the role of the government agencies from “provider” of goods and infrastructure to “enabler” of the community to mobilize its own resources and capacity for solving problems. A new Policy for Irrigation Management Reform (PIMR) was formulated, based on extensive public consultations, and officially endorsed by the president (April 1999). *van Nes I, Hasibuan, Hasan*

10 years beginning in 2003. These five major projects still cannot cover all the systems in the country. There are still many more systems which could not be reached and which need to be included in project implementation.

Despite the large number of projects during the last three years, the issue of sustainability of irrigation reform implementation was never brought up⁵. Vermillion (2001) and Zamaan (2002) tried to make preliminary assessments at the policy level, but nobody looked at the implementation level. This paper aims to fill that gap.

This paper, though preliminary in nature, is based on my own observations and discussion with several individuals involved in the implementation of the irrigation management reform program in West Sumatra Province, where the five projects have been implemented since the year 2000. The argument is that the IMR implementation with heavy external support will not be sustainable because the nature of its implementation is very much “project oriented” rather than “program oriented”. The main parties involved in the project do not have the concept of a participatory approach. The paper also argues that policy implementation still adopts a bureaucratic approach by involving the bureaucracy as the main actor in project implementation, instead of allowing more accountable organizations like NGOs. Universities and NGOs should be given the chance to implement these projects, as they are relatively clean and have less interest in managing irrigation systems. This is unlike the irrigation bureaucracy which sees the IMR program as threatening to their career. In addition, this paper argues that such heavy foreign support is not necessary for the province where irrigation affairs are nothing new to the communities.

What is needed is mutual communication between the government and the stakeholders, the water users, who should be involved in policy implementation. Projects have their own procedures and those were designed for country-wide implementation. They ignore site-specific situations, and as such the projects are only wasting resources. Unfortunately, during the World Bank Kick-off mission in 2001, field implementation issues were not really looked into. The mission only focused on the accomplishments based on the work plan, thus elements such as motivation of people in the implementation remain untouched. In this alternative option, policy socialization and mutual understanding should develop between the government and WUA in order for both to be empowered. The government needs to explain the adopted irrigation management reform policy and then let the WUAs and LGUs find their way to continue management activities including financing. This would enhance local capacity and reduce government expenditure for irrigation operation and management.

Objectives

This paper aims to describe and assess the sustainability of irrigation management reform implementation. Specifically, it aims to: (a) describe major projects in irrigation management reform policy; (b) provide evidences on sustainability issues of implementation of the program; and, (c) propose recourse of program implementation in order to attain sustainability.

⁵ Sustainability simply means maintaining the implementation of the program over time (taken from Elliot 1994)

Irrigation Sector Management Reform: from turn over program to management transfer

Irrigation management reform is a subject that concerns many organizations in the government and the private sectors (Abernethy, 1998). Earlier discourse on irrigation management reform was to turn over small-scale (below 500 ha) irrigation management responsibility from government to Water User Associations (WUAs) (Vermilion, 2001 and Abernethy, 1998). Irrigation management reform redefines management roles and responsibilities of government and water users. Formerly, when the government had a heavy intervention in irrigation management, the role and responsibility of WUAs were limited to the tertiary block. The government was responsible for managing the primary and secondary canals. With the reform, WUAs take a bigger responsibility. As in other cases, prior to irrigation management reform, management was centralized and under the authority of the central government. It has been well-documented that under centralized management, irrigation performance and farmer participation were low. It created high dependency toward government support, and management cost was high because of complex irrigation bureaucracy (Bruns, 1999). This is not conducive for WUA empowerment and irrigation management improvement.

The decision to adopt irrigation management reform varies from country to country because of the socio-economic and political variation in each country. Some of the reasons according to Abernethy (1998) are as follow: (a) reduction and restriction of regular, recurrent public expenditure for operation, maintenance and management; (b) belief that irrigated agriculture would perform better if users of irrigation facilities have a role in decision-making; (c) standard maintenance on public irrigation systems was low and caused frequent rehabilitation; (d) change in attitudes towards public investment in irrigation and the thought that social support to the poor is no longer needed when production potential increases to a level much greater than household needs; (e) change in production orientation where the government is no longer responsible to support such investment when markets could operate well to mobilize resources for irrigation management.

In the 1990's, irrigation management reform shifted from small-scale turn over program to irrigation management transfer (IMT), wherein the government transferred its management responsibility to the WUAs. Unlike the previous turn over program which only covered small-scale irrigation systems (below 500 ha), the IMT intended to transfer all irrigation management systems, regardless of their sizes, to WUA, partially or completely. However, the basic principles behind the two reforms are the same, which are to avoid the government's recurrent investment on irrigation and to transfer the responsibility to irrigation users.

Current irrigation reform policy adopted in Indonesia, in addition to the above-mentioned reasons and objectives, is also pushed by the economic crisis that badly hit the country in 1997. The crisis forced the government to cut the budget and to reform almost all sectors through decentralization.

Indonesia Irrigation Management reform

As mentioned earlier, the current irrigation and water sector management reform in Indonesia is being facilitated through the World Bank's Water Resources Sector Adjustment Loan (WAT-SAL). The program summary states that the proposed loan would provide balance of payments

assistance to the Republic of Indonesia to support a structural adjustment program of policy, institutional, regulatory, legal, and organizational reforms in the management of the water resources and irrigation sector.

The Program's four objectives⁶ are as follow:

- 1). Facilitation of efficient, environmentally and socially sustainable water resources development and management by improving national policy, institutional, regulatory and decision-support frameworks;
- 2). Strengthening of the institutional and regulatory frameworks for integrated and equitable river basin management;
- 3). Establishment of effective regulatory institutions and implementation arrangements for water pollution abatement and regional water quality management;
- 4). Improvement of the performance and sustainability of irrigation systems by establishing an institutional framework for transparent and accountable delivery of irrigation services and participatory fiscal support to empower democratic farmer organizations with governance and financial authority to manage irrigation networks under their control.

With regard to objective no. 4, WATSAL's activities are: a) adopting a national framework to establish autonomous and self-financing WUAs and WUAFs to manage irrigation networks; b) launching of a program for democratic establishment of empowered WUAs; c) revising the roles and responsibilities of government irrigation agencies to provide support services to WUAs and WUAFs in conformity with decentralization; d) implementing a nation-wide Irrigation Service Fee framework for sustainable financing of operation, maintenance and asset amortization of irrigation schemes; and, e) establishing a "demand-based" WUA Irrigation Improvement Fund for affordable financing of prioritized incremental rehabilitation of irrigation networks.

The Irrigation Management Reform Policy (*Pembaharuan Kebijakan Pengelolaan Irrigasi* or PKPI) is similar to other policies adopted by Asian countries as outlined by Abernethy (1998) earlier that is irrigation management transfer.

Implementation of Irrigation Management Reform Project

Each of the major funding agencies (WB, ADB, GoN, EU, and JBIC) came with various project schemes and selected implementation sites in the name of PKPI. These projects include JIWMP, IWIRP, NSI-ASP, PTSL II, PPISP, WISMP, and Good Governance Project. The materials being reviewed here mainly come from downloaded project documents as well as printed materials.

JIWMP

The Java Irrigation Improvement & Water Management Project (JIWMP) was the pilot project on irrigation management reform policy implemented initially in five provinces in Java (from 1997 to 2001). For some reasons, two provinces in Sumatra, namely West and North Sumatra, were also included in this project. JIWMP aimed at establishing the legal aspects of irrigation

⁶ for detail please visit: <http://www.worldbank.org/html/extdr/offrep/eap/projects/watsal/watsalexecsum.htm>

management reform at the provincial and district levels and piloting WUA empowerment in selected districts and irrigation schemes. It focused more on organizational and institutional reforms in irrigation management without facilities improvement. JIWMP was fully implemented in 10 provinces, namely: Banten, Central Java, DI Yogyakarta, East Java, West Java, Central Sulawesi, Lampung, South Sumatra, South Sulawesi and West Nusa Tenggara

JIWMP started piloting large-scale irrigation reforms in Java in 1997⁷. Over the past 5 years more than 2,500 legalized Water User Associations have been established in 2,325 schemes.

JIWMP encourages the provincial and district governments to formulate and enact local regulations for irrigation management as per guidelines, such as the WUA empowerment project, irrigation management transfer procedure, and the provision of district budget for irrigation management called KIF (*kabupaten* or district irrigation fund). The JIWMP follows the multi-stakeholders project implementation approach, wherein the local bureaucracy, NGOs and the local university staff are involved, and later on, both the NGOs and the local university would play only minor roles.

After five years of implementation, JIWMP claims the following successes⁸:

- 1). Reduced water conflicts resulting in a better cropping pattern particularly during the dry season;
- 2). Increased WUAF bargaining position with other water users (water-polluting industries, in particular) as well as personnel support from irrigation agencies;
- 3). Management of the government irrigation management fund WUAF has started;
- 4). Irrigation management reform is better understood now by water users;
- 5). Inter-farmer communication has intensified after the irrigation reform was implemented.

However, these achievements do not guarantee sustainability should the project be terminated because the WUA organizational sustainability was not assessed.

IWIRIP

The Indonesia Water Resources and Irrigation Reform Project (IWIRIP) is a continuation of the JIWMP in the provinces of Banten, Central Java, DI Yogyakarta, East Java, West Java, Central Sulawesi, Lampung, South Sumatra, South Sulawesi and West Nusa Tenggara. This project was funded by the Government of Netherlands (GoN) with a grant of US\$10 million for FY 2001-2003. This enabled the piloting of water resources and irrigation sector reforms based on the Water Resources Sector Adjustment Loan (WATSAL) program and the changing sector administration (authorities, planning, programming and budgeting) required by UU 22/99 and UU 25/99.

⁷ World Water Actions Java Irrigation Improvement and Water Management Project Evaluation. http://www.worldwatercouncil.org/view_doc.php?id_doc=2023

⁸ see Sudarmanto (2002) Implikasi Peraturan Pemerintah No. 77/2001 Tentang Irigasi Di Daerah (The Implication of Government Regulation No. 77/2001 on Irrigation at district level)

The Component Irrigation Management Reform (PKPI/PPI) subprogram activities included:

- *WUA Empowerment* to provide support to the Director of Regional Development of the Ministry of Internal Affairs to establish a legalized scheme level water user associations and federations
- *District Irrigation Improvement Fund* to provide support to the Director of Regional Development and Regional Governments for piloting demand-based matching grant funding of irrigation investments by WUA Federation
- *Community Organizers (COs)*. This includes training of trainers, community organizer training and provision of a limited number of COs per province

NSI-ASP

The Asian Development Bank (ADB) has, ever since, been concerned with irrigation and irrigated agriculture development in the country. In 1999, ADB agreed to provide loan for this sector in Indonesia, especially in the five provinces in northern Sumatra, i.e. Aceh, North Sumatra, Riau, West Sumatra, and Jambi. The project was called the Northern Sumatra Irrigated Agriculture Sector Project (NSI-ASP). This project started in 1998 after a study of irrigation management turn over program was carried out and it was found that there were still many aspects that needed to be addressed to improve the irrigated agricultural sector in Sumatra Island. These included the need to improve still irrigation facilities, support services for irrigated agriculture, water users development, and strengthening of the inter-sector coordination among line agencies in delivering these services. NSI-ASP was not, however, intentionally designed to implement irrigation management reform policy, It was, rather, designed under the centralized irrigation management system. However, since the proposed activities were related to the irrigation sector and the loan was approved during the time that the irrigation management reform policy was being formulated, NSI-ASP implementation was suspended until the said framework was finalized. Thus it was only in the year 2002 that NSI-ASP was fully implemented,⁹ after almost four years of being on hold.

The NSI-ASP has four main components:

Component A activities focuses on the rehabilitation and upgrading of existing irrigation systems.

Component B activities focuses on agricultural support services, like inputs and marketing

Component C deals with the empowerment of water user associations (WUA)

Component D deals with strengthening coordination among line agencies

As the policy on irrigation management reform has been effective since 1999, NSI-ASP must adopt a participatory approach in project implementation, where farmers and water users are involved in all projects components. However, as shown in the section on project implementation in West Sumatra province, the NSI-ASP is still far from adopting the participatory approach. The usual top-down project implementation was obvious and the orientation was narrowed to project oriented activities.

⁹ NSI-ASP Loan identification number is Northern Sumatera Irrigated Agriculture Sector Project (NSIASP) Loan ADB No 1579-Ino.

PTSL II

The Project Type Sector Loan II (PTSL II) is the contribution of the Japan Bank for International Cooperation (JBIC) to implement PKPI at newly constructed irrigation systems. PTSL II is being implemented from year 2002 to 2007 to correct former top-down approach in irrigation construction and management. The main objectives of the Project are to increase cropping intensity and farming productivity as well as to improve living standards. The related objective of the Project is to formulate a framework and standardized procedures for preparatory work for 19 sub-projects scattered in Sumatra, Java, and Kalimantan islands. As the PKPI has already been formulated, PTSL II must follow PKPI principles in project implementation. In general, PTSL II is different from other PKPI implementation projects because it is being implemented on newly constructed irrigation systems, which are systems under PKPI that will be transferred to WUA. The component on WUA empowerment is thus very crucial and institutional development ideally should be the main priority.

However, as noted by a consultant, institutional and organizational matters were not really given attention in PTSL II as outlined by PKPI¹⁰. This project, in view of this consultant, seems not to adopt a participatory approach and gave little attention to institutional development at the farmers' level, although the irrigation structure to be completed under this project will be transfer to the WUAs. What is obvious here is that the project is still following the business-as-usual mechanism.

Other irrigation and water resources sector development projects currently funded by JIBIC are the Small-Scale Irrigation Management Project (SSIMP) and the Rural Development Pioneer Project. Unfortunately, there no information is available on these two projects so no further analysis will be made in this paper.

PISP

The Participatory Irrigation Sector Project (PISP) is another ADB-funded project to boost the implementation of PKPI in Indonesia. As read in the project document¹¹, PISP will improve the management and governance of irrigation water resources by the implementation of recent irrigation reform principles in six provinces, namely: Lampung, Banten, West Java, Central Java, East Java, Central Kalimantan and South Sulawesi. It will also strengthen river basin management units in three provinces, namely: Bali, West Nusa Tenggara and South Sulawesi. In other words, PISP covers sites that are not covered by other projects.

PISP is intended and was designed to implement the PKPI, with the rationale that massive investments (about US\$10 billion) over the last three decades in irrigation system development have not been supported by sustainable irrigation management and the sector as characterized

¹⁰ Anonymous International Technical Assistant. in his email to a colleague, March 03, 2003

¹¹ Asian Development Bank. to be dated. Report And Recommendation To The Board Of Directors On A Proposed Loan To The Republic Of Indonesia For The Participatory Irrigation Sector Project (PISP)

by: (i) O&M under-funding; (ii) Poorly prioritized and inefficiently executed rehabilitation; (iii) Under-utilized local knowledge and capacity; and (iv) lack of water users' empowerment. It was designed in line with recent decentralization and irrigation reform regulations that have created a new decentralized framework for irrigation management. The PISP will support, through a program approach, implementation of these reforms – sustaining and enabling farmers and local government to carry out their new irrigation management responsibilities.

This project does not cover West Sumatra Province, thus no evaluation can be made at this time. But this project does explain how several foreign funding agencies legitimate their involvement in the implementation of PKPI in Indonesia using irrigation management reform policy and weak government financial capacity as stepping-stones.

The other two projects implemented by ADB are Farmer Managed Irrigation Systems Projects and Capacity Building Projects for the Water Resources Sector. No further analysis will be made for these two projects.

WISMP

With the termination of the JIWWP in 2001, the World Bank returned to help the implementation of PKPI in Indonesia, this time with the long-term Water Resources and Irrigation Sector Management Program (WISMP) to be implemented from the year 2003 to 2013. WISMP was designed based on the apprehension that the GOI would not be able to implement PKPI throughout the country with a limited budget. WISMP would be implemented in three phases¹²:

Phase I (*Initial Capacity Building Stage*) will last for about 3.5 years. This will help the GOI and the regional governments to develop a capacity-building program needed to strengthen the WATSAL institutional framework continuation in five Java provinces and, to a lesser extent, in several off-Java provinces under IWIRIP (and their eligible *kabupaten*).

The Phase I activities include:

- 1). completion of regional legislation and implementation guidelines in line with regional needs and policies;
- 2). preparation and introduction of relevant capacity building programs for the improvement of governance, fiscal sustainability and quality assurance in water resources and irrigation management;
- 3). prepare/finalize capacity-building programs for WUAF office holders and implement *Kabupaten* (District) Irrigation Improvement Fund and related WUA financial assistance programs;
- 4). support initial implementation of water quality management through river basin corporations in one or two river basins;
- 5). pilot irrigated agriculture support programs in each of the program provinces;
- 6). pilot implementation of water use rights and decision-support/MIS program in 3 program provinces; and

¹² DHV Consultant and Mott MacDonald. Water Resources and Irrigation Sector Management Program (WISMP). Inception Report, 25 February 2003.

- 7). support river basin operational management and river infrastructure programs in program provinces.

Phase II (Expansion Stage) will be adjusted based on the experience of Phase I and will expand WISMP to more irrigated *kabupaten* along with increasing the scope and complexity of planning, programming and budgeting for investment components of sector support in selected basins.

Phase III (Consolidation Stage) will further expand the WISMP and institutionalize its innovations as a sustainable modus operandi within the GoI.

Given the above activities and phases, the WB had seen that its previous initiative on irrigation reform policy implementation was not sustainable unless further support is provided.

EU-supported Good Governance in Water Resource Management Project

This project has a broader objective and was designed to help the country to recover after the severe economic crisis that caused millions to fall below the poverty threshold. The overall objective is to improve the living conditions of the population by the sustainable management of natural resources. Project period is 3 years from September 2002 to August 2005. The purpose of the project is to establish efficient, economically and environmentally sustainable management of water resources in three river basins. This is to be achieved by means of an improved transparent governance, providing for stakeholder empowerment and devolution of administrative power to stakeholder level. On the water sector and irrigation management aspect, this project expects to:

- 1). Establish three public-private water-boards which will efficiently distribute the available river water among agricultural (irrigation), industrial and urban water uses.
- 2). Prepare river basin water resource management plans.
- 3). Ensure administrative transparency through joint management of the *balais*, allowing stakeholder representatives to access information and participate in the financial and technical planning and management of the irrigation systems.
- 4). Establish streamlined district irrigation support agencies, well-trained for their new task as 'enabler' instead of 'provider'.
- 5). Set up self-reliant and self-governing water user associations (WUAs) with clear roles and responsibilities in the management of irrigation networks. These WUAs will be responsible for enforcing their own rules, levying fees, operating bank accounts and undertaking financial obligations.
- 6). Establish voluntary Federations of WUAs as higher level organisations (up to the scheme level) that can resolve water disputes and engage in operation and maintenance activities.
- 7). Build-up capacity of stakeholders to ensure sustainable watershed management to safeguard the long-term viability of the ecosystems involved.

The sum of loan from the above projects (WATSAL, JIWMF, WISMP, PISP, and IWIRIP) is US\$ 536.6 million or US\$ 120.03 per ha of irrigated land. No data is available for NSI-ASP.

The Government of Indonesia only provided 10% of the total budget. The provincial and district governments also provided 10% of the project budget allocated in respective provinces and districts. It is enough to say that the implementation of irrigation management reform policy is heavily dependent on foreign financial support. It is at this point that the sustainability of irrigation reform policy implementation reaches its height. Some facts and finding from West Sumatra Province, where the majority of implementation sites are taking place, will talk for themselves.

PKPI implementation in West Sumatra Province

Characteristics of government-managed irrigation systems (GMIS)

West Sumatra is one of the sites where irrigation management reform projects are being implemented. This province is considered important owing to its position as one of the leading provinces in rice production in Indonesia with 969 public irrigation systems (4.26% of total systems in the country) supplying water to 161,233 ha irrigated land (3.61% of total irrigated land in the country). Government-managed irrigation systems are characterized by hill irrigation system with a command area of less than 500 ha (92.26%) and 56.04% of total irrigation system is semi-technical construction and irrigating land within one or two village administrative boundaries (see Annex 3). These were previously farmer-managed irrigation systems (FMIS) and with government intervention in irrigation management from the 1970s to late 1980s, these systems became GMIS. Majority of GMIS are simple irrigation systems (semi-technical), that do not require sophisticated management tasks, and their operation and maintenance are within farmers' capacity to manage.

PKPI Implementation

The Irrigation Management Reform Program has been implemented in West Sumatra since 2000, through a series of projects such as the JIWMP, IWIRIP (2000 – 2003), NSI-ASP (2002 – 2007), WISMP (2002 – 2013), NSI-ASP (2002-2010), WISMP (2003-2013), and PTSL II (2003-2004).

JIWMP and IWIRIP are pilot projects, implemented in two districts, namely: Solok and Tanah Datar covering an area of 8,331 ha. spread across 38 irrigation systems (see map in Annex 4). The intended tasks of JIWMP and IWIRIP were to prepare provincial and district regulation laws regarding the new irrigation management policy, to pilot WUA empowerment model, and to transfer irrigation management systems. JIWMP began in 2000 and ended in 2001 and it was continued by IWIRIP from 2002 to 2003. The implementation of JIWMP involved local NGOs and the local university as emphasized in the project document.

NSI-ASP covered all the 14 districts in the province, taking 2 irrigation systems each year as focal areas and expand to additional irrigation systems in the following years. With the enactment of Government Regulation No. 77/2001, NSI-ASP uses a participatory approach in project implementation, however, NSI-ASP is still following more of a top-down and project-oriented

approach. The actual implementation is far from the participatory approach. As mentioned earlier, NSI-ASP was designed under centralized mode of irrigation management and its implementation was delayed until the irrigation management reform policy was formulated.

WISMP began its activity in 2003 with a series of public consultation. Unlike JIWMP, WISMP intended to help district government units to manage the irrigation systems under PKPI. It encourages district governments to allocate some amount from the development budget to the district irrigation fund (DIF). In the year 2003, WISMP is implemented in one district, Tanah Datar where JIWMP and IWIRP had been active.

With a closer look at all of the above-mentioned projects implemented in West Sumatra Province, through discussion, observation, and reports, several issues of sustainability arise.

Sustainability Issues

The issues of sustainability and success of irrigation reform implementation were analyzed in this paper according to several aspects. These are, i.e., project conflict, motive and attitude of individual involved in the project, role of provincial and district people representatives, counter decentralization program, project assumption, asset versus management transfer, and lessons learned from previous small-scale irrigation management turn over program as a precedent of unsuccessful management reform. Discussion will also include the nature of irrigation management reform: institutional or organizational. All these aspects, unfortunately, will point to unsustainable policy implementation

Project Conflict

Project conflict refers to overlapping and over claim among various projects being implemented. This is unavoidable when various project schemes are being implemented in the same area without clear coordination among line agencies and project administrators. These conflicts can be seen in matters pertaining to project leading agency, site selection, project activities, inappropriate implementation scheme, implementation approach, and project financial administration.

Each project is under a specific provincial and/or district agency. JIWMP and IWIRIP are under the Provincial Planning Board (BAPPEDA Province) which is supposed to coordinate project activities among line agencies. Unfortunately, project documents consider this agency as the lead agency but in the implementation it hardly coordinated the activities with line agencies. One of the results of uncoordinated efforts was the rejection by many other agencies of its drafted provincial irrigation regulation.

NSI-ASP is supposed to be carried out under good coordination among line agencies and among project components. As mentioned earlier, NSI-ASP has four components; Component A (rehabilitation and upgrading of existing irrigation systems) is carried out by provincial irrigation and water resource services; Component B (agricultural supporting services) is carried out by the Provincial Agricultural Service Agency; Components C (empowerment of WUAs) and D (strengthening coordination among line agencies) are carried out by the Provincial Development

Planning Board. However, in reality, each agency implemented the project components arbitrarily.

Project site selection by JIWMP, NSI-ASP, and WISMP also created conflicts on which irrigation schemes to be included in each project. When JIWMP was about to be implemented in year 2000, there was a conflict on irrigation scheme selection proposed by the LGU, as the case in Solok and Tanah Datar district. These systems either had previously been turned over through the Irrigation Operation Management Policy (IOMP) implementation in 1987 or they were irrigation schemes that had been included for NSI-ASP in 1999. Previously turned over irrigation schemes mean that administratively those schemes fall under farmer-managed irrigation system (FMIS). FMIS logically should be excluded from PKPI. Yet, somehow these systems are still in the GMIS list. These FMIS were then selected with a note that there would be no more irrigation management transfer activity in that system, and that only WUA empowerment will be carried out.

Different project activities pose another kind of project conflict, as found in Solok District. Different packages of NSI-ASP project activities are being implemented in separate irrigation systems so much so that the project has lost coherence. Not only that, project implementation confused the farmers. Under JIWMP, project staff informed farmers that under the new irrigation reform policy more responsibilities would be borne by the farmers themselves, with the government playing only a minor role in the maintenance of irrigation systems. To the very same farmers, NSI-ASP project staff introduced their project concept that there would be an irrigation facility improvement project. The project staff also mentioned that because socialization is part of the project activity, they included it in any irrigation scheme. Also the staff mentioned that the project's upgrading and rehabilitation component would be implemented in other irrigation schemes and not in sites where socialization is made. This confused not only the farmers but also the academicians.

Conflicts in the implementation of project schemes are probably the most significant. In the two years of JIWMP implementation, the activity scheduled for 9 months in each year could be done in 5-6 months only. This happened because the remittance of project funds was always late. Funds came only on the 7th or 8th month but the project was expected to be completed at the end of the year (12th month). In addition, the project spent the funds without a clear long-term implementation schedule. For example, in the year 2000, 8 trainers were recruited and trained, but only 4 of them were hired. Such kind of miscalculation of project's need also happened in the recruitment and training of local community organizers. In year 2000 under the JIWMP scheme, 28 COs were recruited and trained, but only 18 of them were finally employed in 2001, and 14 COs in 2002. This is an inefficient way of using project resources because the project has already lost its long-term schedule of implementation.

NSI-ASP components were not implemented logically. Component A (irrigation facilities improvement activity) required that a participatory approach be used in coming up with the design and in construction, and agricultural services should be provided by the organized WUAs. In that logic, WUA empowerment (Component C) should come first before participatory design and construction could be carried out. However, in the field, Components A and B were com-

pleted before Component C was started. This provides another evidence on poor coordination among line agencies and lack of participatory minded among project staff.

The project financial administration was trapped in a generalization model. Thus each district and province would adopt similar administration procedure and assume similar needs when administering project funds, from preparing the Annual Work Plan (AWP) to making financial reports. It ignores provincial and district variations. The project leader in province A or district B would just follow the same AWP of another other province or district. The Department of Finance would not approve an AWP with a different pattern. Financial administration is still centralized.

The implementation of PKPI at national, provincial, and district levels requires a working group in each level with representatives from the government, NGOs, university, and farmers. However, in the current process, the role of the government is getting stronger and marginalizes other stakeholders such as the NGOs and university staff. With this kind of situation, check and balance will not work as expected. Because they have a stronger power, the government bureaucracy can run the project the usual way.

Individual motives: Attitudes of individuals involved and their consequences

The individual's motive in project implementation is another issue in sustainability and goal achievement. As organizational experts would argue (see for example Olzen, 1968 and Etzioni, 1985)¹³, an effective organization is influenced by the motivation of individuals within the organization. The implementation of irrigation management reform is an organization that aims at empowerment of water user organizations and local government units. PKPI implementation involves many stakeholders, i.e. irrigation bureaucracy, consultants, NGO staff, university personnel, and water users. However, there are differences among these people in terms of their understanding of project objectives and their perception towards farmers' capacity to take over. It seems that the local government bureaucracy and consultants do not believe that the WUAs have the capacity to take over irrigation management responsibility, thinking that as farmers they have limited capacity. The international consultants also have the same thought. WUAs, on the other hand, expect to take a bigger role in irrigation management.

It is sad to say then that key individuals in the implementation of irrigation management reform have different motives. Their motives do not seem to go in line with the reform goal, but are focused more on other things, and the empowerment of the WUAs is not one of them. In West Sumatra these individuals are bureaucracy staff and consultants. NSI-ASP consultants used to express such kind of perception. This is also true at the central level as reported by Zamaan (2002) that irrigation reform policy is "complicated and cumbersome provisions of the restructuring have to be developed and implemented by a reluctant water sector bureaucracy that is fearful of losing its traditional authority and status".

Given such perception, it is unlikely these individuals would work for WUA and farmers' empowerment. This situation also proves that policy and program socialization has not succeeded

¹³ .The Process of Social Organization. Marvin Elliot, Organisasi-organisasi Modern. Amitai Etzioni, 1985. UI Press.

in reforming key individual perception at provincial, district, and national levels. For these individuals, WUA empowerment would threaten the status quo. They would openly express this perception. They also seem not to understand the nature of institutional development which needs time to see the results. For example, after two years of JIWM implementation in West Sumatra, the head of the district planning body made a statement that empowerment projects gave no result, simply because he could not see the result physically.

This kind of perception might have developed during their interaction with farmers. When project staff (government officials and consultants) asked the farmers regarding their capacity to manage, the farmers would always deny that they had capacity to carry out irrigation management tasks and expect the government to continuously carry out such tasks. This was an expected answer since the farmers were talking to government officials. Such questions should not be asked by the project staff. When the same question was asked by NGO or University staff, farmers replied differently. They insisted that the government only play a minor role in irrigation management if not at all. The farmers insisted that they were willing to carry out irrigation management tasks. They also mentioned that even though field irrigation workers were present in their areas, they hardly did their jobs. Even though there were conflicting responses, the project staff constantly expressed farmer incapacity.

Such perception was obvious among NSI-ASP consultants. These consultants are retired irrigation and agricultural officials whose perception on irrigation management was shaped during the centralized management era. It is questionable that these people are involved in this irrigation reform project implementation because it is required that consultants should at least have 15 years work experience. It is not possible for retired government officials turned consultants to carry out the policy reform because they hardly internalized the basic element of policy reform which is institutional development.

Involvement of provincial and district representatives

Provincial and district level representatives are among the strategic stakeholders in the implementation of irrigation reform policy. Their important role is in approving the development budget. But they could have a vested interest with the budget, which is to increase government revenue as basis for their salaries and for honor. When this is the case, little can be expected if these legislative interests are not in line with policy reform. This aspect has never been tackled very well in JIWM and NSI-ASP. However, WISMP has tried to address this issue.

Counter decentralization program

These projects are countering decentralization in many sectors. Under the decentralization program, irrigation management is the responsibility of the district government, but these projects enhance centralized management and create dependence on the government. On the other hand, these projects also diminish initiatives taken by district governments. One example is in Solok District, where the LGU has taken some initiatives to manage irrigation systems in the area in

early 2001 by decentralizing much of its responsibility to village level government (*nagari*) following overall decentralization policy¹⁴.

The Solok District Government made it clear to the communities including WUAs that under decentralization, the government wanted to empower them to manage their own affairs. LGU provides some participatory fund that can be used by the Nagari on a competitive basis. Various PKPI projects implemented in this district thus nullified early initiatives taken by the local government.

Based on developments, the PKPI project is, in fact, strengthening the central government's role, up to the ministerial level as project broker. This was felt during the WISMP public consultation held in West Sumatra. A participant expressed that this public consultation is just a mechanism for the central government to justify their attempt to beg for more money from foreign sources where procedures such as public consultation should be done. It was strongly felt that the public consultation was conducted to accomplish the requirement set forth by donors¹⁵. As Vermilion (2001:6) argues, new "reform" program was seen as a means to obtain additional funds from external donors for more rehabilitation External donors, especially the World Bank and Asian Development Bank, promote policy reform as a condition for new irrigation investments.

Project assumption

All projects share a similar assumption that the GoI is not capable in implementing reform policy initiated by WATSAL. As the case in Solok District has shown, these projects created ambiguity on the part of the district government as it was trying to develop structure and capacity under decentralization.

A complete overhaul of the Indonesian water sector seems to be on the agenda of the World Bank as well. The Bank's RRP states that it had also concluded in late 1997 that "further assistance to the water resources and irrigation sector was not possible unless major sector reforms were undertaken". The Bank's reform proposal appeared to be similar to those articulated by the Asian Development Bank (ADB) and BAPPENAS and was accepted by GOI. The GOI was also told that the successful implementation of the WATSAL proposed restructuring would pave the way for the Bank and other donors to release a series of future assistance for civil works, capacity-building, and other investments in water resources management (Zamaan, 2002). This was also seen by Bruns (1999) when in mid-1998, the World Bank began increased dialogues about the need for major reforms in the irrigation and water resources policy and institutions, as a prerequisite for future lending. Thus the assumption of government incapacity to carry out implementation reform was set forth by donors themselves. It then becomes clearer

¹⁴ *Nagari*, a socioeconomic and political unit in West Sumatra, used to manage community affairs including the management of communal irrigation system. It is being revived to accommodate decentralization.

¹⁵ The reluctance of central government bureaucracy to decentralize most of responsibility does not only happen in irrigation sector, but also in many sectors. Current conflict happen between government of Jakarta with central government regarding management of several asset within Jakarta, including toll ways and sport facilities which according to Law No. 22/1999 should be decentralized to provincial government provides some example (Ryas Rasyid, 2003 Pemda DKI Tak Usah *Ngotot-ngototan* Soal Aset, <http://www.detik.com/peristiwa/>)

whose interest is actually fulfilled through these projects. The lending agencies stand to benefit as they quickly respond to loan proposals from GoI since the GoI argues that it has no capacity to implement the policy without external support. This argument is accepted by the lending agencies even though, there had been not enough time and evaluation given to local government on how to manage irrigation systems under the centralized system without project support. LGUs that had taken the initiative to implement decentralization including in irrigation management seemed shocked by these new projects that run counter to decentralization.

Asset vs management transfer

Another sustainable issue is the fact that under PKPI only the management is transferred to the WUAs but the assets remain as government property. The Government still holds control over irrigation facilities which would present difficulty in the future when a re-design might be needed for better yield (see Government Regulation No. 77). This concept again reflects on the government's perception that farmers are incapable of handling irrigation management tasks including assets maintenance. There will be a management audit to make sure that farmers are managing properly, otherwise the government will take back the responsibility from the farmers. This again is looked at as a way for the government to still have control over the systems and thus would defeat the empowerment of WUAs.

Lesson from PIK Small-scale Irrigation management turn over program

Donor Supply driven policy program is not new in irrigation management in Indonesia. In 1987, World Bank supported a small-scale irrigation management turn over program (*Penyerahan Irigasi Kecil* or PIK). The reason for having PIK was mainly the limitation of government financial capacity to monopolize the irrigation management system in the country (Bruns, Adamanto, 1992). In PIK program, irrigation systems with a command area of less than 150 ha were turned over. Systems above 150 ha to 500 ha were not touched as planned. Vermillion (2001) found that the Small-Scale Irrigation Turnover Program was a modest reform that affected only a small part of the irrigation sector. Only a limited amount of authority was devolved to farmers. The Turnover Program did not solve the problem of financial and physical sustainability of irrigation.

WUAs are still relatively weak organizations in the rural institutional landscape of Indonesia. They do not have water rights, do not own any infrastructure, have difficulty obtaining credit from banks and do not have an influential link to river basin management fora. Irrigation intensities are already relatively high in Java and turnover per se creates very limited potential for increasing agricultural productivity.

PKPI is likely to replicate the PIK. Even though farmers could manage 80% of the systems after PIK¹⁶, later evidence showed that the government took back the management responsibility from WUAs (Helmi, 1998). As a result, government investment for irrigation management did

¹⁶ An evaluation of sustainability of turned over irrigation system in West Sumatra Province was held by researcher from Center for Irrigation Studies of Andalas University in 1994

not decrease with the turn over program when in fact the main reason was to reduce government recurrent investment.

Irrigation management reform: institutional or organizational?

What is most obvious in irrigation management reform in Asia is whether the reform involves institutional level or only just at organizational level. Abernethy (1998) for example believe that institutional reform is a risky business; in irrigation sector he found that many government irrigation departments around the world have become aware of this point, as these departments saw that new organizations of irrigators are inactive within a few years after their establishment. He adds that an organization of irrigators (or any other kind of local organization) does not become an institution automatically on the first day when its existence is registered. The status of being accepted as an institution comes with its continued existence and useful functioning over a sufficient period of time (p14). What is going on with PKPI is basically organizational reform, where irrigation management responsibility from central government to local government, but in the bottom line, it is still government who take responsibility, not of WUAs.

Implementation Recourse

Considering all the issues in the implementation that cause unsuccessful empowerment of WUAs and LGUs, this paper proposes recourse in the implementation schedule.

For provinces like West Sumatra where small to medium scale systems are dominant, a simple procedure can be made. The farmers used to manage the systems and continue to do so. It is only in administration that the systems fall under GMIS but the actual tasks have to be done by the farmers themselves. It is necessary to have clear terms of reference between the government and WUA responsibility and authority in managing the systems. Clarity is an essential aspect of irrigation management reform. Abernethy (19??) argues that when institutional reform happens, many rules and relationships change, everybody should be able to understand the new arrangements.

It is time to trust local capacity in handling matters pertaining to irrigation management. As pointed out by Martius and Osmet (1995), locally imposed collective action in operation and maintenance is more sustainable than externally imposed one. Abernethy has warned that WUAs would remain dependent on government support and never be self-reliant, especially if the government influences the choice of leaders, or undermines those whom the irrigators have chosen for themselves.

There is also a need to clarify ownership of irrigation facilities. If the government maintains the ownership, it has to expect that it will also be responsible for the usual duties of an owner, such as major repair and renewal. In Indonesian irrigation management reform, the government remains as ultimate owners of the irrigation facilities. This would not achieve WUA empowerment and institutional development.

Concluding Remark

Lessons learnt from NSIASP, JIWMP, IWIRIP in West Sumatra Province lead to the conclusion that irrigation management reform policy intended toward empowerment of WUA and LGU may not achieve this goal. Factors such as project conflict, individual motives, hidden donor agenda behind the reform, and inconsistencies with decentralization support this apprehension. If the government and lending agencies really want to see the Indonesian people empowered, participatory approaches in decision-making should be followed and local initiatives should be allowed to emerge and grow. The lending agencies would not be able to cover all 18,993 government-managed irrigation systems around the country. Therefore, relying on local capacity is key to sustainable policy reform and irrigation management.

Reference:

- Abernethy, Charles A. 1998. Introduction of Proceedings of the International Workshop on Institutional Reform and Co-Operation in Irrigated Agriculture with special reference to Lao PDR and Vietnam. DSE, Feldafing.
- Arif, Sigit Supadmo. 2002. Menggagas Kembali Kebijakan I Pembaharuan Kebijakan Pengelolaan Irigasi, Pkpi : Redefinisi Tugas Dan Peran Kelembagan Irigasi (Dari telaah akademis ke pelaksanaan).
- Asian Development Bank. to be dated. Report And Recommendation To The Board Of Directors On A Proposed Loan To The Republic Of Indonesia For The Participatory Irrigation Sector Project (PISP)
- Bruns, Bryan and Atmanto, Sudar Dwi. 1992. Bagaimana “Menyerahkan” Pengelolaan Irigasi Kepada Petani, problem and solution for Indonesia” “(*How To Turn Over Irrigation Management To The Farmers, problem and solution for Indoensia*). VISI Irigasi Indonesia No. 7(2), pp 131 – 146.
- Bruns, Bryan. 1999. From Voice to Empowerment: Rerouting Irrigation Reform in Indonesia. Pre-Conference Version, November 29, 1999 Prepared for the International Researcher's Conference The Long Road to Commitment: A Socio-Political Perspective on the Process of Irrigation Reform December 11-14, 1999 Hyderabad, Andhra Pradesh, India
- DHV Consultant and Mott MacDonald . 2003. Water Resources and Irrigation Sector Management Program (WISMP) Preparation of Program Implementation Plan–Phase I
- DHV Consultant and Mott MacDonald. Water Resources and Irrigation Sector Management Program (WISMP). Inception Report, 25 February 2003.
- Elliott, Jennifer A. (1994). An Introduction to Sustainable Develoment. Routledge. London and New York.
- Etzioni, Amitai 1985. The Process of Social Organization. Marvin Elliot, Organisasi-organisasi Modern. UI Press.
- Helmi , 2000. Transition of Irrigation System Management In Indonesia: Challenges And Opportunities For Sustainability. Conference of International Association for the Study of

Common Property Resources Bloomington Campus of Indiana University, Indiana, USA May 30 - June 4, 2000.

<http://dlc.dlib.indiana.edu/documents/dir0/00/00/02/72/dlc-00000272-00/helmi041300.pdf>

- Helmi, 1995. "Irrigation Management in Transition: Strengthening the Role of Water Users' Association (WUA) in Indonesia." *Visi Irigasi Indonesia* 11(15), 70 -86.
- Helmi. 1998. Study of O&M Experience under Turnover Irrigation Systems. Asian Development Bank (ADB), Manila.
- International E-mail Conference on Irrigation Management Transfer June – October organized by FAO and INPIM 2001.
<http://www.fao.org/ag/agl/aglw/waterinstitutions/docs/overview.pdf>
- Kärkkäinen, Tero. Irrigation Management Transfer – A Step Towards Caring More For Water
<http://www.water.hut.fi/~tskarkka/Work/LisTyo/Paper4.doc>
- Martius, E and Osmet. 1995. Prilaku Petani dan Sustainabilitas Irigasi, Tinjauan terhadap Irigasi-Irigasi PIK di Sumatra Barat (*Farmer Behaviors And Sustainability Of Irrigation System, Study Of Turned Over Irrigation Systems In West Sumatra*). VISI Irigasi Indonesia No. 10(5), pp 64 – 85.
- Pacific Consultants International (PCI). 2001. The Study for Improvement of Irrigation Management and Empowerment of Waters' Association for Enhancement of Turnover Program in the Republic of Indonesia (Progress Report II). Jakarta.
- Pusposutardjo, Suprodjo. (n.d) "Konsep Konservasi Tanah dan Air untuk Keberlanjutan Irigasi." (*The concept of Soil and Water Conservation for Sustainability of Irrigation*). Gadjah Mada University. Yogyakarta.
- Sudarmanto (2002) Implikasi Peraturan Pemerintah No. 77/2001 Tentang Irigasi Di Daerah (The Implication of Government Regulation No. 77/2001 on Irrigation at district level.
- van Nes, A.R; Hasibuan, Parma; and Hasan, Mohd, . 2001. Irrigation Management Reform In Indonesia. <http://www.fao.org/ag/agl/aglw/waterinstitutions/docs/PIMIndon.pdf>
- World BANK GROUP, n.d. Republic Of Indonesia Water Resources Sector Adjustment Loan, Loan And Program Summary.
<http://www.worldbank.org/html/extdr/offrep/eap/projects/watsal/watsalexecsum.htm>
- World Bank. Water Resources And Irrigation Reform Project (WRIRP) May-June 2001 Kick-Off Mission Aide Memoire http://www.geocities.com/dhv_bangda/Gonkic.pdf
- Zamaan, Mishka. 2002. Restructuring of the Water Sector in Indonesia An Institutional and Legislative Challenge A Preliminary Assessment by Bank Information Center.
<http://www.bicusa.org/publications/watersectorreform.htm#execsummary>

Annex 1: Number of Government Managed Irrigation System in Indonesia by province as of (1993)

Province	No of scheme				%	Sawah			Not yet developed sawah	Scheme average area (ha)
	Technical	Semi Technical	Simple	Total		Planned area (ha)	Irrigated sawah	Total area		
DI Aceh	17	118	273	408	2.15	209,994.00	124,937.00	155,143.00	7,708.00	515.00
Sumatra Utara	148	336	145	629	3.31	281,673.00	185,800.00	208,707.00	28,228.00	448.00
Sumatra Barat	51	291	467	809	4.26	234546	149751	161233	28597	290.00
Riau	1	68	0	69		32980	11910	13849	11560	478.00
Jambi	3	63	31	97		26164	14451	17471	6655	270.00
Sumatra Selatan	3	78	15	96		73642	31017	32049	9160	797.00
Bengkulu	24	194	122	340		81588	53430	58486	17300	240.00
Lampung	52	94	2	148		154038	104975	107116	27023	1,041.00
SUMATRA ISLAND	299	1242	1055	2596		1094625	676271	754054	136231	421.66
DKI Jakarta	1	27	4	32		8369	7724	7724	0	262.00
Jatuluhur	57	108	160	325		320152	302419	312313	676	985.00
Jawa Barat	317	211	351	879		550800	487596	497456	9591	627.00
Jawa Tengah	748	929	4943	6620		803001	760113	792161	3060	121.00
DI Yogyakarta	180	290	134	604		58217	52894	54167	2137	96.00
Jawa Timur	2501	2660	1122	6283		935347	910280	914938	695	149.00
Bali	92	310	0	402		88527	79715	79782	6643	220.00
JAWA BALI ISLANDS	3896	4535	6714	15145		2764413	2600741	2658541	22802	182.53
Kalimantan Barat	0	72	24	96		30380	12737	17943	2566	316.00
Kalimanta Selatan	11	16	21	48		26681	9506	442494	7610	556.00
Kalimantan Tengah	3	1	6	10		5480	3003	3430	1231	548.00
Kalimantan Timur	9	11	55	75		32065	6000	11948	5724	428.00
KALIMANTAN ISLAND	23	100	106	229		94606	31246	475815	17131	413.13
Sulawesi Utara	17	85	35	137		66358	46658	48883	14582	484.00
Sulawesi Tengah	41	70	55	166		109854	62724	62828	36006	662.00
Sulawesi Selatan	45	81	86	212		322783	228861	247526	13697	1,523.00
Sulawesi Tenggara	19	19	32	70		52914	26741	27792	16516	756.00
SULAWESI ISLAND	122	255	208	585		551909	364984	387029	80801	943.43
NTB	35	217	25	277		175038	146460	152206	7152	632.00
NTT	5	85	50	140		55819	38225	29374	25717	399.00
Maluku	0	0	16	16		16526	8203	12181	3174	1,033.00
Irian Jaya	0	2	3	5		4359	632	1482	1577	872.00
INDONESIA	4380	6436	8177	18993		4757295	3866762	4470682	294585	250.48
Share	23.06	33.89	43.05	100.00		100.00			6.19	

Source: Pacific Consultants Internation (PCI), 2000. The Study for Improvement of Irrigation Management and Empowerment of Water Users' Association for Enhancement of Turnover Program in the Republic of Indonesia. INTERIMA REPORT Volume II: Annex

Annex 2: Map of Indonesia showing location of PKPI implementation project on the county



Annex 3: Number of GMIS in West Sumatra by category as of 2002

District/City	Number of scheme							Area (ha)											
	T o t a l	Command area (ha)			Construction			Technical			Semi Technical			Simple			Total		
		< 500	500 - 500 0	> 500 0	Te ch ni cal	Se mi Te ch ni cal	Sim ple	Com - man d area	Po ten tial	Fung ci - onal	Com - man d area	Po ten tial	Fung ci - onal	Com - man d area	Po ten tial	Fung ci - onal	Com - man d area	Po ten tial	Fung ci - onal
1. Kab. Pasaman	1 0 1	92	9	0	18	68	15	33,9 07	15,0 54	11,9 24	7,35 3	6,27 3	5,97 6	2,07 7	1,13 1	1,12 9	43,33 7	22,45 8	19,02 9
2. Kab. Agam / Kota Bukittinggi	1 5 4	148	6	0	20	10 7	27	5,46 9	5,46 9	5,46 9	12,5 81	12,5 81	12,5 81	2,67 6	2,67 6	2,67 6	20,72 6	20,72 6	20,72 6
3. Kab. 50 Kota / Kota Payakumbuh	8 8	79	9	0	9	44	35	7,51 5	7,51 5	7,51 5	7,13 7	7,13 7	7,13 7	3,00 8	3,00 8	3,00 8	17,66 0	17,66 0	17,66 0
4. Kab. Tanah Datar / Kota Pdg Panjang	1 3 6	134	2	0	1	97	38	830	830	830	9,71 9	8,75 7	9,34 6	4,54 3	3,94 5	3,71 0	15,09 2	13,53 2	13,88 6
5. Kab. Pd. Pariaman / Kota Padang	1 4 2	119	23	0	9	37	96	10,5 35	10,5 35	10,5 35	8,01 1	8,01 1	8,01 1	8,98 6	8,98 6	8,98 6	27,53 2	27,53 2	27,53 2
6. Kab. Solok / Kota Solok	1 9 8	186	12	0	30	95	73	11,0 44	11,0 44	11,0 44	10,3 07	10,3 07	10,3 07	6,81 4	6,41 4	6,41 4	28,16 5	27,76 5	27,76 5
7. Kab. Swl Sijun- jung / Kota Sawahlunto	1 0 6	103	3	0	3	89	14	864	864	864	5,40 1	5,40 1	5,40 1	603	603	603	6,868	6,868	6,868
8. Kab. Pesisir Sela- tan	4 4	33	11	0	5	6	33	10,3 10	7,64 4	6,20 8	6,82 2	6,82 2	5,11 6	21,6 04	9,45 3	5,23 1	38,73 6		
Sumatera Barat Prov- ince	9 6 9	894	75	0	95	54 3	331	80,4 74	58,9 55	54,3 89	67,3 31	65,2 89	63,8 75	50,3 11	36,2 16	31,7 57	198,1 16	160,4 60	150,0 21

Source: West Sumatra Provincial Water Source Management Agency 2000.

Annex 4 : West Sumatra Province showing site of implementation of irrigation management policy reform



