Abstract

Participatory Irrigation Management (PIM) and Irrigation Management Transfer (IMT) Policy: Lessons from Mexico and the Philippines (Case Study: Indonesia)

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Participatory irrigation management (PIM) and irrigation management transfer (IMT) have become important elements to improve irrigation system performance in many countries. In 1950s and 1960s many irrigation systems in the world were dominated by the state control. States and their agencies were seen as the primary actors. However, farmer involvement has been felt necessary in many parts of the world since 1960s and 1970s. The trends to promote farmers' participation are among others caused by the problem of financial pressures of government and the intention to improve the sustainability of irrigation systems. At the heart of PIM and IMT is water user association (WUA). PIM and IMT intend to address management problems of irrigation through devolving management responsibilities and authorities to WUA.

This research provides a comparative study and analysis of Mexico, the Philippines, and Indonesia related to the implementation of PIM and IMT, and considers the possibility of policy transfer from Mexico and the Philippines to Indonesia. PIM and IMT in Mexico and the Philippines are regarded by many authors as good examples of IMT implementation and have good results such as the improvement in the quality of operation and maintenance, the improvement of agricultural productivity, and financial performance as well. Meanwhile, in Indonesia, based on some studies of the results of IOMP (Irrigation Operation and Maintenance Policy) 1987, the evidence shows that the impacts of IMT on irrigation management indicate no significant changes or outcomes, and lack of improvement of agricultural productivity. In addition, the IMT program in Indonesia did not lead to significant reduction in the cost of the irrigation sub-sector for the government.

In this research, the elements to be evaluated and compared between Mexico, the Philippines, and Indonesia are: motivation for IMT policy adoption, legal and institutional arrangements, process and implementation of IMT, components that are transferred (*management responsibility and authority, infrastructure, water right*), and the impacts of IMT itself. By comparing the elements of IMT among those three countries and comparing their impacts, it is found out that there are some crucial aspects influencing the impacts of IMT.

The research finds out that there are some important aspects to address in dealing with the sustainability of irrigation systems especially for Indonesia. These aspects are: institutional development of WUAs, clear water rights, ownership right to irrigation infrastructure, balance between responsibility and authority, independency of irrigation agency, and economic incentives for farmers. Those aspects become strategy recommendations for Indonesia to sustain WUA and enhance their capability in managing irrigation system. Furthermore, in order to adopt the elements of PIM and IMT policy from Mexico and the Philippines, there should be some adjustments and requirements for Indonesia such as capacity building and adjustment to other existing policies.

Key words: *participatory irrigation management*, PIM, *irrigation management transfer*, IMT, *water user association*, WUA, *sustainability*, *irrigation system*

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Preface

Working in Irrigation Planning and Development subdivision of Dinas Pekerjaan Umum/ Public Work Office in Muara Enim Regency (South Sumatera Province, Indonesia), I am very interested in the topic of irrigation management especially concerning participatory irrigation management (PIM) and irrigation management transfer (IMT) policy. In addition, a lecture from Dr. Johan Woltjer about the Policy Transfer in the course of International Planning Practice has motivated me to study more about PIM and IMT from other countries.

This master thesis is concerning PIM and IMT policy that have become important elements to improve irrigation system performance in many countries since 1970s. At the heart of PIM and IMT is water user association (WUA). PIM and IMT intend to address management problems of irrigation through devolving management responsibilities and authorities to WUA. Using the concept of policy transfers as a useful concept to adopt policies from other countries, I elaborate the possibility for Indonesia to take lessons of PIM and IMT implementation from the experiences of Mexico and the Philippines. In addition, this master thesis is also a final part of my study in Double Master Degree Programme of Environmental and Infrastructure Planning (Faculty of Spatial Science, RuG) and Development Planning and Infrastructure Management (School of Architecture, Planning and Policy Development, ITB).

Furthermore, it is almost impossible to acknowledge all those who have supported me in my thesis writing. Firstly, it was very difficult to make a good thesis with a limited amount of time without any support from my supervisors. Therefore, I would like to address special thanks to my supervisors Dr. Johan Woltjer (RuG) and Dr. Ir. Uton Rustan Harun, M.Sc (ITB) for giving comments, criticisms, suggestions, and feedback on my thesis. Secondly, I would like to express my appreciation for the National Planning Board (Bappenas), the Netherland Education Support Office (NESO) and the StuNed for institutional and financial support. Thirdly, I also would like to thank to all my lecturers and faculty members of RuG, SAPPK ITB, and UPT Bahasa ITB, all my colleagues, and all Indonesian students in Groningen. Finally and importantly, I would like to thank to Allah Almighty for giving me an opportunity to study in the Netherland and blessing me to finish this thesis. Special thanks are also devoted to all my family especially my lovely wife dr. Iin Imelda, and my lovely son and daughter Yusuf and Nida for your patience and support during my study in Groningen.

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Chapter 1
Introduction

1.1 Background

Participatory irrigation management (PIM) and irrigation management transfer (IMT) have become an important component in many countries' attempt to improve the performance of irrigation system. In 1950s and 1960s many irrigation systems in the world were dominated by the state control. Meizen Dick (1997, p.104) stated, "States and their agencies were seen as the primary actors, creating systems and delivering water to farmer *beneficiaries* of irrigation systems, who took the water, supplied to their fields and used it for cultivation". Farmer involvement is felt necessary in many parts of the world since 1960s and 1970s.

The trends to promote farmers' participation are among others caused by the problem of financial pressures of government in irrigation operation and maintenance, and the intention to improve the sustainability of irrigation systems has also been the driving force to this trend. Vermillion and Sagardoy (1999, p.2) in FAO Irrigation and Drainage Paper stated, "Driven largely by financial pressures, many governments are attempting to transfer management responsibility for irrigation systems from government agencies to local water service providers, such as water user associations".

Farmers in many countries have organizations that are usually called Water User Associations (WUAs). When transfer of management occurs, new institutional arrangements have to be made and organizational changes are also made. In this situation, the responsibilities of management formally implemented by the government agency are transferred to Water User Associations (WUAs).

Water user associations are regarded by many authors as a crucial element for improving irrigation systems performance. Barker and Molle (2002, p.17) stated,

"In the area of institutional reform, the devolution of management and financial responsibility from irrigation systems managers to local user groups has gained prominence". The existence of WUA is also felt important since there has been the transition from supply-based management towards demand-based management. Kijne (2001, p.109) mentioned:

> "Scarcity of good quality of water has led many countries to introduce demand-based water management in the irrigated agriculture section in place of the existing supply-based water management. This transition needs institutional changes, including the formation of Water User Associations (WUAs). ..... the development of WUA is a vital step in the development of integrated water resource management. "

In this regard, as stated by Meizen Dick (1997, p.110), "clear definitions of the roles and responsibilities of both farmers [in this context WUA] and agency are important, especially in turnover situations where the traditional lines of demarcation are changing".

Meinzen Dick et al. (1994) in Meizen Dick (1997, p.112-113) differentiate two possible models of farmers' involvement and participation that are termed as the Asian model and the American Model. The Asian model (e.g. Sri Lanka and the Philippines) usually tends to have smaller base organizational units allowing direct participation of all members, while the American model (e.g. Mexico) depends more greatly on formal irrigation organizations rather than face-to-face interactions among all members. As levels of income and infrastructure rise in many countries, we can expect shift from Asian to the American Model (Meizen Dick 1997, p.113).

It is necessary to know the experiences in the policy and implementation of participatory irrigation management (PIM) and irrigation management transfer (IMT) in both models in order to take valuable lessons for irrigation management that might be transferred to borrowing country. In this research, lessons and experiences are taken from one country of American model [Mexico] and one

country of Asian model [the Philippines], while Indonesia is taken as a case study. The policy and implementation of irrigation management transfer are analytically compared between Mexico, the Philippines, and Indonesia.

1.1.1 Mexico

Mexico has undergone the most rapid incorporation of user participation in the irrigation sector. The objective was to create financially self sufficient national irrigation system as well as to gain full cost recovery over time for irrigation works that have already been constructed. The basis of this policy was the transfer of irrigation management to Water User Organizations. The Mexican program for IMT started in 1991. By the end of February 2000, Mexico has transferred 95 percent of its 3.2 million hectare to 427 water user associations (Modulos) serving 474,000 water users; 72 of its 82 irrigation districts have undergone total transfer, 7 partial transfer and 3 districts are yet to be transferred (Peter 2004, p.5). Meinzen Dick and Reidinger (1995, p.13) wrote:

> " the Mexican example shows how rapidly change can be made when there is a clear plan and vigorous government support. It also shows the relative importance of creating the proper environment for participation at the policy level ".

The lesson of irrigation management transfer from Mexico has drawn world attention and interest and is a part of a wide and ongoing reform in the country for over a decade (Peter 2004, p.5). The so-called *Mexican Model* has received international acclaim, particularly through World Bank seminars and study tours. Groenfeldt and Sun (1996, p.3) stated, "the rapidity and thoroughness of the transfer process offers a dramatic example of water policy reforms being implemented on the ground"**.** In addition**,** research and field studies by IWMI have shown modest improvements in the quality of water services and productivity after transfer. The quality of O&M in general has improved (Peter 2004, p.5). Furthermore, recent experiences in IMT suggest that there has been considerably more success in transferring management responsibilities in more advanced countries such as Turkey and Mexico than in the developing countries

(Samad 2001 in Shivakoti 2005, p.8; Samad 2001 in Barker and Molle 2002, p.18).

1.1.2 Philippines

The first major effort to introduce participatory irrigation management in the management of public irrigation systems in Asia began in the Philippines. Since 1970s, the National Irrigation Administration (NIA) has adopted the policy of transfer of management responsibilities to water users association (in the Philippines called IA: irrigator associations). Philippines adopted an incremental voluntary approach to transfer management responsibility for irrigation systems from the National Irrigation Administration (NIA) to water user associations (WUAs) (Peter 2004, p.5). The transfer of management responsibilities to the users in the Philippines is probably the first reported case on the process of intervention and turnover (Joshi et al. 2000 in Shivakoti 2005, p.7)

According to Groenfeldt (1988, p.253), in the Philippines, NIA (National Irrigation Agency) has adopted a participatory management approach because of financial constraints, and the results have been successful. He stated that the Philippines experience has had a profound demonstration effect. In addition, Bagadion and Korten (1991) in Meinzen Dick (1997, p.106) reported, ”impact evaluations showed that there were clear gains, to the farmers as well as to the agency, which more than offset the cost of the program”.

Both cost savings and efficiency related to participation have been documented in the Philippines. Svendsen (1992) in Meinzen Dick and Reidinger (1995, p.6) reported that, in five major irrigation systems, equity of water deliveries increased, particularly in the dry season, so that available water was spread over more of the service area while yields increased. In addition, Groenfeldt (1988, p.249) stated, “The cases from Sri Lanka and the Philippines have been cited as *successful models* of irrigation systems jointly managed by farmers and a government agency”. Although there are also some problems and negative results

of the transfer program, these are overshadowed by the many benefits derived as referred to some other studies.

1.1.3 Indonesia

In Indonesia, infrastructure developments especially irrigation infrastructure have ever been conducted intensively in the early 1980s as the effort to reach 'self-sufficient food supply' in 1984. However, in the last two decades, the infrastructure developments have been stagnant, even the existing infrastructures have undergone degradation in its function as a result of low operation and maintenance performance as well as lack of rehabilitation funds. Besides, due to the development approach in irrigation in the past that tends to be centralistic, this has caused the dependency of farmers to the government in irrigation infrastructure provision and maintenance.

Indonesia has begun the reform in irrigation management policy since 1987 (called Irrigation Operation and Maintenance Policy). In 1999, the Indonesian government also adopted another new policy called Irrigation Management Policy Reform because the implementation of irrigation management policy 1987 was not as expected. In addition, the financial crisis in 1997 has led the government to review its public policy including for irrigation management. Both policies demanded major role of farmers through their WUAs in irrigation management. The adoption of those both policies showed the commitment of Indonesian government for shifting the irrigation management from government agency dominated toward promoting partnership between government and farmers.

However, the experience in Indonesia shows that many WUAs in Indonesia were inactive after the IMT (irrigation management transfers) as summarized by Helmi (2000, p.14-15).

> "Aziz (*1991*) evaluated the HPSIS [High Performance Sederhana Irrigation System] project and found that the WUAs set up in this project did not continue beyond project implementation. He [Aziz] writes that: *"HPSIS had little, if any, long term institutional impact in*

> *the study sites. Despite several years of GOI efforts to create and sustain new management entities in the HPSIS systems, farmers clearly demonstrated their reluctance to participate in and sustain the P3As (local term for WUAs) much beyond the time the community organizer was in place working with them".* Moreover, he [Aziz] writes that "*P3As created in the system examined have not been sustained. ...the government sponsored farmers' organization did not continue beyond project implementation or other PU (local term for Department of Public Works) efforts*".
>
> Hutapea (1993) also observed a similar tendency in the participatory tertiary *development* projects in the large scale Madiun irrigation system in Java. He [Hutapea] writes that *"one year after project completion almost all P3A (WUA) were inactive. Irrigation became individual or small group matters...".*
>
> With regard to the turned over systems, in 1993, there was an attempt by DGWRD to evaluate the activities of the WUAs in West Sumatra and three other provinces (DGWRD, 1993). The evaluation used a scoring method which covered three aspects: (1) the institutional aspect which consisted of organizational, water management, maintenance, and financial aspects; (2) the physical condition of the systems; and (3) the provision of guidance to WUAs by irrigation committees. The score obtained by each system was used to determine the degree of WUA development which consisted of active (good), semi-active (fair) and inactive (poor). Almost all turnover systems (145 out of 151) were involved in the evaluation. The result of the evaluation showed that a small proportion (12%) of the WUAs were actively performing their tasks and got "good" status. The remaining were classified as "fair" (semi-active) or "poor" (inactive). This indicates that after two years of turnover most of the formal WUAs in the systems turned over in 1991 had not sustained their role and activities in irrigation management."

In addition, a study conducted by IWMI (Vermillion 2001, p.19-20) about the impacts of IMT on irrigation management and irrigated agriculture in West and Central Java showed that the turnover program did not result in any significant impact. Vermillion (2001, p.19-20) wrote :

> "The study carried out to assess the results of the Small Scale Irrigation Turnover Programme did not show evidence of any significant impacts. Although improvements in water distribution and prevention of water disputes in some systems were reported, the turnover programme did not lead to a significant reduction in the cost of the irrigation sub-sector for the government, which was the principal objective of the programme".

1.2 Research Objectives

This study is drawn from the emerging trends of the participation in irrigation management known as Participatory Irrigation Management (PIM) that shifts management responsibility and authority from government agency dominated toward promoting partnership between government and Water User Association (WUAs).

The research objective of this study is to formulate some strategy recommendations to sustain WUAs and enhance their capability in managing irrigation system in order to achieve the sustainability of irrigation system in relation to the adoption of the concept of participatory irrigation management and irrigation management transfer policy.

1.3 Research Questions

The questions explored in this research are:

1. ***How the concept of PIM and IMT are implemented in Mexico, the Philippines, and Indonesia?*** *(What factors motivate the irrigation management transfer program, what elements are transferred to WUAs, what are the new roles of government agency and WUAs after the transfer, and what are the impacts after the transfer).*

   Through this question, the implementation of participatory irrigation management (PIM) and irrigation management transfer (IMT) in Mexico, the Philippines, and Indonesia is elaborated. Firstly, the discussion is concerning

the key motivating factors that influence the adoption of IMT policy in Mexico, the Philippines, and Indonesia. Secondly, since the IMT program attempts to transfer management responsibility for irrigation systems from government agencies to water user associations, then it is necessary to know the kinds of responsibilities transferred to WUAs in each country, and the new roles of WUAs and irrigation agency after the transfer. Then, the impacts of the transfer program in each country are evaluated.

2. ***What can be learned from Mexico and the Philippines for Indonesia?***

   After the discussion concerning the implementation of PIM and IMT in Mexico, Philippines, and Indonesia, a comparative analysis between those three countries is provided. The elements to be compared and analyzed are based on the previous discussion as in the first research question. Then, the possibility of policy transfer related to PIM, IMT, and WUAs that may be learned from Mexico and the Philippines and might be adopted for Indonesia is analyzed.

3. ***How to sustain WUAs and enhance their capability in managing irrigation system in Indonesia. What are the limitations and challenges?***

   The sustainability of WUAs is important for the sustainability of irrigation system since these associations are responsible for the management operation and maintenance of the system especially after the transfer. Through this question, the pre-conditions influencing the sustainability of WUAs in managing irrigation system are discussed. Furthermore, some strategy recommendations to enhance the capability of WUAs in managing irrigation system in Indonesia are formulated by considering the experiences from Mexico and the Philippines that are possible to be implemented in Indonesia, and considering the limitations and challenges that might be encountered.

1.4 Research Methodology

This research is developed into several methodological steps as follows:

1. *Development of theoretical and empirical base*

   First of all, this research develops the understanding of theoretical and empirical bases focusing on the concept of participatory irrigation management (PIM), irrigation management transfer (IMT), water user associations (WUAs) and their sustainability, institutional arrangement for IMT, possible impacts of PIM and IMT, and the concept of policy transfer. These theoretical and empirical bases are derived from some sources such as journal articles and research papers. Furthermore, this research also uses more information and data derived from other relevant publications.

2. *Collecting and analysing data and information from the experiences of Mexico, the Philippines, and Indonesia especially about the implementation of PIM and IMT.*

   After developing theoretical and empirical bases, the data collection about the implementation of PIM and IMT in Mexico, the Philippines, and Indonesia is conducted. These data include key motivating factors for the adoption of irrigation management transfer policy, elements that are transferred to WUAs in IMT, the new roles of government irrigation agency and WUAs after the transfer and the impacts of the transfer. The collected data are also derived from literatures (secondary data) since there are some sources of information from some relevant publications, journal articles, and research papers.

3. *Comparative Analysis*

   The previous steps supposedly provide input for analysing. After the data collection, it is important to compare the elements and characteristics of policy and implementation of participatory irrigation management and irrigation management transfer between lending countries (in this regard Mexico and the Philippines) and the borrowing country (Indonesia) to get to know what policies or concepts that might be transferred and what conditions

and adjustments are required in order to adopt the policies from the lending countries. The analysis in this research is conducted using comparative analysis method.

4. *Formulating the strategy recommendation to sustain WUAs and enhance their capability in managing irrigation system in Indonesia.*

   Finally, this research proposes some strategy recommendations to enhance the capability of WUAs in managing irrigation system in Indonesia by considering the experiences/ lessons from Mexico and/or the Philippines that might be implemented in Indonesia, and considering the limitations and challenges that might be encountered.

The diagram of research methodology can be illustrated in figure 1.

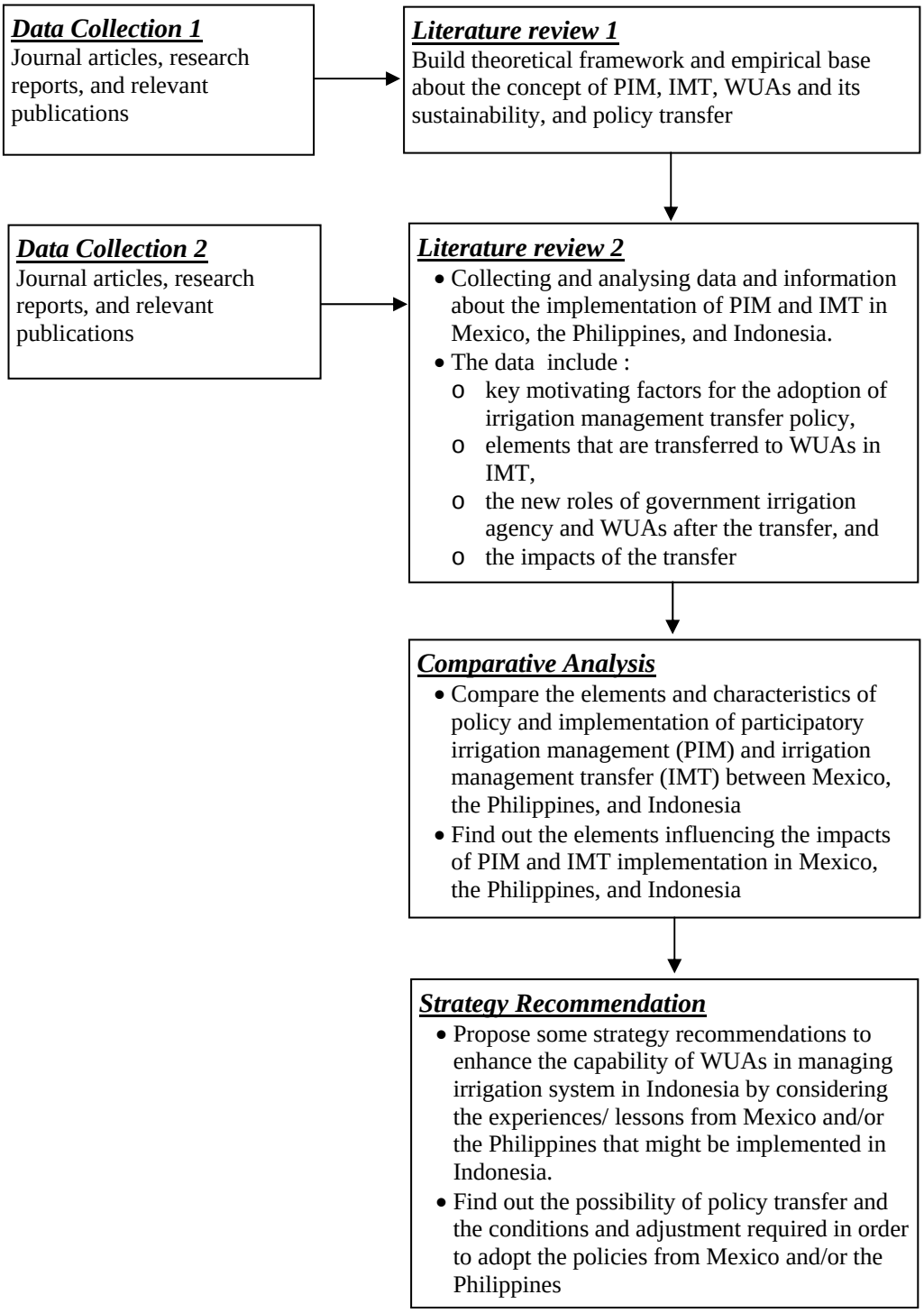

Figure 1. Research Methodology

1.5 Structure of the Research

The structure of this research is divided into six chapters. The content of each chapter can be described as follows:

Chapter 1 : Introduction

The Introduction consists of background, research problems, objectives, research questions, research methodology, and structure of the research. It describes the background of the study as the starting point of conducting research about participatory irrigation management and irrigation management transfer.

Chapter 2 : Theoretical framework

Theoretical framework provides theoretical bases mainly comprising the concepts of Participatory Irrigation Management (PIM), Irrigation Management Transfer (IMT), Water User Associations (WUAs) and their sustainability. It also elaborates those concepts and the implementation of the concepts in irrigation management. Furthermore, the concept of *policy transfer* as one of useful concept to analyse the possibility of applying a certain policy based on other countries' experiences is discussed. Finally, at the end of this chapter, the framework of analysis for this research is provided.

Chapter 3 : Participatory Irrigation Management and Irrigation Management Transfer in Mexico and the Philippines.

After the elaboration of theory in chapter two, the third chapter describes the implementation of PIM and IMT in Mexico and the Philippines. It reviews key motivating factors for the adoption of irrigation management transfer (IMT) policy, legal and institutional arrangement, the process of IMT and elements that are transferred to WUAs in IMT, the changing roles of irrigation agency and WUAs after the transfer, and the results of the transfer.

Chapter 4 : Participatory Irrigation Management and Irrigation Management Transfer in Indonesia.

This chapter describes the implementation of PIM and IMT in Indonesia and key motivating factors for the adoption of irrigation management transfer (IMT) policy. In addition, it also reviews the conditions of Indonesian irrigation infrastructure, two policy reforms of PIM and IMT in Indonesia as well as its key points and objectives, institutional arrangements, the process of IMT, and the results of IMT itself.

Chapter 5 : Comparative Analysis

After the discussion concerning the implementation of PIM and IMT in each country in chapter three (Mexico and the Philippines) and chapter four (Indonesia), a comparative analyses between those three countries is conducted. The elements to be compared are among others: motivation, process, and implementation strategy of IMT, elements that are transferred to WUAs in the IMT, the changing roles of irrigation agency and WUAs after the transfer, and the institutional arrangements. In addition, the impacts of the transfer are also evaluated.

Chapter 6 : Strategy recommendation for Indonesia and Reflection of the Theory.

Finally, the last chapter provides some strategy recommendations for Indonesia in order to achieve sustainable irrigation system. The recommendations are about the strategy to sustain WUAs and enhance their capability in managing irrigation system in Indonesia by considering the experiences from Mexico and the Philippines that might be implemented in Indonesia, and considering the limitations and challenges that might be encountered. The recommendations are taken by considering the comparative analysis in Chapter 5. Furthermore, in the last part of this chapter, the reflection of the theory into practice and some concluding remarks are provided.

Chapter 2
Theoretical Framework

Over the past several decades there has been increasing acceptance that Water User Associations (WUAs) have advantageous roles to play in water management for sustainable improvement in irrigated agriculture. The conventional way that dominated many irrigation developments in the 1950s and 1960s was that irrigation systems need centralized control. States and their agencies were functioned as the primary actors that created irrigation systems and delivered water to farmer who used the water for their fields. This state-dominated approach is often referred to as supply-oriented management of irrigation system. However in many parts of the worlds, in the 1960s and 1970s farmer-managed irrigation systems showed that farmers are capable to manage irrigation system effectively without external intervention as exampled by such system as *subak*[1] in Bali, *zanjeras* in the Philippines, etc. In 1980s, some countries tried to foster participation of farmers through farmer organizations or WUAs (Water Users Associations). This kind of participation is commonly termed Participatory

[1] Irrigation in Bali is known all over the world for its well-organized use of irrigation water. At the center of irrigation management are the water users associations called *subak*. *Subak* is commonly acknowledged as an independent socio-religious association. They have evolved for centuries, organized by the farmers themselves without or with little control from the government (http://blog.baliwww.com/arts-culture/467/).

The philosophy guiding the *subak* system is the principle of Tri Hita Karana emphasizing that happiness can only be reached if the creator (God), the people (the farmers) and nature (the rice fields) live in harmony with each other. This philosophy is the basis for the clearly defined rules of a *subak*. This set of laws regulates rights and duties among the members, including public obligations, regulations concerning land and water use, legal transactions of land transfers, and collective religious ceremonies (http://blog.baliwww.com/arts-culture/467/).

The indigenous social-administration organization in *subak* is also supported by efficient and effective water system. *Subak's* water system consist of many parts such as empelan (dam) functioned as water reservoir, aungan (tunnel), telabah (primary waterway), tembuku aya (primary inlet), telabah gede (secondary waterway), tembuku gede (secondary inlet), telabah pamaron (tertiary waterway), tembuku pamaron (tertiary inlet), telabah penyacah (quaternary waterway), tembuku penyacah (quaternary inlet), tembuku pengalapan (individual inlet), tali kunda (individual waterway). *Subak*'s water system also has complementary part such as penguras (flushing), pekiuh (overflow), titi (bridge), Jengkuwung (small tunnel), abangan (off-land tunnel), petaku (waterfall structure), and telepus (siphon). (http://blog.baliwww.com/arts-culture/467/)

Irrigation Management (PIM). Furthermore, PIM is felt necessary for some reasons such as to reduce government costs in irrigation and also to improve the management and sustainability of irrigation system.

Participatory Irrigation Management (**PIM**) needs transfer of responsibility and authority from government to Water users Associations (WUAs)**.** This transfer of responsibility and authority is generally called **IMT** (Irrigation Management Transfer). The policy of irrigation management transfer started in the mid 1970s in a few developing countries such as the Philippines and Colombia. The phenomenon of IMT has been used variously to refer to "turnover" (as in Indonesia and the Philippines), "management transfer" (Mexico and Turkey), "privatization" (Bangladesh), "disengagement" (Senegal), "post-responsibility system" (China), and "participatory management" (India and Sri-Lanka), and "Commercialization" (Nigeria) (Kurian 2001, p.2*)*.

Participatory irrigation management and irrigation management transfer intend to address management problems of irrigation through devolving management responsibilities and decision-making power to the local level and empowering farmers. The expectation is that water user associations (WUAs) will take responsibility for local irrigation management. This chapter elaborates basic terms and concepts in relation to Participatory Irrigation Management, Irrigation Management Transfer, Water User Associations and its sustainability, institutional arrangements for PIM and IMT, and possible impacts of PIM and IMT. Furthermore, the concept of policy transfer is also discussed. Finally, at the end part of this chapter, a framework of analysis is provided.

2.1 Participatory Irrigation Management (PIM)

The term participatory irrigation management (PIM) generally refers to the involvement of water users (WUA) in irrigation management, along with the government (Vermillion 1999, p.2). The Handbook on PIM defines *Participatory Irrigation Management as "the involvement of irrigation users in all aspects of*

irrigation management, and at all levels". All aspects include planning, design, construction, operation and maintenance, financing, decision rules and the monitoring and evaluation of the irrigation system. All levels include the primary, secondary and tertiary levels. The theoretical advantages of this concept are: farmers who depend on irrigation water for their livelihood have a strong incentive to manage that water very carefully (*International Network on Participatory Irrigation Management - www.inpim.org)*.

Groenfeldt (2003) in Peter (2004, p.2) states, "PIM processes build two forms of capital: *productive capital* (better maintained irrigation infrastructure) and *social capital* (new institutions such as WUAs, skills, leadership and community action)". From the governance point of view, participatory irrigation management can be regarded as a partnership between governments, agencies, and users.

Participation in irrigation management does not only need to give information and to make farmers follow government specified roles in projects but also involves larger roles of farmers. Participation may range from giving information and opinions during the process of consultation to totally enabling farmers to perform as the main decision makers in all or most activities.

The way adopted by many countries in the implementation of participatory irrigation management can be ranged from the *bottom-up* approach such as used in the Philippines to the *top-down* approach such as conducted in Mexico and Colombia. In practice, both top-down approaches and bottom-up approaches are required in the process of implementing PIM. Top-down is principally needed at the starting stage that includes formulating a legal framework, reforming irrigation agency structure, and rehabilitating infrastructure. However, the bottom-up approach is also essential when WUAs are to be structured, during which time thorough understanding and participation of farmers are required (Groenfeldt and Sun 1996, p.7).

2.2 Irrigation Management Transfer (IMT)

Although the concept of PIM is different from IMT, PIM is closely related to the concept of irrigation management transfer (IMT). The term IMT usually refers to a shift from public sector management to user management, which is the fundamental characteristic of PIM. Vermillion and Sagardoy (1999, p.1) mention that Irrigation management transfer (IMT) is defined as "the relocation of responsibility and authority for irrigation management from government agencies to non-governmental organizations, such as water user associations". The transfer of responsibility and authority may include a whole or partial transfer of management function, full or only partial authority.

Vermillion (2003) in Peter (2004, p.2) mentioned that IMT is "the full or partial transfer of responsibility and authority for the governance, management and financing of irrigation systems from the government to water user associations". Peter (2004) mentioned that this involves two key roles: the authority to define what the irrigation services will be and the authority to arrange for the provision of those services. After the IMT, water users, typically organized into a water users association (WUA), decide what services should be provided, what their objectives and target should be, what service performance standards are acceptable. Arranging for the provision of those services includes choosing service providers and collecting whatever resources are required to implement the desired services (Facon, p.2).

Groenfeldt (1997, p.3) mentioned three elements that can be owned/ transferred or to which rights can be ascribed to water users. These three elements are: (1) management control (planning, design, construction, operation, maintenance), (2) infrastructure (canals, pumps), and (3) water rights. The management function that irrigation agency most interested to transfer to water users are the operation and maintenance of canals. There are also other important management functions that are likely to be transferred. In the case of new systems or the improvement of old

systems, the functions of planning, design, and construction are also part of management functions.

Based on overview paper from INPIM (International Network on Participatory Irrigation Management)[2], IMT may include some elements to be transferred such as transfer of decision-making authority, transfer of ownership of infrastructure, transfer of water rights from government to water users associations (such as in Mexico), or transfer partial water management responsibilities, such as water delivery, canal maintenance and paying for irrigation services (such as in the Philippines).

There are also some potential rights and power transferred to WUAs, such as: (a) right to use, improve and extend infrastructure, (b) right to require water users to become members and pay for the water service, (c) right to make rules and enforce them with sanctions, (d) right to make and implement O&M plan, (e) right to set, collect and use a service fee, (f) right to make legal contracts and own property, and (g) right to determine cropping pattern (normally with consensus among water users). In addition, Facon in his paper (p.2) stated :

> "IMT programs commonly also include efforts to rehabilitate, upgrade or modify irrigation infrastructure. They also often include efforts to introduce new management systems or procedures that are consistent with the expectations and constraints which result from IMT, such as service agreements, management audits, asset management and information systems".

Management transfer may take many forms. It can mean narrowing of the scope of government managerial responsibility to encompass only the largest facilities in the system, leaving management of tertiary distribution facilities to farmer groups or other private sector facilities. Transfer may also encompass the entire irrigation system, including intake, distribution, and drainage works. IMT can even

[2] Irrigation Management Transfer, International E-mail conference on Irrigation Management Transfer, June 2001

comprise transfer of responsibility for groups of separate systems to management entities under farmer control (IIMI 1995, p.4. in Kurian 2001, p.2).

Irrigation Management Transfer as a strategy has obtained wide acceptance in policy circles in recent years. Some of the central reasons for the growing acceptance of IMT as mentioned by Kurian (2001) are:

- The potential for IMT to reduce the state budget in operating and maintaining irrigation systems
- The potential to improve system performance and productivity
- Response to pressure exerted by international funding agencies
- The potential of IMT to enhance sustainability and reduce damaging environmental impacts of irrigation systems

Rationale	Assumption	Means	End	Goal
Improved systems performance	Technical design is sound	Ensure compliance with operational rules	Water availability improved	Equity effects of irrigation service delivery enhanced
Government budgetary support towards operations and maintenance reduced	Staff levels will fall/ maintenance costs will be borne by beneficiaries	Ensure cost-recovery through compliance with Irrigation Service Fees (ISFs) payment schedule	Routine maintenance ensured	Efficiency of investment enhanced
Negative externalities reduced	Beneficiaries consultation prior to system construction/ topographic survey	Ensure catchment protection/ better design of facility	Provision of ecological services like Non Timber Forest Products and water ensured/ effects of soil erosion/ salinization/ flooding reduced	Damaging environmental effects of project intervention mitigated

Table1. Rationale of Farmer-Managed Irrigation Projects
Source : Mathew Kurian 2001, p.3

A paper of irrigation management transfer from INPIM (Vermillion 2001, p.5) mentioned some elements of IMT program that are most probably to contribute towards favorable outcomes. These elements are:

- Clear and strong legal status of WUA,
- Clear water use rights vested in WUA,
- Irrigation technology is functional and compatible with water right and service objectives and management capacity of water users,
- Full decision-making authority transferred to WUA, which federates to scheme level,
- Irrigation agency reorients its relationship with farmers from top-down to new partnership with service agreements, backed up by irrigation management audits,
- The irrigation agency (or larger ministry) does strategic planning to restructure and identify new roles to take on,
- New cost-sharing arrangements for O&M & rehabilitation,
- During and after the IMT process, the government gives high priority to building the capacity of WUAs and providing an adequate support system for them,
- High-level political commitment is mobilized and communicated through consistent policies and legislation,
- Strong program parallel to IMT to develop agriculture, agri-business and marketing.

After the management transfer, the agency may take some possible functions such as intensified river basin management and regulation, watershed protection, monitoring water quality, providing technical and financial support to WUAs, and monitoring and auditing WUA performance.

Svendsen et all (1997, p.20) mention that there are some possible roles that irrigation agencies can take after the IMT. These roles are: river basin planning, water resources allocation & monitoring, development of new policies and regulations, environmental monitoring and enforcement, groundwater monitoring and control, project planning, design and construction, technology transfer to

water users, advisory services to associations, monitoring of association performance, and arbitrating disputes.

2.3 Water Users Associations (WUA)

The terms of farmer organizations vary from country to country. It may be called water user association, water user organization, farmers' council, irrigation union, irrigator association, etc. For consistency, in this section and also in theoretical framework, the term "water users association" (WUA) is used to refer to any such organization.

2.3.1 The Need to establish WUAs

The change from supply-based management to demand-based management of water in irrigated agriculture has been associated with the need to organize farmers into water users associations (WUAs). This was seen as a first step towards greater farmers' responsibility for the management and maintenance of the irrigation systems. In the early 1980s, donors such as the World Bank and United States Agency for International Development (USAID) started to realize that performance improvement in irrigated agriculture could only be achieved by introducing and sustaining appropriate institutional and management arrangements. In the past, technical changes and the expansion of irrigation infrastructure had priority over institutional changes, and consequently, less research and policy support were given for institutional development and cost recovery issues.

The establishment of WUAs is part of institutional change and is seen as an important condition for the shift toward a more sustainable irrigation sector. Kijne (2001, p.122) stated, "the WUA, as the organizational structure for the empowerment of farmers and for forcing farmers to take responsibility for their own decisions, especially their long-term impact, is thus the essence of the democratic process now taking place in the irrigation sector of many countries". Water user associations are seen by many authors as an essential element for

improved irrigation systems performance. In the area of institutional reform, the devolution of management and financial responsibility from irrigation systems managers to local user groups has gained prominence (Barker and Molle 2002, p.17). In addition, the development of WUAs is a vital step in the development of IWRM (integrated water resource management).

Based on paper from Water Policy Series (Water & Rural Development Policy Issues 2003, p.4), WUAs are conceived as the intermediary between physical/technical, social/economic, and public/agency aspects of water reform and the actual irrigation performance (see Figure 2).

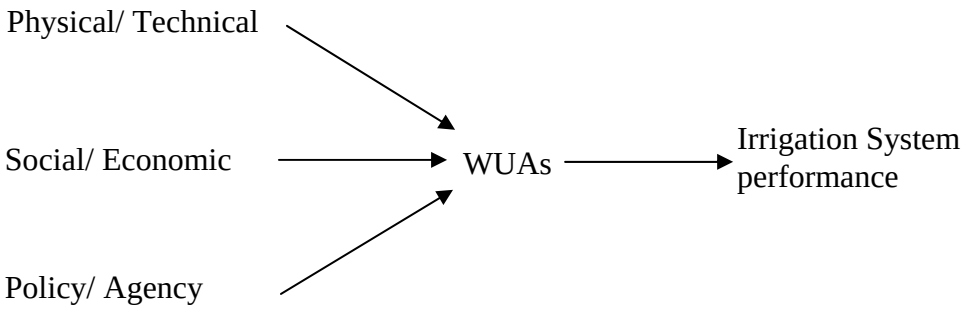

Figure 2. Factors that impacts Irrigation System Management
Source : Water Policy Series C /Water & Rural Development Policy Issues, 2003, p.4

Physical/technical aspects include the environmental factors, such as the availability of water, the climate, and the infrastructure already in place. Social/economic considerations include whether farming communities are village based, the ethnicity of the area, the extent to which there are other long-standing conflicts in the area, the crops grown, and access to domestic and international markets. Public/agency aspects include the type of regulatory authority, the extent to which agency involvement is key to upstream water system management, the efficiency and professionalism of the existing agency, the extent to which agency functions are publicly accountable.

In establishing water management functions at the local level, the argument for water users associations is that they will more naturally able to balance these three types of considerations.

2.3.2 Sustainability of WUA

In the concept of PIM, the sustainability of irrigation system depends to a certain degree on the sustainability of water users associations. A successful farmers association has to be sustainable. This means that its members do not leave the association and act in consistency with their roles. Peter (2004, p.1) stated, "sustainable WUAs require an enabling environment, clear political will with clarity of objectives, accountable partnerships, incentives and long-term capacity building". "There is an urgent need for networking at the local, national, regional and international levels to share information, new ideas and learn from the lessons of hard-won experience to be incorporated into new programs implementing PIM reforms" (Peter 2004, p.1).

Some evidence showed that if some basic conditions are met, WUAs can have long term sustainability. Groenfeldt and Sun (1996, p.8) mentioned that the basic conditions are "financial autonomy and management transparency". Groenfeldt and Sun (1996) mentioned:

> " Financial autonomy implies that the WUAs are not directly subsidized by the government, and thus are protected from shifts in government policy and funding priorities. The principal source of revenue for most WUAs is the irrigation service fee. Setting an appropriate fee structure and establishing an effective collection system are critical to the financial health of the association.
>
> Management transparency is necessary both to keep the association honest, and to inspire confidence in its members that their irrigation service fees are being well spent. A number of steps can be taken to increase transparency in WUA management, including regular financial audits, wide dissemination of budgets and financial plans, and broad representation among users on the association's board of directors "

In addition, Facon (p.3) in his paper cited :

> "The sustainability of the water users associations is however now seen to depend on their capacity to provide an adequate water delivery service and control and to allocate water and to provide an improved

> service to enable gains in agricultural productivity (Svendsen, 1997). This is essential for the capacity of farmers to pay water and for the water users associations to be financially viable. As a result, it is now recommended that strategies of gradual improvement of irrigation systems be adopted to support the transfer of water management responsibilities and associated rights (Vermillion et al., 2000)"

Vermillion and Sagardoy (1999, p.74) in FAO irrigation and drainage paper mentioned some key organizational characteristics for sustainable WUAs. These characteristics are:

- participatory approach in decision-making procedures;
- full control over irrigation infrastructure and rights of eminent domain;
- full control over O&M, financing and dispute resolution;
- primary responsibility for financing O&M, rehabilitation and modernization;
- agreed and measurable definition of an irrigation service;
- clear definition of who are the members of the association;
- means for excluding non-members and/or non-payers from receiving services;
- leaders who are elected and can be removed from office by the water users;
- clear policies and rules subject to approval by the water users;
- transparent administration, operations and performance;
- service charges based upon actual service delivery and strict accounting practices;
- financial and technical audits performed by the government or other independent entity;
- power to impose strong incentives and sanctions to ensure:
  - adherence of water users to agreed rules and policies,
  - accountability of WUA leaders to the assembly of water users, and
  - accountability of hired management staff to WUA leaders.

However, not all those characteristics may be required of feasible in all locations. Those characteristics can be regarded as a condition of the ideal. Some WUAs might be sustainable or viable without all these features, but experiences suggest that the more those characteristics exists, the more sustainable the WUAs is likely to be.

2.4 Relationship between PIM, IMT, and WUAs

When discussing participatory irrigation management [PIM], the discussion about transfer of responsibility and authority [IMT] from government to water users association [WUA] can not be neglected. These three terms [PIM, IMT, and WUA] are inherently connected.

Based on the previous explanation, to make it clear, the relationship between participatory irrigation management, irrigation management transfer, and WUAs can be figured as follows (Figure 3):

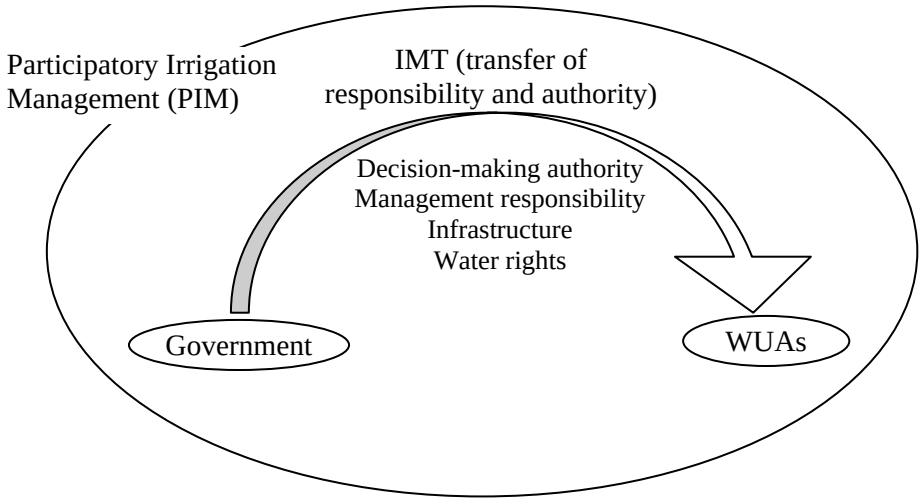

Figure 3. Relationship between PIM, IMT, and WUAs

2.5 Institutional arrangements for PIM and IMT

By tradition, irrigation sector has been managed by large centralized agencies at state level. Meanwhile, the roles and functions of water user associations are vital

to PIM and IMT. Peter (2004, p.4) mentioned, " apart from a wide variety of functions four factors namely regulation, ownership of structures and assets, collection of water charges, and responsibility of O&M are considered important to define the levels of participation".

Table 2 shows the shift in responsibilities of government in transferring authority from the irrigation agency to water users associations. Depending on the level of decentralization and devolution of authority over water management, government will have more or less control over the system (Water Policy Series C, 2003). The level of participation can be ranged from full agency control to full WUA control.

Activity	Full Agency Control	Agency O&M (User Input)	Shared Management	WUA O&M	WUA Owned (Agency Regulation)	Full WUA Control
Regulation	Agency	Agency	Agency	Agency	Agency	WUA
Ownership of Structures, Water	Agency	Agency	Agency	Agency	WUA	WUA
O & M Responsibility	Agency	Agency	Both	WUA	WUA	WUA
User Representation	Agency	WUA	WUA	WUA	WUA	WUA

Table 2. Theory of Decentralization and WUAs
Source: Water Policy Series C /Water & Rural Development Policy Issues, 2003

There are also some pro and contra about irrigation management structures. Table 3 describes the reasons for each proponent of Irrigation management structure.

	Decentralization Proponents		**Citizen/Farmer Advocates**	
Activity	**Pro**	**Con**	**Pro**	**Con**
Full Agency Control	This is the system currently in place in many countries	Has a track record of inefficiency and corruption	Keeps water in public hands.	Has a track record of inefficiency, corruption, top-down decision making.
Agency O&M (User Input)	Allows for some level of user input, which could provide improved management.	Still maintains control in the hands of top-government agency structures	Keeps water in public hands.	Generally involves required local action without empowerment

	Decentralization Proponents		Citizen/Farmer Advocates	
Activity	**Pro**	**Con**	**Pro**	**Con**
Shared Management	Provides greater level of farmer input, and therefore potentially greater efficiency.	Tends to maintain government control over decision-making and water trading limited.	Government maintains control, but there is some level of local decision-making.	May be excuse for increased fees - with little real opportunities for democratic management
WUA O&M	Allows for some level of community / WUA decision-making.	Tends to maintain government control over decision-making and water trading limited.	Local groups empowered to participate in better management of water systems	May be excuse for increased fees - with little real opportunities for democratic management
WUA Owned (Agency Regulation)	Allows for local management and ownership. Tradable water rights allow for efficient use.	Agency regulation may hinder free trade and local autonomy in decision-making	Gives the local groups autonomy in management, while protecting down-stream users.	May force local groups to absorb full cost of O&M, may allow for exploitation by local groups.
Full WUA Control	Allows for local mgmt and ownership. Tradable water rights allow for efficient mgmt and use.	Lack of accountability for local actions, possible negative externalities	Provides wide range of options for water management.	Possibility of exploitation by local elites; Full cost recovery a potential major issue.

Table 3. Pro and Contra of Irrigation Management Structures
Source: Water Policy Series C /Water & Rural Development Policy Issues, 2003 p.9

2.6 Conditions identified as important in stimulating PIM & IMT policies

From five case studies conducted by Economic Development Institute (EDI) and the International Irrigation Management Institute (IIMI), on Mexico, Colombia, Argentina, Turkey, Philippines, there are some conditions identified as essential in stimulating PIM & IMT policies (Groenfeldt and Sun 1996, p.6-7).

a. *national budgetary crisis*. It is not urgent to start changes without a crisis. This was relevant to some cases such as in Mexico, Colombia, Turkey, and Philippines. However in Argentina, PIM process was a part of privatization of the economy as a whole in early 1990s.

b. *top level political will and commitment*. Without strong political commitment at the highest levels, the initiative to transfer management from the public sector agency will not go far. This condition can be applied in four case study countries. The exclusion was the Philippines, where a bottom-up approach was adopted. The Government and the National Irrigation Administration (NIA), collaborating with NGOs have promoted farmers participation in irrigation management in a gradual manner since the mid-1970s.

c. *good physical condition of irrigation infrastructure***.** If the system does not work, farmers will not be willing to take over management. This could be normally applied in all five cases. However, there is huge room for negotiation in the kinds of repairs that are necessary prior to transfer, and even on the timing of the repairs. In Mexico, the government promised farmers to rehabilitate certain portions of their systems after management turnover. In some systems in Colombia, the government transferred infrastructure in bad condition to WUAs. Consequently, it made those WUAs financially unmanageable, and created serious second generation problems.

d. *a workable legal framework***.** The legal framework needs to be *workable* though not necessarily enacted specially for supporting the transfer program. The legal aspects are supposed to include formation of WUAs, water rights, the new role of irrigation agency, and supportive measures to WUAs. In most cases, a new set of laws will be needed, although the transfer process may begin while the new law is taking final form. In Mexico, the first systems were transferred in 1990, although the new water law did not take effect until 1992.

2.7 Impacts of PIM and IMT

In this section, the possible impacts of participatory irrigation management and irrigation management transfer are discussed. It is important to see and discuss the

possible impacts of participatory irrigation management and irrigation management transfer in order to know whether PIM and IMT will be helpful enough or not. Woltjer (2005, p.274) stated, "a more helpful approach would begin with a more precise definition of the possible effects of public participation". Furthermore, this section also discusses some indicators that can be used to assess the performance of participatory irrigation management.

Some authors mentioned that user participation in managing, operating, and maintaining irrigation facilities may bring several benefits. Participatory irrigation management provides opportunities for collective action, dialogue between governments, agencies, and users as stated by Svendsen et.al (1997) in Peter (2004, p.2) :

> "…… It provides opportunities for collective action, dialogue between users, agencies and governments. Community based and community driven approaches have come to be the norm in most rural development strategies. ……..... Studies of farmer managed systems indicate that the active participation of farmers in irrigation management helps ensure the sustainability of irrigation systems through predictable water deliveries and allocation of water, improved design and construction, reduced conflicts over water, improved maintenance of the irrigation system, accessibility to government and system personnel and increased agricultural productivity (Svendsen, et.al 1997)"

In addition, theoretically, there are several benefits (economic, social and environmental benefit) gained from participation in irrigation management. These includes: water savings, water distribution efficiency, conflict resolution, financial savings and higher agricultural productivity. The main social impact of farmer participation in irrigation management is the sense of responsibility that is generated among the water user (mainly farmer). This sense of responsibility leads to more efficient operation of the system, equity in water allocation and distribution among farmers. In environmental aspect, one of the main impacts of user participation in irrigation management is water saving and conservation as well as protection against pollution.

Improved access to water is also an important benefit that PIM can offer for farmers. Communication channels can help farmers to better know and plan when and how much water they can expect to receive. Participatory reforms can improve the capability of agencies to listen to water users. They can create and strengthen ways for agencies and farmers to jointly plan water allocation and resolve problems making them effective and transparent (Peter, 2004 p.3).

However, as stated by Woltjer (2005, p274), "A deeper interpretation of the success of participation efforts requires insight in other possible effects as well". Besides the positive impacts, PIM and IMT have some possible negative impacts. The negative impacts are among others: less assistance in case of disaster, no assured rehabilitation assistance, and there are even reported decreased agricultural productivity.

In addition, some government-managed irrigation systems have actually performed relatively well, and they have been able to maintain the costs lower for small farmers than they would be for locally managed systems. In this case, there is a question whether or not these systems need to be transferred to farmers. The case in Zimbabwe (in Water policy series Paper No.2, 2003, p.7) shows that government has exercised a relatively good job on irrigation system management and delivery of service and advice to small farmers. In 1990s, research found that 70 percent of farmers preferred continued management by government agency for smallholder irrigation, even when they would have to pay twice the existing irrigation service charges.

There are some other critics about the benefits of PIM and IMT as mentioned in Water policy series Paper No.2 (2003, p.7). Policy statements about the benefits of PIM and IMT have often overlooked the potential for local level corruption, inefficiency, and inequity of distribution and the positive preventing role that central government agency can play in this regard. In the Philippines, for example, the first effort of IMT permitted for local politicians and elites to consolidate control over water distribution, exacerbating rather than solving distribution inequity.

Unequal bargaining position is also a possible implication from IMT. Since IMT involves eliminating or reducing the function of government agency that is designed to protect irrigation interests, WUAs are possibly lack of power in negotiating with upstream users. For example, the hydro-electric project along the Mekong River has restricted irrigation options for downstream users. The local irrigation associations have lack of power to oppose the project or to force the private corporations to equitably distribute water to downstream users for irrigation and other purposes.

Groenfeldt and Sun (1996, p.10) see the impacts of IMT from actors' perspective. There are some positive and negative impacts that are likely to occur after management transfer. These impacts can be seen from the perspective of farmers, the government (society as a whole) and the irrigation agency. The impacts are described in Table 4.

Farmer Perspective	
Positive Impacts	**Negative Impacts**
Sense of ownership	Higher costs
Increased transparency of processes	More time and effort required to manage
Greater accessibility to system personnel	Less disaster assistance
Improved irrigation service	No assured rehabilitation assistance
Improved maintenance	Less secure water right
Reduced conflict among users	Decreased agricultural productivity
Increased agricultural productivity	

Government Perspective	
Positive Impacts	**Negative Impacts**
Reduced costs to government	Less direct control over cropping patterns
Greater farmer satisfaction	Need to reduce staff levels, sometimes over union opposition
Reduced civil service staffing levels	Reduced ability to implement new agricultural policies through the irrigation agency
Reduced costs to the economy (greater economic efficiency)	

Irrigation Agency Perspective	
Positive Impacts	**Negative Impacts**
Fewer conflicts to deal with	Reduced bureaucratic and political influence
Reduced operational involvement	Uncertainty over agency role
New responsibilities	Reduced control over water resources
Reduced political interference	
Reduced O&M staff levels	

Table 4. Potential Impacts of PIM & IMT
Source : Groenfeldt and Sun, 1996 p.10

Groenfeldt and Sun (1996, p.6) also mentioned that there are some benefits that involve to all the interest groups. Reduced conflicts among water users, for example, are appreciated by farmers, as well as by the irrigation agency and by the government. However, obviously the three parties do not have an equal interest in PIM. The apparent winners appear to be the national governments, or society as a whole, who benefit from reduced subsidies to the irrigation sector. Farmers also obtain much benefit in terms of transparency, more reliable information about future irrigation timing, better service, etc. The irrigation agency seems to be the losers due to the fact that the successful transfers of authority from the agency to the farmers. In addition, the agency becomes accountable to the farmers for the delivery of water on schedule, reparation of the main system, etc. Even though there are also some benefits that agencies may obtain from PIM such as less political interference, some of those benefits such as reduced opportunities for rent seeking are actually costs to those officials who had previously benefited from those reduced practices.

In water policy series paper (2003, p.8), some authors propose several indicators that may commonly be used to assess the performance or the result of irrigation management transfer. These indicators are:

- Technical impact (water availability, equitable distribution, expansion of irrigated area, efficient delivery of water, and improved maintenance of systems);
- Productivity impact (the tangible benefits of increased yields, intensified cropping patterns, and improved farm incomes);

- Financial impact (reduced irrigation costs and increased cost recovery);
- Environmental and other non tangible impacts (changes in water quality, water logging and salinity, groundwater tables, and other externalities that result from farmers' participation).

2.8 The Concept of Policy Transfer

In this section, the concept of policy transfer is discussed. This kind of transfer is different from irrigation management transfer (IMT) that we have discussed earlier. Policy transfer is a process in which knowledge about policies, administrative arrangements, institutions, etc in one time and/or place is used for the development of policies, administrative arrangements, institutions in another time and/or place (Marsh and Dolowitz 1996). The concept of policy transfer is necessary to discuss because in the last part of this research, the possibility of policy transfer from Mexico and the Philippines to Indonesia is analyzed, for instances, whether the strategy of IMT implementation in Mexico and/or the Philippines is possible to be implemented in Indonesia, or whether Indonesia can adopt some elements of the IMT policy from Mexico and/or the Philippines.

Marsh and Dolowitz (1996) suggest that policy transfer can occur voluntarily or coercively. They identify several objects of transfer which are: policy goals; structure and content; policy instruments or administrative techniques; institutions; ideology; ideas, attitudes and concepts; and negative lessons.

Marsh and Dolowitz (1996) also differentiate the degree of policy transfer ranging from copying to inspiration. The degree of policy transfer could be copying that means adopting a program in use elsewhere without any changes; emulation that means rejecting to copy in every detail, but accepting the policy that is suited with the condition; hybridization that mean combining elements of program found in two or more countries to develop a policy best-suited to the emulator; synthesis that means combining elements of program found in two or more countries into a distinctive new whole; and inspiration that means adopting a program or policy inspired by other country's experience.

Transferring a policy is not an easy task. Since every country has its own characteristics and cultures, there will be some constrains in adopting a policy from one country to another. Marsh and Dolowitz (1996) identify some factors that might influence policy transfer such as complexity of a program, the institutional and structural constraints, political system, bureaucratic size and efficiency, economic resources, technological ability, etc.

Degree of Transfer	Definition
Copying	adopting a program in use elsewhere without any changes
Emulation	rejecting to copy in every detail, but accepting the policy that is suited with the condition
Hybridization	combining elements of program found in two or more countries to develop a policy best-suited to the emulator.
Synthesis	combining elements of program found in two or more countries into a distinctive new whole.
Inspiration	adopting a program or policy inspired by other country's experience

Table 5. Degree of Policy Transfer.
Source : Marsh and Dolowitz, 1996

By using the concept of policy transfer, we could learn the experiences from other countries, in this research Mexico and the Philippines, in the practice of irrigation management to be adjusted with the condition of Indonesia. Since there are differences in culture and socio-economic conditions between Mexico, Philippines, and Indonesia, the degree of policy transfer might be emulation, hybridization, synthesis, and inspiration.

2.9 Framework of Analysis

Framework of analysis is useful to obtain the general overview about this research. From the theory discussed in this chapter, there are some elements taken to be used in the next chapters for comparisons. Those elements are: key motivation factors influencing the adoption of IMT policy, legal and institutional arrangement, the elements to be transferred in IMT, the process implementation of IMT, the changing roles of government agency and WUAs in irrigation management, and the impacts of the IMT. The framework of analysis is shown in figure 4.

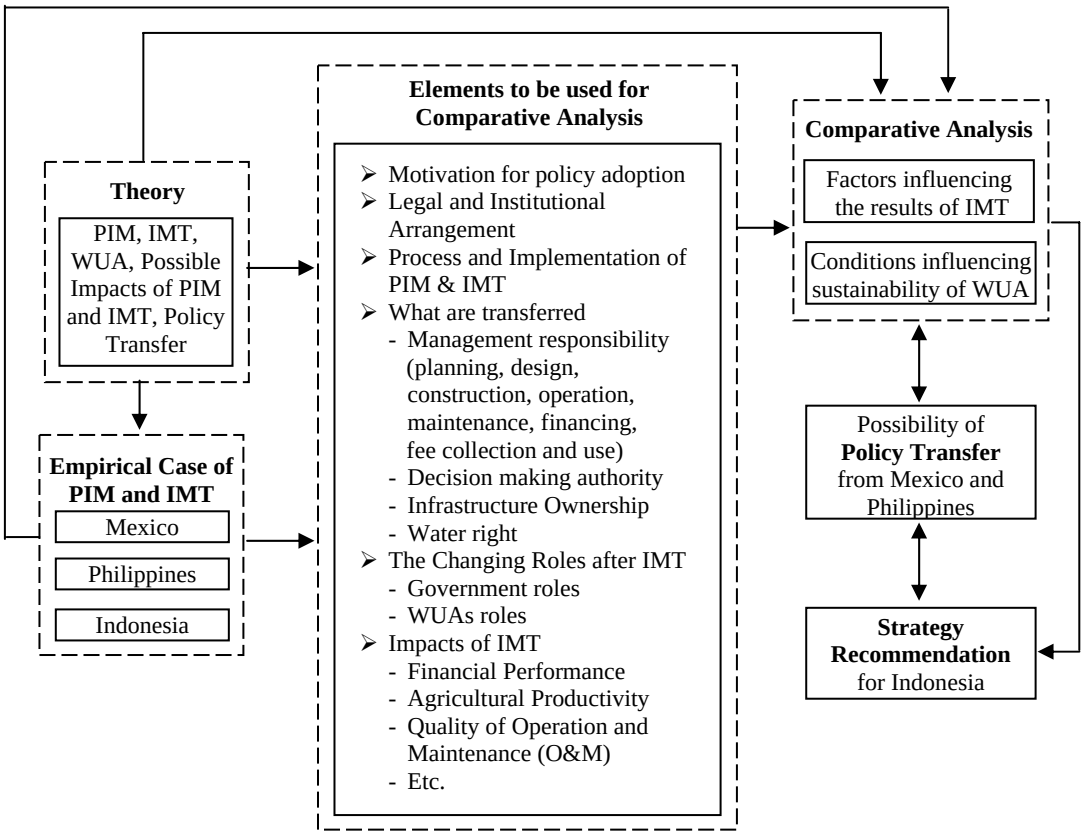

Figure 4. Framework of Analysis

Chapter 3
PIM and IMT in Mexico and the Philippines

This chapter elaborates the implementation of participatory irrigation management and irrigation management transfer policy in Mexico and the Philippines. Some points to be discussed and reviewed are key motivation factors influencing the adoption of IMT, legal and institutional arrangement, the process of IMT, and the changing roles of government agency and WUAs in irrigation management in each country.

3.1 Mexico

3.1.1 Motivation for IMT

The economic crisis in 1980s has encouraged some reforms in Mexico. One of the most important institutional reforms was the management transfer of irrigation operation and maintenance from irrigation agency to water users.

The national financial crisis has influenced the investment for new irrigation systems and funding for operation and maintenance of the existing irrigations districts. In 1988, the investment in irrigation infrastructure was less than 3 percent of the total public expenditure compared with about 10 percent in 1978 (Gorriz et all, 1995, p.2). The reduction of public funding in operation and maintenance caused the deterioration of irrigation system in Mexico. Consequently, agricultural production also declined with the average 0.4 percent per year in 1982-1987 periods. By the end of the decade, about 800.000 hectares of irrigated land were estimated out of production or under utilized because of the deterioration of the infrastructure. As much as 1.5 million hectares were in need of rehabilitation to recover system efficiency (Garces 2001, p.5). Trava (1994) and Johnson (1997) in Garces (2001, p.5) mentioned that at the end of 1980s, 3.4 million ha of land served by public irrigation systems were under heavy financial and physical stress, and in need of a recovery strategy. In addition, the

deterioration of irrigation infrastructure also caused the problem of water conveyance loss as reported by World Bank (1994) in Gorriz et all (1995, p.3). Water conveyance losses in the gravity based irrigation schemes were about 40 percent and losses in minor canals were about 20 percent. At the farm level, losses are between 30 and 50 percent, resulting in an overall conveyance efficiency of about 30 percent.

In the past, the irrigation operation and maintenance (O&M) was financed by both government and farmers. Farmers paid irrigation O&M trough water fees. However, the share of farmer contributions were more and more decreased. In 1960s, farmers contributed around 65 percent of O&M and administration costs, but by the end of 1980s, the contributions had decreased to only 18 percent (Gorriz et all, 1995, p.3)

The decrease of farmers' contribution to O&M and the lack of government funds have resulted in the deterioration of the irrigation and drainage infrastructure. This has led the Mexican government to initiate management transfer of Irrigation districts to Water Users Organizations (WUOs) in 1989 under the National Program for Decentralization of Irrigation Districts derived from the National Development Plan (1989-1994). The National Development Plan (1989-1994) required an increase in agricultural production by improving the efficiency in the use of existing irrigations, and to achieve this, government needs to transfer O&M responsibility to WUOs and enlarge users' contribution to O&M.

The Mexican transfer program was designed to ensure sustainability of the irrigated districts, reduce financial burden on the government, pass responsibility for O&M to users, increase efficiency of the use of water, improve system performance, and reduce the number of public employees in irrigation districts. In addition, by maintaining the irrigation systems in operating conditions, it was expected that agricultural productivity would increase, but this was not mentioned as the main objective of the program.

3.1.2 Legal and Institutional Arrangement

Gorriz et al. (1995, p.39) mentioned that the implementation process of a program of reform needs "strong government commitment and the establishment of sound legal and institutional framework". In addition, the transfer of management and responsibility required adjustment to the roles of farmers and irrigation agency. The government's role is changed from performing all activities to assisting or supporting water users, while the user's role is changed from non-active participants to participatory actors and decision-makers. In Mexico, the new role of CNA[3] is supervising the operation, maintenance, and management of the infrastructure that has been transferred to WUOs, providing technical assistance to WUOs in carrying out their activities, and monitoring the use of the nation's water resources.

In Mexico, the legal framework for transfer is provided by National Water Law. At the irrigation district level and the modulo[4], the legal instrument is the Title of Concession[5]. It describes and identifies the duties and obligations of all parties involved in the management transfer of a modulo to a WUO. The National Water Law also stipulates that every user, both public and private must have a license or concession to use national water resources. The IMT program in Mexico was accompanied with the new water law defining the property right over water and provided the WUOs with clear rights, roles, functions, and responsibilities.

WUOs can be granted water rights. Water rights can be transferred among members of the same WUOs and between WUOs. Water can be sold to other farmers, but not to other sectors. In addition, WUOs can make improvements to

[3] The CNA is the national water authority responsible for the use, allocation, handling, and conservation of water resources at the rural and urban levels for agricultural, municipal, and industrial use.

[4] Modulo is the unit at which WUO are formed. Each WUO operates and manages an irrigation subsystem (modulo), ranging from 5.000-20.00 ha in size. In addition to WUOs, there are also SRL (Society of Limited Responsibility) that have been formed. SRL is a user organization at the district level and responsible for the administration and operation of the main irrigation and drainage network and the maintenance equipment and machinery

[5] Tittle of Concession is the legal instrument that identifies and describes the duties and obligations of all parties involved in management transfer with respect to the use of the water.

the physical structures, but the plans must be approved by the CNA. Irrigation infrastructure can also be transferred to WUOs.

Irrigation management transfer to WUOs needs a change in the institutional arrangements to manage and operate irrigation districts. The transfer of management has resulted in changing roles for government agency and the users.

By the formation of National Water Commission (CNA) in January 1989, the federal government of Mexico adopted a water policy that promoted reduction of state role to the operation and maintenance of irrigation system in the whole country. In 1992, the Mexican constitution gave ejidos [6] the right to form associations, and rent and sell their land and water associated with their property. The rural land property right is a necessary condition for the development of government-farmer partnerships in water management (Kloezen et all 1997 in Salas and Wilson 2004, p.90).

The functions assigned to CNA range from planning, programming, study, construction, administration, and O&M to rehabilitation of the irrigation systems. After the transfer of irrigation management to WUOs, the government [in this case CNA] has some roles: supervising the operation, maintenance and management of the infrastructures that have been transferred to WUOs, providing technical assistance to WUOs in carrying out their activities and monitoring the use of the nation water resources. Meanwhile, WUOs are responsible for delivery of irrigation water and O&M of canals, dispute settlement, constructing their own infrastructure or participate in government-financed construction projects, and updating a register of members and their respective water rights.

In the aspect of culture, farmers in Mexico are accustomed to formal irrigation associations with formal rules and decision making. Mexican agriculture is highly

[6] There are two types of users recognized in Mexico: small landowner farmers (29%) and ejido farmers (71%). Small landowner farmers own private lands (on average 5-20 ha). Ejido farmers cultivate communal lands and they are provided with land use rights but no property right. Formerly, ejido farmers can work and cultivate the land but they do not own the land. However, recent legislative changes have permitted ejido farmers to sell or rent their land. Changes in article 27 of constitution allow ejido farmers to sell and rent their land and water

productive in certain regions, especially in the northwest regions (more commercial irrigated areas). In these areas, farmers are accustomed to perform economic activities or agri-business. In addition, level of education of farmers in Mexico especially in the northwest regions is also quite high. Literacy rate in Mexico is about 92.7 percent in 2005. This potentially influences the implementation process of management transfer to WUO since this will make the institutional development of WUOs become easier.

3.1.3 Process of IMT, Changing Role of Government and WUA

Mexico has experienced the fastest integration of users participation in the irrigation sector. The process is a top-down process encouraged by international development banks. The main objective was to make the national irrigation system financially self-sufficient as well as to obtain full cost recovery over time for major works that have already been constructed. The basis of this policy was the transfer of irrigation management to Water User Organizations. The Mexican program for IMT started in 1991. By the end of February 2000, Mexico has transferred 95 percent of its 3.2 million hectare to 427 water user associations (Modulos) serving 474,000 water users. 72 of its 82 irrigation districts have undergone total transfer, 7 partial transfer and 3 districts are yet to be transferred (Peter 2004, p.5).

There are some strategies applied by Mexico in the implementation of IMT program: agency will co-manage the system for at least 6 months after the time of transfer, a wide range of training program on O&M and financial management to leader and technical staff, and reliance heavily on mass-media campaign.

The comprehensive training and communication programs are implemented in the process as part of management transfer program. After the transfer is determined and WUOs have been organized, the comprehensive training and communication program start. The main objective of the program is to create some skill and well-

educated people at the different levels in irrigation districts and irrigation related institution.

In educating farmer and convincing them to support IMT program, Mexico relied greatly on mass-media campaign arranged by specialist of communication from FAO as well as universities and industries. Although in the beginning of the IMT program there were some resistances from farmers due to the lack of awareness about what the program was and what the benefits it represented, but while the training and the promotion of IMT progressed, the IMT process obtained confidence and was accepted by farmers.

Furthermore, in the implementation of IMT program, there was a "carrot" and a "stick" that makes farmers accept the program (Groenfeldt and Sun 1996, p.2). The carrot is the management autonomy and transfer of equipment from agency to WUOs. Farmer will become the owner of equipment and the canal would be theirs after 20 years of concession. The stick is if farmer refused to take over management, the government could offer no guarantee that the canal network could be kept in repair. In this case, most farmers could not accept the risk of the collapse in irrigation infrastructure. Furthermore, the change of the water law also became an incentive for farmers to join the WUOs since the new water law provides clear water rights at the modulo level.

Before the management transfer of irrigation districts to WUO, government was responsible for the administration and O&M of the whole irrigation districts. The funding for administration and O&M of irrigation districts were mainly covered by government's funds.

After the transfer, the O&M and management of irrigation districts become the responsibility of WUOs in cooperation with the CNA (National Water Commission). Now, users that are organized into WUOs have an active role. WUOs are responsible for the maintenance of irrigation and drainage canals and the related infrastructure. After the transfer occurs, CNA arranges an agreement to deliver its equipment to WUOs to assist WUOs in the first step. However, some

WUOs determined to buy their own equipment and machinery from their water fees. This work is performed and supervised by a manager of modulo employed by WUO. The manager is responsible for O&M of the modulo. In most cases, the manager of the modulo is a privately hired professional replacing CNA personnel (Gorriz et all, 1995, p.10)

In the aspect of water management, CNA will estimate the quantity of water available for each irrigation district, including the estimation of surface and ground water. Meanwhile, farmers submit their cropping plan to WUO and WUO prepares irrigation plan for modulo and sends it to CNA. CNA will review plans collectively and approve allocation of water for each modulo. Water is delivered to modulos by block system through volumetric measurement and WUO has to pay the CNA for block water deliveries. WUO delivers water to users at farm intake and beyond farm intake, water management and use is responsibility of farmers.

Besides the responsibility for O&M, WUO is also responsible for the collection and administration of fees for irrigation services. WUO has to pay the CNA for the delivery of water, and if an SRL[7] exist at the main system level, the WUO must also contribute to the SRL.

3.1.4 Results of IMT

The results of IMT can be seen at least from some performance: financial performance, quality of operation and maintenance, and agricultural productivity.

In the aspect of financial performance, water fees in most irrigation districts have increased substantially after the transfer of irrigation district to WUOs. Nationally, about 80 percent of costs for O&M are covered by the collection of water fees from users. This is a substantial increase from 1991 when the rate of financial self-sufficiency was 57 percent (Gorriz et all, 1995, p.13). If only the completely transferred irrigation districts are considered, the rate of financial self-sufficiency

[7] SRL is a user organization at the district level

in 20 of those districts is greater than 80 percent and 12 of those districts have a water fee collection rate greater than 100 percent (Gorriz et all, 1995). In some cases, the surplus is used to purchase machinery and equipment for maintenance. In addition, Johnson 1996; Gorriz, Subramanian, & Simas 1995 in Vermillion (1997a, p.5) reported that there are 45–180 percent increase in water charges, increase in fee collection rates from 15 percent [originally] to 80-00 percent, the decrease in national financing, and increase in local self-reliance from 43 to 78 percent.

In addition, for quality of O&M, most of IMT studies reported important improvements in water service in the modulos. Kloezen (1997) and Garces-Restrepo (2001) in Salas and Wilson (2004, p.92) concluded that the cooperation between CNA and WUOs in water operation has made the responsiveness, timelines, and flexibility of system operations remain the same or improved after IMT. The head and tail problems, which were common before IMT, have decreased because of the participation of water users in formulating the module's operational guidelines.

In the aspect of agricultural productivity, there has been a nation-wide survey conducted by the irrigation agency through a contractor and it was reported that during the 1991-1998 period, the productivity of land [in term of crop yields] increased 1.85 percent per year on average. Similarly, the productivity of water [in term of yields per unit water] increased 2.2 percent per year on the average, in all irrigation districts (Carlos Garces, 2001 p.24). Contrary to that, Kloezen (1997) in Salas and Wilson (2004, p.92) reported that on the farm-level, there is no evidence that yield per hectare has increased as the result of the IMT. Some researches also state that there are no significant increase in irrigated area, cropping intensity, and yields before and after transfer, or gross economic return (Johnson 1997a; Palacios-Velez 1997; Vermillion 1997 in Rap Edwin 2006, p.1307).

From the agency side, the impact of IMT is the reduction of agency staffs (CNA staff at secondary canal level and also at the district offices). By the end of 1994,

about 75 percent of the total area had been turned over. The total number of agency staffs has reduced from 7.808 to 2.134 (Garces 2001, p.20). Some of the personnel were provided with incentives to leave. Although under the transfer agreement, WUOs have an option to hire CNA staffs that were being let go, but some cases show that this did not occur. In general, WUOs chose to hire their own staffs and few number of the agency staffs were hired by WUOs. The reduction in agency staffs will also reduce the budget from the agency.

From a study by Salas and Wilson (2004, p.105), they conclude that although there are some reported social costs, the overall social benefits of the IMT appear to be far greater than the reported social costs.

At the end of 2000, Mexico has transferred almost all of its irrigation system to WUOs. It is about 11 years after the IMT program was established. The results show that there are many benefits derived from the IMT program.

From some evidence derived from some authors as discussed in the above explanation, it seems that the IMT can improve financial performance, quality of operation and maintenance, and agricultural productivity. However, we must be careful to make a general conclusion that IMT will certainly improve system performance.

It is difficult to judge whether it is actually the IMT that help the improvement, or there might be some other factors that influenced the improvements. For example, the rainfall patterns or availability of water may influence agricultural productivity. When water availability is sufficient, it is very likely that agricultural productivity will increase compared with the condition of inadequate water supply. Economic conditions may also influence financial performance. When the price of agricultural production (e.g. rice) goes up, it will potentially increase financial performance. Therefore, it becomes a question whether without IMT the system will perform well or not, or whether IMT did really help the improvement. In this regard, I do not mean to say that IMT is not good or helpful, but I suggest that we should also see other factors influencing the improvement of agricultural

productivity or financial performance of irrigation systems, when we make a study of the IMT result. Statistical methods should be used to assess the relative importance of different factors influencing the results of IMT.

3.2 Philippines

3.2.1 Motivation for IMT

Philippines is the first country involving farmers in management and planning of irrigation system. It has for centuries a tradition of managing and developing small irrigation system by local communities. In the 1970s, Philippines started to adapt and apply management by community and began with communal irrigation system (CIS) assisted by government. Then, in 1984 this was continued to larger national schemes. In some literatures, the process was generally termed the *learning process approach.*

NIA [8] (National Irrigation Administration) in the Philippines has adopted a participatory management approach because of financial constraints in the country. The initial motivation for participatory policy originated mainly from economic constraints on NIA budget in operation and maintenance of irrigation system. The objectives of IMT in Philippines are to reduce operation and maintenance expenditures of the government, to empower users and increase their satisfaction through beneficiary participation, to increase water use efficiency, and to increase productivity.

In addition, the deterioration of irrigation facilities also became a problem of irrigation in the Philippines as mentioned by Raby (1997, p.3). The deterioration of irrigation systems in the Philippines was caused not only by lack of maintenance but also by natural disasters such as periodic typhoons, floods, and volcanic explosions. Therefore, periodic rehabilitation and major or minor improvement of irrigation systems are required.

[8] The National Irrigation Administration (NIA) is a government agency that has the task to develop water resources for irrigation purposes

3.2.2 Legal and Institutional Arrangement

There are three kinds of irrigation schemes in the Philippines: CIS (Communal Irrigation System), NIS (National Irrigation System), and PIS (Private Irrigation System). The communal irrigation systems are relatively small (<1000ha) and the operation and maintenance (O&M) is conducted by farmers themselves. Meanwhile, the national irrigation systems are over 1000 ha and the O&M is operated by NIA and financed from the irrigation service fee (ISF). Private irrigation systems are owned by individuals or corporations, and the system are managed independently.

A major strategy conducted by NIA is the program called PAP (participatory approach program) in irrigation. The key instrument is the organization of irrigation called Irrigators Association (IA). IA is a non-profit association and its membership is voluntary.

The policy of participatory irrigation management began in the Philippines in the period of 1970-1980. In this period, the transfer of management control of planning, design, construction, and O&M from NIA (National Irrigation Administration) to IAs (Irrigators Associations) occurred in communal irrigation systems (CIS) in which local community legally owned irrigation infrastructure. After this period, the process of transfer program continued and expanded to the national irrigation system (NIS). The program shifts the management functions from NIA to IAs. However, the ownership of irrigation facilities remains with the government. IAs have legal right to the O&M and fee collection but they do not have right to make decision on improvement of the canal.

The turnover program actually began in 1976 with the issuing of Philippine Water Code. This policy gave IAs power to allocate and distribute water in the most equitable and efficient manner. In addition, the water code support IA by separating water rights and land ownership. This means that IAs can be the legal holder of water right and have the power to allocate and distribute water in the most equitable and productive way. The new code also supported IAs by

stipulating that a permit would not be approved to an individual if his water requirement could be supplied through an IA. Groundwater was declared as belonging to the State and no longer to the owner of the land above, which facilitated granting water rights to irrigators' associations for groundwater use. (Bagadion 1988 in Groenfeldt 1997, p.4).

Furthermore, this water code mentions that all water belongs to the state, and the state may allow the use or development of waters by administrative concession. The water code, under the term of 'transfer', also provides some choice for farmers in relation to their contract with NIA. There are three possibilities that might be applied. The first is maintenance contract, second is maintenance plus irrigation fee collection contract, and the third is total irrigation management transfer contracts. By the end of 1990, total management transfer has been implemented in 10-15% of the irrigation scheme, and more than half were under the maintenance contract (Peter 2004, p.5).

At the end of 1990, NIA introduced the Irrigation Management Transfer (IMT) program as the continuation of PAP (participatory approach program). IMT was aimed to reduce O&M expenditures of the government, empower users and increase their satisfaction through beneficiary participation, increase water use efficiency by improving local governance, and increase productivity. Considering the various size of NIS, IMT has two models (Ofrecio 2006, p.3): Complete transfer and Joint system management. Complete transfer is applied to the management of an irrigation system with less than 3.000 ha of service area and it is totally transferred to IA or IA federation. Meanwhile, Joint system management is applied to the larger systems (>3.000 ha) where NIA continues to manage the main system (headwork and main canals) while IA or IA federation takes over the management of secondary or tertiary canals including water delivery. For both models, NIA obtains ownership of the irrigation facilities and the responsibility for major repairs.

The membership of IA is voluntary and this has two impacts: first, IAs can not obtain support from non members to execute their obligations in the contract and

the second, due to voluntary membership, IAs have limited capacity to force their policies even on their members, for example, in the payment of irrigation service fees. For non-payment of fees, it is NIA that has to take non-paying farmers to court.

The Philippines has the spirit of helping one another that is called "*bayanihan"*. In agricultural communities this spirit is reflected during planting and harvesting when family members and neighbors give their help freely. In addition, keeping smooth interpersonal relations, *"pakikisima"*, is a cultural value relevant in community interactions. Historically, these and other values have mobilized the community into action groups for irrigated agriculture. Raby (1997, p.4) mentioned, "such values become social capital, institutionalized for the achievement of instrumental goals in the interests of self and the community". Farmers in the Philippines are accustomed to direct participation rather than formal organization. Participation in irrigation activities may be exercised in other social institutions established on daily interactions of farmers.

3.2.3 Process of IMT, Changing Role of Government and WUA

The process of participatory approach in the Philippines is a shift management functions previously handled by NIA to irrigation users organized into irrigators association (IA). In 1974, government declared that operation and maintenance cost should be financed by irrigation fee collections from farmers in national systems (those managed by NIA) and construction or rehabilitation costs should be covered from farmers in communal system (those managed by farmers). In 1976, NIA introduced a new approach in implementation: using trained community organizers to help organize farmers. Community organizers came from college graduates especially from agriculture, social science, and civil engineer. These college graduates have experienced in working with the rural and urban. They were hired temporarily as community organizers. These community organizers lived with farmers, participated in community activities, and gave assistance to farmers regarding irrigation system expansion, operation and

maintenance, solving their problems and giving information about types of assistance they could obtain from NIA. In 1980, farmer organizations were formed to manage tertiary levels of the system including in the national systems. The community organizers helped to train farmers about basic understanding in agriculture, and this was the first step of the efforts to give assistance to farmers for rehabilitation process.

Meinzen Dick (1997, p.105) mentions that there are some key features of participatory irrigation management in the Philippines.

- The first is the use of trained community organizers who were employed by NIA to work with farmers. Community organizers assisted farmers to build up an association that can manage the system or a part of the system that was previously managed by agency.
- The second is the emphasis on local organizations for irrigation management. Even though many communal irrigation systems have already had indigenous organizations before the NIA involvement, the organizations were modified to be able to take responsibility, increase their capability, and make them as legal entities. NIA would eventually turnover the ownership and management responsibility for the system to IAs. The turnover program would enable farmers to mobilize resources, make contracts, and take a wide variety of irrigation tasks.
- The third key feature was modification of government's approach to irrigation to make it work with farmers. NIA was changed as a financially autonomous body, and its subsidies were eliminated. NIA did not rely anymore on government budget allocations, but had to overcome to fulfill their expenditures, including staff salaries, from irrigation service fee. This made an incentive to devolve O&M to farmers and increase collection of irrigation fees.

The process of management transfer of responsibility for irrigation system from NIA to IA occurred in an incremental and gradual way. In the case of large

schemes, IAs were formed at tertiary level and federated at secondary level. After the transfer program is implemented, NIA is responsible for providing IAs with technical and managerial training, and responsible for rehabilitation and major repairs to the irrigation system. Meanwhile, the duties of IAs are negotiated and defined in the contractual agreement between IAs and NIA. Generally, IAs are responsible for delivery of irrigation water, and operation and maintenance of canals. In addition, IAs are also expected to take roles in dispute settlement assisted by NIA. Furthermore, IAs are also responsible for maintenance and minor repair works as well as for delivering irrigation water and collecting irrigation service fees.

In 2000, Philippines started to implement a new approach through Southern Philippines Irrigation Sector Project (SPISP). The new approach motivates farmers through IAs to improve the performance of irrigation system by transferring the ownership of system assets and management to them. The basic principle of the SPISP is to work in partnership with local communities in all stages of management from design, construction, and operations phases to ensure that community has full ownership of the new system or the improved system and can take the operation and management of the transferred system. This new approach in the Philippines is called PIMT (Participatory Irrigation Management and Transfer). It has been implemented in 13 areas in Southern Philippines. The PIMT and the previous PIM in Philippines are quite different. Under the previous PIM and IMT approach, the government agency only devolves the management of irrigation system but keep the ultimate legal ownership and authority of the system. On the contrary, PIMT approach gives full transfer of ownership and authority of the system to Irrigators associations. After three years under apprenticeship by NIA, IAs will be fully responsible for managing and sustaining their irrigation facilities (Mohammed & Kelly[9]).

[9] Team Leader & Project Director, Southern Philippines Irrigation Sector Project, Philippines

3.2.4 Results of IMT

Based on the study conducted by the World Bank (2003) in Ofrecio (2006, p.4) to review the results of IMT implementation, there are some results of IMT in the Philippines. The findings of the study are among others: (1) participation in management by IAs resulted to strong feeling of ownership, (2) faster resolution of water related conflicts, (3) better maintenance of canals and other facilities, (4) enhanced financial capability from the ISF share, (5) reduced burden in system operation by NIA, and (6) reduced O&M cost for NIA.

In addition, other studies also reported some findings about financial performance after transfer. Oorthuizen and Kloezen (1995) in Vermillion (1997a, p.5) reported reduced cost to farmers, increase in fee collection rates from 20% to 81%. Wijayaratna and Vermillion (1994) in Vermillion (1997a) also reported the increase in revenue from water charges from 24% in 1979 to 60% in 1990, reduction in agency field staff, and increase in fee collection rate from 27% to 60%. In addition, there are also a decrease in frequency of deficit budgets, and increase in revenue from water charges and other income, and 29% drop in the operating expenditures are reported by Bagadion (1994) in Vermillion (1997a, p.5). There is also the decline in staff from 13% to 75%, and decrease of government subsidy from 25 million peso in 1976 to zero in 1982 as reported by Svendsen (1992) in Vermillion (1997a, p.5).

In the aspect of quality of O&M, there are some findings from some research: water distribution became less equitable and maintenance was worsened (Oorthuizen & Kloezen 1995 in Vermillion 1997a, p.14), and no increasing trend in service area (Bagadion 1994 in Vermillion 1997a, p.14). However, Wijayaratna & Vermillion (1994) in Vermillion (1997a) reported improved water distribution equity and expansion of dry-season irrigated area. Svendsen (1992) in Vermillion (1997a, p.14) also reported improved equity of water distribution.

In agricultural and economic productivity, there are increases in cropping intensity (Wijayaratna & Vermillion 1994 in Vermillion 1997a), and increase rice yields by 4% in both wet and dry seasons (Svendsen 1992 in Vermillion 1997a, p.21)

Although there are some problems and negative results of the program such as reported by Oorthuizen & Kloezen (1995), these are overshadowed by the many benefits derived as referred to other studies.

Similar with the discussion about Mexico (p.44), we should be careful to make general judgment that the improvement is certainly caused by the IMT program. There may be some other factors that influenced the improvements such as rainfall patterns, the availability of water, and economic conditions at that time.

Chapter 4
PIM and IMT in Indonesia

This chapter elaborates the condition of irrigation infrastructure and the implementation of participatory irrigation management and irrigation management transfer policy in Indonesia. There are two important polices regarding participatory irrigation management and irrigation management transfer in Indonesia: Irrigation Operation and Maintenance Policy (IOMP) 1987 and Irrigation Management Policy Reform (IMPR) 1999. Both policies call for major role of farmers through their WUAs in irrigation management. Some points that are discussed and reviewed are key motivation factors influencing the adoption of IMT policy and policy reform, key points and objectives of the policies, the process of IMT, and the changing roles of government agency and WUAs in irrigation management.

4.1 Condition of Indonesian Irrigation Infrastructure

Irrigation infrastructure developments have ever been conducted intensively in the early 1980s as the effort to reach 'self-sufficient food supply' in 1984. However, in the last two decades, the infrastructure developments have been stagnant, even the existing infrastructures have undergone degradation in their functions as the result of low operation and maintenance performance as well as lack of rehabilitation funds.

Based on the study conducted by the National Planning Board/ Badan Perencanaan Pembangunan Nasional (Bappenas, 2002), the total of irrigation assets consisting of technical, semi technical, and rural irrigation (with the areas of 5.7 million Ha), including reclamation network of swamp area (with the areas of 1.2 million Ha) reaches the number 278 trillion rupiahs (Dikun, 2003). Unfortunately, however, the big assets in its growth are less adequately paid

attention so that the condition more and more declined, even some have undergone very heavy damages.

A survey conducted by Direktorat Jendral Pengairan (General Directorate of Irrigation, Ministry of Public Works) in 1999 (Dikun, 2003) shows that about 1.4 million hectare (20.84%) of the total 6.7 million hectare of irrigation network have undergone light damages and about 126 thousands hectare (1.86%) have undergone heavy damages. This condition now can be predicted to be worse when it is linked with the reality that the more limited government funds allocated for irrigation development and maintenance. Furthermore, the development approach in the past that tends to be centralistic has caused the dependency of farmers to the government in irrigation infrastructure provision and maintenance.

4.2 Motivation for Policy Reform

From 1960s to 1990s, irrigation infrastructure developments were conducted by government with little or even no involvement of farmers in the process of design, construction, and management of the new or existing infrastructure. This period can also be regarded as the era of construction for irrigation infrastructure. The positive impact of this era was the rapid expansion of irrigated agriculture area. According to Vermillion (2001, p.3), the total irrigated area expanded by 1.4 million ha in 1969 and 3.4 million ha in 1994. However, since the focus of government in the construction era was on the infrastructure development, the importance of creating viable water users association was neglected.

The expanded area of irrigation system consequently needs much funding for their O&M. In order to maintain the irrigation infrastructure, the government should have enough money. The financial shortage in 1987 generated deterioration of the infrastructure.

Indonesia began the reform in irrigation management policy since 1987 (called Irrigation Operation and Maintenance Policy/ IOMP). This policy reform was generated from the condition of financial shortage at that time and under

performance problems to maintain irrigation sustainability. In addition, according to Soenarno (1995) in Vermillion (2000, p.6), there are some reasons for the adoption of this turnover policy: (1) inability of provincial governments to provide sufficient funds for irrigation O&M, (2) inability of the central government to provide a sufficient subsidy to provincial governments to finance the cost of O&M, (3) management of irrigation systems by the provincial irrigation services was considered to be unsatisfactory. Furthermore, there was actually another factor motivating the turnover policy: the donor agency especially the World Bank and Asian Development Bank had promoted this policy reform and funded the turnover activity.

In 1999, the Indonesian government also adopted another new policy called Irrigation Management Policy Reform (IMPR) since the achievement of irrigation management policy 1987 was not as expected. In addition, the financial crisis in 1997 has motivated the government to review its public policies including for irrigation management. Both policies [IOMP 1987 and IMPR 1999] called for major role of farmers through their WUAs in irrigation management. This means that there will be a transfer of management from government to WUAs (in Indonesia called P3A/ Perkumpulan Petani Pemakai Air).

The adoption of those both policies shows the commitment of government for shifting the irrigation management from government agency toward promoting partnership between government and farmers.

4.3 Irrigation Operation and Maintenance Policy (IOMP) 1987

4.3.1 Key points and Objectives

The IOMP 1987 marked the beginning of irrigation management turnover from government to farmers. The main component of IOMP 1987 is turnover of small-scale irrigation systems and the collection of irrigation service fee from water users. Some key points of this policy are among others: (1) turnover management of all public irrigation system of 500 ha or less in service area to WUAs, (2)

introduce an irrigation service fee for farmers in all public irrigation systems, and (3) introduce more efficient O&M procedures in public irrigation system. This policy also stipulated that after the turnover, the WUAs would take responsibility for O&M of all irrigation infrastructure, and water delivery from intake to fields. Irrigation agency will take responsibility of providing technical assistance and restrict its role only to the management of large scale irrigation systems and river basins. However, it is not clear in the policy about who is responsible for the management of intakes.

The IOMP policy mentioned that the implementation of turnover program would be conducted gradually in 15 year period, and would finish in 2003. The objectives of the policy were: (1) to increase farmer participation in O&M of small scale irrigation system, (2) to decrease or eliminate government funds in O&M by empowering WUAs, and (3) to improve the O&M performance of small scale irrigation systems.

4.3.2 Institutional Arrangement

Irrigation management transfer program requires the changing roles of government and water users. In Indonesia, after the management transfer, government would no longer be responsible for operation and maintenance of irrigation systems. Central government agency would be responsible for regulations, while local government agency promotes the formation and establishes WUAs, as well as approves the rules adopted by WUAs. In addition, the agency also provides technical assistance to WUAs in carrying out their activities. Meanwhile, WUAs are responsible for water delivery and operation and maintenance of the canals.

Based on the coverage of the area, there are two types of irrigation schemes in Indonesia: small scale irrigation scheme (<500 ha) and large scale irrigation scheme (>500 ha) (Bruns 1999, p.5). For the small scale systems, farmers have for long time operated and managed the irrigation systems. Meanwhile, for large scale

system, farmers are responsible for operation and maintenance only until tertiary canals, and government agency generally takes responsibility for operation and maintenance of secondary and main canals.

For management transfer program in Indonesia, the operation and maintenance of irrigation systems were transferred to farmers, but only a limited amount of authority was devolved to farmers.

WUAs in Indonesia do not have clear water right. Even though there has been a legal framework for issuing water permits to provide water use rights, this has not been applied in irrigation. In addition, WUAs can not own the infrastructure constructed by the government, but can own the infrastructure they construct. For large irrigation system, the legal ownership of the assets remains with the government since the infrastructure was generally constructed by the government. Farmers were also not involved in the design of the physical improvement of infrastructure before the transfer. In addition, there was also no concession in management transfer program in Indonesia between government and WUAs. Furthermore, the collection and management of irrigation service fee was conducted by local government through Dinas Pendapatan Daerah [local revenue office]. WUA did not have authority to manage the irrigation service fee.

In the aspect of political culture, Indonesia has tradition of centralism in public management, clientelism in government culture, and strong paternalistic in state-society relationship especially for Javanese tradition (Hudalah 2006, p.5). The 1945 constitution gives socialistic role for the state. State has control over the use of land and water, spaces and natural resources for the greatest benefit of all people.

In addition, similar with the Philippines as discussed in chapter three, Indonesia also has the spirit of helping one another that is called *gotong royong*. In agricultural communities this spirit is also reflected during planting and harvesting when family members and neighbors give their help each other.

The level of education in Indonesia especially for farmers is generally low. This may influence the implementation of IMT since it will need more efforts to make farmers understand about the IMT program, and also to achieve a sufficient result of the training programs.

4.3.3 Process of IMT

In the process of IMT, government made priority to the provinces that had much concentration of small scale irrigation systems. In addition, the priority of turnover in these provinces was arranged as follows : (1) irrigation below 150 ha in area, (2) did not require heavy repairs, (3) did not have difficult or complex O&M, (4) had existing WUAs and farmers who seemed responsive to the program, (5) used water in the systems almost entirely for irrigation. For this reason, government tended to turnover the easier and better systems in the early stages.

However, the program gradually dealt with more challenging systems, and this might be one of the reasons that the program moved slowly after a few years. Based on field observations by Vermillion and by IWMI research collaborated with Gajah Mada University (in Vermillion 2001, p.7), there were also some main problems identified during the implementation of the small scale irrigation turnover program:

- Farmer motivation to take over full management and financing of systems was hindered by regulations imposed by local authorities to dictate official cropping patterns (which were often at odds with farmer preferences);
- The turnover program has generally been implemented according to rigid administrative guidelines, quotas, schedules, and standard training materials rather than according to a flexible process of negotiation and solving local management problems;
- The irrigation agency was often made busy with physical repair works, often to the overlook of adequate effort in organizing WUAs and capacity building;

- Farmer inputs to design of repairs were overlooked or ignored during construction;
- Design and construction was financed entirely from government funds, with only occasional voluntary additional contributions by farmers;
- Long delays in construction and legalization of WUAs exhausted enthusiasm of farmers for the program;
- WUA were legally and politically weak, had no water rights and were not included as members of the district-level irrigation committee. Therefore, WUAs had no voice to deal with the rising issues of water allocation along river basins and little power to enforce its own rules, collect water charges, and settle water disputes among members;
- The program was prepared and implemented based on top-down administrative instructions, quotas and standardized training materials. Little room was provided for meaningful negotiation and joint planning with farmers.

4.3.4 Results after IOMP 1987

Based on the study conducted by IWMI[10] (Vermillion et all, 2000) about the impacts of IMT on irrigation management and irrigated agriculture in West and Central Java, the evidence indicates no significant changes or outcomes from the turnover program for O&M, and lack of improvement of agricultural productivity, although there are some indications that equity of water distribution has improved and frequency of water disputes has decreased. In this study, the impacts considered includes among others: quality of operations and maintenance, agricultural productivity, and financial and economic viability of irrigation systems. The turnover program did not lead to significant reduction in the cost of the irrigation sub-sector for the government.

[10] International Water Management Institute, the headquarters based is in Colombo, Sri Lanka.

There are some reasons influencing the results of IMT program. No significant changes from the turnover program for O&M and lack of improvement of agricultural productivity were caused by the strategy that was implemented in the transfer program. As discussed before, the government tended to turnover the easier and better systems in the early stages. In this system, farmers were already much involved in conducting various management functions. Therefore, after the transfer the conditions did not change too much, except for improved equity of water distribution and decreased frequency of water disputes. In addition, there are some other reasons that cause the IMT program in Indonesia having no significant outcomes. Among these reasons are: WUAs were not provided with sufficient training program, WUAs do not have formal water right, and limited degree of authority are transferred to WUAs.

In addition, a large majority of farmers were not involved in the decision making concerning the design and construction of physical improvements before the transfer. Although farmers were involved in physical improvement, they were paid by the government for their labor. It means that there was no or minimum farmers' investment in the physical improvement.

4.4 Irrigation Management Policy Reform (IMPR) 1999 (Pembaharuan Kebijakan Pengelolaan Irigasi (PKPI) 1999)

There were some factors and conditions motivating the adoption of the Irrigation Management Policy Reform (IMPR), the President Instruction No.3 Year 1999. Firstly, after the economic crises in 1997, in April 1999, national parliament issued new laws on decentralization and regional autonomy. The shift in political culture provided the basis for reforms in the water and agricultural sector. In addition, since the harsh crisis of 1997 it was obvious that broad institutional reforms were necessary. The key focus was enhancing the role of the farmers, and shifting the role of the government agencies from *provider* to *enabler*. Secondly, the policy reform was again promoted by the World Bank. The Indonesian government and World Bank prepared Water Sector Adjustment Loan Program

(WATSAL). The short-term goal of this program is to provide fiscal support to Indonesia to overcome the economic crisis. To obtain these funds the Indonesian government determined to design and implement a comprehensive set of policy and institutional reforms for water sector, including irrigation and river basin management (Vermillion 2001, p.17). Finally, as discussed earlier, the result of the previous policy IOMP 1987 was not as expected. Many problems related to irrigation sector existed. Various reports showed that there were some problems in the irrigation sector that needed to be addressed. These problems included rapid deterioration of irrigation systems, poor design and construction of projects, failure in irrigation service fee system, under investment in maintenance, over-dependence on foreign-financed projects, no system of water rights, weak and ineffective WUAs, and the inability of central government to continue subsidy in irrigation O&M (Vermillion 2001, p.17-18).

The Irrigation Management Policy Reform (IMPR) 1999 consists of five principles:

1. redefinition of tasks and responsibilities of irrigation management institutions;
2. empowerment of farmers through autonomous, self reliant Water User Associations (WUAs), rooted in society, including formation of WUA Federations at Scheme level, as well as representation of WUAF in Basin Water Resources Committees and Irrigation Committees, and formal regulation of water rights to scheme level WUAFs;
3. transfer of authority over irrigation management to the Water User Associations, with the principle of one system, one management;
4. finances to pay for operation and maintenance, rehabilitation and development of irrigation systems will be collected, managed and used by the Water User Association of that system;
5. sustainability of irrigation systems through a general policy of water resources conservation and controlled conversion of irrigated land

Redefinition of tasks and responsibilities of irrigation management institutions

This principle is intended to ensure a larger role for the farmer communities in decision making for irrigation management. The implementation consist of reorganizing the functions and responsibilities of all irrigation institutions, both private and government organizations

Empowerment of farmers and WUAs

Farmers through Water Users Association (WUA) and WUA Federation (WUAF) would be empowered to take control over irrigation system management and take responsibility for protecting related aspects of the environment surrounding irrigation systems. WUA would have legal and political autonomy; it would be self-reliant and would be based on local socio-cultural conditions. Farmers and WUAs would also have the right to develop agribusiness enterprises as legal entities. It is also mentioned that the WUAF may federate up to the level of an entire irrigation scheme (one system, one management) and have legal powers to oblige water users to pay irrigation fees, to enter into binding contracts.

Transfer of authority over irrigation management to WUAs.

By using the principle of one system one management, the government will transfer the responsibility in irrigation O&M and financing for all irrigation system to WUAs in a gradual, selective, and democratic approach. This would be conducted without restriction in size of irrigation system. As long as WUAs have not yet been capable or willing to take over management and financing of O&M for an entire irrigation system, the system would be managed jointly by the government/ local government and the WUA. Although an irrigation system has been transferred, the government will still have the role to monitor, evaluate (technical and financial audit), and give technical and financial assistance for matters that can not be handled by WUAs.

Until now, WUAs are already entirely responsible for the tertiary systems. They are gradually taking over authority in the secondary systems and smaller primary systems. Meanwhile, the responsibility for service delivery is still under joint management.

Funds for O&M collected, managed, and used by WUAs.

The collection, management, and use of funds for irrigation management, including Operation and Maintenance as well as Rehabilitation and Development, would become the responsibility and right of WUAs. This will be implemented for all systems throughout Indonesia. In addition, the new policy obviously states that WUAs will have the right to determine their own fee level and the right to use all of the funds collected.

Sustainability of Irrigation Systems

Considering that the investment in irrigation sector is very expensive (irrigation infrastructure development, O&M, rehabilitation, etc), the government will maintain the sustainability of water resources and prevent the land conversion from irrigated agriculture to other uses. Policies and laws will be issued to conserve water resources and to protect against unregulated conversion of irrigated land to other uses. To maintain the sustainability of irrigation infrastructure, farmers should be incorporated in every stages of irrigation development activity.

In the implementation of IMPR, in order to implement the process, particularly the empowerment of the WUAs, the Community Organizers (CO) have been formed. The Community Organizers will help WUAs and WUA Federation to initiate empowerment, to implement of IMPR, and to make better communication with variety of support organizations. The Community Organizers only assist to promote introduction and implementation of reform. This is different from the approach applied in the Philippines. In addition, Community Organizers should assist WUAs at their request, and they should be well trained to provide support as needed by WUAs.

Chapter 5
Comparative Analysis

This chapter provides a comparative analysis between the three countries: Mexico, the Philippines, and Indonesia. There are some items that are compared, discussed, and reviewed: motivation, process, and implementation strategy of IMT; elements to be transferred in the IMT; the roles of WUA and Irrigation agency after the IMT; institutional arrangements (dependency of irrigation agency to government and dependency of WUA to irrigation agency); and the objective of farmers as an economic incentive for WUAs' sustainability.

5.1 Motivation, Process, and Implementation Strategy of IMT

Mexico, the Philippines, and Indonesia did not begin the IMT policy at the same time, but they have at least the same factor motivated the adoption of IMT policy. The key motivating factor is to deal with the shortage of government funds in irrigation operation and maintenance that will eventually influence the sustainability of irrigation system. The constraint on government budgets result in poor operation and maintenance of irrigation system. In Mexico and Indonesia, the inability of government to collect sufficient fees from water users contributed to the poor operation and maintenance, whereas if this fee was effectively collected, it might help reduce government burden on operation and maintenance. In addition, Mexico IMT policy is part of general liberalization policies of the government after the economic crises in 1980. Meanwhile, in Indonesia, it is also a part of policy reform on decentralization and regional autonomy after the economic crises in 1997.

In the process of transfer, all three countries have a top-down process of IMT encouraged by international development banks. However, the process of IMT in the Philippines and Indonesia occurred in a gradual and incremental way, while Mexico has rapid process of transfer. This difference was caused by the strategy

and condition in the implementation process. The IMT process in Indonesia and the Philippines started with small scale irrigation system, while Mexico started with large irrigation system. In the Philippines, government started the program with the communal irrigation system (CIS) in the 1970-1980 period. In this period, the number of hectares transferred to users was low since the transferred systems were the small ones. In addition, in transfer process, the government negotiates on case by case basis and the systems are only transferred if water users agree. Then, after 1980, the process of IMT continued to the national irrigation system (NIS). The process of transfer both in CIS and NIS was implemented gradually. Similarly, Indonesia also started the implementation of IMT from small scale irrigation system (irrigation system below 150 ha in area). In addition, in the early stage, government tended to turn over the easier and better system, such as irrigation systems that did not have difficulty or complex problem, had existing WUAs and farmers responsive to the program, and did not require heavy repair. However, the implementation in the IMT program gradually dealt with more challenging systems and made the IMT program move slowly. Slightly different from Indonesia and the Philippines, Mexico transfer program was initiated with irrigation districts (large scale public irrigation system, 50.000-300.000 ha). Therefore, the number of hectares transferred increased rapidly. The Mexican program for IMT started in 1991. By the end of February 2000, Mexico has transferred 95 percent of its 3.2 million hectare to 427 water user associations (Modulos) (Peter 2004, p.5). In addition, the condition in Mexico in the more commercial irrigated areas, especially in the Northwest where more than 45 percent of the irrigated area is located (Johnson 1997, p.10), farmers were very enthusiastic to this program because they could not take the risk of the failure on their irrigation system. They realized that government could not afford anymore to finance the irrigation O&M. Therefore, they requested that government transferred the management responsibility for O&M of irrigation districts to water users. Consequently, when the program began, hundreds of hectares were transferred to users.

In the aspect of the implementation strategy, Mexico relied heavily on mass media campaign to promote the transfer program, while Indonesia and the Philippines used community organizers. In the Philippines, community organizers came from college graduates especially from agriculture, social science, and civil engineer. They were employed on temporary basis and they lived with farmers, participating in community activities, giving assistance to farmers regarding irrigation system expansion and operation and maintenance, helping to solve their problems and giving information about types of assistance they could obtain from NIA. In Indonesia, the community organizers will help WUAs and WUA Federation to initiate empowerment, to implement IMPR (Irrigation Management Policy Reform), and to make better communication with variety of support organizations. The community organizers only assist to promote introduction and implementation of reform, and facilitate the process of WUA formation. They also should assist the WUA at their request, and should be well trained to provide support as needed by WUA. Another strategy of implementation is the training program. All three countries conducted training program on operation and maintenance, and financial management to leaders and technical staffs.

In Indonesia, there is a requirement that before the transfer is implemented, there should be a physical improvement on the irrigation system. The decision to improve the system before the transfer resulted in the delay of the program so that the transfer program was behind the schedule. This was due to the reluctance from provincial and local irrigation services about the program, and financial constraint as well. After ten years of implementation, by 1997, only 47 percent of the 900.000 hectare targeted area was transferred, which is supposed to be reached by the year 2003 - (Vermillion et all, 2000, p.10). Besides the physical improvement, all systems must have formal WUAs to accept the transfer. The establishment of WUA is in parallel with the physical improvement of the system. However, since the irrigation agency was made busy with the physical works, it has given little and insufficient attention to organizing farmers. In addition, the physical improvement was also most familiar and easily managed components of the

activities and has visible output, while institutional development of WUAs was established on paper. Since WUA was not officially formed until the physical improvement was conducted by government, users/ farmers did not have a chance to arrange formal agreement on the improvement earlier, and WUAs were not sufficiently involved in the improvement process.

Different from Indonesia, rehabilitation of irrigation district or modulo is not a pre-condition for transfer in Mexico. The negotiation is conducted on case by case basis between WUO and CNA for rehabilitation. This means that the establishment of WUO should be conducted before the rehabilitation process.

In the Philippines, IA was established before rehabilitation process. This newly established IA then has the first task to decide what kinds of rehabilitation are required. Every scheme of irrigation undergoes some kinds of improvements determined with the agreement between NIA and IA. The process of planning and rehabilitation of facilities are conducted with full farmers' participation in decision making. In addition, NIA and IA will have to pay the final cost together. In this case, there is also capital involvement from IA in the physical improvement. This kind of participation will likely enhance the capacity and confidence of farmers in their associations.

The involvement of WUAs in physical improvement is necessary. For this reason, WUA should be formed before the implementation of physical improvement. The case in Mexico and the Philippines show that there are negotiations between irrigation agency and water users before the rehabilitation process. There is also capital involvement from water users. This may create high sense of ownership of water users. When farmers have voice in the design and construction of physical improvements, or farmers are involved in the rehabilitation process, or there is capital investment from them, it is very likely that farmers will have high motivation to maintain the infrastructure. Some experiences in the fields showed that if farmers are not consulted or involved in design of tertiary canals, they may destruct or change the structures and canals to adapt to their needs. Hence, in

order to ensure that WUAs are involved in the planning, design, and improvement process, it is necessary that the establishment or institutional development of WUAs is conducted before the implementation of physical improvement.

5.2 Elements to be transferred in the IMT

Based on the theory as discussed in chapter two, there are some elements that can be transferred. In the World Bank paper these elements are termed as irrigation rights. They are management control, physical facilities/ infrastructure, and water right. The process of IMT to users may involve some or all of these three things. In this part, I discuss the components that are transferred in each country.

Philippines

As discussed earlier that in the Philippines there are Communal Irrigation System and National Irrigation System. In the communal irrigation systems, local communities have already legally owned the infrastructure, and they have been for long time managed their irrigation system. Meanwhile, for national irrigation system, the management functions are transferred to users after the IMT, but not the infrastructure. Management functions that might be transferred are responsibility for maintenance and minor repair works as well as responsibility for delivering irrigation water and collecting irrigation service fee.

IAs in the Philippines have legal right to the O&M and fee collection but they do not have right to make decision on the improvement of the canal. In addition, associations could be the legal holder of water right, having full power to allocate and distribute water in most equitable and productive manner. In article three of Water Code, it is stated that all waters (ground water, surface water) belong to the state. The state might allow the use of waters by giving concession. Water can not be appropriated without a water right obtained through a water permit and this water right is a special right granted by government. In communal irrigation system, IAs can obtain a permit. Meanwhile, NIA holds the permit in national

irrigation system. This permit can be transferred to others, with the approval from National Water Board.

One innovation occurred in the Philippines regarding the ownership of infrastructure is the implementation of PIMT as discussed in chapter three. Under the PIMT approach started to implement in 2000 in some areas of Southern Philippines, IAs obtained full management transfer of responsibility and ownership of the infrastructures.

Mexico

More management functions are transferred in Mexico rather than in the Philippines. After the transfer, WUOs have some roles: delivery of irrigation water and operation and maintenance of canals, dispute settlement, construct their own infrastructure or participate in government-financed construction projects, and keep and update a register of members and their respective water rights. WUOs in Mexico also have right to hire or fire their own staff. The hired staff might be from CNA staff or professionals. This ability has made an improvement to the responsiveness of the employed staffs to the needs of the users.

In Mexico, WUOs can be granted water rights and can own the infrastructure. Water rights are established through giving concessions. The concessions clearly define user rights and obligations. Government, through CNA is establishing Public Registry of Water Rights to ensure the legal certainty of water rights. In addition, CNA has the authority to allocate water resources. Water rights can be transferred among members of the same WUOs and between WUOs. Water can be sold to other farmers, but not to other sectors. Furthermore, WUOs can make improvements to the physical structures, but the plans must be approved by the CNA. Irrigation infrastructure can also be transferred to WUOs after a time of concessions. Farmer will become the owner of equipment and the canal would be theirs after 20 years of concession.

Indonesia

In Indonesia, management functions for large scale irrigation systems can be transferred until secondary canals. WUAs can be granted water use rights. WUAs can own the infrastructure they construct, but not infrastructure constructed by the government. It is almost the same with the Philippines. However, there is no concession in Indonesia between government and WUAs. In 1987, Indonesia implemented a small-scale irrigation management turnover program. The reason for this program was primarily because of the constraint on government financial capacity to manage the irrigation management system in the country. In small-scale irrigation management turn over program, the O&M of irrigation systems with the area of less than 150 ha were transferred to users. However, only a limited amount of authority was devolved to farmers. The program did not solve the problem of financial and physical sustainability of irrigation. WUAs are still quite weak organizations. They do not have water rights and do not own infrastructure.

Under the Irrigation Management Policy Reform (IMPR) 1999, the management of irrigation system is transferred to the WUAs but the assets/ infrastructure still remain as government property. The government still has the control over irrigation facilities. This indirectly reflects the government's perception that farmers are incapable of handling irrigation management tasks including assets maintenance. In addition, there will be an audit to ensure that farmers are appropriately managing the irrigation system, if not the government will get back the responsibility from the farmers. This is again seen as a way for the government to maintain the control over the systems and thus would crush the empowerment of WUAs.

Discussions

As described in theory, sense of ownership is one of the benefits from participatory irrigation management. There is actually a need to clarify ownership

of irrigation facilities. If the government maintains the ownership, it can be assumed that government will be responsible for the common tasks of an owner, such as repairs and improvements. This would eventually not achieve the empowerment and institutional development of WUA. The transfer of ownership of infrastructure to users will potentially encourage the sense of ownership from farmers. In this regard, if farmer have high sense of ownership, they might have high motivation to maintain the infrastructure.

This can be learned from the case of irrigation districts in Mexico and communal irrigation system in the Philippines. Legal ownership of the assets in Mexico and communal irrigation system in the Philippines become motivation for farmers to improve operation and maintenance, and increase productivity. Indigenous farmers-managed irrigation system in Indonesia is quite similar with the communal irrigation system in the Philippines. In these systems, farmers own the infrastructure and consequently there is high motivation for farmers in operation and maintenance tasks.

For large-irrigation system in Indonesia and national irrigation system (NIS) in the Philippines, the legal ownership of assets remains with the government (except for some areas in Southern Philippines that implemented PIMT approach). This becomes a major constrains for irrigation users to perform better maintenance since they might have lack of sense of ownership. As Coward (1986, p. 227) in Oad (2001, p.281) argued that property rights become the social basis for collective action by irrigators in performing various irrigation tasks. The PIMT approach implemented in some areas in the Philippines gives an example for Indonesia in order to enhance partnership with local communities in all stages of management from design, construction, and operations phases to ensure that community has full ownership of the new system or the improved system and can take the operation and management of the transferred system.

Water right is also an important factor and might influence the results of IMT. Establishing clear water rights could improve agricultural productivity. If farmers have secure water rights, they can schedule planting dates more consistently. Mexico transfer program gives secure water right to users. The example in Mexico shows that farmers schedule their cropping plan and submit it to WUO, then WUO prepare irrigation plan for modulo and send it to CNA. In this case, farmer can make their own schedule consistently because they have clear water right. Water right can be transferred among members of the same WUOs and between WUOs and water can be sold to other farmers, but not to other sectors. In the Philippines, water right is a special right granted by government. In communal irrigation system, IAs can obtain a permit while NIA holds the permit in national irrigation system. Meanwhile, in Indonesia, there has been a legal framework for the issuing water permits to provide water use rights, but this is not presently applied in irrigation. Hence, after the management transfer, WUAs do not have an explicit water right.

From the above explanation, we can summarize the things that are transferred in IMT process in each country in table 6.

	Philippines		Indonesia		Mexico
	CIS	NIS	Small	Large	Irrigation districts
O & M Responsibility	WUA	Both	WUA	Both	WUA
Water Right	WUA	Agency	WUA	Agency	WUA
Infrastructure	WUA	Agency	WUA	Agency	WUA

Table 6. The elements to be transferred in IMT process

When we connect the theory of decentralization in WUAs, and relate the things that are transferred, the three countries can be classified in the table 7 as follows:

Activities	*Full Agency Control*	*Agency O&M (User Input)*	***Shared Manage-ment***	*WUA O&M*	***WUA Owned (Agency Regulation)***	*Full WUA Control*
Regulation	Agency	Agency	Agency	Agency	Agency	WUA
Ownership of Structures, Water	Agency	Agency	Agency	Agency	WUA	WUA
O & M Responsibility	Agency	Agency	Both	WUA	WUA	WUA
User Representation	Agency	WUA	WUA	WUA	WUA	WUA
Countries			**Philippines, Indonesia**		**Mexico**	

Table 7. Category of each country based on theory of decentralization and WUAs

5.3 The Roles of WUA and Irrigation Agency after the IMT

5.3.1 The Roles of WUAs

After the IMT, WUAs in all three countries take some roles. There are some similarities in Mexico, the Philippines, and Indonesia on the roles of WUA after transfer. The similar roles are **irrigation water delivery, operation and maintenance of canals, and dispute settlement**. In Mexico, the tertiary and secondary canals are transferred to WUA, while the main system, infrastructure, machinery, and equipment are transferred from district office of CNA to SRL[11]. This means that water users can be responsible until the main system. In Indonesia, the responsibility that can be transferred to WUA is only until secondary canal, while the main canals are still in the hand of irrigation agency. Similarly, in the Philippines, IA is responsible for tertiary canal, while IA Federation is responsible for secondary canal. In addition, there are also some differences. In Mexico, WUOs can construct their own infrastructure, participate in government-financed construction projects, and keep and update a register of members and their water rights, while in Indonesia and the Philippine, WUA is responsible for maintenance and minor repairs.

[11] SRL is a user organization at the district level

Another important role is **water fee collection and management.** Since the main source of income for most WUAs is the irrigation service fee, establishing an effective fee collection system is critical to the financial health of this association. Water fees in Mexico and the Philippines are collected and managed by WUAs, while in Indonesia before IMPR 1999, the collection and management of ISF are exercised by local government through Dinas Pendapatan Daerah (regional revenue office). After the reform, water fees are collected, managed and used by WUAs. (see *Principle 4 of IMPR in Chapter 4)*.

Fee collection in Mexico increases significantly after transfer from 57% in 1991 to 80% in 1994. From 20 districts surveyed, if only the completely transferred irrigation districts are considered, the rate of financial self-sufficiency is greater than 80% and 12 of those districts have a water fee collection rate greater than 100% (World Bank 1994 in Gorriz 1995). This shows that fee collection by WUOs in Mexico is reliable enough. As discussed earlier, WUOs are responsible for the collection and administration of fees for irrigation services. WUOs can determine the use of fees for their own matters such as operation and maintenance, equipment purchasing, etc. Besides, WUOs have to pay the CNA for the delivery of water, and if a SRL exist at the main system level, the WUOs must also contribute to the SRL. In this case, WUOs can see and feel the use of their fees and see the benefits. Accountability in this kind of fee collection can also be conducted and this is necessary to encourage farmers to pay their fees. In addition, Each WUO in Mexico determines its own water fees based on its own cost of operation and maintenance, and administration; therefore water fees may be different among modulo within irrigation districts and this water fees are paid at the beginning of the cropping season before WUO received water. The title of concession between CNA and WUO specifies clear actions given to users who do not pay the water fees.

In the Philippines case, as it has been discussed in chapter three, there are three kinds of contract: (1) maintenance contract, (2) maintenance plus irrigation fee collection contract, (3) total management transfer contract. For the second and the

third type of contract, fee collections are conducted by IAs. However, IAs have limited capacity to force the payment. It is NIA that has to take non-paying farmers to court.

Meanwhile, in Indonesia, before IMPR, fee-collection and management was conducted by local government through Dinas Pendapatan Daerah. This needs additional time and efforts. Since the Dinas Pendapatan Daerah has a limited number of staffs and has some other tasks, this makes it difficult to concentrate on collecting irrigation service fee. In addition, farmers did not have control over their uses. After the reform, water fees are collected, managed and used by WUAs. The new policy obviously states that WUAs will have the right to determine their own fee level and use all of the funds collected. This is great change in irrigation policy in Indonesia. However, there is still a weakness in the policy that it is still unclear about the sanctions that will be given to the farmers that do not pay, and this becomes a problem that potentially might cause the system collapse.

Accountability and incentives in the use of ISF are important to convince farmers that they really contribute to the O&M. However, for the system in which fee collection is conducted by government, it is not clear where the fee goes and for what the fee is used. It seems that the fee is like irrigation tax and farmers can not see directly the benefits from their fees. In addition, if these fees are collected and managed by government, the fees from an irrigation system are very possibly not to be used for that system. It is important that fees are used within the same irrigation system in order to make farmers see directly the impacts of their fees and eventually encourage motivation for farmers.

5.3.2 The Roles of Irrigation Agency

According to Svendsen et all (1997, p.20) as discussed in chapter two, there are some possible roles that irrigation agencies can take after the IMT. These roles are: river basin planning, water resources allocation & monitoring, development of new policies and regulations, environmental monitoring and enforcement, groundwater monitoring and control, project planning, design and construction,

technology transfer to water users, advisory services to associations, monitoring of association performance, and arbitrating disputes.

After the transfer program, irrigation agencies in all three countries have some new roles. In Mexico, irrigation agency has the roles for supervising the operation, performing maintenance and management of the infrastructures that have been transferred to WUOs, and providing technical assistance to WUOs in carrying out their activities. In the Philippines, the IDD (Institutional Development Department) is responsible for organizing farmers as IAs, while NIA (National Irrigation Association) is responsible for providing IAs with technical and managerial training, and rehabilitation and major repairs to the irrigation system. Meanwhile, in Indonesia, the central irrigation agency is responsible for regulating matters related to WUAs, while local irrigation agency promote the formation and establishment of WUAs, and approve the statutes and rules adopted by WUAs.

5.4 Institutional Arrangements

5.4.1 Dependency of Irrigation Agency to Government

The dependency of irrigation agency to the government financially or organizationally will influence the performance of irrigation system and its sustainability. CNA in Mexico and NIA in the Philippines are autonomous irrigation agency. Meanwhile, Indonesia has irrigation agency that is dependent on the government financially and organizationally. Merrey D.J (1996) in IIMI research report made a matrix (table 8) showing the relationship of irrigation agency to government. The relationship between the agency and government can be ranged from autonomous to dependent in both financial dimension and organizational dimension. Merrey stated that the dependency of Irrigation agency to government is related to the sustainability of an irrigation system. He uses the term sustainability to refer to whether an irrigation system continues to meet its users' expectations over time.

CNA in Mexico are financially and organizationally independent from the government and manages a single system. Based on the matrix by Merrey, the agency that is autonomous and manages a single irrigation system will achieve highest performance, most adaptive to changing conditions, and most sustainable. The results in Mexico as described in Chapter three is good enough. In most irrigation districts, water fees have increased substantially after the transfer of irrigation district to WUOs. In some cases, the surplus is used to purchase machinery and equipment for maintenance. Most of IMT studies report important improvements in water service. In the aspect of agricultural productivity, the productivity of land (in term of crop yields) increased 1.85% per year on average. Similarly, the productivity of water (in term of yields per unit water) increased 2.2 % per year on the average, in all irrigation districts. Since the CNA do not depend on the government to fulfill their expenditures, including staff salaries, but it depends on the WUOs from irrigation service fee, it is very likely that CNA will work seriously in helping the WUOs in enhancing the productivity.

	Relationship of Irrigation Agency to government	
	Autonomous	Dependent
Agency manages a single irrigation system	(1) • Achieve highest performance • Most adaptive to changing conditions • Most sustainable	(2) • Mixed but generally low performance • Low adaptability
Agency manages multiple irrigation system	(3) • Performance will vary among systems but overall will be lower than cell 1, higher than cell 4 • Adaptability and sustainability will vary among systems but overall will be lower than cell 1, higher than cell 4	(4) • Wide range of, but generally low performance • Low adaptability and sustainability, with variation among system based on local factors

Table 8. Matrix of irrigation system governance arrangements
by Douglas. J. Merrey 1996, p.9

NIA in the Philippines was established in 1964 as a government-owned corporation. It has the responsibility for construction and O&M of irrigation facilities. As a public corporation, NIA obtained subsidies from government.

However, NIA was changed as a financially autonomous body in 1974, and its subsidies were eliminated. Financial autonomy is defined as "a condition where irrigation agency must rely on user fees for a significant portion of the resources used for O&M, and the agency has expenditure control over the use of the funds generated from these charges" (Small 1990 in Oorthuizen and Kloezen 1995, p.15). Since that time, NIA has not relied anymore on government budget allocations, but has to overcome to fulfill its expenditures, including staff salaries, from irrigation service fee. This made an incentive to devolve O&M to farmers and increase collection of irrigation fees. NIA does not manage a single system but manage multiple irrigation system. Based on the matrix by Merrey, D.J, the performance will vary among the systems, but overall will be lower than the previous (autonomous agency manage a single irrigation system). Similarly, adaptability and sustainability will vary among the systems but overall will be lower than the previous. The results of IMT as described in chapter three show variations in the irrigation system performance in the Philippines.

Indonesia has irrigation agency that depend financially and organizationally on the government. In addition, the irrigation agency in Indonesia manages multiple irrigation systems. This might be one factor resulting in low irrigation system performance. According to the Merrey's matrix, this kind of agency (autonomous agency managing multiple systems) will generally result in low performance, low adaptability and sustainability, with variation among systems based on local factors. In fact, although there might be some good irrigation system performance, such as subak in Bali, irrigation systems in Indonesia generally have low performance and adaptability.

Even though there might be some other factors resulting in low performance of irrigation system in Indonesia, the dependency of irrigation agency to the government organizationally and financially to some extent might contribute to this low performance.

5.4.2 Dependency of WUA to Irrigation Agency

In addition to the dependency of irrigation agency to the government, a common problem for management transfer is the dependency of the newly established WUAs on the irrigation agency that helps their establishment. The core of this problem is that the new WUAs are initially accountable to the promoting irrigation agency. This should be changed so that the accountability of WUAs is not directed to irrigation agency but directed to their members. If this is not conducted, WUAs are very likely difficult to become sustainable as autonomous associations. Autonomous association is defined by Pradhan and Bandaragoda (1997) in Abernethy (2001, p.4) as "the condition that the organization becomes *self-governing*, *self-regulating* and *self-supporting*". It is important to reduce or even eliminate the dependency of WUAs on irrigation agency's assistance. The empowerment of WUAs is intended to make WUAs as autonomous associations.

5.5 The objective of farmers, an economic incentive for WUAs' sustainability

An association or organization can be defined as a group of people with certain objectives. Since the objectives are difficult to achieve individually, people make organization. However, if these objectives are determined by others outside the organization, it is likely that the members of organization will not have enough motivation to achieve the objectives. When the members of organization feel that they can reach their objectives through the organization, this will become the strength of the organization.

Since the success of IMT can be defined as the condition when the objective of the transfer program can be achieved and the WUA is sustainable, then it is important to think carefully about the objectives. Peter (2004, p.1) mentioned, "Sustainable WUA requires an enabling environment, clear political will with *clarity of objectives*, accountable partnerships, incentives and long-term capacity building". Hence, it is important to consider whether or not the objectives give

motivation for the actor [in this case WUA]. Sustainable WUAs are very likely to be achieved when the members have an incentive to achieve the objectives.

Naturally, farmers decide to involve in WUA in order to increase their income and for their livelihood. This is the most common and natural objective of farmers. They expect that through this association, they can obtain more income.

However, WUAs were commonly established with the objectives from government or agency. It is generally imposed by government. When we see some of the objective of IMT in the three countries, the main objective is to reduce government burden in irrigation O&M. This objective is on government side. In this regard, I do not mean to say that the government should abandon the objectives that have been determined, but it is also important to think from farmers' side. If farmers' objective can be achieved, it is very likely that the government objective can also be achieved. The focus should be shifted to the main objective of farmers that is to increase their income. In this way, there will be sufficient incentives for farmers.

To increase farmers' income, there should be an inclusion of farmers' activities not merely on irrigation water delivery, operation and maintenance of canals, dispute settlement, and water fee collection and management, but also the need to include economic activities of farmers. This means that WUAs should focus not only on water-related tasks and management but also on other economic functions.

The case of Pinit communal irrigation system in the Philippines, as reported by Bagadion (1991) in Helmi (2000, p.25) shows the example of the incorporation of economic activity conducted by WUA. WUA in this system has two operating units: irrigation service unit and agribusiness service unit. The activities of the agribusiness unit include distributional of agricultural input, credit facilitation, and the marketing of unhusked rice on behalf of the members. This system has increased the capital of the system over the year. There was about 400 percent increase of their saving between 1989 and 1990.

Chapter 6
Strategy Recommendation for Indonesia, Reflection of the Theory, and Concluding Remarks

Using the previous discussions, this chapter provides some strategy recommendations that might be useful to be adopted for Indonesia in order to achieve irrigation sustainability. The strategy recommendations are derived from the lessons or experiences in Mexico and the Philippines. Indonesia may adopt some policies from those countries in the form from copying, emulation, hybridization, synthesis, or inspiration. Finally, the last part of this chapter discusses a reflection of the theory as elaborated in chapter two connected with the practical situations.

6.1 Strategy Recommendations for Indonesia

6.1.1 Institutional development of WUA

Since the sustainability of irrigation system depends on the sustainability of WUA, the process of organizing farmers into a strong WUA and the process of institutional development of WUA are important. The importance of institutions in sustainability of irrigation systems has been emphasized by Svendsen (1987) & Curruthers (1992) in Helmi (2000, p.4). Svendsen and Curruthers in Helmi (2000) suggest the essential role of institutions in irrigation systems sustainability. Helmi quoted:

> "…Over a period of a few seasons, no piece of irrigation infrastructure is stable or sustainable without institutions to operate, repair, adapt and maintain it. In line with Sevendsen, Carruthers writes that: ...it is in the software of institutions that the success of the hardware - the physical engineering efforts - will lie"

Therefore, institutional development of WUA is important to sustain irrigation system.

The process of institutional development of WUA can be started with the help of well-trained community organizers, and training programs for WUAs. There should be enough time provided for this process. As it has been implemented in Indonesia, community organizers will help WUAs to initiate empowerment, assist to promote introduction and implementation of reform, and facilitate the process of WUA formation. Community organizers should not make decisions or create dependency of WUAs to them. The emphasis of community organizers is to assist empowerment of WUAs. In some difficult cases, it might be that their involvement is more intensive. Training programs are also necessary to enhance WUAs capability. This has actually been conducted in Indonesia. However, it is necessary that the materials in training program are not only determined by irrigation agency itself but also should be adjusted with the need of farmers. Farmers can be consulted about what knowledge or skills they need.

The process of institutional development of WUA is a continuous process and is not an easy task. Furthermore, it is also necessary in institutional development that WUAs be involved in every stage of the process. This kind of participation will potentially enhance the capacity of WUA and their confidence. The example is the PIMT in the Philippines in which the institutional development of WUA is conducted through participation of WUA in planning, design and construction of physical activities. Farmers' participation in planning, design and construction of physical activities is expected to enhance the sense of ownership among them and will encourage them to sustain the irrigation system in the long term. Woltjer (2002, p.443) stated, "A *sense of ownership* of the plan or project can improve public support, and thus ease implementation". There is large room of opportunity for farmers' involvement in planning, design, and construction of physical facilities in Indonesia and this may be easily conducted since the experience in this matter has already long existed in agricultural community in Indonesia. In this regard, a strong government commitment to involve WUAs in every stage of the process is needed.

6.1.2 Clear Water Rights for WUAs

Clear and sustainable water right is a crucial element in irrigation management. If farmers obtain clear water rights, it is very likely that they will have confidence in the irrigation management and willingness to maintain the investment in the system for long-term. Secure water rights as shown in Mexico will enable farmers to schedule consistently so that it will potentially improve agriculture productivity. The transfer program in Mexico provides WUAs with clear water rights through giving a concession for 20-years period. It will also protect WUAs from breaking the law of the allocation and share of water to other powerful interest such as industries or municipalities. Indonesia can take lesson from Mexico to give clear and sustainable water rights to WUAs especially for large scale irrigation system. In this regard, Indonesia can adopt a policy transfer from Mexico. Adaptation or emulation might be suitable for this policy of water rights.

As discussed in chapter five, there has been a legal framework in Indonesia for water permits to provide water use rights, but this has not presently been applied in irrigation. Therefore, it will be easier for Indonesia to adopt this policy. In addition, government must have a strong commitment to apply this legal framework in irrigation sector. However, as discussed in chapter two, there may be some challenges in the implementation of this policy in Indonesia. WUAs will be likely to have unequal bargaining position in the use of water after the transfer of water rights, and lack of power in negotiating in upstream users. In this regard, the role of government is important to coordinate and protect various sector interests. Furthermore, the adoption of this policy should also be accompanied with the efforts to strengthening WUAs.

6.1.3 Ownership right to Infrastructure

Right to infrastructure potentially gives incentives to farmers to maintain the irrigation infrastructure. Coward (1986, p.227) in Oad (2001, p.281) argued, “property rights become the social basis for collective action by irrigators in performing various irrigation tasks”. From the previous discussion, it is obvious

that for large-scale irrigation system in Indonesia, government still has the ownership of irrigation assets. The IMT program in Indonesia for large irrigation system only transfer the responsibility of management and operation but does not include the transfer of ownership to infrastructure. The PIMT approach implemented in some areas in the Philippines provides an example for Indonesia about full transfer of ownership to water users. In addition, Mexico also transfers the ownership of the assets to WUAs by giving a 20-year concession. Indonesia can adopt this policy from Mexico and the Philippines. The policy transfer might be hybridization or synthesis from the Philippines and Mexico.

It will not be difficult for Indonesia to implement this policy when considering the condition of Indonesia in which many indigenous irrigation infrastructures owned by farmers have proved that farmers are capable enough to maintain the infrastructures. Although there is a possibility that the system will fail (farmers fail to manage and maintain the irrigation infrastructure), the ownership transfer is actually an important stage in empowering them. In this regard, the adoption of policy to transfer the ownership of infrastructure to farmers should be accompanied with providing clear mechanisms or procedures that should be taken by the government when farmers fail to manage and maintain the infrastructures.

6.1.4 Balance between responsibility and authority

The balance between responsibility and authority is necessary to promote the incentive from users for irrigation management task. Sometimes the transfer program is implemented by transferring more responsibilities than authority. Mexico transfer program for irrigation districts provides an example of transferring full authority and responsibility, while national irrigation systems (NIS) in the Philippines transfer more responsibility than authority except for some areas where PIMT is implemented. Meanwhile, in Indonesia, for large scale irrigation system, the IMT program also transfers more responsibility than authority. Table 9 shows the balance between authority and responsibilities in Mexico, the Philippines, and Indonesia.

Countries	Type of irrigation system	Balance between management responsibility and authority
Mexico	Irrigation Districts	Balanced. Full authority for management responsibility
Philippines	CIS	Balanced. Full authority for management responsibility
	NIS	More responsibility than authority
	SPISP (PIMT)[12]	Balanced. Full authority for management responsibility
Indonesia	Small-scale	Balanced. Full authority for management responsibility
	Large-scale	More responsibility than authority

Table 9. Balance between management responsibility and authority in Mexico, Philippines, and Indonesia

The experience in Mexico shows that the transfer program with balance between responsibility and authority will have better results. Transfer of responsibilities without adequate authority will create lack of ability and incentives for WUA in irrigation management task. Vermillion (1997b, p.2) stated, "without a balance between responsibility and authority for key management tasks, the local organization will lack the ability and incentive to discharge its new responsibilities".

Learning from Mexico irrigation districts and from SPISP in the Philippines, Indonesia may transfer adequate authority for large-scale irrigation systems in order to enhance the ability and incentives for WUAs in irrigation management tasks. In this regard, there might be a policy transfer from Mexico to Indonesia.

However, the adoption of policy to transfer more authority to farmers in Indonesia should be accompanied with enhancing capacity building of WUAs. This capacity building is intended to enable WUAs to implement the authority. For examples, the transfer of authority to make physical improvement of irrigation infrastructure needs strengthening WUAs' technical capability, and the transfer of authority to collect and manage irrigation fees needs strengthening WUAs' financial capability. Considering that many farmers in Indonesia have low level of education, the government has to pay more attention to this capacity building. The capacity

[12] Southern Philippines Irrigation Sector Project in 13 areas in Southern Philippines.

building or institutional development of WUAs should be conducted continuously and intensively.

Decision making authority on cropping patterns and timing of water delivery also need sufficient knowledge from farmers. However, it will be not so difficult for farmers in Indonesia to arrange cropping patterns and timing of water delivery since most farmers have been accustomed to it. The important thing is that the adoption of this policy should be accompanied by serious willingness from local governments not to impose their official cropping patterns as mentioned by Vermillion (2007, p.7) as one of the main problems during the implementation of the small scale irrigation turnover program (see chapter 4 page 58).

6.1.5 Independency of irrigation agency

The dependency of irrigation agency to the government financially or organizationally may influence the performance of irrigation system and its sustainability. CNA in Mexico and NIA in the Philippines are the examples of autonomous irrigation agency, while Indonesia has irrigation agency that is dependent on the government financially and organizationally. The logic behind autonomous agency is that when the agency does not depend on the government to fulfill their expenditures (e.g. staff salaries), but depends on the water users from irrigation service fee, it is very potential that the agency will work with high motivation in helping the WUAs to enhance their financial capacity through increasing productivity. Therefore, the agency also needs to develop financial, organizational, and technical capacity of WUAs.

However, policy transfer for the establishment of autonomous irrigation agency for Indonesia needs to be learned carefully. It may not be only a copying from Mexico or Philippines. For example, Indonesia needs a strategy of implementation so that the autonomous irrigation agency can be established without creating other social problems. The strategy of implementation required can be that the government provides a range of time for the agency to be prepared for autonomy.

In this given time, the agency should conduct seriously the empowerment of WUAs to prepare the conditions for autonomous irrigation agency, for example water fees from WUA should be adequate enough to cover agency's expenditures, including for staff salaries. In this regard, the training programs to empower WUAs are also necessary to enhance their capability. It is not an easy task. Preparing strong WUAs and autonomous irrigation agency should be conducted simultaneously.

The centralistic tradition of government in Indonesia may also become a challenge in the adoption of this policy. In this regard, there should be a strong government commitment to implement this policy since there might be some resistance from the agency side. The staff of the agency may be reluctant to make their agency become an autonomous irrigation agency since they may deal with uncertainty about their funding for operational activities and salaries.

6.1.6 Economic Incentives for Farmers

As discussed earlier, the sustainability of WUAs is crucial for the sustainability of irrigation system. Sustainable WUAs are very likely to be achieved when the members have an incentive to achieve their objectives.

The natural incentives for farmers to involve in WUAs is commonly to increase their income and for their livelihood. They expect that through this association, they could obtain more income. Therefore, it is necessary to make WUAs involved not only in water delivery or O&M tasks but also in economic activities. The case of Pinit communal irrigation system in the Philippines and irrigation districts in Mexico especially in northwest regions give valuable lesson for the inclusion of economic activities of WUAs. Indonesia might adopt the idea from these cases.

However, in order to adopt the idea from the Philippines and Mexico, there should be some adjustments in the policy of WUA in Indonesia. The current policy in Indonesia only focused WUAs on irrigation management task such as water

delivery. Presidential Decree of Indonesian Republic number 2 /1984 states, "WUA is an organization for social activities which applies collective action principles with the main objective of managing water use and irrigation facilities at tertiary level in large scale systems or the whole system in small scale system". This statement also means that WUA is not an organization for economic activities or business. In this regard, the idea for incorporation of economic activities to WUA has constraint from the current policy. Therefore, there should be adjustment in the current policy to adopt this idea.

In addition, the adoption of the policy to involve WUA in economic activities will also meet some challenges since farmers in Indonesia have not yet to be accustomed to deal with business activities. The condition of farmers in Indonesia is rather different from Mexico where farmers are accustomed to perform economic activities. This does not mean that this policy can not be implemented in Indonesia, but Indonesia needs more efforts in the implementation of this policy. Again, capacity building of WUAs is important.

6.2 Reflection of the theory and Concluding Remarks

After the discussion of the theory and the implementation of PIM and IMT, in this section the reflection of the existing theory into practice are discussed.

As discussed earlier in the theoretical framework, PIM and IMT may bring many benefits. These includes: water distribution efficiency, conflict resolution, improving the quality of operation and maintenance, improving financial performance, higher agricultural productivity, reducing cost to the government, etc. However, besides the positive impacts, it is important to consider some possible negative impacts of PIM and IMT since a deeper interpretation of the success of participation efforts requires insight in other possible effects as well (Woltjer 2005, p274). The negative impacts are among others: less assistance in case of disaster, no assured rehabilitation assistance, and there are even reported decreased agricultural productivity.

Empirical cases from Mexico and the Philippines show that the implementation of PIM and IMT provides good results such as the improvement in the quality of operation and maintenance (O&M), the improvement of agricultural productivity, and financial performance as well. This is in line with the aforementioned theory about the benefits of PIM and IMT. On the contrary, in Indonesia, the evidence shows that the impacts of PIM and IMT on irrigation management indicate no significant changes or outcomes, and lack of improvement of agricultural productivity. In addition, the IMT program in Indonesia did not lead to significant reduction in the cost of the irrigation sub-sector for the government. This does not mean that the theory about the benefits of PIM and IMT is wrong. However, there might be some elements missing or lacking in the adoption of the concept of PIM and IMT in Indonesia.

Taking lessons from the experiences of Mexico and the Philippines, I conclude that there are some important aspects to address in dealing with the sustainability of irrigation systems especially for Indonesia. Those important aspects are: (1) institutional development of WUAs, (2) clear water rights, (3) ownership right to infrastructure, (4) balance between responsibility and authority, (5) independency of irrigation agency, and (6) economic incentives for farmers. All those aspects have actually existed in the theory of PIM and IMT. Therefore, there is basically no lack of concept or theory. However, the adoption of PIM and IMT policy should be adjusted with the condition of the borrowing country. In addition, we also need to see each case of PIM and IMT implementation as a specific situation. The implementation strategy in one country must fit with its specific situation, for example, whether or not the creation of autonomous irrigation agency is possible to be implemented in one country, and whether or not the implementation strategy is easy to perform.

PIM and IMT are tools to achieve irrigation sustainability. However, PIM and IMT are not everything. There may be some other factors influencing the results of irrigated agriculture such as rainfall pattern, water availability, and economic condition of a country. Although the experience from Mexico and the Philippines

shows that the IMT can improve financial performance, quality of operation and maintenance, and agricultural productivity, we must be careful to make a general judgment that IMT will certainly improve system performance. It becomes a question whether or not without IMT the system will perform well, or whether IMT did really help the improvement. In this regard, I do not mean to say that IMT is not good and helpful, but I suggest that we should also see some other factors influencing the improvement of agricultural productivity or financial performance of irrigation systems when we make a study of the IMT results. Statistical methods should be used to assess the relative importance of different factors influencing the results of IMT. In addition, short terms assessment about the impacts of irrigation management transfer might be misleading because it might be that extra resources are given in that short period. Therefore, continuous learning about the implementation and the impacts of PIM and IMT is necessary.

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