

**TRANSITION OF IRRIGATION SYSTEM MANAGEMENT IN INDONESIA:
CHALLENGES AND OPPORTUNITIES FOR SUSTAINABILITY**

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Abstract.

This paper discusses transition of irrigation systems management in Indonesia in order to maintain sustainable benefits from its operation. Its specifically focus on reviewing the evolution of government policy on the role of the farmers in irrigation management, the emphasis of the management activities, and strategies to help developed farmers' organisation. Lessons from past experience, opportunities, and challenges for sustainability is identified.

The way irrigation has been and being managed in Indonesia is very much under influence of the perspectives developed at international level. The perspective which sees irrigation as purely technical process which then evolved to perspective which sees irrigation as socio-technical process has been the dominant perspectives in the past. This paper argues that the socio-technical perspective is necessary but not sufficient to help developed programs and strategies which supportive for the sustainability of irrigation. The experience in Indonesia tend to suggest that we need to move toward perspective which sees irrigation as a business process to support irrigators to generate higher productive value from available water. The combination between the development of farmers' water-based business and the need for reliable water supply would enhance the sustainability of irrigation.

The transition from policy and program which developed based on technical perspective, then to socio-technical perspective, and moving toward irrigation as business process required reforms on the policy and strategies. The reforms efforts in the past much more geared toward the farmers' side and less attention has been given to the reform of water related bureaucracies. This has resulted in ineffective implementation of irrigation policies and programs specifically those related to the strengthening and development of farmers' organisation for water management and facilitating farmers' water-based business. The supply driven logic of operation applied by the water related bureaucracies in implementing their programs not always in line with the application of participatory approach in developing farmers organisation.

Indonesia has started to develop a new policy on irrigation management which opening room for greater role of farmers' organisation and the development of farmers' water based business. This paper will discuss the challenges and opportunities for the sustainability of irrigation under the new policy.

1. Introduction.

Indonesia has started to initiate reform of its irrigation management policy since the adoption Irrigation Operation and Maintenance Policy (IOMP) in 1987. This reform efforts is a respond to the financial shortage, institutional, and the under-performance problems faced by the government in order to maintain the sustainability of irrigation. In 1999, the government, again, adopting new policy called Irrigation Management Policy Reform (IMPR) because the implementation of IOMP 1987 was not as expected and the financial crisis which started in 1997 has led the government to review its public service policy including for irrigation management. Both policies open a larger room for and demanded major role of the farmers through their water users associations (WUAs) in irrigation management. The adoption of both policies marked and reinstated the government commitment for transition of irrigation management from government agency dominated toward a new form of institutional arrangements which promote partnership between the government and the farmers. As the new form of institutional arrangements required strong and viable WUAs, the sustainability of these associations becoming an important agenda in the transition of irrigation management.

The experience in Indonesia as well as at international level in helping develop sustainable WUAs was not indicated satisfactory results. Irrigation management policy and institutional design developed based on the perspective which looking at irrigation as purely technical process was not put much attention on the participation of farmers (through their WUAs) in irrigation management. Even though the perspective has evolved toward looking at irrigation as socio-technical process which put emphasis on farmers participation in the planning, design and construction of systems improvement, however, the evidences indicated that WUAs development still not produced better results. Its means, failure in helping develop sustainable WUA would posed a constraints to the future sustainability of irrigation systems.

This paper attempted to assess Indonesian experience in the efforts to help develop WUAs. Then, it tries to draw lesson from past experience and look at the lessons from international perspective and experience. The first part of the paper discuss sustainability of irrigation systems from institutional perspective. The following five parts of the papers presented the description changing perspective in irrigation development, assessment of the government policy toward WUAs development, and analysis of the strategies adopted by the government. The 1999's IMPR policy presented in the following section followed by the discussion on the moving from irrigation as socio-technical process toward perspective which looking at irrigation as business process. The concluding part presented the opportunities and challenge for the sustainability of irrigation in Indonesia.

2. Institutions, Institutional Reforms and Sustainability of Irrigation Systems.

Bromley (1982) defined institutions as "collective conventions and rules that establish acceptable standards of individual and group behaviour" (p. 839). He further distinguished between the concept of institutions as norms and principles that define organisation, and organisations themselves which are the operationalization of the institutions. North (1990:4) defined institutions as "any form of constraint that human

beings devise to shape human interaction. ...They therefore, are the framework within which human interaction takes place." North, as with Bromley, also differentiates the concept of institutions and organisations. According to North, organisations provide a structure for human interaction based on the institutional framework. North (1990) further argues that the existence and evolution of organisations are fundamentally influenced by the institutional framework.

Abernethy (n.d) has tried to translate the concept of sustainability in the context of irrigation. He proposed that irrigation systems as functioning enterprise be the object to be sustain. He writes:

"...when we speak of 'sustainability', as a kind of shorthand or keyword in irrigation management context, we are implying the search for some set of policies and practices under which we will feel confident that the system should continue to exist and to function, ..." (Abernethy, n.d: 2).

Moreover, Abernethy argues that sustainability is not a physical property. Instead, he writes, "It is a concept that relates the physical artifacts of development to the socio-economic and biological environment in which they are placed" (Abernethy, n.d: 2). This relation is ordering by human institutions. It appears that the central message of the definition is that: what needs to be sustained is the continuation of the benefits stream from the functioning irrigation systems and, for this, institutions plays an important role.

The importance of institutions in sustainability of irrigation systems have been stressed, among others, by Svendsen (1987) and Carruthers (1992). Svendsen clearly points out the central role of institutions in the sustainability of irrigation systems. He writes that "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 Svendsen, Carruthers writes that: "...it is in the software of institutions that the success of the hardware--the physical engineering efforts--will lie" (Carruthers, 1992: 244).

The description and arguments presented above made clear that the institutions are directly related to people behaviours and actions. If certain behaviours or actions are expected from individuals or group, then the question is "how to get the institutions right" so that those behaviours are performed. The term "getting institutions right" implies that the environment within which the individual or group expected to perform certain behaviours are dynamics and changing. In this context the need for institutional reforms arise to enable "appropriate institutions" are putting in place (they could be completely new and/or modification of existing one) to guide individuals or groups behaviours and actions in a given (social, economic, physical, and political) environment.

The issue of "getting institutions right" is high in the irrigated agriculture agenda. It is because changes in the overall environment of development which characterized by adjustment (reduction) of government's role in provision of goods and services (in particular for rural areas), expansion of the role of market institutions, and the continuation of commitment for poverty alleviation (Uphoff, 1993). The main concern is that how to maintain the sustainability of irrigation in the changing development environments.

In a broader context, sustainable development basically consists of sustainability of economic growth, sustainability of natural resources and social institutional sustainability (Cernea, 1993; Rees, 1993; Munasinghe, 1993). The sustainability of economic growth and natural resources has been the predominant concern in the past. However, it is argued the neglect of social and institutional sustainability has continued to be one of the basic factors which has caused non-sustainability of benefit streams from development activities (Brinkerhoff and Goldsmith, 1992; Wilson, 1992; Cernea, 1993). The development of institutional arrangements which order human relations with regard of the use and conservation of natural resources is as important as the economic and ecological objectives in determining the successful development activities. In this context, it has been argued that the issue of institutional sustainability comes to the forefront and needs to be addressed along with the economic and ecological concerns of development (Brinkerhoff and Goldsmith, 1992; Wilson, 1992; Cernea, 1993). Brinkerhoff and Goldsmith (1992) define institutional sustainability as: "the ability of an organization to produce outputs of sufficient value so that it can acquire enough inputs to continue production at a steady or growing rate."

Wilson (1992) and Cernea, (1993) point out that it is both the weaknesses in institutional arrangements within which the organisation responsible for production and provision of goods and services operates and the insufficient attention to institutional sustainability which inhibits the continuation of benefits stream from development activities. There are two logical implications that follow from those arguments. First, changes in the environment of irrigation management will affect the sustainability which, in turn, implies the need to reform institutional arrangements and practices to maintain the sustainability of irrigation systems. Secondly, sustainable institutions are a key factor for the sustainability of irrigation system.

As discussed earlier, in the era of state disengagement, the burden of the provision of water services is being shifted to the users. As such, sustainable water users' association which could facilitate users participation are becoming the core elements in sustaining irrigation system.

3. Changing Perspectives of and Farmers' Participation in Irrigation Development in Indonesia.

Irrigation development in Indonesia is carried out in the framework of Five Year Development Plan (REPELITA) which was started in FY 1969/1970. The main objective of irrigation development is to expand irrigated area in order to increase rice production. Whilst the main objective remain similar from one to the next REPELITA, the emphasis and the strategy employed have gradually changed. In the period between REPELITA I to REPELITA IV (about 20 years) the emphasis was on the rehabilitation of existing irrigation systems (both large- and small-scale) and construction of new irrigation systems. The construction of irrigation facilities and expansion of irrigated area has created the operation and maintenance challenges from its different aspects.

At the end of REPELITA IV, the government started to lay down a new irrigation management policy which known as IOMP 1987 (Irrigation Operation and Maintenance Policy) which shifted the emphasis of irrigation development from construction to

operation and maintenance of irrigation systems¹. The core component of the IOMP 1987 are turnover of small-scale irrigation systems and the collection of irrigation service fee from the irrigation water users, and associated institutional reforms required to support those two. Overall, the IOMP 1987 consist of six components: (1) provision of O&M fund which the major activities were turnover of small-scale irrigation systems and redefinition of government-farmers relationship in the sense that irrigation water users should take more responsibility in irrigation O&M; (2) the source of fund to finance O&M; (3) the collection of irrigation service fee (ISF); (4) policy development; (5) restructuring O&M finance and program; and (6) rationalisation of finance program (Bappenas/DGWRD, 1988: 11-3 to 11-5). In REPELITA V, the new policy has implemented in nation-wide scale. The policy in REPELITA VI, has been developed further to include aspects of efficiency and productivity in the water sector and to increase water supply for domestic use, agricultural development, industry, tourism, and electrical power generation. The application of appropriate economic principles in water allocation and the improvement of the role of economic actors, including farmers, in line with the improvement of regulations related to water and land use rights were part of the planning agenda.

Change in the emphasis and strategy of irrigation management and development implied the changes in the perspective used as the basis in formulating the policy and designing institutions. During the period of about the last thirty years, irrigation management and development in Indonesia has at least encompassing two perspectives: the technical perspective, which then evolved to be socio-technical perspective. The application of these perspectives in formulating policy and designing institutions could not be separated from international mainstream thinking on irrigation development and management in respective period.

The technical perspective. When the global effort to increase irrigated land in Asian countries started to support the green revolution in 1960s, it was realized that technical capacity to implement irrigation project was not adequate. Technical aspects of implementing irrigation projects became a major impediment in expanding irrigated land. Therefore, the main concern of institutional reforms was to strengthen the technical capacity of irrigation agencies to carry out project implementation. Irrigation development perceived as merely a technical process. Little or no concern about farmers' participation in irrigation development and management. The development of WUAs was also not gained much attention². The development programs developed based on this perspective have limited effectiveness in achieving designated objectives. The problems encountered ranging from problems associated with the suitability of irrigation structures

¹ The rank of priorities for irrigation development previously were: (1) rehabilitation and improvement; (2) construction of new irrigation systems, and (3) operation and maintenance of irrigation systems. Under the IOMP, operation and maintenance is ranked as first priority (DGWRD, 1992: 14).

² WUAs development in this period has the following characteristics: (1) Construction and WUAs development treated as separate tasks carried out by different agencies; (2) It was assumed that minimal coordination required between the government agencies in carrying out both construction and WUA development tasks (Bagadion and Korten, 1980: 278); and (3) WUAs development were done after the completion of physical improvement of the systems (Coward and Uphoff, 1985: 12).

with local institutions and their functionality, to under-performance of irrigation systems, and inappropriate governance³.

The socio-technical perspective. Many of the problems encountered in the technical-oriented programs could be ameliorated by involving the farmers in the planning, design, and construction of irrigation facilities. This reasoning has led to the changes in the perspective toward recognising the important role of the farmers and local institutions at appropriate level in irrigation development intervention. The basic proposition of this perspective is that for irrigation system to operate effectively in order to support irrigated agriculture, it is necessary to have compatibility between the physical infrastructures and the institutions to operate and maintain them, and this can be achieved through farmers participation⁴. As it is impractical for the farmers to participate individually, organizing the farmers into WUAs as a means to involve them in the planning, design, and construction process is a major theme in this perspective. This principle has been the core concept in the implementation of participatory (engineering bias) irrigation development projects in Indonesia (i.e. HPSIS, Turnover of Small-scale Irrigation Systems, Irrigation Service Fee/ISF, and others the so-called participatory irrigation development projects).

4. Government of Indonesia's Policy on WUAs Development.

4.1. The Government's Interest in Organizing Farmers into WUAs.

Organizing farmers into WUAs in Indonesia has started along with the expansion of area under irrigation and the need to improve operation and maintenance of irrigation systems. The government has putting efforts to help develop strong and viable farmers' organizations for irrigation management. The policy towards farmers's involvement in irrigation development has evolved since the government started heavy investment in irrigation development in FY 1969/1970. The evolution of the policy can be divided into two periods which are differentiated from one another by the government's attitude towards formal WUAs.

First, is the period between 1969 - 1978, when there was no systematic effort to organize farmers into formal WUAs⁵. The government concentrated on the rehabilitation of main systems and assumed that the farmers would develop and maintain the tertiary facilities themselves. The village government was in charge of mobilizing the farmers to carry out the tasks⁶. The consequent results of this strategy did not satisfy the

³ See among others Rao (1984); Coward and Uphoff (1985); Coward and Martin (1986); and Coward, Johnson and Walter (1988).

⁴ See among others: Lynch, 1985; Uphoff, Meizen-Dick and St. Julien, 1985; Uphoff, 1986; Coward, Johnson and Walter, 1988; and Uphoff, Ramamurthy, and Steiner, 1991).

⁵ However, it is important to note that in this period the government enacted the Water Resource Development Law (Law No. 11/1974) which provides general guidelines on the divisions of responsibility between the government and water users in water resource development.

⁶ Presidential Instruction No. 1/1969 clearly stated this division of responsibility: "The operation and maintenance of tertiary facilities is the responsibility of village governments" (article 5 of the 1st instruction).

government. The pace of irrigation facilities development in the tertiary area of large systems and in the small-scale systems was not as quick as expected by the government (DGWRD, 1978: 1). Two reasons were mentioned in this regard: the financial and the technical capacity of the farmers.

The solution to this problem was for the government to change the strategy by taking full responsibility for developing irrigation facilities from the main system down to the tertiary facilities of both large and small-scale systems. This strategy was applied during the period of 1975 to 1978. This direct approach later appeared to create problems related to the suitability of the physical infrastructure developed by the government to local conditions (water rights, location of the structures, type and design of the structures, etc.)⁷. This, in turn, affected the performance of the systems.

Second, based on the experiences mentioned above, since 1978 the government has changed the strategy of farmers' involvement by attempting to organize the farmers into formal WUAs and involve them in the development activities.

Since then various legal measures concerning WUAs have been enacted. In 1982, two government regulations were released. One is about water allocation and distribution (regulation No. 22/82) and the other is about irrigation (regulation No.23/82). Both regulations have made clear the division of responsibility in irrigation development and management between the government agency and the farmers. The regulation on irrigation provides guidelines on setting up and strengthening formal WUAs. In 1984, a presidential instruction was also enacted which specifically provided detailed guidelines on WUAs development in Indonesia. Moreover, in 1992 the government released a Ministerial ordinance which among others provided an explicit recognition of WUAs as legal entities.

We can identify the interest of the government in developing and strengthening the WUAs from the laws and regulations enacted and the development programmes launched. At least four types of government interests can be recognised along the course of evolution of the policies related to the farmers involvement in irrigation development activities initiated by the government.

First, is in organising farmers to develop irrigation facilities at tertiary level to improve the effectiveness and efficiency of irrigation, especially to support the rice intensification programme. In the period between 1969 - 1978, there was no systematic effort to organise the farmers. The village government was in charge of mobilising farmers for this purpose. There were no clear guidelines on how the farmers should be organised or whether they had to form formal WUAs. This task was left to the village heads.

The second type is in organising farmers to share the operation and maintenance (O&M) burden of the systems managed by the government. Since the release of the Government Regulation on Irrigation in 1982, the division of responsibility in irrigation

⁷ Robinson (1985: G.I-3) listed several shortcomings in the small-scale irrigation systems assisted through *Sederhana* Project.

development and management has been made clear. In terms of construction of the main system the farmers may be asked to contribute to the cost. While the operation and maintenance of tertiary facilities is solely the responsibility of the farmers through their WUAs.

Third, is in organising farmers and involving them in the improvement of the system initiated by the government to improve the effectiveness of project implementation (e.g. improving the suitability of the facilities developed to local conditions). Farmers participation in project planning, design, construction and implementation is expected to develop a sense of ownership among the farmers which will motivate them to maintain the system in the long term.

Fourth, is in organising the farmers as revenue collecting agent to help in collecting the irrigation service fee (ISF).

The third and the fourth interests were directly connected with the implementation of IOMP 1987.

These interests are equivalent to the interests of the government either to support national programs, to reduce government O&M expenditure, to improve effectiveness of project implementation, or to collect ISF in an effective and efficient manner. This preoccupation might not always coincide with the interest of the farmers who are much more concerned about achieving higher levels of incomes from irrigated agriculture activities. This implies that irrigation activities can not realistically be separated from other activities related to the irrigated agriculture enterprise (e.g., development water-based economic activities, provision of inputs, marketing of products, and other types of services needed to support irrigated agriculture enterprises) in order to generate higher productive value from available water.

In this regard, the nature of the associations promoted by the government is becoming an important issue. In other words, what is this association for, or what sorts of rights and responsibilities does the association have are important questions which need to be answered. This issue will be discussed in the next section.

4.2. The Nature of the Water Users' Association.

The Government Regulations on Irrigation made clear the aspects of the associations' capacity which need to be developed and strengthened by the government. These cover three areas: organisational, technical and financial capacity⁸. The mandate to strengthen the financial capacity of the association implies that the association should also be concerned about income generating activities both for the members as well as for the association itself. However, there is an ambiguity in the nature of the association as

⁸ The direction of WUA development as it is provided by Government Regulation No. 23/1982 (Chapter IV, article 20) stated that: "By considering the stage of development of any particular irrigation system, the local government can make the decision to develop and/or strengthen water user associations which **organizationally, technically and financially** have the capacity to accept the tasks and responsibility to develop, rehabilitate, operate and maintain irrigation facilities and complementary structures at the tertiary level, quaternary level, village irrigation systems and Subak" (emphasis added).

to whether WUAs are the vehicle for the farmers to run their irrigated agriculture enterprises as a whole or just dealing with the tasks related to producing and supplying water.

The guiding principles of setting up and strengthening the association (as provided through the presidential decree in 1984) are not consistent with the direction of WUAs strengthening efforts especially with regard to financial capacity. The design of the association is not directed towards developing the association as a vehicle for the members to represent their economic interests. Rather, it is directed towards dealing with the matters related to producing and supplying water, and does not include other activities related to their irrigated agriculture enterprises.

The nature of the association was much more directed toward producing and supplying water, as it is clearly stated in the articles 4 and 6 of the presidential decree No. 2/1984. In short, the article contains the following principles:

(a) WUA is an organisation for social activities (not for business and not for politics) which applies collective action principles with the primary objective of managing water use and irrigation facilities at tertiary level in large scale systems or throughout small-scale systems.

(b) The tasks of the association are only associated with mobilising members' resources be it labour, in kind or cash for maintenance of the irrigation facilities and provision of water to be used by the members.

(c) The association should also provide guidance and monitor the activities of the members in order to comply both with government regulations related to water use and with the association's regulations themselves.

5. Strategies of WUA Development.

In practice, there are two strategies adopted in the efforts to help develop and strengthen the formal WUAs: participatory and training. An overview of the strategies is first presented and this is then followed by a discussion of their effectiveness.

5.1 Participatory Approach.

Application of the approach. The application of the participatory approach in small-scale irrigation development started in 1982 with the High Performance *Sederhana* Irrigation System (HPSIS) Project. This project was the continuation of the *Sederhana* Project started in 1974 which focused on improving small scale irrigation systems to support a rice intensification programme. However, the approach applied in this project was different from the *Sederhana* Project with respect to farmer participation. In the HPSIS, the promotion of farmer participation was based on the lessons learned from the implementation of the *Sederhana* Project. The evaluation of the *Sederhana* Project showed that it was less successful than expected in two aspects: (1) it suffered from technical problems, and (2) the farmers did not perform O&M adequately. The major factor identified as the cause of the problems was that the farmers did not participate in the design and construction related decisions of their system improvement through

government intervention (Robinson, 1984). Therefore, the intention to have farmers' participation in the HPSIS Project, is basically to improve design and construction of system rehabilitation. Participation of the farmers in the design and construction is seen as the key factor for farmers participation in O&M.

Learning from the previous experience, an alternative approach based on the socio-technical perspective was developed. It was then translated into project implementation by assigning community organisers (COs) to help organise the farmers into WUAs and to facilitate the communication between the farmers and government agency officials during the design and construction activities, and then to help the WUA to prepare an O&M plan. The types of activities carried out during the design and construction stages were: (1) the CO and the farmers' leaders collecting information on the socio-technical aspect of the system, checking the conditions of the physical facilities and preparing farmers' proposals for improvement, (2) the technician preparing a technical design, which was then (3) discussed with the farmers, and (4) the construction of the facilities where some of the farmers were involved as wage labour, in selling materials to contractors, or acting as sub-contractors. Along with these processes the COs helped in establishing the WUA (LP3ES, 1989).

The HPSIS project also made clear that the effort to help organise and strengthen WUAs only took place during the design and construction activities. Robinson (1984: 7) writes that "after the systems are completed, farmers are expected to know that it is up to them to take care of the tertiary facilities, use the available water in the best and most agreeable way, and to resolve their conflicts with the minimum of outside assistance."

Similar principles and strategy have been duplicated in different projects e.g. Madiun Irrigation System Tertiary Development Project (LP3ES, 1989), South Sumatran Provincial Government assistance to farmer-managed irrigation system (LP3ES, 1989) and in the turnover of small-scale irrigation systems.

In the case of turned over small-scale irrigation systems the provision of support services for the WUAs follows the guide lines in the Presidential Instruction (*INPRES*) 2/1984 on the Promotion and Development of WUAs. According to this instruction the DGWRD will just provide technical guidance of O&M of the system and provide assistance for the physical improvement if the repair to any damage of the structure is outside farmers' capacity. Other support services will be provided by DOA and DHA on respective matters as mandated by the above mentioned *INPRES*. The implementation of the provision of support services is done through the so-called Irrigation Committee (Panitia Irigasi).

The Irrigation Committee. The intersectoral nature of water management and conservation--especially with regard to the government objective of increasing rice production--requires coordinated actions among related government agencies. In order to facilitate this coordination the government decided to set up an Irrigation Committee, both at the provincial and district level. The following paragraphs provide and illustration of the Irrigation Committee in West Sumatra Province.

In West Sumatra the provincial government started to set up an Irrigation Committee in 1978 at the Provincial level. The committee was established to step up the effort to increase rice production, and more specifically to deal with irrigation matters. The structure of the organization of this committee consists of Chairman, Vice Chairman, Secretaries, and Members. Overall the committee composed twelve persons from technical agencies and directorates under the Governor's office.

The committee had three main tasks: (1) coordinating all activities related to the planning, development, O&M and evaluation in the irrigation and water resource sector; (2) helping to solve the irrigation and water resource related problems; and (3) providing operational guidelines for improvement of irrigation and water resource development. Included in the tasks is the role to help develop and strengthen WUAs. The Provincial Government also ordered the District Government to establish a committee to deal with the tasks in their respective area.

As the policy on O&M of irrigation system changed, adjustment were also made with regard to the role of the Irrigation Committee. In 1988, a Governor Decision on the provincial level irrigation committee was released which restated the main tasks of the committee. Basically, the essence of the tasks are similar with those in the 1979 Governor Decision, however, it is presented in more detail⁹.

Subsequently in 1989, the Provincial level Irrigation Committee produced and released guidelines on the operation of the district and subdistrict level irrigation committees¹⁰. There are two interesting points with regard to the organizational structure. First, even though the committee consisted of twelve or more technical agencies and offices, only three government agencies appeared in the organizational structure: Provincial Government, the Provincial Agricultural Service, and the Provincial Water Resources Service and their staff down to field level. The point is that, as the irrigation committee is a coordinating body the more the number of the agencies and offices involved, the higher the possibility of duplication of tasks and difficulties in clarifying and coordinating the activities. Second, the organizational structure clearly shows that the WUAs are under the line of command of the three government agencies, confirming that the government perceived the WUAs as the part of their bureaucratic chain for programme implementation.

A further attempt has been made to implement the guidelines implemented as a response to the implementation of the new policy on O&M. A Governor Instruction No. 17/1992 was released. In this instruction details of the tasks of the committee in district and subdistrict level are provided. The tasks of the committee have more emphasized on helping set up and develop WUAs as the implementation of the other tasks depend upon

⁹ There are a list of nine tasks of the committee which cover provision of guidance, monitoring and evaluation of irrigation water and/or irrigation structures related matters; the matters related to implementation of the tasks by district level irrigation committee; formation of WUA. For a complete list of the tasks see, *Upaya Mengaktifkan Panitia Irigasi Tingkat II dan Tim Pelaksana Teknis Pengairan di Sumatera Barat*, DPU Sumatera Barat.

¹⁰ This guide line contain a complete description of tasks of district and subdistrict irrigation committee's and procedure for their implementation. For a complete list see, *Panitia Irigasi Tingkat I, 1989, Petunjuk Tata Kerja Panitia Irigasi Tingkat II di Sumatera Barat*.

the existence of these associations. However, this attempt only ends up producing eleven reporting forms which need to be filled up by WUA, subdistrict and district level irrigation committees. There is no clear direction and strategy for the efforts to strengthen the WUA.

The Performance of Irrigation Committee. With regard to the performance of the committee, however, the internal evaluation revealed that the committees both at the provincial and district level were not functioning as expected. The committee did not perform any activities as mandated. A number of problems faced by the committee to perform their function were identified (DPU, 1991): (1) unclear role and tasks for each government agency involved; (2) the head of each government agencies involved is busy with implementing their own agency programmes, therefore, their role and involvement in the committee has a lower priority; (3) the perception among the agencies that there is no need for co-ordination in irrigation; (4) there is no office or staff which directly handles the administrative activities of the committee; (5) the perception is that the tasks of helping to develop and strengthen WUAs are the responsibility of the Department of Public Works¹¹, therefore, there is no importance for other agencies to become involved in this matter.

Above all it appeared that there are unclear ideas about what tasks exactly this committee has to deal with, because each government agency concerned has been handled part of the committee tasks. This left the committee without any clear work programme or planned activities to achieve the tasks.

5.2 The Training.

The government started to adopt and implement a training strategy in 1984 with financial support from the World Bank. This strategy first focused on the large government managed systems, however, after the adoption of new policy on O&M (IOMP) in 1987, small-scale irrigation systems were also targeted (DGWRD, 1993). After about fifteen years focusing its activities on rehabilitation and construction of new large irrigation systems the government realised that without proper management at tertiary level the full benefits of irrigation development would not be achieved. Lack of understanding at the local level among parties concerned with irrigation management in both government agencies and amongst the farmers were seen as major impediment for optimising irrigation benefits. Therefore, training of water users has been seen as a solution to this problem.

The objective of the water users training project (WUTP) is to achieve a unified understanding of operation and maintenance of on-farm water distribution systems among local personnel of Provincial Water Resource Service, Provincial Agricultural Service and Local Government and among the water users association and key farmers (DGWRD, 1985). There are three target groups for the training. The target Group A consists of government agency officials at provincial and district level. Target Group B consists of field level staff of the above mentioned government agencies. Target Group C consists of WUA officials, progressive farmers and local leaders.

¹¹ Under the new government the status of DPW has change to become state ministry without portfolio.

At the end of the training the participants of target groups A and B are expected to co-ordinate their activities in providing guidance and in helping to activate WUAs. The Presidential Instruction No.2/1984 provides guidelines for them to perform the activities (DGWRD, 1987).

6. Effectiveness of the Strategies in Helping to Develop Sustainable WUAs.

6.1 The Participatory Approach.

The main proposition of this approach is that: If the farmers are actively involved in the planning and construction of their system, then their sense of responsibility to perform O&M tasks will be developed and their organisation will be sufficiently strengthened to be able to maintain the sustainability of irrigation in the long term (Lubis and Harahap, 1991). This proposition has two basic implications: (1) farmer participation is defined narrowly to only cover planning and construction aspects of irrigation, and (2) the efforts to organise the farmers only took place during the planning and construction period.

Following this proposition, irrigators social organisers (ISOs) are assigned the main tasks of helping to organise the farmers during this period and to bridge the communication gap between government agency and the farmers to improve the effectiveness of project implementation. Therefore, what appeared to be a participatory approach was much more concerned with and touching the aspect of improving the agency performance, specifically in physical improvement of the system, rather than that of the concern of farmers for creating productive value from irrigation management activities. Because the farmers earned wages through their involvement in the construction, it is not surprising if there is high farmer participation at this stage. Moreover, the farmers expected that the improvement of the physical facilities of the system would lessen their maintenance burden. However, Robinson (1985) reported that farmers' participation during the design and construction period has no correlation with their participation in the maintenance¹². Thus, it appears that the incentive for participation is different for different stages of irrigation development and management.

Evaluation studies have shown that this approach has little impact in helping develop sustainable WUAs in the long term. Aziz (1991) evaluated the HPSIS project and found that the WUAs set up in this project did not continue beyond project implementation. He 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 (p.xii)".

¹² The report of evaluation of farmer participation in irrigation at the HPSIS site (Robinson, 1985) concluded that: "Farmers who participate in the design of their irrigation systems also tend to participate in its construction, **but not in its maintenance**. They also tend to be more active in the formal activities of their WUA. Participation in maintenance, something that irrigation agencies are usually quite interested in, **does not correlate with any of the other kinds of participation**" (p.G.III-19). Cernea and Meizen-Dick (1992) recognized the difficulties in explaining the phenomenon of inactive WUAs after the completion of construction activities.

Moreover, he 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" (p.57).

Hutapea (1993) also observed a similar tendency in the participatory tertiary development projects in the large scale Madiun irrigation system in Java. He 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.

6.2 The Training Approach.

The basic proposition underlying the implementation of this approach is that: if there is a clear and consistent understanding among the various local government officials and the farmers on the legal regulatory frameworks for operation and maintenance of irrigation, then, they will co-operate in the effort to develop and strengthen WUAs. Following this proposition the action taken is to train local level officials of government agencies concerned and WUAs' officials.

The proposition of this strategy implies that the focus of the training is creating an understanding mainly among the government officials responsible for WUAs development. The training is focused on communicating the existing policy framework and producing local level regulations related to water resource and irrigation management, and then making efforts to help develop and strengthen WUAs based on these regulations. It is again concerned with and touching aspects of what the government agencies official perceived as the constraints of inactive WUAs. However, in similar way to the participatory (engineering bias) approach, it does not address the farmers' concerns and interests. There are no systematic follow up actions simply because the WUAs do not expect to do other things beyond performing the tasks related to producing and supplying water.

The evaluation of this programme also revealed that training has a limited impact both on the behaviour of attending officials toward developing and strengthening WUAs, and on WUAs leaders who attend the training (Early, 1993). With regard to WUAs performance, and the role of agencies concerned he found that : (1) each of the three agencies has their own role and are in some ways in competition with each other; (2) multiple services result from the multiple projects often with confusing and agency based competitive project objectives that are not fully understood by the farmers; and (3) most *P3As* (WUAs) and *GP3As* (local term for WUA federation) are currently: i) sleeping; ii) comatose; or iii) dead.

As the sustainability of WUAs are the core element for the sustainability of irrigation in the transition period, the next section provide analysis why WUAs help developed through the participatory approach based on socio-technical perspective could not sustain beyond project period.

7. Analysis of the Strategies and Government Supports to WUAs.

This analysis cover the period prior to the adoption of 1999's Irrigation Management Policy Reform (IMPR). The available evidence shows that, the participatory approach and training strategies did not help much in the effort to help develop sustainable WUAs. This is not because the two strategies are not important but rather because of a lack of clear vision on the direction of the strengthening efforts. The important question in this regard is: what are these two strategies for? It is the lack of a clear vision on the nature and type of WUAs and how they would develop and strengthen that caused the participatory and training programmes to have less impact on developing and strengthening the formal WUAs than was expected.

The inactivity of the formal WUAs has led to the argument that what the farmers' need is just enough organisation to perform O&M activities (Bruns, 1992). But it is assumed that the farmers only concentrate on planting rice. In a number of cases improvement of irrigation facilities especially those of weir/dam development and canal lining/retaining wall construction in the small-scale system or at the tertiary level of larger systems seems to reduce the management intensity of the system to the level which does not require complicated organisational arrangement for resource mobilisation.

If the farmers just concentrate on planting rice then the level of resource mobilisation required to provide water for the rice is much less compared to the situation before the main structures (dam/canal lining etc.) were built. This, in turn, makes the existence of formal and sophisticated WUAs organisation less relevant¹³. The extensive improvements of irrigation physical facilities and changes in the broader environment of system operation has shifted the irrigation development question from the first, that is, how to produce and supply water for the crops (what physical facilities need to be built); towards the second generation question, that is, how to enable the farmers to respond to the business opportunities they have, given the environment where the system operates, in order to increase their benefits from irrigation.

¹³ The tendency for WUAs to be inactive after the completion of the project even though the project was applying a participatory approach was also experienced in Pakistan. See Byrnes (1992), *Water Users Associations in World Bank-Assisted Projects in Pakistan*, Washington: World Bank.

The second generation question particularly relevant in the context on the change in government policy in O&M which transferred the management responsibility to the farmers through WUAs. In this situation as argued by a number of authors among others Wijayaratna, 1992; Meizen-Dick et al, 1994; and Navalawala, 1994 there is a need to incorporate economic forces in order to develop sustainable WUAs. This require more than just participatory (engineering bias) approach in WUA development.

The participatory (engineering bias) approach has successfully helped in improving design and construction of the system but seems less successful in sustaining WUA in the long term. It raised the question: what were the missing elements which resulted in the WUAs not being sustained after project completion? This question is directly related to the farmers' priorities and concerns related to their involvement in system management. It is clear that the main concern of the farmers is the gains from this involvement of which income is the most tangible one¹⁴. This is not to say that organising farmers into WUAs and involving them in planning/design and construction in order to strengthen their organisation for O&M is not important. In fact, the capacity to produce and supply water to the service area of the system is a necessary condition to open an opportunity for the farmers to gain more financially from irrigated agriculture activities.

Given that the farmers from different systems have different business opportunities, the focus to organise the farmers to produce and supply water *per se* is not sufficient to increase farmers income. Farmers capacity through their organisation should also be supported to respond to the relative business opportunities that each system has. In this regard, the participatory approach needs to be directed towards enhancing the farmers' capacity through their association to respond to business opportunities¹⁵.

However, the existing government agencies' practices in providing supports to the farmers are not in favour of the above insights. In this context, there is one interesting point from the evaluation done by Early (1993), which is termed the 'sectoral egoism' factor. This factor, in addition to the nature and strategies of WUAs development made the environment more difficult for the WUAs to be sustainable.

There are three government agencies concerned with the development of WUAs. The department of Public Works (DPW) provides guidance on technical matters related to planning, construction, operation and maintenance, while the Department of Agriculture (DOA) provides guidance on agricultural techniques, specifically rice, related to the on-farm water management. The activities of these two agencies are co-ordinated by the local government under the supervision of Department of Home Affairs (DHA).

¹⁴ One of the example which indicates farmers concern about income is the case of Mohini Water Distribution Co-operative in Gujarat, India. Even though the government prescribed them to put 82 percent of their irrigated land under food grains, instead they plant sugarcane for almost the same proportion (85 percent). By doing so they make profits under present prices (Patil, 1987: 9-11).

¹⁵ The benefit of WUAs which expanded their activities beyond O&M of the system clearly help the WUAs in financing their activities (Patil, 1987; Shah and Shah, 1994; Svendsen and Changming, 1990; and Bagadion, 1994).

Even though there are three government agencies theoretically concerned with WUAs the common perception among the agencies and the farmers is that the WUAs are regarded as belonging to DPW. This is because the other two agencies have their own local organisation set up for the purpose of their programme implementation.

The DOA has farmers' groups (FGs) while the DHA has Village Community Strengthening Bodies which concern more on village general affairs. Particularly with regard to FGs, this group handles on-farm water management. This further divides, informally, the responsibility in water management. On-farm water management is perceived as the responsibility of the DOA through FGs which has made the DOA more concerned about FGs than WUAs. FGs are also the target group for the DOA to deliver extension services. This further confirms that WUAs are only directed to deal with water and specifically at tertiary level.

Another government agency, the Department of Co-operatives (DOC), deals with the provision of inputs and the marketing of agricultural products (though farmers can also acquire inputs and sell products in the market directly). At the field level the DOC also has its own local organisation called the village co-operative unit (*KUD*). This, further, leaves WUAs to be only concerned with producing and supplying water.

There are two possible way to resolve the 'sectoral egoism' problem and create a suitable environment for sustainable local organisation for irrigation management.

First, develop WUAs as the farmers organisation with ultimate authority to deal with irrigation management, water use, and irrigated agriculture related matters. Given the nature of each local organisation it is the WUA which is legally recognised as having authority for the entire system. The existence of WUA technically is not associated with any government agency so that there will be no inter-agency conflict in provision of support services.

Moreover, it will put each irrigation system under a management unit so that it can be effective both in water management (e.g. resolving conflict) and co-ordinate diversification of water use to support different type of irrigated agriculture enterprise.

Farmers' Group (FG) beside its informal status, cover only part of the system (quarternary unit). However, FG's activities are very close to WUA's activities which make integration of them become more realistic.

Second, develop a demand-driven support services provision in the sense that support services to WUAs are provided in such a way that there is a dialogue between the farmers-cum-WUA and the related government agencies. This means that the government agencies could not decide on their own what type of services they are going to provide for the farmers and how they are going to do that. For this purpose there is a possibility to transform the role of Irrigation Committee (*Panitia Irigasi*) to that of facilitator of the dialogue. In doing so, farmers representative need to become members of the committee and it needs to be empowered so that the agreement reached in the dialogue would influence the way government agencies interact with the farmers-cum-WUA in supporting their irrigated agriculture enterprises. In addition, relevant private

sector organisations can also be invited and involved in the dialogue in order to facilitate an appropriate link with the WUAs.

The policy change which demanded a greater role of the farmers implies the need for the change in institutional arrangements and to find out an appropriate strategy to help develop sustainable WUAs. The framework for WUAs development has to provide a built-in incentive structure, especially financial incentives, for the WUAs to take the O&M responsibility.

The discussion in the preceding sections on the irrigation development policy and WUAs development in Indonesia indicated that the effort in the past where the policies and programs developed mainly based on socio-technical perspective were not produce results as expected. A series of lessons can be draw out from the past experiences: (1) the implementation of participatory program was bias toward engineering side; (2) the efforts to develop and strengthen WUAs more geared toward these association to perform tasks limited to water provision and little attention has been given to support the farmes and the WUAs to generate productive value from water available for them; and (3) necessary bureaucratic reform were not carried out. These conditions

8. The 1999's Irrigation Management Policy Reforms (IMPR) and Changes of Development Environment in Indonesia.

At least there were two factors which led the government to adopt 1999 IMPR: the implementation of IOMP 1987 which was not as expected; and the changes in the overall development environments including the monetary crisis started in 1997 and the decentralization and autonomy policy.

The IOMP 1987 actually has started to lay down the foundation for transition of irrigation management. However, the implementation was not as expected. The following are some observations on the implementation of IOMP 1987.

First, IOMP 1987 indicated the need for adjustment and improvement of the roles of both irrigation bureaucracy (both at national level and provincial level) and farmers' local institutions (WUAs). Efforts have been made to strengthen WUAs, however, substantial adjustment on the bureaucracy was not carried out. Therefore, the dominant role of irrigation bureaucracy continue and farmers participation tended to be seen from the interest of reducing government burden and improve the irrigation structures construction without sufficient effort to empower the farmers and improving the accountability of public agency.

Second, the implementation of IOMP 1987 still put emphasis on construction to rehabilitate and improve irrigation facilities both in the small-scale irrigation systems and large irrigation systems under ISF project. Little attention has been given to the development of institutional arrangement which ordering the relationship between the government agencies and the farmers in the post turnover period.

Third, in the IOMP 1987, irrigation not yet understood in the context of river basin management so that the issues of water rights for the farmers not yet addressed. In the context of increasing competition of water use among various users, security of water rights for the irrigation water users is in question.

Fourth, IOMP 1987 still oriented toward supporting rice production. Little attention has been given to support the farmers' interest to increase their income and gain more from the water available to them. The efforts to strengthen WUAs more directed toward the management of water distribution and irrigation systems maintenance. Irrigation management tended to be treated as separate task from other agricultural activities.

Fifth, the implementation of the turnover of small-scale irrigation system, which was one of the main component of IOMP 1987, was done gradually in the period of fifteen years. When the financial support was not available anymore the future of irrigation management reforms became uncertain.

The monetary crisis which started in the middle of 1997, has put more pressure on the government to reforms public services including irrigation management. Whilst the decentralization and autonomy policy provide "room for institutional reforms".

Specifically the 1999's IMPR contained five components as follow:

First, redefinition of roles, tasks, and responsibilities of water management organizations by giving larger role to the farmers water users as decision maker in managing irrigation systems which they are responsible for.

Second, empowerment of farmers water users through the development of autonomous, self reliance WUAs, and provision of support services to the farmers to set up economy and business units, with legal status, at the irrigation systems (farms) level.

Third, gradual and selective handing over irrigation management responsibility to WUAs through a democratic processes with the guiding principle: one irrigation system, one management. For irrigation systems which not yet handed over will be jointly managed between the government and WUAs until the management completely handed over to the WUAs.

Fourth, WUAs are given the authority to collect irrigation service fee (ISF) and manage its uses for operation and maintenance, rehabilitation, and construction of new irrigation facilities.

Fifth, the development of general policy on water conservation, irrigated land conversion in order to maintain the sustainability of water supply and irrigation systems.

The components of the 1999's IMPR open a way to develop irrigation management policy and program beyond those develop based on socio-technical perspective.

9. Beyond Irrigation as a Socio-technical Process: Moving Towards Irrigation as Business Process.

9.1 The Need to go Beyond Water-focused Management.

The argument that the WUAs need to expand its economic activity has become very important in light of the changing environment of irrigation development in Asia,

which is characterized by government's financial shortage and the expectation that the farmers would take some of the financial burden over. In addition, the increase in the degree of agricultural systems' market orientation (Sampath, 1992) has also open opportunities for the expansion of farmer-cum-WUA economic activities. However, Meizen-Dick (1994) argue that this matter has been neglected in previous strategy.

It is clear that any effort to solve irrigation problems which only focuses on reforming institutional arrangements for ordering farmer-government relationships is necessary but not sufficient. The main weakness of this type of reform is that it is focused on institutional arrangements related to producing and supplying water. More specifically it focused on reducing government financial burden by developing institutional arrangements to allow mobilization of resources from the farmers. As such, it neglects the important aspect of reforming the institutional arrangements which are related to farmers-cum-WUA financial viability.

Easter (1986) and Keller (1990) have also argued that institutional arrangements which focus on producing and supplying water are necessary but not sufficient. In supporting their argument, they divided the management of irrigation system into several parts¹⁶. However, based on the nature and focus of the management activities, it falls into two basic management domains: the water supply system domain and the agricultural domain.

The water supply system management domain consists of the management of irrigation structures at two levels. First, is the management of water acquisition (dam, reservoir, weir); conveyance (main and secondary canals); distribution (regulating structures along the main and secondary canals) at the main system level and drainage structures. Second, the tertiary delivery and distribution facilities (on-farm waterworks). The main objective of management here is to focus on supplying water to the service area. The farmers are usually expected to play a direct management role at the tertiary level of large systems or in small-scale systems.

The agriculture management domain includes the tertiary off-take and its distribution networks, the irrigated farms it served, and the type of irrigated agriculture activities run by the farmers. At this level of management water is viewed as an input combined by the farmers with other inputs to produce certain irrigated agriculture products. The main objective of management here is to generate productive value from overall irrigation system management.

The effort to achieve the objective of the agriculture domain therefore, covers relatively broader aspects than the water supply system management domain. The development of water-based economic activities, of cropping pattern, input provision, the acquisition of new production skills and techniques, and the marketing of the products are among the many issues which the farmers need to deal with.

¹⁶ Easter (1986) divided it into six parts of management: watershed, reservoir, canal system, farming system, drainage system, and marketing system. Keller (1990), divided it into three: watershed, water supply system, and agricultural management. However, there is no difference between them because the Keller's categories are simply a regrouping of Easter's. Moreover, Keller left out the watershed management because it is outside direct influence of irrigation manager.

In this regard, Keller strongly argued the insufficiency of water-biased focus of management in this domain. He writes: "Since water is not only essential but often the most costly and difficult to manage input to irrigated agriculture, this focus is necessary but not sufficient" (1990: 38). Clearly, water control is not an end in itself, therefore, it can not be assumed that if the water is available then productive value will be automatically generated. Various forms of support services need to be provided to the farmers. The provision of support services is not an easy task as it involves various organization and institutions

This situation has two logical implications. First, the efforts to strengthen the role of farmers in irrigation management need to be directed toward enhancing their organizational capacity in such a way as to enable them to acquire different forms of support services in order to generate the productive value of irrigation. Second, institutional arrangements which are able to facilitate the farmers in generating the productive value in an effective and efficient manner become an important part of this endeavour. Both of these issues require reform on the institutional arrangements for irrigation which cover broader aspects than just reducing government financial burden, and include financial viability of the farmers-cum-WUA. This calls for the decentralisation¹⁷ of irrigation management.

The core concept of decentralization is financial responsibility (Rondinelli , 1983; Rondinelli, Nellis and Cheema, 1984; Ostrom, Schroeder and Wynne, 1993). Unless both public and private local organizations have a stronger authority to raise revenues and to generate larger amount of revenues, decentralization will not create a real impact (Rondinelli, Colluogh, and Johnson, 1989:69). In the context of transition of irrigation systems management, enhancing local capacity for irrigation management needs to include improvements in the capacity to generate local funds for operation and maintenance and reinvestment in the systems' physical facilities (beside other possible source of funding)¹⁸.

The question is how the farmers water users can generate productive value from water available for them.

¹⁷ Rondinelli, Cullough and Johnson (1989) define decentralization as: "the transfer of responsibility for planning, management, and the raising and allocation of resources from central government and its agencies to field units of government agencies, subordinate units or levels of government, semi-autonomous public authorities or corporations, area-wide, regional or functional authorities, or non-governmental private or voluntary organizations" (pp. 58-59).

¹⁸ There are nine possible financing arrangements for the provision of goods and services for the people. They are: (1) adoption of user charges; (2) application of betterment levies; (3) adoption of co-financing; (4) expansion of general revenue sources for public goods; (5) earmarking special revenues or funds from specific revenue sources such as tax charges, import duties, fees and fines, amusement or entertainment taxes or lotteries for rural infrastructure and services; (6) mobilization of government resources (through loan guarantees or subsidized credit) for borrowing by individuals to obtain services from private providers; (7) exchange of services or labour of beneficiaries in return for extension of services or infrastructure by local governments; (8) use of fiestas, community fairs, and the solicitation of ad hoc contributions and donations to raise funds for self-help service provision; and (9) creation of small-scale community productive activities to raise funds for service provision and infrastructure construction and maintenance (Rondinelli, Colluogh, Nellis, and Johnson (1989:69),).

9.3 Developing Sustainable WUAs in the Changing Environments of Development.

The Basic Elements. A number of authors have highlighted the important elements of developing sustainable WUAs in this era among others Wijayaratra (1992); Meizen-Dick et al (1994); ISPAN (1994); and Navalawala (1994). All of them identified, among others, the elements which emphasizing the need to incorporate economics forces in the effort to develop sustainable WUAs. These elements are:

(1) Increasing profitability which implies the need to expand the WUAs' economic activity which could entail that the association engage in multiple functions (Wijayaratra, 1992; Meizen-Dick, 1994; ISPAN, 1994; Navalawala, 1994);

(2) Adjustment in the association to cope with new demand (Wijayaratra, 1992). It is related to the expanding association's economic activity which require new roles to be added, new skill to be required and adjustment in the organization for efficiency in handling different activities.

(3) Information system and training related to new technologies which can be used in expanding association's economic activities; opportunities for support services (e.g. banking and credit facilities, market and processing information etc.); information on new policy, legal and regulatory aspect and both government and non-government organization which works in the area relevant to one or more of the association activities; and relevant training (Wijayaratra, 1992; Meizen-Dick, 1994).

The Experience with Multifunction WUAs and Beyond Water-focused Management. The reports on the multifunction WUAs in the era of state disengagement in water management are limited. A number of authors have highlighted the experience related to multifunction WUAs and beyond water-focused irrigation management (Patil, 1987; Shah and Shah, 1994; Svendsen and Changming, 1990; Bagadion, 1991; and ODI, 1994).

Patil (1987) reported three cases from India. Two from Maharashtra: The Minors 5 and 7, Mula Command and Siddeshwar Water Distribution Society; and one from Gujarat the Mohini Water Distribution Cooperative Society. There are two lessons which can be drawn from the cases. First, he indicated the need to create more avenues of incomes for the societies to sustain in the long term, because income from water charges not always sufficient to meet the operating costs. Second, the farmers need to be given some flexibility in choosing the type of crops they are going to grow. In addition, he argued that the importance of market condition and support services for the farmers--in term of inputs and necessary skills--to run their farms.

Shah and Shah (1994) described and examined the experience of AKRSP (Aga Khan Rural Support Programme) in supporting the formation of lift irrigation cooperatives and their performance as multifunctions organizations in Gujarat, India.

They found that there are seven reasons which steer irrigation organizations toward being multifunction: (1) poor access to the service, (2) institutional vacuum, (3)

viability and profitability, (4) leverage, (5) credibility and legitimacy, (6) limited managerial pool, and (7) equity. Of these seven reasons two are very relevant in the context of transferring irrigation management responsibility to the farmers: the viability and profitability and credibility and legitimacy.

In terms of viability and profitability they found that earnings from commercial activities (input supply, credit and marketing) contribute between 10 - 40% toward total earnings of the WUAs. Taking up these commercial activities helps to increase the turnover of irrigation enterprise by increasing demand for water and crops productivity. Earnings from these activities have helped to subsidize the operational cost of irrigation system. Moreover, they also found that many WUAs which do not have flexibility on their activities (stick to water distribution and operation of irrigation system) tend to collapse in the first year of operation. They concluded that 'there is a synergism between the growth and viability of irrigation as an enterprise' (Shah and Shah: 5).

In terms of credibility and legitimacy they found that the multiple functions give the WUAs a credible and legitimate status in relation to their members, external institutions and markets.

Based on the findings they identified three implications for policy and practices in helping develop sustainable WUAs. First, initial appraisal process of irrigation development need to include other aspects of irrigated agriculture enterprise which related to the functions the WUAs could take up in order to enable them to be sustained in the long term. They argue that the dialogue with the community at the pre-design stage much more centered around irrigation system and its installation¹⁹.

Second, reorientation of the WUAs development strategy from focusing on water control to a much broader aspect of irrigated agriculture enterprise which could help the WUAs to be sustainable. They argue that the 'farmers do not get attracted towards IOs because it is concerned with only a small aspect of agriculture enterprise' (Shah and Shah, 1994: 11).

Third, development of training programme for the some government officials, NGOs staff as well as the IOs members and managers to support the new strategy of WUAs development.

Svendsen and Changming (1990) has also describe and examine the practices which are being employed in managing and supporting irrigation system operations in Western Hunan Province, China. The principle of 'let water support water', as they reported, is the basis to reform irrigation management practices which led to the--what they called--'proliferation of secondary-income generating process' (Svendsen and Changming, 1990: 214). They found that often the secondary enterprises has a larger

¹⁹ They write: "Most irrigation establishments (NGOs as well as government) do not perceive IOs (irrigators organizations/WUAs) as potential MFOs (multi function organizations) when they conceive of the institutions for the systems. At the pre-design stage, during the dialogue with the village community, discussions centered around the irrigation system and its installation. Issues, like water distribution, are discussed and irrigation organization are established around the objective of water distribution and operation of the irrigation system" (Shah and Shah, 1994: 10).

contribution in total income of the system than the irrigation service fee. They reported that in Maochi reservoir irrigation service fee only contributed 10% toward total system revenues. The remaining large proportion (90%) came from other sources include the revenues from hydropower, fish production in the reservoir, supply of domestic water to the city, and the sale of fruit from a citrus orchard on the slopes above the reservoir. In a small system, Changhong irrigation system, irrigation service fee contributed 39% of the total revenues while the rest come from hydropower (4%) and the sale of fish raised in the reservoir (57%).

Bagadion (1991) reported the case of Pinit communal irrigation system in the Philippines. The WUA in this system has two main operating units: irrigation water service unit and agribusiness service unit. The activities of the agribusiness unit include credit facilitation, procurement and distribution of agricultural inputs, and marketing of unhusked rice on behalf of the members. The inclusion of the agribusiness operating unit, as he reported, has helped to increase capital build-up of the system over the year. There was about 400% increased of their saving between 1989 and 1990.

The cases discussed in this section indicated the provision of support services and diversification of water use as a potential source of income for irrigation management entities to sustain themselves as well as the systems they managed. These facts indicated the need for reform and the development of an institutional framework which provides incentives for the farmers-cum-WUA to play a major role in irrigation development by creating a supportive environment. This implies the need for institutional frameworks of WUAs development which go beyond matters related solely to producing and supplying water.

10. Concluding Notes: Opportunities and Challenge for Sustaining Irrigation Systems in Indonesia.

Irrigation development efforts in the last three decades (1960s - 1990s) have been wrestling with the problem of making the physical infrastructure function in an effective and efficient manner. The role of the farmers through their WUAs have been at the centre stage of concern both with regard to water service provision and to the sharing of the financial burden for the operation and maintenance of irrigation systems. The bottom line of the problem was finding appropriate institutional arrangements whereby the farmers could play a major role in sustaining irrigation system operations. In this regard, the sustainability of WUAs is becoming an important element.

Irrigation management and development perspective has shifted from a technical to a socio-technical one in order to respond to the problems and difficulties in solving water problems. However, the socio-technical perspective also appears insufficient in the changing environment of irrigation development, which is moving towards a reduction of government involvement in the financing of irrigation development. The need for the inclusion of the productive value generating aspect from water and irrigated agriculture into the irrigation management policy and designing irrigation management institutions is becoming obvious in the light of the need to develop financially viable and sustainable WUAs. This implies that water focus WUAs development orientation is no longer

appropriate and both farmers and their WUAs need to be strengthened and supported to respond to the economic/business opportunities available given the environment where their system operated. The (including institutions at water users level) leads to a new perspective which sees irrigation development as a business process. In relation to the effort to develop sustainable WUAs, this implies the search for some set of institutional arrangements and practices under which we feel confident that the WUAs will continue to exist and to function in maintaining sustainability of irrigation system.

The new perspective in irrigation development implies that the current institutional arrangements need to be reformed. Institutional reforms, especially with regard to farmer participation and the establishment of WUAs, have taken place in the past. However, this reform has been much more focused on institutional arrangements and practices whereby the WUAs perform irrigation management tasks related to producing and supplying water, especially on matters related to improving the effectiveness of project implementation and to reducing the financial burden of the government. The evidence, however, suggests that this type of institutional reform is necessary but not sufficient in creating a suitable environment for sustainable WUAs. It is argued that the sufficient condition is the incorporation of productive value generating aspect into irrigation management policy and the design of irrigation management institutions. By that the financial viability of WUAs can be strengthened, allowing them to play major role in irrigation management.

The 1999's IMPR and the policy to decentralize and give autonomy to the regional government in development management have opened the opportunities for reforming institutional arrangements for irrigation management. In addition the financial crisis facing by the government is added to the drive for reform. However, carrying such reform would not be an easy task and will be the major challenge in order to create governance structure and incentives for the farmers (through their WUAs) to play a substantial role in sustainability of irrigation systems.

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