Time for Innovation in Indonesia's Irrigation Sector

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Abstract

This paper briefly summarizes the key trends in the irrigation sector in Indonesia, including at the policy, legal, administrative and project levels and, more especially, at the irrigation system level. It identifies key pressures on the sector from outside forces of change and identifies key challenges that the sector faces in terms of its efficiency, equity, productivity and sustainability. Pro-active initiatives are needed to prepare farmers and other stakeholders for the changes coming. Several innovations are suggested for development and testing as methods to address these challenges effectively. The innovations concern policy and legal aspects; institutional development; irrigation system governance, management and financing; capacity building and provision of support services. Finally, a pilot project is proposed that will introduce and refine key innovations in three selected provinces and districts. Successful introduction of these preliminary innovations will be the precursors for introducing other innovations thereafter.

1. Trends in irrigation and agriculture in Indonesia

Background on the sector

The majority of Indonesia's irrigated area receives an annual rainfall of 2,000 to 3,500 mm. 82% of rice production is irrigated. Irrigation serves 6.2 million hectares (ha), of which 5 million ha is public irrigation and 1.2 million ha is small systems managed entirely by farmers. 60% of irrigated area is under irrigation systems above 500 ha and 40% is in small systems below 500 ha in service area. The average yield for rice is 4.5 metric tons per ha and the average cropping intensity is 155% although there are many areas that reach 250% or more.

Between 1969 and 1989 aggressive investment in irrigation and agricultural development spurred an increase of 4.8% in rice production per year. The expansion of irrigated area and intensification of rice production led to a reduction in rural poverty from 40% in 1970 to 16.5% in 1997. Today, approximately 43% of Indonesia's labor force is employed in agriculture, but this is on the decline.

In 1987, the Government adopted an irrigation O&M policy. This included efforts to ensure adequate funding for O&M, introduction of irrigation service fees (ISF), better management of large irrigation systems, and management transfer to water users associations for schemes less than 500 hectares. Apparently, inadequate participation of WUA and local governments in the policy led to unsatisfactory results. Also, arrangements for technical and institutional guidance and support services were unclear and poorly funded. O&M budgets were allocated in accordance with average per ha amounts rather than actual needs per system. Approximately

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60 to 85% of O&M budgets have been used for staff costs and urgent repairs and rehabilitation, so in fact, little was left for routine maintenance and deterioration ensued rapidly. The ISF failed because the funds were directed to regional revenue offices not to irrigation systems, and farmers were reluctant to pay. However, between 1969 and 1994 irrigation systems serving 2.5 million ha were rehabilitated and 1.7 ha of new irrigation systems were developed. Together with this massive expansion of irrigated area and farmer extension and programs to provide inputs, Indonesia achieved self sufficiency in rice production in 1984. However, it has been difficult to sustain self sufficiency in rice due to continuing inadequate maintenance, rapid deterioration and loss of productivity of irrigation systems. And the cost of rehabilitation significantly exceeds the cost of adequate routine maintenance and periodic investments in minor repairs and improvements.

Recent policy, legal and regulatory development

In 1999 the Government issued the decree for the Irrigation Management Reform Program (IMRP) and in 2001 it issued Government Regulation No. 77, both of which mandated reforms that were based on the principles of participatory irrigation development and management. These called for transfer of management authority and responsibility for irrigation systems management from the secondary to main canal levels. Water users were to collect irrigation service fees for their own associations. The IMRP placed the district in the position of the primary actor for planning and financing irrigation management and development through the establishment of multi-stakeholder Irrigation Commissions. In 2003 the Ministry of Finance issued a Ministerial Regulation that authorized setting up Kabupaten Irrigation Improvement Funds (KIIF) at the district and provincial levels to conduct allocation of funds for minor repairs and improvements based on joint investment between the government and water users associations.

However, the Water Law of 2004 pulled back the movement of reform by making management transfer only optional and Government Regulation 20 of 2006 and pursuant regulations stated the participatory irrigation management (PIM) principles and legal basis for it within the new limited conception of PIM. So far tens of thousands of water users associations and over 1,000 WUA Federations that serve over 800,000 ha have been established. Irrigation Commissions have been established in donor-assisted projects.

Recent projects

In 1995, the Asian Development Bank (ADB) and the Government of Indonesia (GOI) initiated the Farmer-Managed Irrigation Systems Project (FMISP), which aimed at developing a participatory approach with joint investment between government and WUA for O&M as well as rehabilitation and upgrading. In 1998, the World Bank and GOI began the Java Irrigation Improvement and Water Resources Management Project (JIWMP) that supported participatory irrigation management and development as well as other elements of water sector and river basin management reform, as were included in the World Bank's Water Sector Adjustment Loan Program that started in 1999. The interventions from JIWMP were expanded in 2001 to 12 provinces with the Indonesia Water Resources and Irrigation Reform Implementation Project (IWIRIP), with funding from The Netherlands.

Under these projects 400 WUA Federations (WUAF) were established in 235 schemes that served 315,000 ha. Management transfer to WUAF occurred in 61 schemes that serve 73,000 ha. Key benefits from these projects were improvements in O&M and gains in cost effectiveness of O&M and rehabilitation and upgrading. The European Union and Canadian and Italian governments have funded projects following the same reform strategy. These projects have demonstrated that the key challenges concern how to achieve higher quality maintenance, more significant contributions by farmers to the costs of management, rehabilitation and upgrading, using government funds in ways that stimulate local investment and joint planning between the district Irrigation Services or Water Resources agencies and WUA and WUAF.

However, it is notable that such changes have not been widely made outside of these project areas. As yet, such projects have not become nation-wide trends, partly for financial reasons, partly because decentralization has made a national reform program haphazard and partly, apparently because of lackluster political support.

2. Current and emerging challenges: What will be required of the Irrigation Sector in the near future

Water resources management and irrigation play a very important role in Indonesia's socio-economic development in terms of food security (bulk of the grain crops is from irrigated areas) and water security particularly because of the country's high exposure to climate change impacts. Though Indonesia is in general a water rich country, spatial and seasonal variation of water availability poses high risks for water security for domestic, municipal, industrial and agricultural uses. Population growth, urbanization, economic development, and the impacts of climate change place increasingly high pressure on land and water resources and increase the vulnerability of the nation to water related risks such as floods. As a result, many catchments are degrading rapidly with severe soil erosion and sedimentation of storage reservoirs, increased floods, landslides and reduced availability of water in dry seasons. Urbanization and economic development is leading to rising water pollution and farmland conversion endangering food security. Furthermore, increasing seasonal water shortage over wide areas worsens use competition for water and groundwater overexploitation in different provinces, especially in urban areas, and threatens water security for socio-economic development.

Several large-scale forces are emerging and increasing in importance for irrigation and agriculture. These include the steady shrinking of farm sizes, especially on Java, to the point of their becoming non-viable economically. Some sort of land consolidation, either in terms of ownership or, perhaps more likely, operational consolidation, may start becoming necessary in the future. Farming on such small fields as a quarter of a hectare or less cannot produce enough income for a farm family. In many areas of Java farmers are only part-time and they engage in all sorts of other activities for income. This is not only because of small farm sizes but also because of low economic returns of rice and other irrigated crops. Another influence is the reality that the younger generation is losing its interest in becoming farmers and most are

seeking off-farm opportunities. Irrigated land on Java is disappearing at the rate of at least 20,000 ha per year due to its conversion to urbanization. Also, when in competition with other sectors for government funds, irrigation loses out to roads, housing, municipal water supply, power, etc. Most irrigation systems have the distinctive characteristic that their maintenance can go under-financed for a few years before structures begin to fail. But when they do, expensive rehabilitation is needed.

It seems that with each passing year the pace of change accelerates. This is true not only for technology, but also for populations, livelihood strategies, the economy, markets, competition for water and the environment. These changes are creating six main challenges for the irrigation sector in Indonesia, listed as follows.

Challenge 1: How to ensure effective irrigation system management?

Challenge 2: How to decide on appropriate role sharing for irrigation system governance, management, financing, capacity building and regulation?

Challenge 3: How to optimize investments in irrigation rehabilitation, upgrading and development of new irrigation systems?

Challenge 4: How to introduce efficient and effective financing mechanisms for irrigation management and development?

Challenge 5: How to design appropriate institutional arrangements and modernize human resources management?

Challenge 6: How to adopt needed policy, legal and regulatory changes?

3. What we should do today to prepare for tomorrow

When we envision the kinds of changes that will be needed to ensure a productive, efficient, equitable and sustainable irrigation sector in the future, we realize that we must get started now in order to make the series of changes happen when they are needed. Many changes are needed already. The process of innovation will require a series of changes occurring in a logical order and being made as a series of changes spread out over several years. They need to be prioritized and sequenced because some changes can only be made after other changes have been made previously.

The changes needed include a new policy and changes in legislation and regulations. They involve preparation and discussion of concept papers, a series of meetings of issue groups, production of recommendations and decisions about them by policy-level and regional authorities, research studies to answer strategic questions, study tours within and possibly outside of Indonesia, workshops, and a pilot project to introduce and test innovations that

require a preliminary learning experience. We recommend that the Government form an Irrigation Policy Working Group consisting of highly experienced functional experts to guide the overall process of strategic change and coordinate among issue groups and working groups that are overseeing pilot projects in selected provinces and districts. Next we suggest what key innovations are needed for each of the challenges facing the irrigation sector.[2]

Recommendations for key innovations that these authors believe are needed are described for each of these challenges in sections 4 through 9 below.

4. Challenge 1: Ensure effective irrigation system management

There are five priority recommendations for Challenge 1. These are described below.

4.1 Define a Standard for Satisfactory Irrigation System Management and base all investments and activities on this Standard

The quality of O&M in Indonesia's irrigation systems varies considerably and there is a lack of attention to following any minimum and measureable standard for O&M. Implementing routine maintenance at an acceptable standard with needed minor and incidental repairs and improvements, would keep irrigation performance at a sustained acceptable standard and would forestall the need for rehabilitation. A minimum and measureable standard for satisfactory O&M needs to be defined and put into use for needs-based budgeting and for an incentive as a pre-condition for eligibility for rehabilitation. Establishment of a measurable standard of acceptable operations and maintenance is an essential part of preparation and implementation of irrigation service plans and needs-based budgets that are based on satisfactory standards of maintenance.

This innovation will require preparation of a concept paper and Guide for Satisfactory Standard for Irrigation System Management, which will identify satisfactory standards for irrigation system O&M, which includes both operations, routine maintenance and minor incidental repairs and improvements. The Guide should also provide an operational definition of "satisfactory operations and maintenance" and a justification for consistent achievement of the standard. It should include a method for preparing an Irrigation Service Plan based on the standard guidelines for implementing it effectively. The suggested satisfactory standard of operations and maintenance will be reviewed and approved by appropriate authorities. Satisfactory Performance Standards should be incorporated into official regulations, instructions and guides. Training for use of the Guide should be incorporated into capacity building programs at provincial and district levels.

4.2 Irrigation Service Plans, needs-based budgeting and Irrigation Service Fees based on Standard for Satisfactory Irrigation System Management

[2] This is not an exhaustive list. The authors are in the process of preparing a more detailed description of innovations needed. They may be contacted via email at douglas_vermillion@yahoo.com.

Irrigation Service O&M staff at the province and district levels and WUA/WUAF officers are significantly lacking in technical skills and training for preparation and implementation of Irrigation Service Plans, needs-based O&M budgets, and Irrigation Service Fees. There is a need for repeating, periodic capacity building in development and implementation of Irrigation Service Plans, needs-based budgeting for an acceptable standard of O&M and an Irrigation Service Fee. Each aspect should be included in a guide and updated training modules.

The following are suggested steps to adopt and implement this recommendation. After a training needs assessment is carried out, experts should update and improve existing curricula materials for training and capacity building on the topics of preparation and implementation of Irrigation Service Plans, needs-based budgets and Irrigation Service Fees, both for Irrigation Service staff and WUA/WUAF officers and staff. This will include preparation of a Guide on this topic. A new program of capacity building for preparation and implementation of Irrigation Service Plans and Fees and needs-based budgets for Irrigation Service O&M staff at provincial and district levels should be proposed, planned and funded. The Guide should be disseminated to the Irrigation Services, Regional Planning Boards, and Agricultural Services in each province and district. Training programs in lectures, role playing and field work should be carried out.

4.3 Irrigation Management Audits

WUA and WUAF will remain active and develop more capacity when they are involved in a collaborative relationship with the Irrigation Service where both enter into a dialogue with support services that is focused on improving the performance of irrigation systems. Irrigation Management Audits (or Audits) should be conducted regularly (once a year or once every two years as may be needed) The main purpose of the Irrigation Management Assessment is to build the capacity of the WUA/WUAF and Irrigation Service Kabupaten. It is a method to see how well the WUA/WUAF or Irrigation Service Kabupaten is doing in its work. The Review compares how performance compares with Irrigation Service Plans or to what extent performance is improving over time. Such reviews can examine three aspects:

1. Quality of WUA governance (including decision making, selection of leaders, clear roles of authority and responsibility, dispute resolution),
2. Quality of irrigation services (including water productivity, quality of O&M, adequacy, reliability, timeliness, efficiency and fairness of water distribution), and
3. Quality of financial management (including budgets, control over revenues and expenditures, bookkeeping).

Assessment of these three aspects can be done based on comparisons between how the WUA is actually performing versus management transfer agreements, WUA constitutions and by-laws, government regulations or Irrigation Service Plans. One of the key benefits of Irrigation Management Audits are when they are used to identify support services needed by WUA.

Simple action plans are prepared to give the WUA/WUAF or Irrigation Service Kabupaten goals to work toward to improve their performance. In order to enhance the incentives for WUA to ensure that quality operations and maintenance services are provided, the results of Irrigation Management Audits could be linked to eligibility for government assistance. Failure to perform

routine scheme maintenance at an agreed standard can cause the WUA to become ineligible to receive government assistance (until such standards are achieved). But satisfactory results can make the WUA eligible for assistance with incidental repairs and improvements, rehabilitation or modernization.

The Assessment can produce recommendations for improvements needed in the WUA/WUAF or Irrigation Service Kabupaten. The recommendations could be ranked at three levels of urgency and importance. For example, the first level can mean 'Urgent and Important'. The second level can mean, 'To be implemented before the next Assessment'. The third level can mean, 'To be implemented when feasible'. Rewards or sanctions could be attached to these ratings.

4.4 Comprehensive, permanent and periodic capacity building program

The irrigation sector has failed to mobilize sufficient funding and support to conduct adequate and frequent capacity building activities, including training, management consultations, management audits, etc. There is a widespread lack of needed skills among irrigation system management staff.

Irrigation Service O&M staff and WUA/WUAF officers are significantly lacking in needed technical skills and training for proper irrigation system operations and maintenance. This includes water acquisition, conveyance, distribution, application and drainage. It includes incorporation of fish ponds and other approved non-agricultural uses of water within the irrigation system management process. And it includes all aspects of system maintenance. Part of the reason training is needed regularly is because irrigation sector staff are frequently transferred to other assignments, including those outside of the sector. On the other hand, such transfers weaken Irrigation Service when experienced and qualified staff are lost through transfers.

There is a need for repeating, periodic capacity building in irrigation operations and maintenance and related topics for Irrigation Service O&M staff at the province and district levels and with the WUA/WUAF. Existing high quality training modules should be upgraded and updated as needed. Additional topics will require new training modules, such as Irrigation Management Audits, Irrigation Management Consultations, Minimal Satisfactory Standard of O&M, needs-based budgeting, integrating all types of water uses into integrated irrigation system management, and Dispute Resolution for Irrigation Management.

Additionally, there is a need to keep functional O&M staff, such as the Irrigation Inspector (Juru Pengairan, Irrigation Supervisor (Pengamat), and Weir Guard (Penjaga Bendung) retained in the sector and not be transferred out of the sector. One of the most important kinds of awareness that needs to be created both amongst WUA/WUAF officers and water users and amongst O&M staff of Irrigation Service is the consequences of their actions and inactions for irrigation system management, governance, financing, capacity building, and provision of support services.

The possibility should be assessed that an agreement could be made between Departments of Internal Affairs and Public Works that if enough core staff positions are provided by the Department of Internal Affairs with civil servant status that the Department of Public Works will provide its share of funding for O&M and will provide capacity building support.

4.5 Launch periodic Management Consultations

Classroom lectures provides theoretical training but this is not always effective for field based irrigation managers such as WUA/WUAF officers and Irrigation Service Kabupaten staff. There is a need for management consultations based on field visits to irrigation systems that are focused on problem solving and preparation of action plans.

There is a need for a regular program of management consultations as part of the efforts for guidance and capacity building, under which an Expert from a Irrigation Management Team from the province visits Irrigation Service Kabupaten as well as key O&M field staff and WUAF/WUA at the irrigation system level every few months or each year as needed. During the visits they review challenges, needs for organizational development, identify improvements needed, and help counterparts prepare action plans.

There is a need to create a Team of Irrigation Management Experts, constituted by practical experts with extensive experience. These could be newly retired experts who could serve for a period of 3 or 5 years, as long as they are willing and productive. Means need to be found to pay for this valuable service that is much needed. In the near term this Team could focus on irrigation system management and the irrigation sector. Later, after the first stage of development, when the irrigation services are functioning well, the Team could be enlarged with experts from Dinas Pertanian and Bappeda to join them and assist with wider issues, such as improving the value of agriculture, land conversion, etc.

5. Challenge 2: Establish appropriate role sharing in irrigation system management

There are two priority recommendations for Challenge 2. These are described below.

5.1 Building Water Users Associations and Federations through participatory decision making and actions

Farmers tend to think that maintenance and repair of secondary canals are the responsibility of the government. However, in places where the Irrigation Service meets regularly with the WUA/WUAF and involves them in decision making and making investments in operations and maintenance and minor repairs, the WUA/WUAF are strengthened and their capacity grows. Experience with several projects, by the Asian Development Bank (PISP), World Bank (JIWMP, WISMP), and the Dutch Government (IWIRIP) indicates that farmers are capable and willing to satisfactorily manage irrigation systems at the tertiary level and eventually up to the secondary level if their water supplies are assured.

It is apparent that many WUA and WUAF have the capacity to take on larger roles in irrigation system management, governance and resource mobilization. There are multiple ways that the Irrigation Service could share roles for irrigation system management with the WUA/WUAF. Some WUAF were previously established in accordance with Government Regulation 77 of 2001 and management responsibility and authority was already transferred to them. However, Government Regulation 20/2006 reversed this arrangement. In general, WUA should be federated into WUAF and the WUAF should gradually be prepared to take over more and more management, and eventually financial, responsibilities and authority for secondary and eventually main canal levels and have representation in the district Irrigation Commission.

The Irrigation Service should look for opportunities to increase such role sharing and this could be done in an incremental way until the WUAF becomes able to take over responsibility and authority for management at the secondary canal level. Efforts should be made within the district Irrigation Service to find ways to share roles between the district Irrigation Service and WUA/WUAF. An example of this is in Kulon Progo, where the Dinas SDA/Pengairan does irrigation management work between 8 am and 3 pm. Between 3 pm and 8 am the WUAF takes over irrigation system responsibilities, especially for emergencies or other priorities.

Efforts should be made to enable the WUA and WUAF to take on larger roles in developing and agreeing to local policies and decisions for irrigation O&M via the Irrigation Commission at the district and province levels and for implementing these policies and decisions in accordance with the principles stated in Government Regulation 20. This needs the support of the regional governments.

There is no need to have an arbitrary limit on up to what hydraulic level the WUAF might take responsibility. There is no need to make over-generalized assumptions about their inabilities but to assess this objectively and build their capacity. This should be decided in accordance with the capability and willingness of the WUAF, with a continuing role by government for capacity building and regulation. Irrigation systems that have already had their management and responsibility for assets transferred to WUA/WUAF need to have these arrangements evaluated again. Where it is apparent that the capacity of the WUA/WUAF is reliable their status needs to be recognized and acknowledged in accordance with Government Regulation 20, Article 70. There is a need to enable this to happen, through a Ministerial Regulation.

5.2 Assignment of responsibility for management of an irrigation system as single, integrated hydro-management system

In keeping with the principle that an irrigation system is a single hydro-management system, there should only be one leading government agency that has responsibility for irrigation system management. The role of empowerment and capacity building of the P3A should be with Irrigation Service, not the Agriculture Service.

The irrigation system, which includes tertiary blocks, should be developed and managed as a single and integrated hydraulic management system. Given its primary role and expertise, Irrigation Service should be responsible for the governance, management, financing and

provision of some support services of irrigation systems as single hydro-management units. These roles should only be shared with the WUA/WUAF when these organizations become ready to take over such responsibilities. And it should be the responsibility of Irrigation Service to enable the WUA/WUAF to take over these responsibilities as soon as this can be done. The Department of Agriculture should restrict its role to cultivation, agricultural inputs, village irrigation, and on-farm water management. The Irrigation Service should take sole responsibility for managing or supporting management by WUA/WUAF of irrigation system.

6. Challenge 3: Optimize investments in irrigation rehabilitation, upgrading and development of new irrigation systems

There are three priority recommendations for Challenge 3. These are described below.

6.1 Making optimal selections between rehabilitation, upgrading and new irrigation

The national Government has adopted a policy to achieve a surplus of 10 million tons of rice by the year 2015 via development of new irrigation systems, upgrading and rehabilitation. Development of new irrigation systems is very expensive and risky. Research is needed to determine to what extent and under what terms and conditions is rehabilitation, with good O&M, is the most cost-effective way to expand the area irrigated or increase cropping intensity, followed by upgrading and development of new irrigation systems.

There is a need to assemble data on where rehabilitation, upgrading and development of new irrigation are most appropriate. There are risks associated with each option. These need to be understood in order to develop a rational plan to optimize investments rather than to be driven by vested interests that may arise in the course of such planning decisions. In order to optimize investments it will be important to identify and respect the criteria for deciding for or against each option.

There is a need for a research study on under what terms and conditions would rehabilitation, upgrading or development of new irrigation be appropriate. The study should answer such questions as: Will rehabilitation really increase the area irrigated or cropping intensity? Is development of new irrigation cost effective? Under what conditions should rehabilitation, upgrading or development of new irrigation be done? The study should propose a rational course for selecting among these three options in order to achieve the target of 10 million tons surplus rice by 2015 in an optimal manner.

6.2 Need an Asset Management System

In general, the district and provincial Irrigation Services do not have detailed information about the functional condition of their irrigation systems nor the likely timing when which repairs and improvements will be needed. In order to achieve optimal efficiency and sustainability for investments in the irrigation sector it will be essential to have an Asset Management System that includes information and decision-making tools for each irrigation system for which the

district or provincial Irrigation Services or national Directorate of Water Resources has responsibility.

We recommend that an Irrigation Asset Management System (IAMS) be set up in each district and province that has irrigation systems. The IAMS should include an inventory of water control and measurement structures and canals for each system. It should include information on required actions and budgets to achieve a Satisfactory Standard for O&M, optimal timing into the future for minor repairs, improvements, and rehabilitation. And it should include a designation of what kinds and numbers of staff are in each system and what kinds and numbers of staff are still needed. The following are steps needed in order to adopt and implement this recommendation. The first step needed is to prepare a concept paper for the Irrigation Asset Management System. This should be discussed until a consensus is reached among key stakeholders about the Irrigation Asset Management System. The IAMS should be pilot implemented in selected districts, after which recommendations would be made from lessons learned for widespread application. The sector will need to mobilize political and financial support for the IAMS and then prepare and implement a plan for widespread development of the IAMS.

6.3 Need more small reservoirs to ensure second irrigation season

Gradual changes in climate and increasing uncertainties of rain appear to be making the second and third cropping seasons become more problematic over time. Java has a shortage of small reservoirs (embung) which means that river-supplied irrigation systems are becoming increasingly vulnerable to droughts and flooding.

In drier parts of Indonesia only one irrigated crop can be grown per year. Sometimes a second crop could be grown if there were at least a modest amount of water made available for rotational or periodic irrigation during the second and perhaps even third season. In places like West Nusatenggara farmers use the Crop Season 1 crop (typically rice) for household consumption, whereas the Crop Season 2 crop (if feasible) is used for a non-rice cash crop. Normally, the second or third seasons are only made possible with access to a small dam.

It may be economically viable to build small irrigation networks served by small reservoirs (embung), between 5 and 150 ha in service area, for development of irrigation systems for dry lands. There is a need to develop small reservoirs in order to ensure successful production of the second season crop by providing irrigation during the critical month of June or July. Criteria should be identified to justify development of embung and a program and budget for their development should be promoted, as long as environmental and property concerns can be protected.

In order to adopt and implement this recommendation a study should be conducted to identify costs, benefits and risks for developing embung. The study should include making an estimate of the potential and locations where development of small reservoirs has the best potential. A plan should be prepared to develop small reservoirs and mobilize funding, after which the plan should be implemented for developing small reservoirs.

7. Challenge 4: Introduce efficient and effective financing mechanisms for irrigation management and development

There are three priority recommendations for Challenge 4. These are described below.

7.1 How to mobilize sufficient funds to achieve the Standard for Satisfactory Irrigation System Management

Currently, there is no assured financing for irrigation O&M and it is normally inadequate. Allocations to the irrigation sub-sector are normally not based on actual needs for the sub-sector but results of vying for funds between sectors. Irrigation O&M normally loses in the competition for funds with other sectors, such as education, health, roads, electricity and drinking water. The effects of under-financing of irrigation O&M are not dramatic until several years, after which collapses and the need for "premature" rehabilitation occurs. Also, funds are often allocated for irrigation O&M on the basis of arbitrary average amounts per hectare, whereas the actual cost of irrigation O&M in each system is unique. This creates inaccurate estimates of cost requirements.

Top priority for financing the irrigation sector should be given to ensuring that routine O&M is provided at an officially-recognized and verifiable Standard for Satisfactory Irrigation System Management. This strategy requires adoption of an agreed and verifiable standard of O&M and a standard method to assess whether it is achieved, such as through the Irrigation Management Audit.

Achievement of this standard may require an increase in allocation of funds by the central government temporarily, in the earlier stages of achievement of the strategy. And, the strategy to achieve satisfactory financing for routine O&M should be directed to enable the district Irrigation Service and WUA/WUAF to achieve this as much as possible over time, with the central government shifting relatively more of its funding over time from routine O&M to rehabilitation, modernization and capacity building.

The inefficient and inaccurate bureaucratic tendency to standardize assumptions about costs of irrigation O&M on a per hectare basis should be changed to use of a practical, verifiable method to estimate the actual O&M requirements of a specific irrigation system—at a Standard for Satisfactory Irrigation System Management—and to estimate the pragmatic budget needed to implement it. This is needs-based budgeting (or AKNOP, in the Indonesian acronym). There is a need to adopt a system of budgeting for irrigation O&M that is based on pragmatic and efficient O&M in accordance with the actual levels of management intensity required within each irrigation system in order to achieve the Standard for Satisfactory Irrigation System Management.

What we normally refer to as O&M actually should not only include routine operations and maintenance. It should also include enforcement of rules pertaining to O&M, provision of

facilities required to implement O&M (office, supplies, equipment, oil, paint, etc.), administrative and financial needs, possible provision of support services, and capacity building.

7.2 Using government funds in ways to stimulate local investment

There is a tendency for the Government to allocate and expend funds for routine irrigation O&M or rehabilitation in a manner that does not require but may discourage local investment by the WUA/WUAF. If farmers consider the irrigation system to be the property of the Government they may not be willing to invest in its maintenance. If people think that another rehabilitation project can be expected in a few years they may prefer to minimize maintenance in anticipation of another rehabilitation project in a few years.

In Kabupaten Jombang in East Java the provincial or district governments offer to maintain or finance the maintenance of irrigation for part of a system under the condition that the WUAF maintains another part of the irrigation system. Other examples of use of government funds to stimulate local investment are where local investments in labor, materials or cash are required in correspondence with government assistance for rehabilitation or maintenance. In East Java the province and district work out creative arrangements to share the costs of irrigation management in a context where funds are in short supply. There is an arrangement in place in Purworejo, Central Java, that is that if the WUA collects Rp. 100 million, then the Irrigation Service pays the same amount for O&M. The Irrigation Service often requests labor contributions of farmers to repair canals damaged by landslides and other problems.

The Government should adopt the principle to use its funds to stimulate corresponding local investment in O&M or rehabilitation. The central government should increasingly allocate its funds in a manner that requires corresponding investment by the province, district and WUA/WUAF.

7.3 Defer rehabilitation—not maintenance—with the District Irrigation Repair and Improvement Fund

Rapid deterioration of irrigation systems continues throughout Indonesia. This is the result of inadequate routine operations and maintenance and inadequate repairs and improvements. And as mentioned in section 7.2 above, there is a need to use government funds for the irrigation sector in such a manner as to stimulate local investment.

A two-pronged approach is needed to achieve sustainable functioning of irrigation:

1) Ensure a minimal standard of maintenance[3] and
2) Replace periodic rehabilitation with incremental repairs and improvements.

What if governments, donors, experts and farmers were to take a different, innovative approach to minimising the need for rehabilitation through small-scale, incremental investments that are demand driven and financed by farmers and governments? The aim would be to make recurring investments in irrigation scheme repairs and improvements—while the maintenance needs are

[3] Satisfactory maintenance is defined as the level of maintenance required to ensure effective long-term use of assets through preventing the premature deterioration during the expected functional life of the network.

still small. Water users would be able to play a proactive role in identifying repairs needed and be motivated to contribute significant levels of investment in the form of labour, materials or fees. If it is true that incremental investment will ensure better maintenance, will lower the costs of rehabilitation substantially, will prevent productivity from dropping periodically, and will strengthen WUA, then the benefits will be substantial and long term.

These are works that are normally beyond routine O&M but are less than what is normally done in rehabilitation projects. They would be demand-driven in the sense that WUAF would submit proposals periodically (perhaps annually). The WUAF would be expected to provide some significant and agreed share of the cost or labor of IRIF projects.

The reason why IRIF fund allocations are recommended are because they would: 1) further prevent the need for premature rehabilitation, 2) be a strong incentive to get the WUAF into the practice of taking the initiative and making investments in the irrigation system, and 3) be a means for strengthening the WUAF and its relationships with member WUA. The following are suggested steps for adopting an incremental investment program for sustainable irrigation and drainage systems. For Indonesia, we recommend establishment and activation of an Irrigation Repair & Improvement Fund (IRIF) at the district level through the following 10 steps.[4]

Step 1: Identify provinces and districts which support adoption of the IRIF This should be in locations where there is agreement on an incremental investment program between the government, donors, experts and water users that involves setting up and activating an IRIF.

Step 2: Establish legalized Water Users Associations WUAs are an essential part of the strategy. To function effectively they should be democratically constituted and have the legal authority to include all water users, adopt rules, apply sanctions and make contracts for services by third parties. Water users also have clear rights to use water and responsibility and authority to use and maintain infrastructure.

Step 3: Establish Irrigation Commissions Irrigation Commissions are bodies set up at the district level and consist of staff of irrigation, agriculture, environment, planning, regional or local government departments as well as representatives of WUAs or their federations. The Irrigation Commission sets up and oversees implementation of the IRIF.

Step 4: Mobilise funds for annual allocation An IRIF is established with the Irrigation Council. It should be replenished annually. Donors may provide funds but this should be taken over gradually by national and local sources. The Fund is to be allocated for incremental repairs and improvements.

Step 5: Agree on IRIF operating principles and procedures The Irrigation Commission prepares a plan for IRIF activities. This includes proposal preparation by WUAs or WUA

[4] Taken from "Achieving Sustainable Productivity of Irrigation and Drainage through Incremental Investments" by Douglas L. Vermillion. Innovation Brief on International Development Services No. 1. Euroconsult / BMB Mott MacDonald Ltd., 2008.

Federations. (WUAFs), criteria for eligibility and selecting proposals, project implementation and evaluation. The criteria should be designed to encourage WUAF to meet agreed standards of performance and accountability. The following are possible examples of eligibility criteria:

a) *Establish constituent WUAs with a legal status,*
b) *Collect irrigation service fees at an agreed rate,*
c) *Pay an appropriate fee for its membership in the IRIF Network,*
d) *Build a capital reserve fund at acceptable rate,*
e) *Implement an O&M plan satisfactorily,*
f) *Receive satisfactory rating in Irrigation Management Audit,*
g) *Submit reports satisfactorily after IRIF grants were received.*

The Irrigation Commission makes an arrangement for periodic submission of proposals to the IRIF by all eligible WUAF. After this they are reviewed and selected by the Irrigation Commission. The following are examples of requirements for proposals:

a) *Simple design with cost estimate,*
b) *Joint investment by WUAF members,*
c) *Description of benefits from the project,*
d) *Signatures of WUA members in favor,*
e) *Government certifies feasibility of proposal,*
f) *Proposal submitted to the IRIF Proposal Review Committee,*
g) *WUAF has prepared an asset management plan for maintenance and upgrading which justifies the proposal.*

The irrigation agency provides engineering support to WUAF in preparation of designs for repairs and improvements. Proposals could be assessed according to agreed criteria, such as the following:

a) *Extent of benefits for farming community,*
b) *Technical and economic feasibility,*
c) *Share of WUAF or WUA members who support the proposal,*
d) *Share of total cost/ labour/ materials to be contributed by WUAF members (demonstrating the extent of its own investment),*
e) *Justification why the project cannot be implemented by the WUAF/WUA alone,*
f) *Costs are within IRIF funding limits.*

Step 6: Review and select proposals Proposals from all eligible WUAF are prepared following guidelines. In accordance with funds available, the IRIF Proposal Review Committee selects proposals.

Step 7: Implement IRIF projects WUAFs selected obtain notification and an initial payment to start implementation. Final payment is made upon satisfactory completion of the project.

Step 8: Implement Investment and Management Audits After implementation, the local government and irrigation agency evaluate each project selected. Inspection of IRIF projects is part of an Irrigation Management Audit. This Audit examines technical, institutional, and

financial aspects of the WUAF. Satisfactory evaluation means that the WUAF may submit new proposals in the next round.

Step 9: Change IIP Fund into a revolving fund Depending upon local capacity and the size of irrigation systems, eventually the IRIF could change into a revolving fund managed by each WUAF. Some WUAF may establish their own Capital Reserve Fund and use it for periodic repairs and improvements. The IRIF may evolve into a rolling fund where it shifts from a grant to a credit system. However, if the government is able to mobilize sufficient capital for the IRIF for the long-term, then it could remain as originally designed.

Step 10: Measure and report on the results This is essential for the learning process and will promote national support for the IRIF.

7.4 Introduction of "entrepreneurial facilitators" to help WUA/WUAF search for higher value from agriculture

There is a need for the value of agricultural products of farmers who use irrigation to rise if they are going to become more able to pay for the full cost of O&M at the tertiary and then secondary levels. The two primary reasons why farmers are unable or unwilling to pay enough of an Irrigation Service Fee to cover the full cost of irrigation O&M at the tertiary and secondary canal levels are:

1) the returns from irrigated agriculture are not sufficiently rewarding due largely to price limitations and
2) the quality of irrigation services delivered are sub-optimal.

To deal with the first constraint, ways need to be found to make agriculture become more rewarding to farmers. With the development of agri-businesses among irrigating farmers, P3A/GP3A will become more willing and able to pay for the cost of irrigation O&M.

It may not be politically possible for the Government to lift the price ceilings on rice because of the interests and greater political influence of urban consumers. Other ways should be found to make irrigated agriculture become more rewarding to farmers. There is potential in the future to have a P3A or GP3A recruit an "entrepreneurial facilitator" who is a creative thinker to investigate and make arrangements with markets and make recommendations to farmers about crop options. Eventually, efforts could be made to enable such entrepreneurial facilitators to replace middlemen, thereby bringing more profits to the farmers. The Government might help finance pilot testing of Entrepreneurial Facilitators but the P3A or GP3A should be willing to pay for their cost eventually.

8. Challenge 5: Adopt appropriate institutional arrangements and human resources management

There are three priority recommendations for Challenge 5. These are described below.

8.1 Unit for Integrated Irrigation System Management in the Directorate General of Water Resources

The irrigation sector faces a number of political sensitivities, such as pressures for development of new irrigation, sensitivity of charging farmers the cost of irrigation services, etc.). It is facing rising competition for water. There is a chronic difficulty of obtaining sufficient funds in competition with other sectors. And yet there is a need to mobilize a steady and sufficient stream of funds to cover irrigation O&M at an acceptable standard, in order to avert the too frequent need for rehabilitation.

Several trends make optimal performance of the irrigation sector to meet national objectives become more and more difficult to achieve. These include:

- Three levels of government responsible for the irrigation sector;
- Division of responsibilities for different aspects of government;
- Growing diversity in organizational arrangements for irrigation;
- Duplication or absence of entities responsible, and
- Weaknesses in accountability.

There is a need to establish a Unit or Directorate for integrated irrigation management at the level of the Directorate General of Water Resources. Its purpose would be to provide the guidance and technical, institutional and managerial capacity building support to ensure that irrigation system management becomes an integrated hydro-management system capable of better productivity, efficiency and sustainability.

In order to adopt this recommendation a concept paper should be prepared that presents the argument for why such a unit or directorate is needed, how it would be organized and financed, and how it would function. A Working Group should hold meetings to approve a proposal to establish the Directorate or Unit. Discussions should be held with the Director General of Water Resources and the Minister of Public Works to obtain their support. Funding and support for new staff positions needs to be mobilized via the Ministries of Finance and Internal Affairs. And the Minister of Public Works should issue a Ministerial Regulation to establish the Directorate or Unit for Integrated Irrigation System Management.

8.2 Develop Irrigation Commissions at the District Level

In general, Regional Parliaments throughout Indonesia do not consider the irrigation sector to be a priority. Routine O&M is off of their radar screen. Irrigation lacks status and is not interesting to most members of the Regional Parliament. The Irrigation Commission needs to play a prominent role in influencing the Regional Parliament as well as the district head (bupati) to give higher priority to irrigation O&M.

The Irrigation Commission at the district level has been established in my areas of Indonesia. In most cases they have not establish a secretariat nor have they been given a budget to permit the secretariat to function. The Irrigation Commission has the potential to become a very important part of the irrigation sector but in most cases it has not yet reached this potential.

The Irrigation Commission should be established at the district level throughout Indonesia. The Irrigation Commission should help finalize the cropping and irrigation plans, determine the priorities for maintenance and repairs, allocation of funds for O&M, identifying priorities for rehabilitation, make recommendations for district-level policies and irrigated land use conversion, water allocation plans, granting of water use rights, preparation of regional regulations about irrigation.

The Irrigation Commission should have a secretariat with at least two or three staff in the beginning and a budget to enable it to perform the functions of communications and networking among WUA and WUAF throughout the district. In order to adopt this recommendation a guide for establishing the Irrigation Commission and for making it become effective should be prepared, disseminated and incorporated into training and management consultation programs. Key staff of the Irrigation Service at district and provincial levels should meet with the head of each district and win his support for establishment and proper staffing and funding for the Irrigation Commission. The Irrigation Commission should be established with a secretariat of at least 2 or 3 staff in the beginning with a budget to perform essential functions. Someone in the provincial Irrigation Service should be assigned responsibility to monitor the activities of each Irrigation Commission at the district level and to provide support with capacity building.

8.3 Need to strengthen incentives and accountability mechanisms

Seniority-based, rather than merit-based, bureaucratic agencies lack sufficient incentives and mechanisms for accountability to the clients, water users, that they are serving. New systems of incentives and accountability, typical of modern, client-based organizations could shift the Dinas Pengairan into high performance organizations. It is likely to require several ways of introducing incentives in order to bring about a significant improvement in irrigation system operations and maintenance.

Staff in the provincial and district Irrigation Services often do not have significant incentives to perform their work up to satisfactory standards nor do they have effective accountability mechanisms to make them sufficiently responsible to their supervisors and clients, the water users. There is a need to increase the incentives for WUA/WUAF and Irrigation Service to implement operations and maintenance at a satisfactory standard.

There is a need to identify what kinds of incentives and accountability mechanisms and rewards and sanctions should be introduced into irrigation system management, for districts and WUA/WUAF, to support satisfactory performance of essential aspects of O&M. These incentives, accountability mechanisms, rewards and possibly sanctions should be considered and adopted as agreed to in the procedures of the Irrigation Service and the WUA/WUAF. Incentives to achieve operations and maintenance at a Minimum Satisfactory Standard of Performance should be identified and applied. For example, except for systems or sub-systems that are in urgent need of rehabilitation, there should be a requirement for demonstration of satisfactory maintenance for at least two years before the system or sub-system is eligible for rehabilitation.

Another way to increase incentives to achieve a satisfactory standard of maintenance may be to require pre-season maintenance at the tertiary level before water distribution to the tertiary canal can begin. Other means could be to have the Regional Government offer to implement maintenance in part of the system if the GP3A and member P3As do it in another part of the system. Other incentives should be identified for how to ensure that a satisfactory standard for both operations and maintenance will be achieved. Periodically, through Irrigation Management Audits, an irrigation system is evaluated in terms of to what extent it has achieved maintenance at the Satisfactory Performance Standard. In the education sector there is an arrangement in place where high performing teachers are awarded certificates that double their monthly income.

9. Challenge 6: Adopt needed policy, legal and regulatory changes

There are five priority Recommendations for Challenge 6, as follows.

9.1 Need a new Policy for the Irrigation Sector to enable improvements that are needed in the sector

The range of recommendations for innovations that are suggested in this paper, and the apparent potential support for continuing reform in the sector, suggest that a new Policy for Irrigation should be prepared to overcome inconsistencies in the current regulatory framework and to strengthen support for progressive reform in the sector in such a way as to give highest priority to satisfactory O&M, to give support for developing the capacity of WUAF as far as they are capable, and to lead the sector to more efficient, adequate and sustainable irrigation management.

9.2 Need Ministerial Regulation on financing irrigation

It is frequently the case that O&M and rehabilitation within a single irrigation system are financed from multiple sources. There is a need to simplify financing for irrigation management, consolidate funding sources, and enable regional governments to prioritize allocation of funds for irrigation system management. And in order to ensure the sustainability of irrigation management in the future, to provide direction for financing that is consistent with principles of participation, equity and effectiveness, with respect to financing, there needs to be a reliable assurance that sufficient funds will be made available through a Finance Ministry Regulation based on the advice of the Minister of Public Works about the mechanism for financing and allocating irrigation O&M to the provinces and districts. This should be done in accordance with actual needs for irrigation management to at least meet the Minimal Standard of Satisfactory O&M in accordance with needs-based budgets. This Regulation should also provide direction to regional governments to increase the proportion of their expenditures that are used for actual maintenance and rehabilitation relative to salaries.

9.3 Need Ministerial Regulation on human resources management to ensure adequate staff for the irrigation sector

There is a growing inadequacy in staff needed in the irrigation sector. The sector has difficulty mobilizing sufficient staff in competition with other sectors. There is a need for certification of certain staff positions and there is a need to modernize some recruiting and staff payment practices in order to insert performance incentives into irrigation system management personnel. It is time to modernize the human resources arrangements affecting civil servants in the irrigation sector in Indonesia. A key objective of the changes will be to improve the accountability and incentives of staff to achieve high performance.

There is a need for a Ministerial Regulation on human resources management that would help ensure adequate mobilization of staff for the irrigation sector, especially for the core positions of Irrigation Supervisor (Pengamat), Irrigation Inspector (Juru Pengairan), Weir Guard (Penjaga Bendung) and Irrigation Gate Guard (Penjaga Pintu Air). It should also enable introduction of some modern human resources management arrangements, such as recruitment procedures, staff remuneration rules, and performance reviews. It should be issued jointly by the Ministries of Home Affairs, Public Works and Manpower Discipline and Reform of Bureaucracy.

9.4 Need Ministerial Regulation on water use rights

There is a lack of a clear legal basis for water use rights in Indonesia. The rising competition and disputes over water distribution is having increasingly profound effects on the ability of irrigators and other water users to gain adequate access to water. There is a need to clarify and establish water use rights and procedures for allocating, administering, these for all water users. A more clear legal basis to establish water use rights is needed in order to provide the stability and trust that water users need in order to invest in water system maintenance and make optimal investments in their other sectors, such as for brick making, cattle raising, fish ponds, and so on.

In accordance with PP 20, Article 31, we recommend that a process be initiated to develop a practical method for establishing defendable water use rights that protect water users fairly, prevent over-exploitation of water resources and preserve water for environmental purposes.

9.5 Need Ministerial and Regional Regulations to minimize land conversion

Land use conversion out of farming is continuing unabated. Irrigation Service officers interviewed are at a loss about how to stop it from happening. If this is allowed to continue it will become more and more difficult for Indonesia to meet its needs for rice and other food crops. The parallel losses in irrigated land, the younger generation fleeing from farming, and the steadily rising demands for food require a more concerted, systematic effort to stop or slow down the uncontrolled conversion of rice land into non farming land, such as for urbanization and factories.

In accordance with Public Law 41/2009, more practical and effective ways need to be found to minimize farm land conversion. This will involve additional ministerial and regional regulations and other arrangements at the Kabupaten and P3A/GP3A levels to identify pressures for land conversion and enable preparation of counter actions to be taken. Land conversion should be prevented or stopped by the government with whatever methods are appropriate in each area.

For example, the government might buy sawah land being sold and the seller may rent it. Or sawah might be created in another place to replace sawah land that is lost through land conversion.

There is a need to identify which organization(s) should monitor and document occurrences of land conversion. The National Land Board (BPN), Ministry of Public Works (including Irrigation Services at regional levels), and Ministry of Agriculture (including Agricultural Services at regional levels) should be involved in enforcing regulations. The Irrigation Commission can draft a Regional Regulation about Land Conversion that is subsequently approved by the Regional Parliament (DPRD) and Regional Government. Members of WUAs can monitor land conversion and report cases to the Irrigation Commission, which in turn can report them to the BPN.

There is also a need to conduct inventories and mapping about irrigated land at present. Following Public Law 41/2009, there is a need to prepare and adopt regulations and an implementation guide to prevent land conversion. Spatial planning should guard against land conversion, with rules and methods for doing so and consequences for those who break the regulations.

This will involve politically sensitive power struggles at least in some cases. A working group should be appointed to identify potential ways and means to prevent or stop conversion of sawah land to other purposes. A concept paper should be prepared about how to prevent or stop conversion of irrigated land to other purposes. The Concept Paper should include recommendations for options that could be pursued. These may include such things as: 1) the government purchases land sold by owner and rents it out to those who farm it as irrigated land; 2) the land is sold and land use is changed only if an equivalent amount of land is developed into irrigated land elsewhere; 3) the seller must compensate the Department of Public Works for its costs of investment in creating the irrigation system that has delivered water to the land whose use is changed, and so on. Other potential actions would be identified. Necessary supporting regulations and instructions must be adopted in support of the strategy in order to prevent or stop land use conversion for irrigated land. Authorities involved then will take action to enforce the new regulations and instructions.

10. Suggestion for a pilot project

We have identified three areas that we believe would make the most difference and these are capable of being introduced through a pilot project in two or three provinces. The main constraints for high-performing and sustainable irrigation system management are: lack of O&M funds, shortage of qualified staff, inadequate training and experience, inadequate incentives and accountability mechanisms, poor planning and implementation of Irrigation Service Plans, inefficiencies in financing irrigation due to lack of needs-based budgeting, poorly performing Irrigation Services and WUA/WUAF, and lack of adequate Irrigation Service Fees.

In order to move forward on the core innovations needed at the district and provincial levels, we suggest that a pilot project be implemented in one district in each of three provinces to be

selected. It is our opinion that a pilot project should consist of three components, each of which is dependent on the other to achieve a significant improvement in irrigation sector performance. These are the following.

1. Support the development of the provincial and district Irrigation Commissions to achieve their full potential to mobilize sufficient funds for O&M, allocate funds according to priority needs, promote and prioritize capacity building, direct Irrigation Management Audits, support Management Consultations, help regulate the sector and promote support services needed by WUA and WUAF. The Irrigation Commission should have a Secretariat with at least 3 full-time staff.
2. Establish a Unit of Irrigation Management Experts at the province level. Most often these will be retired experts with extensive successful experience in irrigation system management. A program of management consultations should be initiated with priority Irrigation Services and two or three irrigation systems within the selected district.
3. Prepare a capacity building program that includes a training needs assessment, an updating of training modules for all topics needed. Potential trainees include Management Experts, province and district-level Irrigation Services, irrigation system management staff, and WUA and WUAF officers and staff.

11. How to move forward?

In order to create optimal solutions for the future it will be necessary to bring experts and stakeholders together to discuss and evaluate options, answer key questions through research, propose recommendations to policy makers, introduce and refine key innovations through pilot projects, mobilize political support for the changes, make policy, legal, regulatory and programmatic decisions, allocate resources needed and obtain needed financial and technical support from multi- and bi-lateral agencies.

As the pace of change accelerates, so does the need increase to prepare for the future, starting today.

End