

## FARMERS' PARTICIPATION IN THE TRANSITION OF THE IRRIGATION MANAGEMENT SYSTEMS : Lessons Learned from the WISMP Program

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### ABSTRACT

Awareness of the importance of farmers' participation has emerged since a long time in Indonesia and have succeeded in making farmers' participation as part of the irrigation sub-sector development policy. The development of farmers' participation officially became one of the important Indonesian government programs. One of them is the WISMP program which is funded with assistance from the World Bank. Many valuable lessons can be learned from the WISMP experience, including the application of models of cooperation between farmers and the government in implementing rehabilitation of irrigation schemes proven to be effective in increasing farmers' participation. There are three models of farmers and government cooperation, namely full self-management, appointment self-management and sub-contract. The sub-contract model is most widely implemented followed by the appointment self-management and the full self management models. The evaluation results of the level of farmer participation showed that the majority of WUAF (62.17%) reached high participation level, and the other half (35.65%) achieved a moderate participation level and a small percentage (2.17%) of low participation level. Institutionalization of farmers' participation faces five challenges and obstacles, firstly, the authority distribution of irrigation management according to the level of government, namely the central, provincial and district levels. Second, the separation of functions of fostering farmer institutions, technical development of irrigation and of agriculture handled by different government agencies. Third, the procurement of government services and goods regulations is less conducive for farmers' participation development. Fourth, the government's planning and budgets mechanism is so rigid that create hurdles for farmers' participation. Fifth, the existence and quality of government agencies' staff that are less supportive of the needs of developing farmers' participation. In the scale and scope of the WISMP project, these constraints cannot be fully overcome and even cause delays in the smooth running of activities. Greater difficulties will be faced in the environment of program and activity mechanisms that are routinely running. The urgency of developing farmers' participation is now facing new challenges arising from changes in the strategic environment. First, the increasing need of water for non-irrigation purposes which forces more efficient use of irrigation water. Second, impact of climate change and third, the rapid advancement of communication and information technology that makes easier for farmers to obtain information for farming production and marketing. Sooner or later, the need for modernization of irrigation as a logical response to these changes will make the issue of participation more questionable. The assumptions and principles of participation that have so far been held may have to be reviewed.

**Keywords** : farmer participation, irrigation modernization, socio-technical, climate change, information and communication technology.

### INTRODUCTION

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Farmers' participation becomes an inseparable part of irrigation management as in fact farmers are irrigation water users whose needs and aspirations cannot be ignored. Base on the existing Indonesia's law, the farmer community has a responsibility in managing irrigation schemes at the tertiary level of irrigation schemes in irrigation systems that are built and managed by the government. Awareness of the importance of farmer participation in irrigation management has emerged for a long time in Indonesia and efforts to provide space and strengthen have succeeded in making farmers' participation as part of the irrigation sub-sector development policy. Strengthening and developing farmers' participation gained new momentum when policy reforms were implemented following the recovery of the economic crisis in 1998. Strongly institutionalized in the policies and legal products resulting from policy reforms in the field of water resources and irrigation, the development of farmer participation officially became one of the important programs that were launched by the government. One of them is the WISMP program which is funded with assistance from the World Bank<sup>2</sup>.

### **WISMP PROGRAM**

The WISMP (Water and Irrigation Sector Management Program) program is one of the programs launched by the Government of Indonesia to implement water resources and irrigation policy reforms with the World Bank loan assistance, following changes in the water laws, especially the Law No. 7 of 2014 on Water Resources and the Government Regulation No. 20 of 2006 on Irrigation. The Phase I WISMP program began in 2007 to 2012, covering 13 provinces and 99 districts. The Phase II WISMP program started in 2013 and ended in 2018 with the same number of provinces but more districts, i.e 101 districts. The long-term goal of the WISMP was to increase economic growth and reduce poverty in selected districts in rural Indonesia with the sustainability of decentralized irrigation management, and to increase productivity or yield from irrigated crops. The WISMP program has three main components, namely Strengthening the Management of Water Resources in the River Region, Strengthening Participatory Irrigation Management and Strengthening Project Management which are supporting components. In Phase II, one more component was added, namely Strengthening of the Jatiluhur Irrigation Management. As reflected in its components, the implementation of the WISMP Program involved the roles and responsibilities of cross-sectoral and cross-regional government agencies. The management of the WISMP Program involved four ministries at the central level, namely the Ministry of National Development Planning, Ministry of Public Works and Housing (PWH), Ministry of Home Affairs (HA) and Ministry of Agriculture. At the provincial and district levels, there are three Regional Government Agencies, namely the Regional Planning and Development Agency (Bappeda), the Regional Water Resources Development/Public Works Agency (Dinas PSDA/PU) and the Regional Agriculture Service (Dinas Pertanian). Meanwhile in the Ministry of PWH, there are two functions that are carried out, namely the function of program management and the function of program implementation, each of which is held by a different directorate unit. Likewise, at the provincial and district levels, these two functions are held by Bappeda. Each of these agencies carries out their respective functions within the normative boundaries of the main tasks established in the organizational structure of the relevant ministries and offices.

### **FARMERS' PARTICIPATION**

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<sup>2</sup> Beside WISMP, it was also existed the Irrigation Management of Participatory System (PISP) supported by ADB's loan and the West Nusa Tenggara – Water Resources Management Program supported by the Dutch Government's Grant

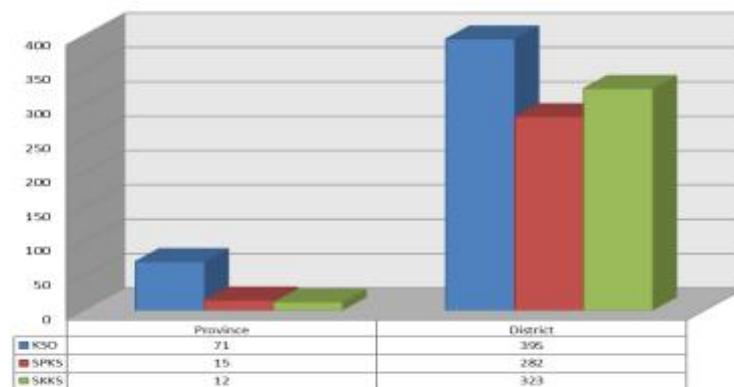
An important issue in the WISMP Program is the participation of farmers in the development and management of irrigation systems. After the adoption of the participatory principles in the law, the WISMP Program is the the first practical effort to implement the concept of Participatory Irrigation Managemen and Development (PIMD) as regulated in the law. There are five program elements in the WISMP Program that are designed and implemented to realize farmers' participation in the rehabilitation of irrigation schemes. *First*, the agreement of roles and responsibilities sharing of PIMD among government agencies that have tasks and responsibilities related to irrigation at the central, provincial and district levels. The roles and responsibilities sharing is inevitable because irrigation is an affair involving responsibilities between sectors and between regions in accordance with the division of authority as stipulated in the law. Broadly speaking, there are three main government agencies that have tasks and responsibilities related to irrigation matters: (1) Ministry of PWH agencies whose responsibilities for irrigation engineering, (2) Ministry of Home Affairs agencies whose responsibilities for synchronizing regional development between sectors and (3) Ministry of Agriculture agencies having responsibilities for agriculture and empowering farmer communities.

*Second*, the preparation and implementation of a series of program activities in a sequence that is chronologically and systematically integrates the processes of farmers' participation in each stage of schemes rehabiltion process. Broadly speaking, there are three main steps that must be carried out sequentially by following the technical process of irrigation scheme rehabilitation (SIDCOM), namely the stages of Survey, Investigation and Design, the implementation phase of Construction and the Operation and Maintenance (OP) stage. At each stage, the farmers participate in a form that is in accordance with the nature of the technical activity at the relevant stage. In practice, it was not easy and cannot always be adhered to consistently in that sequence because of the region and the field circumstances that are not always ready with the conditions required.

*Third*, institutional preparation and empowerment of farmers. The participation of farmers in the management of irrigation systems is understood as the participation of farmers in the primary and secondary irrigation schemes management, because tertiary schemes are already the responsibility of the farmers themselves. The participation was carried out through the organization of water users, namely the Water User Association (WUA) at the tertiary level and Federation of WUA (WUAF) at the secondary level as well as the Apex of WUA (WUA Apec) at the primary or system level. In the WISMP Program as rehabilitation of irrigation schemes was only carried out on primary and secondary schemes, the farmers' organization required wasthe WUAF. To encourage and facilitate the formation of WUA and WUAF, a Community Organizer (CO) is assigned which also acts as a mediator in connecting WUA/WUAF with concerning regional agencies and implementer of irrigation schemesrehabilitation.

*Fourth*, training of farmers' participation in rehabilitation of irrigation schemes. After the WUA/WUAF was formed, its boards and some of its members were included in the participation training which was divided into three types of training, namely the Participative Design training, the Participative Constuction training and the Participative O & M training. As the name implies, the three types of training are carried out according to the stages of ongoing technical activities. Usually before the technical activity stage is carried out, or at the beginning of the relevant stage, training is carried out by the Dinas PSDA/PU both at the provincial and district levels. The Participation trainings is not only given to the WUA/WUAF'sboards and members, but also to Dinas PSDA/PU's staff so that all have readiness to carry out the participation process.

*Fifth*, the implementation of farmers' participation in the construction of irrigation scheme rehabilitation activities through appropriate cooperation models. There are three models of cooperation that are chosen, namely the full self-management model by signing the Memorandum of Understanding for Cooperation (SKKS), the appointment self-management model by signing the Memorandum of Agreement for Cooperation (SPKS) and the sub-contract model with the implementing party stated in the Memorandum of Operational Cooperation (KSO). The three models created in accordance with the procurement system of Government goods and services as stipulated in the Presidential Regulation No. 54 of 2010. The first model where the WUAF participates just as labors in construction works carried out by Dinas PSDA/PU is applied for WUAF which is considered not yet capable of carrying out technical works in the construction of irrigation scheme repairs. The second model, is a self-management method with direct appointment. WUAF which is considered capable of carrying out construction work will be appointed as the executor of the work by the Agency but still in the responsibility of the Agency for administrative matters. The third model is the contractual method in the procurement of government services and goods where the contractor who has won the job auction is required to work together with WUAF as a sub contractor. In reality, as shown in the table of Figure 1, the KSO model was most widely applied, followed by the SPKS and SKKS models.



**Figure 2.** Number of cooperation models between WUAF and the Government in the implementation of the construction of the irrigation scheme rehabilitation of the WISMP Program (NPIU Irrigation, 2013)

The extent to which the WUAFs' participation successfully realized in the WISMP Program can be seen from the results of the WUAF's participation level assessment as follows. The assessment was carried out in the 2012 to 2015 Budget Year for 230 WUAFs, consisting of 23 WUAFs in irrigation systems under the Provincial authority and 207 WUAFs in irrigation systems under the District authority.

### **WUAF's Level Participation**

The level of participation of WUAF was assessed from the involvement of WUAF in four stages of activities, namely design and construction for rehabilitation of irrigation schemes, routine operation and maintenance of irrigation schemes. WUAF participation is ranked into three levels, namely Low, Medium and High based on the scores obtained from the results of the assessment. The assessment was carried out by an Assessment Team formed by Dinas PSDA/PU consisting of staff from the Dinas PSDA/PU, Bappeda and Dinas Pertanian both at the provincial and district levels at the location of the WISMP Program assisted by CO. Of the 230 WUAFs

assessed, the majority (62.17%) reached the High Level of Participation, as much as 35.65% classified as Medium and only a small portion (2.17%) classified as Low. Figure 2 visually shows the results of the overall assessment.

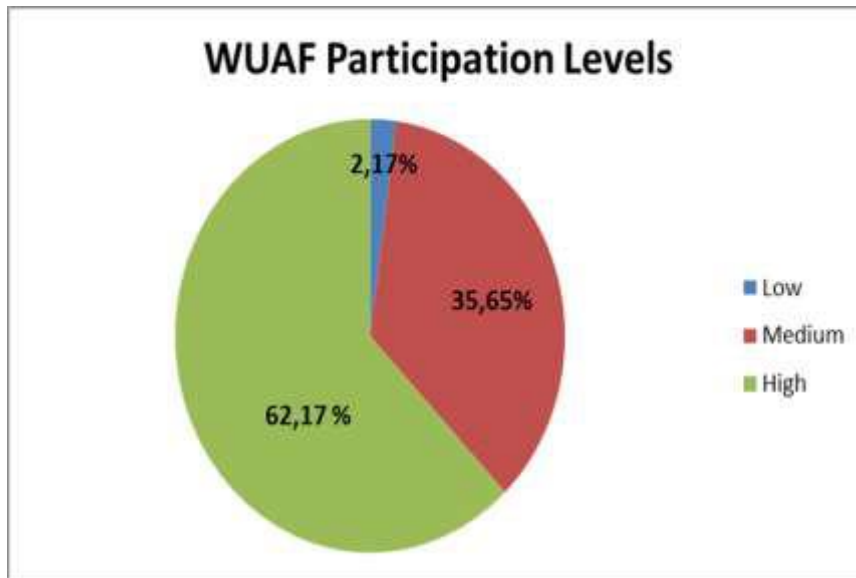


Figure 2. WUAF Participation Levels

## CHALLENGES AND CONSTRAINTS

Although successfully completed with many worthy results, the implementation of the WISMP Program faces several challenges and obstacles. Launched at a time when the government is undergoing a transition to massive reform in almost all fields, including water resources and irrigation sector, the WISMP Program is required to find appropriate ways to achieve its goals and objectives. There are five main challenges that require the readiness of the WISMP Program in carrying out its activities. *First*, the division of authority for the development and management of irrigation systems between the Central Government, the Provincial Government and the District Government. This division causes changes in the management of irrigation programs, which are new things for all government officials responsible for irrigation, both at the central and regional levels. Complexities have to be faced when the WISMP as the central government's program needs to channel funds to local governments because almost all of the irrigation areas as location of the program are under the authority of the Provincial Government and the District Government. Procedures for budgeting and planning programs in hierarchical stages with financial regulations and strict supervision often become the main obstacles hampering the program implementation.

*Secondly*, the post-reform regional autonomy policy that freed the regions to regulate affairs under their responsibility had an impact in arranging institutional structures of the local government dealing with irrigation matters. The most significant impact of the restructuring regional organizations is the elimination of organizational units managing irrigation activities at the field level, namely the monitoring unit (Kepengamatan) in charge of field officers such as Juru Pengairan, weir officers, gate officers and maintenance Officers. This happened especially for irrigation systems

under the authority of the Central and Provincial Governments, while the District Government actually suffered an abundance of field workers who initially served in the irrigation systems of the Central and Provincial authorities. A further impact of the changes is the scarcity of skilled workers who handle irrigation management especially at the field level. The lack of clarity in the position of the assignment and the changing situation of local government institutions has made trained and experienced personnel who initially deal with irrigation matters scattered everywhere. For the WISMP Program, which has an interest in preparing staff having the capacity to implement a participatory approach, it becomes difficult to get the right staff and be able to remain in their position to take part in training and handle WISMP activities.

*Third*, regarding the empowerment of irrigation water users, which previously within the scope of duties and responsibilities of the Ministry of Public Works turned to the Ministry of Agriculture. This change requires adjustments in activities for preparing water users institutions to participate in scheme rehabilitation carried out in the WISMP Program. The difficulty faced is that on the one hand the WUA/WUAF institutional preparation responsibility lies with the Agriculture Service agency, while the responsibility for implementing the irrigation scheme rehabilitation work lies with the PSDA/PU agency. *Fourth*, the existing planning procedures for development government activities and budgets. Procedures for planning activities and budgets for ministries and state institutions have been regulated based on laws and regulations, namely Government Regulation No. 90 of 2010 concerning Preparation of Ministry / Institution Work Plans and Budgets. While based on this regulation the formulation of the activity and budget plan is carried out by each ministry and institution at every level of government, a series of WISMP Program activities designed to institutionalize farmers' participation must integrate activities at all levels of government and related sectors. To answer this challenge, the WISMP Program prepares the Annual Work Program (AWP) before the ministries / agencies starting preparation of their activity plans and budgets. It is hoped that based on the AWP, the ministries and agencies participating in the WISMP Program will plan and budget their activities for the State or Regional Budget Plan that will be officially established then. This strategy is quite effective, but does not always go as expected and if there are changes that need to be carried out the procedures taken also require the approval of the World Bank as the lender.

*Fifth*, the existing government procurement system for goods and services. Procurement of government goods and services as regulated under Presidential Regulation No. 54 of 2010 must be followed to carry out the participation of farmers in the rehabilitation work of irrigation schemes. The provisions of the regulation require certain legalities and technical capabilities that cannot be fully prepared by farmer institutions. Therefore, in the WISMP Program models of cooperation with farmers were developed, namely the SKKS model, SPKS model and KSO model as stated earlier. However, in practice, there is a tendency to prefer the KSO model that actually less participation weight.

## **CHANGES IN STRTEGIC ENVIRONMENT**

The participation of farmers as embodied in the WISMP Program rests on the great impetus created through the implementation of the WISMP Program. It can be seen that the complexity of the government bureaucracy makes it difficult to implement and institutionalize farmers' participation. Models of cooperation between farmers and the government to accommodate farmer participation should be applied in the routine of irrigation sector development activities after the end of the WISMP Program. However, this requires a readiness of a set of regulations and institutional mechanisms and personnel that support the implementation of such cooperation models. Without this support, the participation of farmers will return only to become a jargon that cannot be realized.

Farmers' participation in the WISMP Program is carried out on the assumption of a conventional irrigation management system that has many problems. Generally there is a consensus that the performance of irrigation management in Indonesia is not in maximum level. The system of supplying, distributing, giving and using water is still not optimal so irrigation efficiency is very low. Lack of costs recovery caused many irrigation scheme repair works to be delayed.. In addition, irrigation scheme rehabilitation projects become routine every year to repair the damage that continues to accumulate. The participation of farmers in this type of irrigation management system is needed more for cooperation in the process of rehabilitation of irrigation schemes.

After decades of persisting in conventional irrigation management systems, changes in the strategic environment are increasingly demanding adjustments. At least three changes in the strategic environment will be discussed to understanding their impact on the irrigation system and participation of farmers, namely increasing water demand for sectors outside irrigation, global climate change and advances in information and communication technology.

### **Increasing water demand for non irrigation sector**

Low irrigation efficiency will be confronted with increasing water demand for sectors outside irrigation. Especially for irrigation systems where the supply of water is supplied from dams, there is an urge to increase efficiency to support the optimization of dams in order to increase raw water supply for drinking water needs. Of the 14.1 billion m<sup>3</sup> of raw water available at 224 dams at present, most of it is still used for irrigation (913,423 ha) and a small portion is for drinking water (40.9 m<sup>3</sup> / dt) and electricity (4059.3 MW) . Meanwhile, the achievement of raw water infrastructure development until 2019 only reached 78.68 m<sup>3</sup>/ sec, far from the target set in the RPJM of 118.6 m<sup>3</sup>/sec. The target can actually be achieved if optimization of the existing dam can be done, which will reach 216.3 m<sup>3</sup>/sec (Idris, 2019).

Demands to improve irrigation efficiency are also implied from cases of conflict that occur between the use of irrigation and drinking water in the regions, among others, the case of Umbul Temanten in Sleman Regency, the case of Umbul Betek, Umbul Ingas and Juwiring in Klaten Regency of Central Java Province. In accordance with Indonesian laws and regulations, the use of drinking water has a higher priority than for agriculture (irrigation) so that if the demand for drinking water is getting stronger, the use of water for irrigation will be reduced. Farmers who have been judged to be excessive in using water for rice cultivation will be required to save more money.

### **Global climate change**

As a result of global climate change in the form of changes in rainfall patterns and extreme climate events will increase the threat of flooding and drought. Changes in the pattern of rain also caused a decrease in the availability of water in the reservoir, for example for 10 years the average volume of water flow from the Citarum watershed into the reservoir decreased from 5.7 billion m<sup>3</sup> to 4.9 billion m<sup>3</sup> per year. The same conditions occur in Gajah Mungkur and Kedung Ombo Reservoirs. Another impact of changes in rain patterns is a shift in planting time, planting season and cropping pattern. There was a tendency to shorten the rainy season and increase rainfall in the southern part of Java and Bali, on the other hand the extension of the rainy season and lower intensity in the North Sumatra and South. These changes will force farmers to be more responsive and alert in planning their farming. Likewise, the preparation and stipulation of the Planting Plan (RTT) through the Irrigation Commission is required to adjust to changes in cropping patterns that occur. The irrigation management system by itself will also be required to respond more quickly

to changes in seasonal conditions and rainfall patterns, while minimizing the adverse effects of increased droughts and floods.

### **Information and Communication Technology Development**

The development of information and communication technology in recent decades has become an extraordinary phenomenon that changes many things. The progress of information technology since the 1970s was called by the Memmi (2015) as a revolution that gave birth to the post-industrial era. The appearance of computers and the internet has created new communication patterns that are no longer just face to face, but also point to point. There are five fields of irrigation management activities that can utilize the information and communication technology advances, i.e information dissemination, mapping, management and governance, data analysis and learning.

### **IRRIGATION MODERNIZATION AND FARMERS' PARTICIPATION**

Seeing the conditions and problems faced by irrigation systems as described, the logical response that has began to emerge is launching an irrigation modernization program in Indonesia. Through the Irrigation and Swamp Directorate, Director General of Water Resources (DGWR), the Ministry of PWH has pioneered and conducted studies to develop guidelines for the implementation of irrigation modernization in Indonesia. A number of projects have also been directed towards implementing measures of modernization of irrigation according to their readiness. In summary, the concept of irrigation modernization prepared by the DGWR was built with an insight of the five pillars of irrigation management, namely water supply, infrastructure, irrigation water management, institutions and human resources. The modernization of irrigation defined as the efforts to realize participative irrigation management systems effectively, efficiently, sustainably in order to support food and water security through efforts to improve water supply, infrastructure, irrigation management, management institutions and human irrigation management (Soekarsno et al, 2011).

In this definition the term participation is still included as an irrigation system attribute, but the question is what kind of participation is intended? Is participation as it has been developed in Indonesia as manifested in the experience of the WISMP Program? There is no detailed explanation in the concept of modernization that has been developed by Soekrasno et al about the intended participation. It seems that it will still maintain the concept of participation as it is known as PIMD.

The concept of participation as formulated as PIMD in Indonesia is the translation of participation ideas that have been introduced since the late 1970s and early 1980s. Farmers participation in irrigation management is generally considered as important and useful. Meinzen-Dick et al (1995) mention several benefits such as reducing government funding for irrigation system management, improving the performance of irrigation systems, increasing sustainability and more equitable and equitable water distribution. Sun (1997) cited several reasons underlying the importance of farmer participation, namely the comparative advantages that farmers have, improving the design, construction, operation and maintenance of irrigation schemes, low funding from the government and social capital of farmers who can provide further benefits.

A basic assumption that is generally accepted as a theoretical basis for the urgency of farmers' participation in irrigation management is the view of irrigation systems as a socio-technical system, that irrigation is not only a physical and technical engineering, but also contains socio-cultural dimensions (Ambler, 1992). The participation of farmers as a community that provides a social environment with all its cultural values is therefore a necessity because the interaction of the irrigation system and the

environment of the people served cannot be cut off unless it is only made as a dead monument that does not function. As Coward said that wherever channels (wells, springs or anything) serve more than one person, patterns of social interaction will greatly determine the use of these facilities (Coward, 1988).

In a conventional irrigation management system that is oriented only to maintaining the condition and function of the existing infrastructure without modernization, farmers' participation is sought to be fully realized in the whole stage of irrigation management, namely operation, maintenance and design process and construction of irrigation scheme rehabilitation. Although not fully realized, the farmers participation then is just a process of optimizing the participation of farmers in technical processes whose procedures, rules and norms have been completed and accepted together. When irrigation management systems and infrastructure are no longer oriented only to the initial system design, but move towards modernization with new goals and technology, then as a socio-technical system, both the technical physical aspects and cultural sosia also move towards modernization. In this case irrigation modernization cannot be seen merely as a process initiated and driven only by one actor such as the government, but also as a result of the participation of other actors, especially farmers.

Given the challenges and opportunities that are open to changes in the strategic environment as outlined, the view that farmers' participation means that farmers must be involved in the whole irrigation management process may not be right anymore. New and increasingly sophisticated technologies for modernization will require new skills that farmers will not be able to reach. Meanwhile the advancement of information and communication technology provides opportunities for farmers to access information and conduct the learning process independently without relying on services provided by irrigation managers. The only service function that will continue to be the demand of the farmer is the fulfillment of the water needs in the right amount, time and quality at the lowest possible cost and in the easiest way possible. But all of them are the result of consensus between farmers and irrigation system managers through a more meaningful process of participation since the beginning of the designation of the modernization step.

## **CONCLUSIONS**

Farmers' participation in irrigation management has been believed and will remain relevant to be realized and made part of an effective and sustainable irrigation management system. The conceptual and theoretical understanding of a comprehensive irrigation management system as a socio-technical system requires the participation of farmers as elements that cannot be abandoned. However, the realization of farmers' participation in irrigation development and management practices is not an easy matter and quickly reaches expectations. The experience of the WISMP Program as an effort to institutionalize farmers' participation with the support of a solid legal foundation in Indonesia, still shows a number of obstacles as challenges that must be overcome. This paper has revealed five obstacles that directly or indirectly inhibit the realization of the participation of farmers in irrigation management, which includes the distribution of authority and responsibility for irrigation management between the central, provincial and district/city governments; the regional autonomy policy that gives regional governments the flexibility to organize their respective government structures; the separation of functions of fostering farmer institutions, technical development of irrigation and of agriculture handled by different government agencies; procedures for planning government activities and budgets that are separate between sectors and between regions and systems for the procurement of government goods and services that cannot fully meet the requirements for farmer participation. With all the challenges faced, the WISMP Program also provides several important lessons concerning models of

cooperation between farmers and the government in the implementation of rehabilitation of irrigation networks, covering the full self-management model by signing the Memorandum of Understanding for Cooperation (SKKS), the appointment self-management model by signing the Memorandum of Agreement for Cooperation (SPKS) and the sub-contract model with the implementing party stated in the Memorandum of Operational Cooperation (KSO). The KSO model is the most widely applied model in both provinces and districts, followed by the SPKS and SKKS models at the provincial level and SKKS and SPKS models at the district level. The evaluation results on the level of farmer participation in irrigation management showed that most (62.17%) reached high participation rates, followed by moderate participation rates (35.65%) and low participation rates (2.17%).

While the institutionalization of farmer participation in the management of irrigation systems still requires a lot of efforts, the irrigation system is now also facing challenges from changes that occur in the strategic environment. Three changes in the strategic environment have been described and discussed, namely increasing water demand for sectors outside of irrigation, global climate change and advances in information and communication technology. Furthermore, it has been presented the irrigation modernization program that is now being initiated by the Government through the Directorate General of Water Resources, Ministry of PWH to overcome irrigation problems in Indonesia. Besides being an effort to overcome the problems that arise internally, the modernization of irrigation is also a relevant response to address the challenges arising from changes in the strategic environment. With regard to farmer participation, this paper underlines the importance of continuing to see irrigation systems as a socio-technical system so that the steps of modernization of irrigation should not only be the product of ideas and driven by the government as one of the actors, but also farmers' aspirations and involve socio-cultural aspects of farmers related to irrigation. The participation of farmers in modern irrigation systems does not have to involve farmers in the whole irrigation management process such as conventional irrigation systems, but consensus remains to be reached between irrigation system managers and farmers from the very beginning of the modernization design to ensure fulfillment of water demand in properly amount, quality, quantity and time with the lowest possible cost and in the easiest possible way.

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