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Participatory Irrigation Management : comparing theory with practice a case study of the Beni Amir irrigation scheme in Morocco

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Summary - Participatory Irrigation Management (PIM) and Irrigation Management Transfer (IMT) are studied at three levels : the international literature, the policy and action taken in Morocco and field work in the Beni Amir large scale irrigation system. International literature argues that management will improve if users can take management decisions that are the outcome of local negotiations between stakeholders and based on local knowledge and normative frameworks. Since the 1980s, several governments have adopted these turnover programs, often as part of the requirements of a structural adjustment package negotiated with IMF and international development banks. This shows that in many countries the tight financial situation of governments has been important for introducing PIM/IMT. The management transfer from the State to Water Users Associations (WUAs) has been more successfully achieved in some places (Mexico, Colombia and Turkey), than in other places (India, Pakistan, Philippines). Literature provides explanations as success factors for PIM/IMT like relative strength of economy and central government, higher literacy and standard of living. These factors are largely valid for Morocco and thus raises the question about the Moroccan progress in the domain of PIM in large scale irrigation. PIM policy was introduced by the government in 1990 and specified in 1995 as a policy that should be progressively spread, selective depending on location, adapted to the physical and organizational environment, contractual with the water users as partner and finally provide financial advantages for the water users. Field research took place in the Beni Amir large-scale irrigation system in Morocco, situated 200 km south east of Casablanca, where PIM policy became an issue in 1990. In the context of disengagement of the Moroccan state, objectives of the regional government agency responsible for irrigation management in the area (named ORMVAT, Office régional de mise en valeur agricole du Tadla) are to evolve from a complete State management up to farm level, to a more participatory management. Recent field work in which a check list of management tasks performed by farmers was used, showed that, contrary to the policy objectives, WUAs in the Beni Amir system are weakly involved in decision making and hardly perform tasks in irrigation system management. We found that PIM implementation in Morocco does not comply with the theoretical models that have been developed in Mexico, Turkey, the Philippines or elsewhere. This proves the hypothesis that PIM is context-specific which requires that before attempting to implement major institutional reforms in the irrigation sector, it is necessary to understand the national as well as the local context, the opportunities it offers, and the constraints it places on successful institutional reform. Even though local conditions in Beni Amir somehow fit with some points of the theory related to PIM/IMT (i.e. water scarcity should stimulate irrigation reform, the relatively good performance of the infrastructure should permit that IMT programs take off relatively “quickly”,

availability of cash money for farmers to pay water fees), PIM programs did not come off the ground in Beni Amir. Case specific reasons that could explain the hesitance of PIM/IMT implementation are i) the irrigated perimeter of Beni Amir, as it is managed nowadays by the ORMVAT, functions relatively well, ii) the society is characterised by relatively strong central rule, iii) rigid labour relations in the civil service and iv) farmers are hesitant to take over the irrigation management.

Key words : PIM, Tadla, Morocco

1 PIM and IMT : general theory

1.1 PIM and IMT : definition

The World Bank (1996) defines Participatory Irrigation Management (PIM) as “the involvement of irrigation users in all aspects and all levels of irrigation management” :

- “Involvement” is flexible, ranging from light involvement like information sharing, consultation, and joined assessment of problems to real involvement like shared decision-making, collaboration, and full say by the water users ;
- “Users” refer to water users. The World Bank employs the word userism to express the essence of PIM, because it is management of the users, by the users and for the users. The concept of PIM is then also related to the concept of Water Users Associations (WUAs) ;
- “All aspects” include the initial planning and design of new irrigation projects or improvements, as well as the construction, supervision, and financing, decision rules, operation, maintenance, monitoring and evaluation of the system ;
- “All levels” include tertiary, secondary, main system level as well as project and sector level.

PIM may include the reordering of control over (claims to) water, the redefinition of boundaries and domains of governance and the construction of new entities (users, WUAs, etc.). There is however a large variety in the number of functions that can be transferred, the degree of transfer of the different functions, and the organisational set-up aimed at after transfer. This is due to the fact that participation in irrigation management by water users can take a wide variety of forms. Farmers can be involved in various system management functions, including planning, design, operation, maintenance, rehabilitation, resource mobilization, and conflict resolution. Moreover, they can be involved in these functions at various system levels : from the field channel to the entire system. Almost all irrigation systems show some involvement of water users in the system management. When people speak of introducing PIM, they are usually referring to a change in the level, mode, or intensity of user participation that would increase farmer responsibility and authority in management processes (Svendsen *et al.*, 2000[11]).

The concept of PIM is closely linked to the concept of Irrigation Management Transfer (IMT). Indeed, IMT is a subset of PIM. IMT can be defined as the transfer of responsibility and authority for irrigation system management from government agencies to water users associations, or other private sector entities. This is a broad and rather vague definition. IMT may include transfer of decision-making authority (or governance). It may include transfer of ownership of scheme infrastructure (which is normally considered privatisation). It may include transfer of water rights from government to water users associations. Or it may only include turning over to water users a part of the management responsibilities, such as water delivery, canal maintenance and fixing the water fees, while final approval of operation and maintenance (O&M) plans and budgets are subject to government approval (FAO, 1999).

1.2 PIM and IMT : Why ?

Over the last decades, a large number of countries around the world have adopted programs to transfer management of irrigation systems from government agencies to water users associations or other private entities. Indeed, IMT reforms are at present taking place in many Southern countries that possess a substantial irrigated area.

Governments often adopt PIM/IMT programs in order to improve the financial and physical sustainability of irrigation systems (as in Mexico and Chile), to improve water management and agricultural productivity (as in Andhra Pradesh in India), and to cope with constraints on government budgets (as in the Philippines and most other places). Farmers sometimes promote IMT in order to gain control over the irrigation system and improve the water service (as in the Columbia Basin, USA, Australia). Or they may put pressure on the government to take over management of irrigation systems in order to gain control over use of irrigation service fees and stop irrigation expenditures from rising (as in the Coello and Saldana systems in Colombia and the Dominican Republic) (FAO, 1999).

Van Vuren (1998[13]) analyzed four different angles to answer the question "why participation in water management?". According to a decentralisation perspective, PIM can help to diminish the role of governments, to liberalize the economy, to let more economic room for individual and democratic principals in governance. Also a reason for the government to adopt this new form of farmer participation is the influence the donors have, by making it a prerequisite for financial support in system rehabilitation. According to a financial perspective, PIM is believed to have a positive influence on cost recovery in irrigation systems (farmers will be more motivated to pay fees, staff reduction, lower salaries, better supervision of staff, etc.). Indeed, "an important reason for governments to establish water users associations now is to reduce costs and increase fee income" (Vermillion, 1995[12]). According to an infrastructural perspective, PIM can avoid destruction of the infrastructure by farmers, enable a quick response to system breakdown reducing maintenance costs, reduce water theft, promote a better maintenance, etc. Finally, to a societal perspective, PIM can help to create the feeling of ownership, stimulate self development and a democratic society, achieve more efficient management, etc.

Geijer (quoted by Oorthuizen, 1998[7]) also analysed reasons that can explain why PIM and IMT take place :

- It reduces government expenditure on irrigation system operation and maintenance,
- It improves system performance and productivity, It responds to pressure of external funding agencies,
- It responds to broader national democratization and privatization policies and programs.

However, it seems that the main reason behind IMT is a financial one. In the eighties, most Southern governments were dealing with a financial and economic crisis. Also, international funding for irrigation development declined sharply in the eighties. In the mid 1980s, most governments started to feel the heavy financial burden on their national budgets as a consequence of investments in irrigation. As government surplus staff is not easily laid off, and governments reduce the budgets across the board, budgets for O&M were declining every year. Consequently, irrigation systems deteriorated due to deferred maintenance. Water fee collection was usually very low, due to a combination of poor services provided by the government agencies and for historical political reasons. This inability of governments to continue to finance O&M and the often meagre collection of water fees from farmers, forced governments into IMT reform programs.

Many researchers have tried to determine the factors that restrain or stimulate the IMT process. Vermillion for example, based on a study of IMT programmes in five countries, has identified the five following conditions for successful IMT efforts (Vermillion, 1995[12]) : strong high-level political support with clear policy direction, legal basis for new managing entities, economic benefits for farmers, well defined water rights at system and farmer levels, functional irrigation

facilities.

One could wonder why IMT has been implemented in such a rapid and dramatic manner in several countries such as Mexico, Colombia and Turkey, and why this is not happening in countries like the Philippines, India, Pakistan. Still according to Geijer (quoted by Oorthuizen, 1998[7]), it is suggested that the difference in IMT programs between Mexico and Turkey on the one hand, and some Asian countries on the other hand is caused by the fact that the former have stronger economies, higher literacy rates and standards of living among farmers, stronger central governments, and stronger local institutions. However, we can see that in Morocco, where a strong central government exists, standard of living is comparatively good, the IMT process is not as rapid as theory predicts. We will see in the last section of this article how this theoretical point can be discussed. However, conditions for success of change in irrigation management are indeed strongly linked to context specificities. Implementing a program of management transfer is a complicated undertaking that involves incurring costs and affects the lives and livelihoods of many people. It is thus not desirable to enter into such a program without defining whether the benefits of the changes are positive and significant and for whom.

2 PIM in practice

2.1 Adoption of PIM policies in Morocco : objectives and strategies

It is in the context of disengagement that the Moroccan State opted, in 1990, for the development of Participatory Irrigation Management in large-scale irrigation systems. For the State, the option of PIM was a strategic choice for revising the strategy inaugurated in the beginning of the sixties that was based on an hydro-agricultural development created, planned, financed, made and managed unilaterally by the State.

By creating WUAs the idea was (AGR, 1999[1]) :

- to promote participation and to give effective responsibilities to the water users in the development, operation and maintenance of the infrastructure,
- to promote a dialogue and a planned action between the ORMVA and the water users of the irrigated perimeters,
- to promote a "good" management of the water resources and infrastructure.

The ORMVAs, following the principles that came out during the first national seminar on PIM in Marrakech (1995), declared to be in favour of a strategy that is progressive (that is to say take into account the technical and management capacities of the WUAs), selective (that is to say that the PIM programme can differ from place to), adapted to the environment (taking into account the local social organization), contractual and negotiated (by developing partnership contracts) and with incentives (thanks to financial advantages).

The Office of Tadla has a specific approach. It considers the water user as clients who have the right to benefit from a good quality water service (AGR, 1999[1]). In this context, PIM consists of implementing a spirit of dialogue and cooperation between the concerned actors (the Office and the water users). Indeed, according to ORMVAT officials, "it is by developing a structured, organised, shared and sustainable collaboration between the Office and the water users that we will obtain a better water and infrastructure management". In order to reach these objectives, the ORMVAT developed a strategy that consists of creating WUAs, in organising meetings with farmers and the Board of WUAs, in creating a Union of WUAs, in planning the creation of a federation of the WUAs and in planning the participation of water users in the Board of directors of the ORMVAT (first in a consultative way and later on as members).

2.2 The Beni Amir irrigation scheme

Agriculture in Morocco is the principal economical sector. It contributes to 17.7% of the GDP and employs 40% of the active population. Irrigated zones contribute about 45% of agricultural added value ensure over 33% of employment in rural areas and stands for 75% of the agricultural exports (El Yacoubi and Belghiti, 2002[3]).

The perimeter of Tadla (Beni Amir and Beni Moussa) largely contributes to the national agricultural production since it represents 22% of the sugar beet production, 21% of selected seeds, 15% of the milk production, 11% of the citrus and olives, 11% of the meat and 5% of the cereals and market vegetables (ORMVAT, 2000-2001[9]). The ORMVAT is responsible for improving the agricultural productivity of a total area of 320 000 ha (of which 97 500 ha is large-scale irrigation) that groups 58 000 farmers.

The Beni Amir Irrigation system is a nearly 30 000 ha scheme at the north west border of the Oued Oum er R'bia river. The first development of the Beni Amir system began in 1929 and in 1938 the first irrigation took place. The hydraulic infrastructure has been designed with the concept of central scheduling and a compulsory cropping pattern. In the nineties of the last century the fixed cropping was liberalised and a kind of on-request water delivery was introduced. The irrigation infrastructure could deal quite well with this change because the canal flows can be well controlled due to numerous step wise distributors in the system and concrete canals. The Beni Amir irrigation system has a relatively good technical performance. According to Burt and Styles (1998[2]) who used indicators to compare the performance of several modernized irrigation systems in the world (Thailand, Iran, Turkey, India, Mali, Mexico, etc.), the Annual Project Irrigation Efficiency of the Beni Amir irrigation scheme is close to 100 % (external indicator ITRC10 = IE¹) and the percentage of O&M fees collected is about 80 % (the 5th highest rate out of the 15 irrigation schemes studied).

2.3 Field reality PIM in Beni Amir

During the field research period it was observed that there is no communication between the members of the WUAs and their leaders, which lead to a situation in which either farmers do not acknowledge their WUA board, or are simply not aware about the existence of a WUA. Furthermore, no difference in irrigation management can be noticed between a sector organised in WUA and a sector which is not : it was found that water management, allocation, distribution, control, invoicing and maintenance remain the same, in the case with and without a water user association (see table 1).

The objective of the ORMVAT is the implementation of a privileged dialogue and effective participation of the farmers in the orientation of the mode of management that has to be adopted by the ORMVAT. However, no difference in communication between ORMVAT representatives and farmers could be traced in the locations with and without WUA (individual farmer contacts are direct with the *aiguadier* or with water distribution staff).

3 Reviewing theory using reality

As Svendsen *et al.* (2000[11]) explain, the nature of the impacts (of irrigation reform) that occur will be shaped by the social, political, and economic characteristics of the countries involved. As impacts are conditioned by the actors involved, the expectations of the water users, the

¹ IE= volume of irrigation water beneficially used / (volume irrigation water applied minus increase in irrigation water stored) x 100 %

TAB. 1 – Planning and reality of tasks carried out by WUAs and ORMVAT.

Management tasks	Planned Participation of WUAs	Actual responsibility of WUAs	Actual responsibility of ORM- VAT
Operation of the irrigation system	x		x
Planning and allocation of the water resources	x		x
Weekly programming of the irrigation	x		x
Execution of the water turns			x
Water distribution at quaternary level	x	x	
Billing and recovering of the water fees			x
Water police			x
Treatment of the written complaints	x		x
Control of the irrigation system	x		x
Evaluation of the operation activities of the network	x		x
Maintenance of the irrigation system			
Preparation of the annual maintenance program			x
Calculation of the maintenance budget			x
Establishment of the schedule of maintenance	x		x
Rehabilitation of the irrigation system	x		x
Installation of additional infrastructure			x
Maintenance of the mechanical elements of structures in the irrigation network	x		x
Road Maintenance	x		x
Clearing of the secondary and tertiary canals	x		x

associations that have already been created, the irrigation agency, and the national or state government have to be taken into account before attempting to make major institutional reforms in the irrigation sector. That is why local characteristics have to be carefully examined. Six characteristics have been selected that might influence the PIM implementation. Literature has been consulted to table the degree of support or restraint of each characteristic.

The six major context specificities are :

1. The existence of water scarcity
2. A general strong political intervention but not a real will for IMT
3. An agricultural policy based on State intervention
4. Salinity problems and an old irrigation system that would need some maintenance works, but that however has a relatively good technical performance (Burt and Styles, 1998[2])
5. Small farms and traditional agricultural practices but crops "easily" marketable and cash money available (i.e. dairy and cattle breeding activity)
6. Strong local leaders and high rate of illiteracy

3.1 The existence of water scarcity

According to Johnson *et al.* (2002[5]) history has in general demonstrated that, the more stress there is on available water supplies the stronger the forces for institutional change. As water stress increases and competition between the sectors becomes stronger, pressures for additional institutional reform will build up.

Although water has been scarce in the past years in Beni Amir, so far it did not sparkle off institutional reform. In the interviews held, farmers reasoned the other way around : because there is not enough water, there is no need to take over the management.

3.2 A general strong political intervention but not a real will for IMT

Most researchers agree about the fact that no reforms are possible without political commitment. This lesson has been learnt, as explained by Kloezen (2002), by the Mexican model of market-oriented irrigation reforms that were designed and implemented with the full commitment at the highest political and administrative levels. Early reform activities in the irrigation sector are generally modest, with a primary focus on the formation of small WUAs at the local or village level (Johnson *et al.*, 2002[5]). Many times these organizations are created on paper, often to satisfy a donor requirement, but are in reality non functional. Public irrigation agencies are happy if local WUAs cleaned canals and drains and collect service fees but are not really interested in farmers associations taking over broader O&M responsibilities. These rather half-hearted attempts are not very successful in the absence of political will at all levels to institute serious reforms in the system (World Bank, 1994[14]).

However, according to Rap *et al.* (2004[10]), commitment and political will are outcomes of policy articulation rather than prerequisites for reform. Many observers assume that IMT in Mexico was imposed on the hydraulic bureaucracy by the Mexican president and the World Bank, but Rap *et al.* argue that in the Mexican case water reform was strongly linked with the engagement of the Mexican bureaucracy that was aware of insufficient funds for operation and maintenance under the financial crisis in Mexico.

Even though this argument is relevant in the case of Mexico, it is not (yet) applicable in Morocco because of several context specificities of the country. Indeed, contrary to the past Mexican bureaucracies, Moroccan bureaucracies are performing quite well in terms of irrigation management

and cost recovery (Burt and Styles, 1998[2]). Therefore, the will to change irrigation management may not come from these Moroccan bureaucracies. Furthermore, even though we indeed agree that the involvement of bureaucracies is likely to be more effective for irrigation reforms than a more top-down approach from the national government to the local state agencies, we think that bureaucracies involvement in policy articulation will be difficult in Morocco without favourable political commitment. Indeed, the strong central government has some consequences that do not favour the process of change : the Moroccan society is heavily "controlled" and the staff of the public services in Morocco remain strongly compliant (in the context of economical crisis of the country, working in a public service is a security). Therefore, we think that in the case of Morocco, a real political will is still missing for "changing" irrigation management.

3.3 An agricultural policy based on State intervention

Reforms in irrigation have direct consequences for the running of the system but there are also indirect consequences that affect the wider agricultural policies. An important indirect consequence is the reduced control the government will have over irrigation activities at the system level and a diminished ability to use irrigation as a tool to implement other national policies and priorities. An example might be the wish of many governments to promote cultivation of upland crops rather than rice. In the past it could work through the national irrigation agency to adjust water delivery schedules and volumes to try to achieve this end. Following transfer, this becomes more difficult (Svendsen *et al.*, 2000[11]).

The Moroccan government, which is presently using the irrigation systems in order to implement its general agricultural policy (by allocating water in times of scarcity only to restricted crops), might in the future have significant problems for following its agricultural policy geared towards self sufficiency on staple food (like wheat) and sugar. Indeed, total liberalisation of the sugar production and market in Morocco would not be in favour of the sugar refineries and would therefore also lead to the dismissal of many workers in this industry. Therefore, a change of the Moroccan agricultural policy means a high political risk for the government because it may engender several social conflicts.

3.4 Salinity problems and an old irrigation system

According to Svendsen *et al.* (2000[11]) the hydraulic infrastructure should be in fair condition, and an affordable and reliable water supply should be available most of the time (being in fair condition means the hydraulic infrastructure can deliver water to farms in sufficient amounts to satisfy crop needs and in a timely manner). Also surface drainage of surplus water and salinity should not be limiting factors. However, as the example of Mexico has shown, IMT programmes may take off "quickly" even though the irrigation agencies had suffered considerable deferred maintenance.

Even though maintenance problems exist in the Beni Amir irrigation scheme, it seems that this does not affect the functioning of the irrigation system that still performs quite well. Therefore, the state of the infrastructure in this case should not be a limiting factor for irrigation reform.

3.5 Small farms and traditional agricultural practices

Researchers also generally agree to say that where yields are low and farming practices are traditional, farmers often are struggling to survive financially. As a result, institutional reform is difficult to implement and must be more modest, since farmers usually do not have sufficient income to pay the costs of improved irrigation O&M (Johnson *et al.*, 2002[5]). At the other

hand, the more commercial the agriculture, the easier it is, for farmers to pay actual costs of irrigation O&M and to pay for higher quality service.

In Beni Amir, even though agriculture is not highly commercial, farmers generally can afford to pay water fees. Furthermore, because of the existence of fixed penalties based on : "no payment, no water", cost recovery is quite high. Moreover, if the government stops favouring the cultivation of specific crops that fit the national agricultural policy, horticulture could develop in the area, which in turn could lead to an increase of farmer's incomes and would secure cost recovery.

3.6 Strong local leaders and high rate of illiteracy

If the management of the irrigation system is turned over to a WUA, in principle, the water users take all major decisions on all levels of the irrigation system. However, as explained by Kloezen (2002), decision making is about having power. Therefore, there is a constant struggle in irrigation systems between on the one hand power-holders (like elected farmers' representatives and Board members that are generally the literate elites) and on the other hand groups of "common water users", often illiterate who want to participate in decision making. As it is generally described worldwide, it therefore occurs often that it is the elite that take the decisions and the "common" users still have little to say in the irrigation management.

This phenomenon is likely to happen in Beni Amir since we observed that strong local leaders serve their own personal interests in disfavour of the "common" farmers. Therefore, this issue has to be taken into account before changing the mechanisms of irrigation management in the area.

4 Conclusion

Even though local conditions in Beni Amir fit with several points of the theory related to IMT (water scarcity should simulate irrigation reform, the relatively good performance of the infrastructure should permit that IMT programs take off relatively "quickly", availability of cash money for farmers to pay water fees), real IMT programs did not come off the ground in Beni Amir. Indeed, actors' expectations and local specificities have to be taken into account :

- the irrigated perimeter of Beni Amir, as it is managed nowadays by the ORMVAT, functions relatively well,
- the government has some priorities that it does not want to change,
- the staff from the ORMVAT does not want to lose its position as irrigation manager, and farmers do not want, and do not have the capacities, to take over the irrigation management.

However, in the context of worldwide liberalisation that also affects Morocco, it can not be ruled out that the ORMVA's will face a restructuring (with lower numbers of personnel) and redefinition of its tasks and administrative organisation in the coming years. Indeed, pushed by development banks and international trade negotiations, the Moroccan government could be forced to restrict budget expenditures, which could imply the necessity of reforming the ORMVA's that are partly subsidised. Furthermore, in the context of liberalisation, the government will be obliged to change its interventionist role, which will also affect the reorganisation of the irrigation agencies in Morocco.

Many elements have to be taken into account concerning the implementation and formulation of irrigation reforms. Theory and practice do differ.

Studies concerning existing irrigation reforms are helpful to grab a learning approach rather than to find a standardised solution. Indeed, many studies revealed the danger of implementing "standard models" as blue prints. Processes are complex and context specific and this has been taken into account in formulation of irrigation reforms.

This study conforms that socio-political analysis is necessary because it informs on whether irrigation reform is a process that comes from a need to reform or whether it is the result of an external pressure by development funding agencies. It can make more grounded choices for courses of action and approaches to take. It is an essential element in a reform process that also wants to learn from experience, and develop and improve itself on the basis of that experience.

This analysis shows that the existence of a strong central government can be, at the same time, a catalyser and a restraint for the PIM/IMT process : a catalyst because a real motivation of a central government can speed up the process, but a restraint because of the difficulty to change strong bureaucracies.

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