

In Search of Sustainability of Water and Sanitation Beyond Sectoral Borders

A Critical Assessment Of Current Practices Relating Water Supply And Sanitation To Integrated Water Resource Management In Latin America

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Abstract

Systematic assessments of returns on investments in integrated water resource management (IWRM) do not exist. Yet, examples of unsustainable investments in water and sanitation resulting from poor water resource management are plenty. Consequences range from deteriorated water sources, increased conflicts, health problems, failure to impact on poverty and threats to good governance. In order to reach and sustain targets set for the Millennium Development Goals, WASH programs will need, and should be more actively involved in, improved water resources management.

Current IWRM strategies fall short of dealing with Latin America's complicated political contexts as well as the general trend of the reduction of budgets. The creation of watershed organizations, proliferation of plans as well as many pilot programs requiring excessive inputs in terms of the time, knowledge and staff, all have yet contributed little to effective institutions.

It is our thesis that considering the instability of government organizations and persistence of sectoral barriers, institutional development in IWRM should move away from creating structures or organizations, to social arrangements that reach beyond changes in government and staff. These are in most cases very specific arrangements around a specific (mostly urgent) problem or situation. Opportunities for institutional development in IWRM are sectoral reforms and decentralization.

Such processes need an enabling environment consisting of, among other things, removing legal constraints and providing incentives for improved accountability, transparency and subsidiarity. Territorial and participatory planning processes at provincial level may be geared towards water resources management priorities. Knowledge about available water resources, water right and demands is central. Two promising tools for these purposes are Payment for Environmental Services (PES) and Inventory and Planning of Water Resources (IPRH).

Keywords

Integrated Water Resources Management; Institutional Development; Water, Sanitation and Hygiene, Sustainability

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Introduction

In almost all countries in Latin America the water and sanitation sector is undergoing a reform process. Not only as part of a general trend of decentralization of public administration and the increased attention for participatory approaches, but also out of a general recognition that quite some investments have lasted less than expected or failed to generate the expected gains in coverage, health and well-being. Both in Peru and Nicaragua one encounters many examples of water supply systems that function below quality standards or latrines that nobody uses or maintains because they are too cold, too hot, too dangerous for children, and so on³. Performance of WASH investments and their health impacts are scarcely known, especially in rural areas.

Reform in the water and sanitation sector is mostly centered on tackling the above disparities with the objective to achieve greater sustainability and impact of water supply and sanitation investments in line with the Millennium Development targets. There are many positive and encouraging initiatives that support these reforms. Through SWAP processes donors and governments try to better direct investments. Best practices are being documented and disseminated. Still, a number of issues remain unsolved, above all those related to financial sustainability, organizational support frameworks and management capacity.

Surprisingly, this broadening vision of the water and sanitation sector seldom includes a strategy for water resources management. Obviously water resources management should not and cannot be the sole responsibility of those constructing drinking water supply systems, but it does generate problems for the sector. New investments are needed because existing sources have become unsuitable for drinking water due to problems in quality, quantity and continuity of water sources. Conflicts arise among different users and uses of both superficial and subterranean water resources. In particular groundwater exploitation and use is hardly regulated in the region.

Integrated water resources management (IWRM) arises in response to the need of all users to think beyond their system or sector. Theoretically the ongoing reforms in the water supply and sanitation sector as well as other reforms in the administration of public services could provide an opportunity to promote a decentralized – participatory - IWRM, but in practice this isn't observed.

In the following text, the relevance of IWRM for the water and sanitation sector will be illustrated with examples from SNV experience in Peru and Nicaragua⁴. Next, we will look at the recent developments in IWRM in light of financial and institutional constraints in the national context of the two countries. Based on this analysis, we suggest institutional development strategies, both at the implementation level and policy level. We conclude highlighting two relatively new working concepts, water auditing and payment for environmental services, as promising tools to go forward.

³ As one official said: "Still so much time and money goes into reconstruction, rehabilitation and adjustment of systems, that it is difficult to move towards unattended areas.

⁴ SNV, a Netherlands based development organization, has been involved in IWRM developments in Latin America during more than 20 years, addressing issues like local and institutional capacity development and building interinstitutional linkages at both local as well as national and Regional levels. SNV has offices in Bolivia, Ecuador, Peru, Honduras and Bolivia. Most of the examples in this paper are from Peru and Nicaragua. The focus of SNV experience and of this paper is especially, but not exclusively, on rural areas.

Relevance of IWRM for improved water and sanitation services

No systematic assessment of cost/benefit of investments in IWRM is available for the different sectors involved (WASH, agriculture, industry, energy, fishery, recreation, nature). Often returns will be, as with many environmental expenses, situated in the future e.g. as water security. Such returns can only be roughly estimated— sometimes underpinned by modeling - and are not very convincing to public opinion and politicians⁵.

Box 1: New drinking water source for Juigalpa, Nicaragua

The town of Juigalpa in Nicaragua (population 70.000), has a severe water problem: in the dry season there is a rotation of 8 days and higher placed houses do not receive water for over a month. Now water is obtained from deep wells, but the geological formation of the soil limits extraction and overexploitation has further deteriorated the wells. In order to solve this problem, a 28 million dollar project is planned, that will carry water from the Great Lake of Nicaragua (20 KMs). In addition to investment, also operation and treatment costs will increase. At the same time the town's river is highly contaminated both by excreta, and waste water from leather and cheese production. According to many of the town's inhabitants, the river's volume has diminished considerably in the past 10 years. Though no specific data is available, good water resource management upstream in the watershed might have provided an alternative superficial source of water for this costly project

Meanwhile, there are many urgent and high priority issues identified within the water supply and sanitation sector itself that pose a high burden on the sector in order to reach Millennium Development Goals (MDGs).

In this part it is argued that investments in water supply and sanitation are more costly in the long run, indeed it is questionable whether MDGs can be reached and sustained at all, in the absence of improved IWRM. Also, it is argued that WASH sector involvement in IWRM might contribute to good governance.

Securing the water source

Still planning, process analysis and evaluation of water supply and sanitation investments focus almost exclusively on the supply system and its users. Very little consideration is given to sustainability of the source or existing water rights beyond the system. In both Peru and Nicaragua, rural water supply and sanitation systems are constructed by evaluating different options of water sources, but generally the situation of the (micro) watershed, other uses and its development are not studied.

In the construction phase of new drinking water systems, source problems such as other uses or reluctant "owners" of the water source, may be overcome with the presence of donors or government agencies and because use for drinking water has legal priority. Yet in the years after construction, many cases are found where infrastructure causes conflicts that persist for years and contribute to a general sense of water insecurity in society⁶.

Sometimes systems are built over and over again, like in the case of La Semana (Peru) where a small rural water supply system has been built, and destroyed more than once because upstream users from another community want water from that source for their cows (Guevara et al 1998).

⁵ It is often difficult to know who exactly is going to benefit, how and when.

⁶ Note that sustained access to those water sources depends very much on the negotiating capacity of user groups, thus systems of poorer people tend to be more vulnerable if such conflicts occur.

Box 2: Case of treatment plant in Cajamarca, Peru

Outside the town of Cajamarca, a new water diversion structure was constructed to improve the water availability for the main treatment plant. To implement the project no effective coordination had taken place with the irrigation water users' organization of the catchment and users of a canal downstream of the new weir now protest that their irrigation water will be reduced. Thus a conflict has emerged between the local government and the water administrator who refused authorization for the use of the new infrastructure.

In Nicaragua, one of the first steps of the project cycle for investment in rural water supply is an assessment of the technical feasibility of a project⁷. In order to safeguard water access for the system, in most cases the land where the spring is located is acquired in exchange for some kind of compensation. Formally this arrangement does not guarantee the right to a certain amount of water for the users' community, as it is not yet possible to register user rights in Nicaragua. So any activity upstream of the source is simply bad luck.

Box 3: Case of La Palma, Nicaragua

In 1993 a gravity drinking water system was constructed in the community of La Palma, Chontales, with a water uptake from a surface spring. There was community labor and a water committee was formed. The system was designed for public water points, but within a year almost all houses had made their home connections, without meters. This resulted in localized water shortages and also in increased overall water use.

The land was donated by an old lady, who later transferred it to her daughter. Though many people said that a donation act for the land had been signed by the mother, the document was lost and its existence denied by the daughter.

With time the community developed: now there are homestead irrigation, small restaurants and watering for cows and pigs. Still there are no meters and the fee is 10 Córdobas per month – about 1 USD -, only paid by a small percentage of households. The landowner started blocking from time to time the source and denying access to the site, even for cleaning. Finally the water committee reached a settlement with her agreeing on a compensation of 400 Córdobas a month for water access.

With users refusing to pay and no control on the amount of water used, the committee finds itself in the middle of the conflict. The town mayor threatened to expropriate the site of the water source, but to date little has been done. Actually the committee obtained additional funds to improve both the water system and drainage, but this was stopped due to the internal conflicts and violence.

Apart from the socio psychological burden of conflicts over water sources, they also may entail extra costs for users of drinking water systems, as in the La Palma case described above, or for the responsible government institution like in the case of Molinopampa in the text box below.

While conflicts and degradation of catchments affect water availability for drinking water systems, there is an important amount of investments in large and small hydraulic infrastructure that operates below design levels or is useless, due to insufficient knowledge about the water resources and their fluctuations during the year and between years. In Peru, many drinking water systems constructed during the 1990's by public and private sector agencies⁸ are now useless because the water source wasn't evaluated during the appropriate time of the year. In

⁷ See Medina, 2006, for a detailed description of the project cycle for rural water supply and sanitation in Nicaragua.

⁸ Such as FONCODES

Box 4: Case of Molinopampa, Peru

Molinopampa is a rural community situated in a small plain (*pampa*), some 5 KM distance from the provincial capital of Celendín, where a water spring of more than 35 lit/sec of good quality is situated. Traditionally the spring was used for irrigation, domestic purposes and a water mill (*Molino*, in Spanish) for milling wheat. In the 70's an enterprise had negotiated access to half the flow and started to sell the water to Celendín. Years later, the drinking water system was brought under municipal control.

For years the people of Molinopampa succeeded in getting material benefits from the municipal authorities by threatening to close or effectively closing the water delivery, traditionally during the dry month of July when many migrants come back to Celendín to celebrate their patron saint. In the 90's water became scarcer due to urban expansion and inefficient use. Most "Shilicos" (town people from Celendin) irrigate their ample backyards with the traditional maize and oppose to water meters. Downstream the town areas with vegetables and alfalfa are irrigated with wastewater.

To satisfy the growing needs the Celendin authorities considered three options: 1) treatment of irrigation water from an other source, the Sendamal-El Toro irrigation canal; 2) the negotiation of more water from Molinopampa; and, 3) the use of another spring, much more distant. The last option is now being realized.

Nicaragua, after hurricane Mitch, some infrastructure was build on the basis of discharges that only occurred in that particular year (post-Mitch).

Particularly frightening is the lack of management and regulation of ground water resources, which are of high importance for drinking water production. Many wells are constructed both by public agencies and by private investors. Contamination, for example by leakages from tank stations, may take a very long time to disappear, but there are no water authorities or municipalities assessing such risks.

Impact on health, poverty and equity

Sanitation and hygiene components in WASH programs typically focus on targets like:

- Construction of latrines
- Hand washing
- Hygiene in and around the home and elimination of places for mosquito breeding
- Waste disposal

All these activities require a change of behavior and attitude in people, which is hard to achieve if elsewhere pollution, bad waste management and other environmentally unsound practices remain just outside their homesteads due to productive or governmental activities. It makes people feel that their efforts are insignificant.

The importance of a broad view on sanitation and health in WASH development was also encountered when increased coverage in drinking water supply in many small villages around Cajamarca resulted in degradation of surface water quality and quantity. Yet, water in natural streams and irrigation channels remains an important source of drinking water for people who don't benefit, as well as for farmers when working in their fields and for their animals.

The examples above also show that the importance of clean water in the lives of poor people stretches far beyond the health impact that is the main motive for most donating and government agencies involved in WASH. Poor farmers are as concerned about the health of

their animals as about that of their children. Though formal rules may forbid the use of drinking water systems or sewage water for irrigation, such practices can be found anywhere.

An integral approach to water management, that entails a holistic view on the significance of water in the life of (rural) people who don't think in sectoral terms, is seen to have a positive impact on poverty reduction beyond health aspects, and is now considered to relate positively to sustainability of drinking water and sanitation services⁹. Yet, sectoral divides and regulation impede this finding to become mainstream practice.

In practice, the use of rural and urban systems for irrigation and other productive purposes causes problems because such uses were not considered during design. Consequently, problems weaken the water users' organization that cannot prevent productive uses, and finally this threatens system maintenance and sustainability¹⁰. In the recent past, sectoral approaches to water management in Peru put strict rules for the design of drinking water systems, like for example a strong rejection of productive use (see text box below on the PROMISA case).

Box 6: Case project-PROMISA, 1995-1998.

A group of 11 rural communities (1000 families in total) that used to belong to the former hacienda of Jerez in the province of Celendin-Peru, asked SNV for assistance to find technical alternatives for their lack of drinking water. Currently the only water source was an irrigation canal that gave the less privileged families irrigation turns of 15 minutes every 14 days. That water was stored in an open water tank for domestic use and to keep animals.

A water inventory revealed a "free" water source that discharged 6 lit/sec of good quality, and three other available springs that summed 4 lit/s. Besides drinking water the community proposed using the excess (some 7.5 lit/sec) for productive uses. Small irrigated yards of 250 m² were calculated to be permitted for each household.

To account for the management problems that might arise from the combined use, the design divided the total area, about 2,000 hectares, in 25 sectors, each with its own reservoir and hydraulically independent from the others, and the use of water meters was prescribed as a condition for irrigation use. Low intensity micro sprinklers were designed to provide watering without overcharging the system.

Problems arose when donors who initially supported the multi-use project enthusiastically, met with sectorally defined (at that time Ministry of Health) criteria for drinking water projects. Amongst the criteria was the fixed volume for each inhabitant of 50 lit/day, an obligation to chlorinate, only one reservoir for each community and prohibition of irrigation use. Legal obligation of any public investment in drinking water supply and sanitation to stick to these rules made the project un-financiable. What seemed to be an excellent use of the scarce water in the area, at acceptable cost thanks to the use of a single distribution net, was impeded by sectoral rules.

It should be mentioned that there are also cases where productive uses were successfully fit into the project design, operation and maintenance and helped improve financial stability of the users' organization (Moriarty, Butterworth and van Koppen, 2004).

⁹ This point is also made by Moriarty et al, 2004, and also Alberts and van der Zee (2003) on rope pumps in Nicaragua.

¹⁰ For example in the provincial town of San Pablo, Peru, where the new water treatment plant had been designed for 10 lit/sec, but water demand is 17 lit/sec due to irrigation practices. As the treatment plant can't handle that flow, the water that reaches consumers is sometimes turbid; this is a convenient argument not to pay the water bill.

Good governance

Good governance is part of sustainability of systems and also a value in itself that contributes to overall development. Water management may contribute both positively and negatively to governance. Conflicts over water are likely to contribute to a general discontent of the public with the government and have shown to trigger social unrest like in the “water wars” in Cochabamba, Bolivia and in Arequipa, Peru (See box 7).

Box 7: Conflict between Moquegua and Arequipa, Peru

In November 2002 regional governments were created and elected for the first time in Peru as part of decentralization policy. Most large irrigation systems in the desert coast are served by reservoirs in the Andean Mountains, belonging not necessarily to the same region. Coastal regions are often more prosperous than highland regions.

In November 2003, the president of the highland Region of Moquegua denied water to the farmers of the coastal Region of Arequipa (8 million m³), on the basis of the argument: “The water belongs to Moquegua, and there is nothing to discuss”. There were road blockades, protests, threats etc. and it took the central government more than 10 days to normalize the situation.

Good water management may lead to strong local organizations able to promote other developments, such as in the case of Chancay-Lambayeque (see box 10). In Bolivia it is increasingly recognized that social capital is a condition as well as an outcome of good water management (Verweij and Soto, 2006)

In conclusion, an IWRM approach in WASH development is needed to assure sustainability of water and sanitation services in the future and to bring about the intended health and poverty reduction impacts. More effective investments and a positive effect on good governance are also to be expected.

Review of developments in IWRM in the light of institutional and financial constraints

Both in Peru and Nicaragua, two parallel movements towards institutional development for IWRM may be discerned, the first taking place at the national level, the second in pilot areas in different regions of the country. While Peru has a higher track record in IWRM, among others the result of the traditional importance of the irrigation sector, Nicaragua may have more experience in environmental management and decentralization and also has a Ministry of Environment.

In Peru, the national debate centers around the formulation of a new national legal framework on water for more than 10 years now. The current water law dates back to 1969 and has been modified through numerous sectoral bylaws. More than 18 different law proposals have been launched, with increasing levels of participation of civil society and showing an evolution of thinking about issues like water rights, privatization, decentralization and integrated management. Repeated failure¹¹ to get the a legal framework approved is seen partly as a result of sectoral entrenchment, frustrating efforts to produce a law that promotes integrated water management (del Castillo, 2004).

In Nicaragua water management traditionally centered on drinking water services. Recently, the sustainability of water sources, both in quantity and quality, is becoming a growing concern for professionals and the public opinion as result of pollution and growing competition over

¹¹ It is questionable whether this should be considered so much a failure, as proposals over the years reflect a change of approach (from a centralized, technical and agricultural water use approach, towards a decentralized, more social and integrated approach).

sources. The legal framework on water in Nicaragua is still in its infancy with a water law waiting to be regulated and criticized for favoring privatization. A national water plan was developed in 1997, but is a rather technical series of documents with little political support or concrete impacts (Milton, 2003). Just like in Peru, sectoral interests and contradictions over leadership and goals hamper a public debate on water policy reformation.

Meanwhile, numerous efforts towards implementing IWRM in the field are found, mostly pilots subsidized by international donors or NGOs, not embedded within a more permanent legal and institutional framework that could project these experiments towards normal practice. A common problem is the discontinuous participation of local governments and civil society due to the prevalence of time consuming methodologies and many other participatory processes these local actors are involved in. Only scarce and small scale examples exist where attempts have reached sustainable levels of institutional development (Hendriks, 2004). Operational experience and evidence of measurable impact and cost/benefit assessments are urgently missing to help bring the debate to a higher level, where it might contribute to conceptual clarity and public acceptance.

As mentioned before, the issue of environmental policies has evolved in Nicaragua more pronouncedly in comparison to Peru and recently the water problem is emerging dominantly from strategic environmental planning exercises at the municipal level. New mechanisms like Payment for Environmental Services (PES) are enthusiastically embraced as a promising way out of degradation of the environment and the water sources for WASH (Marín, 2006).

In the following text we look at some constraints that these countries have in common, such as unstable institutions, limited impact of the creation of watershed organizations, low replicability of pilots, chaotic decentralization and participation processes as well as the lack of concurrence between rights and obligations. All these may limit the effectiveness of IWRM policies.

Unstable institutions

Institutional development in many Latin American countries faces the difficulty of instability of public sector institutions. For Peru, the problem is seen as a consequence of incomplete control over bureaucracies by the alternating power alliances that govern the country (Deutsch Lynch, 1988). As a consequence, governments in turn tend to avoid the exercise of power over them and instead cut down finance, while creating new, often parallel, organizations. Almost 20 years later the pattern still looks familiar, and seems to hold not only for central governmental organizations but also applies to recently emerging decentralized bureaucracies that are being formed. Unstable governmental organizations and constantly changing officials reduce the scope for institutional development and learning considerably, even if staff is highly skilled.

As an example, in the 1990's, important investments watershed management and water services were implemented by the centralistic government of Alberto Fujimori. Instruments of these policies were PRONAMACHCS¹², a national government program for watershed management and conservation, and FONCODES¹³ a social investment fund that has invested a lot in rural drinking water and sanitation. Both programs were heavily utilized for political purposes. In the case of PRONAMACHCS, the program was dismantled soon after Fujimori had fled the country accused with charges of abuse of state authority and funds.

¹² Programa Nacional de Manejo de Cuencas Hidrográficas y Conservación de Suelos

¹³ Fondo de Cooperación para el Desarrollo Social

Box 8: Case PRONAMACHCS

PRONAMACHCS implemented during the 1990's a vast micro watershed conservation programme in the highlands of Peru with support of SNV and other international cooperating agents. Efforts concentrated on the MIMA pilot watersheds but at the same time scaling up to other regions and watersheds took place. Methodological development was heavily supported, as well as training of staff for scaling up & rolling out. Also policy development was seriously undertaken.

Once important investments at all these different levels were done, the institution entered into a crisis because of changing political domination in 2001, and after being abused of pursuing electoral purposes for the former government. Thus, the final bottleneck to institutional development was not the methodological development, nor the capacity building or management support. The problem was the instability of government organizations. We rarely see institutional development initiatives take this kind of "contingencies" into account. SNV, World Bank, JBIC and GTZ invested significantly to reinforce PRONAMACHCS's policies and capacities towards watershed management, but failed to recognize the thread to the sustainability of their institutional development efforts by the ongoing abuse of that same program for electoral purposes.

Creation of watershed organisms

In almost all countries in Latin America, institutional development in IWRM is sought in the reform of the sector according to a general impression of the models of Mexico, Brazil and Chile¹⁴. That is to say, aiming at creating watershed organizations of collaborative, multisectoral nature, assignment of water rights, reform of the water legal framework and integrated participatory planning processes. These examples have inspired national planning, legislative proposals, and local pilots. While there are inspiring examples of how certain management practices have managed to survive political and personal changes, often these do not result in sustainable changes in water management.

For example, in spite of the decree that laid the legal framework for the creation of watershed authorities in Peru in 1991, only 6 of such inter-sectoral organizations were created¹⁵. Neither the financial means nor the political backing were sufficient to make them operational and only one of these is currently playing a more active role in IWRM (see Hendriks, 2004).

In Nicaragua, the Association of Municipalities of the Watershed of Rio San Juan¹⁶, the watershed of the great lake, was created by the bi-national PROCUENCA 7 years ago. Due to personal commitment of a few people the association exists, but without legal backing, no funds and an unclear mandate in relation to associations of municipalities at the department level, the initiative can't be sustained.

In Peru about 250 micro watershed committees were formed by PRONAMACHCS during the 90's. Without external support these small scale organizations for IWRM haven't demonstrated sustainability.

In Nicaragua, INTA¹⁷ is working in 21 pilot micro watersheds in different parts of the country. Organizational capacity is being developed but meanwhile, uncertainty prevails about funds, new programs, movement of people and also the organization's survival itself.

¹⁴ See Ballesteros et al, 2005, for details on water management reform in Latin America.

¹⁵ The sixth was created in order to resolve the Moquegua –Arequipa conflict (see box 7), but was thrown out by local people (and regional authorities).

¹⁶ AMUCRISANJ, as the association is called, consists of 36 municipalities situated around the lake. This involves 7 departments. In total there are 152 municipalities in Nicaragua.

¹⁷ National Institute for Agrarian Technology

Scaling up of pilot experiences

Many initiatives of IWRM at the local level are undertaken by donor agencies in coordination with local NGOs and/or sectoral agencies. The planning of activities takes the form of extended participatory methodologies¹⁸. While such processes at micro catchment level take about 10 years to bring about results - that is, if accompanied in a consistent manner - agencies involved often aren't able to offer that kind of support and a clear commitment to scaling up is lacking. So, many of the participatory planning methods are too expensive and time consuming to be feasible for broader application by national institutions and national budgets.

Though recognizing the importance of pilot experiences for learning and as a source of knowledge development, time has come to reflect on pragmatic proposals that might be feasible at the country level. In spite of the considerable amount of literature produced, very little investigation efforts on IWRM in practice, both in terms of environmental, economic and social impacts, have yet been accomplished¹⁹.

Proliferation of plans and final decisions that favor only rights, no obligations

The numerous IWRM initiatives, both at national, watershed and local levels have produced a large amount of management plans, of which very little has been put into practice. At the same time, continuing investments in water infrastructure bear little relationship with the plans produced.

Box 9: Action Plan for Water Resources (PARH) of Nicaragua

The development of a national water management plan for Nicaragua in 1995-1997 (*Plan de Acción de Recursos Hídricos*) is illustrative because a lot has been done (studies, proposals) and very little has been implemented. It was financed by the Danish government with 1.5 million dollars in addition to the national contribution and 13 volumes have been produced (Milton, 2003).

Solid participatory planning methodologies that depart from a thorough understanding of the resource base, user interests, enforcement of measures, and feasible control mechanisms, do exist. It requires a lot of high quality dialogue between technicians, policy makers and stakeholders. In daily practice, however, water management decisions tend to focus on needs, rights and benefits, and much less on obligations or restrictions. The balance between rights and obligations, permits and restrictions is lost and functionally and financially unattractive plans remain waiting for finance.

Decisions on project approval – when showing attractiveness as “political investments” - often come directly from authorities who have a say in public spending. As an insider in a municipal organization narrated: “..several projects, presented for finance, were evaluated between the mayor and an advisor in terms of the number of votes that it could generate. Any other criterion didn't count..”

It is common to see that within the organizational chart of governments a special unit is in charge of infrastructural projects, operating quite independently from other departments related to economic and social development, and generally having their own criteria for planning and investment.

¹⁸ Inspired on RRA, RAAKs or CATIE's methodology.

¹⁹ Pilot experiences like the MIMA micro watersheds in Peru have yielded relatively little to knowledge development on impact, as the focus was more on participatory methodology development (Rojas, 2004) See also Dionne, 2003, for the experience on micro watershed management in Ecuador.

Decentralization and participation

In many countries environmental management and WASH services now formally form part of the responsibilities of municipalities, although in most cases these new competencies still need to be effectuated. In Nicaragua, municipalization of water supply and sanitation services is only to begin, and is a very complex issue. Only 3 urban systems are said to be covering their own operation and maintenance costs, and many systems require rehabilitation. In Peru districts vary from millions of inhabitants (certain districts in Lima) to a few thousands in remote rural areas. Rural municipalities operate in relative isolation and when it comes to basic services they are traditionally inclined to give priority to the district capital, while little attention is paid to disperse villages.

The decentralization process is significantly increasing municipal budgets, and national investment programs like the previously mentioned FONCODES in Peru and FISE in Nicaragua are decentralized and continue to invest in water infrastructure in poor rural areas. In certain regions in Peru the presence of mining activities generate extra income to the municipalities²⁰. Interesting are the legally defined mechanisms of participatory planning of local government expenditure like *Presupuesto Participativo* in Nicaragua and Peru²¹.

While parallel reforms of several water related sectors (drinking water and sanitation, environmental management, water resource management, public administration, the health sector) are great opportunities for shaping institutions for IWRM, there is also a great deal of uncertainty that makes it extremely difficult to operate. Organizations are still being built up and it is unclear who must do what under the new setting. Local governments' institutions share the problems of instability and insufficient institutional learning capacity mentioned earlier for the central government organizations. Both Peru and Nicaragua are still searching for sustainable post-construction monitoring and assistance (Van de Giessen and Tablada, 2003).

In this context, a lot of initiatives are being raised with the intention to contribute to the shaping of new competencies regarding water management, with involvement of all kinds of stakeholders, through inter-institutional coordination, consensus building and policy development. Though certainly having its fruits, these efforts demand a high investment in time from all stakeholders, requiring new patterns of conduct that still need to be developed. Many of these initiatives are to a high extend externally driven and run parallel, thus creating high pressure on the scarce local professional resources and also on local people. All want others to participate in their activities, but cannot change their own objectives in function of others. Additional activities are simply done in additional time, that means overtime.

In conclusion, new IWRM institutions are being developed at different levels under pressure of external and internal forces, in a context of changing governmental roles. This is at the same time a great opportunity and a challenge because different change processes run parallel and act upon generally weak existing organizations, causing an overburden. Many initiatives lack a realistic proposal for IWRM in terms of time, money and staff, considering the social, political and economic reality of the countries.

²⁰ Through a mechanism called "*canon minero*".

²¹ The law on "*Presupuesto Participativo*" in Peru and in Nicaragua establishes part of the municipal budget to be spent in accordance of priorities set in a meeting with representatives of sectoral agencies and civil society.

Approaches and opportunities for institutional development in IWRM

In this section of the paper, some general considerations about institutional development, social capital and accountability in water management will be discussed. Then, trends and opportunities at the local level will be mentioned.

General considerations about institutional development, social capital, transparency and accountability in water management

Considering the instability of government organizations, the focus of institutional development for IWRM should move away from the creation of structures or organizations, towards social arrangements that remain even after changes in government or people. These are in most cases very specific arrangements that increase accountability and transparency, and develop around a specific (mostly urgent) problem. Once in a while, one comes across such very inspiring examples.

Box 10, case Chancay-Lambayeque, Peru

The Tinajones irrigation system serves about 100.000 hectare from which more than 24.000 farmer families live. On irrigation management turnover to the Chancay Lambayeque water users' organization in 1992, the system's infrastructure was in bad shape and had gone in a downward spiral of low percentage of fee payments, low maintenance and transparency and deficient service.

In the first phase of the APOMAR project by IMAR Costa Norte and the Chancay Lambayeque water users' organization, one of the main objectives was to reverse this downward spiral. An automated system of fee charging was introduced together with more transparent and participatory budgeting, improvement of infrastructure and a communication program.

In 1997 the situation had completely reversed. From being the worse, Chancay Lambayeque farmers' organization now became the model for Peru. The annual income of the organization had increased several times to about 3 million dollars a year and more than 60-70% of all fees were collected in the same year as when water consumption took place. Infrastructure had improved and for maintenance of the main infrastructure a semi-independent company had been created of which the farmers were shareholders. Until today the fee collection system called SARA exists and remains successful (Muro Ventura, 1997).

As in the case of Chancay Lambayeque (see box 10), there are more examples of arrangements that do persist and become part of the social capital of a community. For example the garbage collection, separation and processing system implemented in Celendin, Peru in 2001 (Sánchez and Cacho, 2003). After the 2001 municipal elections, the men that were trained for the innovative waste treatment system, including the responsible political and technical staff, were fired by the political alliance that had won the elections. After a few months the mayor had to hire in the old employees again to train the new personnel, because the population had become used to the system and claimed the new authorities to continue what worked well.

The difference of such type of arrangements with comprehensive participatory environmental planning processes may be the following characteristics:

- It is a specific, delimited issue that is felt as urgent by a large part of the population. Often these are issues around which conflicts are emerging;
- It is often related to rights and obligations in relation to a specific territorially defined resource;
- It is possible to make a relatively short loops (in time and space) between planning, implementation and results; and,

- There is not too much power imbalance between different actors.

Obviously this cannot be realized in all situations, but it should help us to start reflect on the fact that current participatory environmental planning processes are sometimes very broad, long-term, time & money consuming, while rights and obligations for different parts may be out of balance or unclear²². In the current context of Latin America, sometimes there is so little confidence in planning and governmental organizations that long-term planning processes are unable to mobilize people's participation. An alternative may be to start with specific, delimited issues that allow for social learning and the development of social capital. Undoubtedly these have to be relevant issues with concrete results and not just dialogue, for example the construction of infrastructure, the solution of a perceived environmental problem or mediation of a conflict.

Box 11, Consultation on conflict management and decentralization in Peru

In reaction to the lack of clarity of water management reform in the new context of decentralization, IPROGA started in 2004 a broad multi-sectoral consultation on conflict management in water. With hardly any funds for implementation, the consultation was able to generate consultations in 12 departments, and mobilize almost 500 people. Starting points of the discussion were the most important local conflicts and not so much the text of a water law proposal. Results were presented to Congress, but were also inputs for the water governance project currently implemented in Peru by IPROGA (see the final section).

How to deal with territorial units?

For many years there has been looked for solutions to water resource management problems in the creation of some kind of organizational structure at watershed level (e.g. authorities, platforms, micro watershed committees).

Though administration of water resources at the watershed level is one of the alternatives, it is neither mandatory nor synonymous to it. In fact, rather seldom are water resources managed by a watershed authority. Instead we observe that either national agencies or local governments are in charge of most water resources management related functions. Transferring part of these functions into a watershed organization carries the risk of weakening the quality and continuity of those services. Certain watersheds may generate enough income to sustain a series of water management functions, whilst others are just too small or unproductive to harbor an integral set of management capacities. Practical experiences show us that often watersheds aren't the relevant units for problem solution²³.

Of growing importance in Latin America is territorial planning (TP). Although not specially developed for water management purposes, TP can be relevant to IWRM because in potential it is a technical and legal instrument to regulate land use in cases where inappropriate uses constitute a threat to the sustainability of water sources. The units of territorial planning are often not the watersheds, but homogeneous zones like the "*paramos*"²⁴ in the Andean countries or forestry reserve areas in Central America.

²² See also Sijbrandij, 2000.

²³ For example, arrangements that deal with sustaining specific uses (especially drinking water) normally are restricted to the areas of direct influence of a certain water source that is socially or economically important. Very often these areas of influence do not coincide with the pre-established catchment areas that are chosen by formal IWRM policies.

²⁴ Paramos are the highest parts of the Andes mountain chain where climate is humid and cold, with special ecological, agronomic and scenic values and very important for the regulation of hydrological regimes

Insisting on the watershed as the single unit of water resource planning is therefore not of much use. Instead, water managers could bring in their interests in TP processes that may occur at different levels (e.g. provincial level, regional level). With this purpose, the earlier mentioned water governance project in northern Peru promoted a working group to device methodological and technical inputs for TP processes that visualize and make operational IWRM interests in these multi sectoral territorial plans for regional policy making.

The relevance of the watershed concept lies in its strength to describe and analyze water management problems (see page 18 on IRPH), especially the analysis of (actual and future) supply and demand and conservation of water resources and planning of IWRM. Implementation of water policies by watershed organizations seems to be less realistic, considering past experiences.

Perspectives at the level of local governments

With the increased responsibility of local governments for drinking water supply and sanitation, as well as for environmental management, a great challenge is to achieve an effective interplay between state authorities, local government and civil society in decision making on water resources. While government expenditure is becoming decentralized and new public spending and accounting procedures between central and local governments are put into place, an inspiring and strategic work field emerges, aiming at improved local water governance. This may include lines of action like:

- Establishment of sustainable mechanisms for coordination between government and non governmental actors around key IWRM issues within the local context. These can take the form of "*mancomunidades*²⁵", as in the case of the Jequetepeque watershed development committee in Peru, in which 21 municipalities and a variety of other organizations coordinate and join resources, amongst others oriented towards IWRM;
- Improvement of methodological tools adapted to the specific legal and institutional context of local governments for planning and implementation of IWRM;
- Development of municipal IWRM policies and its implementation, like land use planning, buying of land as protected areas for municipal drinking water supply, payment for environmental services;
- Work around specific water problems (conflicts) to device socially accepted arrangements of rights and obligations to overcome problems and contribute to social learning; and
- Basic IWRM training for (local) basic services employees, local authorities, planners, etc.; as well as the development of simple manuals for this purpose.

All of these should be developed keeping in mind that social and institutional learning for IWRM will not be effective without action²⁶.

In conclusion, IWRM strategies should focus less on the creation of watershed organizations as the sole answer for IWRM. More opportunities are found in the development of specific solutions to specific priority problems that allow for social learning and create a balance between rights and obligations. Such solutions should be feasible within the time and money constraints of the country. This may be in the context of TP or capacity development for local government, or any other relevant process. If successful, such experiences start to generate enough social capital to take on more complex problems.

²⁵ These are groups of a small number of municipalities that join forces to perform a certain task, such as water supply.

²⁶ See N. van Dijk 2001 for an interesting example of action learning.

Emerging strategies for local institutional development in IWRM

In this part we will set out some strategic elements for local institutional development in IWRM in the light of the foregoing discussion about sustainable water and sanitation services, the importance of social arrangements and the political economic context of Latin American countries. The prime focus of local institutional development is on local governments (municipalities and in Peru also the intermediate regional governments). Currently they are in charge of local environmental and territorial management and responsible for water and sanitation. Other aspects of water management may be the responsibility of specialized agencies, but these often depend partly on local governments to realize their purposes²⁷. In the process of decentralization, local governments are increasingly being endorsed with legal and financial means for promoting local development.

However, local governments are new at this and there's a risk of repeating what was seen happening in past decades with central government investments in hydraulic infrastructure: insufficiently embedded in knowledge about the local physical and sociocultural environment and inefficient or inoperative²⁸. It is therefore widely acknowledged that local capacity development is very important.

Opportunities for improving water governance should be sought first in existing processes of improving local governance, that is: the processes that are able to mobilize popular support and participation. Social arrangements could be developed around investments or management of conflicts over water. A clear example is the scheme of payment for environmental services in Rio Blanco (see next section). All of these processes will require some basic knowledge about the local water resources management situation, related problems and opportunities. Water inventories provide a convenient means for probing into a local water situation (following paragraph). Finally we will look at possible strategies for creating an enabling environment for learning experiences in local water governance.

Local arrangements for good water governance, the case of payment for environmental services (PES) in Nicaragua

Social arrangements for good water governance strengthen the link between rights and obligations in a way that is understandable and acceptable to all parties involved. Negotiation lies at the heart of developing such arrangements, obviously based upon reliable and legitimate information.

In the past, SNV advisors worked on such arrangements at the micro level when designing small-scale infrastructure, while later on, such experiences were used for capacity building of responsible government agencies. Though a variety of examples exist, particularly relevant to water and sanitation is the effort aiming at water conservation by domestic water users through PES for Rio Blanco, highlighted below.

The development of a PES scheme for the micro watershed la Golondrina of the natural reserve la Musún²⁹ started in 2001 in order to confront water problems of the town of Rio Blanco for which it is the main water source. The problem was threefold: a low water yield due to low

²⁷ As an example, a recent law for innovation of irrigation technology in Peru is explicitly laying the responsibility of financing those developments with municipalities

²⁸ An alarming amount of local governmental "white elephants" is already accumulating, like four recently constructed water treatment plants in the province of San Pablo, Peru, all of which aren't functioning for one reason or another.

²⁹ Matagalpa, Nicaragua

permeability and infiltration capacity of the recharge areas, short concentration time after rain and risks of landslides and finally contamination risks due to deficient latrines and cattle watering. The purpose was to develop a scheme of incentives that could persuade farmers living in the recharge areas to change soil use and practice soil conservation.

These are the steps that were followed³⁰:

1. Assessment of the situation of the micro watershed, specifically its water balance³¹ and the identification of environmentally vulnerable areas.
2. Economic valorization of the water resource supply and determination of the required amount of payment for environmental services to the suppliers³². On this basis per hectare costs were defined for different types of conservation measures.
3. Estimation of the willingness to pay of the town's population.
4. Definition of the financial inking mechanism of the payment, for which it was decided to include this in the water company's tariff system.
5. Evaluation of the social and economic viability of the PES scheme, in which environmental costs were compared with the population's willingness to pay.
6. Participatory development of the institutional arrangements necessary for implementing the scheme and the administration of the Environmental Fund.
7. Regulation of the Environmental Fund at the municipal level.

On the basis of the assessment of the situation of the micro watershed, a management plan was made that includes relocation of cattle watering points, reforestation, construction of latrines and change of land use to agro-forestry and rangeland-forestry systems. The total cost of the plan is \$26.980/year, whereas results of evaluation of the willingness to pay of the town's population indicated a possible additional income of \$28.100/year.

For the moment conservation is still financed externally. However, both the municipality of Rio Blanco and its water company are very interested in implementing the scheme. Currently negotiations are taking place with the national regulatory body of drinking water and sanitation in order to make this additional component of the town's water fee legally possible. In many parts of Nicaragua there is an interest in PES schemes in order to make environmentally sound land use management economically viable.

Legitimate local information: Inventory and Planning of Water Resources (IPRH³³)

As mentioned before detailed knowledge of local water balances is scarce in rural areas in the countries under study, and this is a major limitation for quality negotiations among stakeholders. Databases of natural resources have scarcely been built in past decades providing hydrological information at a very general scale, and including too many indicators of all kinds. Moreover the issue of social credibility of information is crucial and not so obvious especially in areas of conflict. The tool inventory and planning of water resources described below, is a pragmatic way of dealing with such issues.

³⁰ For details see Marin et al, 2006.

³¹ With the UNESCO method

³² This entails the calculation of investment and maintenance costs necessary for conservation of critical areas in the micro watershed, as well as foregone benefits of changing to this type of land use. All these costs are further referred to as "environmental costs".

³³ *Inventario y Planeamiento de Recursos Hídricos*

To support the development of rural drinking water services, small scale irrigation and energy generation, a method for measuring and locating water sources, participatory planning of uses, and a database to manage field data was developed by SNV in cooperation with PRONAMACHCS (Anten and Willet, 2002a). Similar experiences are being developed in Ecuador by the *Foro Regional del Agua* (Martines, 2006).

The principal stages of IPRH are:

- 1 Coordination: parties with an interest and disposition to contribute reach an agreement on conducting the inventory & planning process
- 2 Inventory: (a) at the community level; (b) at the level of main streams within the micro-watershed
- 3 Database and analysis
- 4 Participatory planning: (a) at the community level; (b) at the micro basin level

Participatory planning is aimed at defining the water uses with the greatest benefit to the population and to reduce conflict and at negotiating new uses among stakeholders, identify potentials, as well as threats to the sustainability of water sources. Thus local water management plans at micro watershed or district level are developed with a fair degree of accuracy which in turn constitute a sound base for local development plans as far as water investments are concerned. In certain cases, like in the hillsides around Cajamarca where gold mining is threatening to affect water quality and quantity, an inventory may constitute a starting point for environmental monitoring.

Enabling environment

Both in Peru and to a lesser extent in Nicaragua, governments have been involved in ongoing attempts to improve their water legislation and to develop national water plans. Most such plans include a change of role of the state towards a normative, supervising and facilitating and role, away from implementing themselves.

In spite of this, little attention is paid to create an enabling environment for social learning and experiences to flourish. In previous chapters it is argued that local IWRM strategies should adjust to the political, economic and social reality of countries and regions. The question is raised to what extent policy makers could contribute to make that environment more suited for local arrangements to develop. In this section some preliminary ideas are presented on the matter.

Often innovative processes get stuck on small specific parts of regulation. For example the institutionalization of PES by the local government and the water company of Rio Blanco in Nicaragua, is still pending upon the legal possibility for the drinking water company to include this as part of their tariff system. The PROMISA case in box 6 gives another example of a sectoral policy that impeded innovation.

An enabling normative environment for diverse local learning and arrangements, should take those experiences as a starting point. Along those lines, IPROGA³⁴ is now implementing a project to generate regional or sub-national IWRM policies in different departments in the north of the country³⁵. The project helps regional platforms in devising regional water policies, building on experiences and stakeholder involvement to draw policy proposals.

³⁴ IPROGA, Instituto para la Promoción de la Gestión del Agua, www.iproga.org

³⁵ Project “governabilidad”, decentralized IWRM policy development for improved water governance in Northern Peru.

In addition to that an ongoing and systematic analysis of constraints that local experiences encounter, may be a challenging way of getting feedback in policy making. A lot can be gained from creating room and developing mechanisms to make local experiences work.

Basic capacity development for good water governance should be carried out within the framework of decentralization of public administration. However, policy makers should take care that the enormous amount of parallel initiatives and participatory processes at local level, does not cause overburden of local people, local governments and local professional staff.

Governments could help local alignment by setting a binding, clear, limited number of targets for water management, SMART³⁶ quality standards for water resources management, to be targeted by whatever local water management arrangements are being made. An example worth studying is the way the European Water Framework Directive is currently shaping water resources management, without entering into internal national affairs of member states on how to reach those standards and who's responsible.

Finally, a necessity is to promote information and finance services tailored towards the local level. This applies to the scale, the amount of information and the way it is managed. Good financial facilities could for example help user groups or local governments to invest in conservation or to obtain areas for drinking water supply, without harming/ detrimental effects on investments in services.

Obviously these preliminary ideas are not intended to be exhaustive.

Conclusions

The actual state of IWRM institutions in Peru and Nicaragua, as well as in other countries in the region, is insufficient to sustain WASH services in accordance with internationally agreed targets. Therefore, improvement of these institutions should become an integral part of WASH development policies.

Institutional development for IWRM will have to take into account general weaknesses in governmental performance and economic policies of these countries, as well as the ecological and social diversity in the country. An opportunity is to link up with current trends, processes and initiatives that aim to improve local governance, such as participatory budgeting by local governments, territorial planning, environmental planning or conflict management.

For that purpose, the emphasis of IWRM should shift from the creation of organizations and structures, to the promotion of social arrangements less vulnerable to weak and unstable government organizations and continuing political changes. Local social learning around concrete actions is key to developing such arrangements. Clear examples from SNV's experience are the facilitation of negotiations about water sources in the Andes, payment for environmental services and the introduction of payment against service³⁷ in large scale irrigation systems. The high priority of safe drinking water may act as a stimulus for that learning and public investments may function as catalysts. At policy level, a lot can be contributed by creating an enabling environment for such experiences to flourish.

There is a need for better visualizing the benefits & costs of introducing IWRM approaches in WASH interventions, more systematically than the examples we have given in this article.

³⁶ Specific, measurable, attainable, realistic and tangible. Standards may refer to quality or quantity of water resources, but also to environmental aspects, management, stakeholder involvement, information, etc.

³⁷ Pago contra entrega in Spanish. This is a scheme where users pay at the moment they demand for their water turn.

Specific investigation efforts are needed, as well as more interaction (opportunities) between those who work in WASH-spheres and those who work in IWRM spheres.

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