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Institutionalizing monitoring of rural water services in Latin America. Lessons from El Salvador, Honduras and Paraguay

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ABSTRACT[4]

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In the last two years, various countries in Latin America have begun monitoring rural water supply service delivery, largely driven by two objectives: 1) to establish rural water inventories for investment planning, and 2) to better target post-construction support. For such monitoring systems not to face sustainability challenges, clear institutional and financial arrangements must be established.

The International Water and Sanitation Centre (IRC), the Inter-American Development Bank (IDB), and the Spanish Cooperation Agency for International Development (AECID) have been supporting the design and implementation of such monitoring systems in El Salvador, Honduras and Paraguay. In coordination with local sector agencies, a methodology to define an institutional framework for monitoring was developed and tested. This paper provides an overview of the approach, including examples and cost estimates from the three countries.

Keywords

Monitoring, rural water, institutional arrangements, costing, Latin America

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INTRODUCTION

For the last thirty years, community-based management has been the predominant service delivery model for rural water supply in Latin America. Despite its spread throughout the region, this model faces many challenges. A significant percentage of rural water systems under-perform. In Honduras, for example, about 37% of the rural water systems suffer from major problems (SANAA, 2009).

Monitoring can be one way of improving service delivery performance. It offers service providers information to take corrective actions, and it helps technical assistance support providers (PATs or *Prestadores de Asistencia Técnica*, as they are known in Spanish) target their post-construction support. Various countries in the region have seen the development of such support mechanisms, either by the public sector (national, subnational or local), or by private initiatives, such as associations of community-based service providers. Even though such support can have a positive impact on the performance of service providers (e.g. Kayser et al., 2010, Smits et al., 2012, Schweitzer and Mihelcic, 2012), PATs often have limited capacity and do not provide effective backing (as Smits et al. 2012 found in Colombia). One of the reasons is that the support is generally triggered when a problem has already occurred. Having PATs monitor community-based providers on a regular/planned basis could help them anticipate service-delivery problems and better target their support. Regular monitoring may also provide governmental entities with information to adjust and improve policies and regulatory frameworks for the rural water sector.

Monitoring has been fraught with problems, particularly in terms of coverage and sustainability. In many Latin American countries, national regulators monitor urban service providers, but do not include rural providers, or only a small number of them, as collecting data is difficult and expensive. Other countries have been successful in mapping rural services nationwide, typically through resources from big projects or programs, but have struggled to regularly update the information due to lack of resources or unclear institutional responsibilities for on-going monitoring. The Rural Water Information System (SIAR) in Honduras, for example, performed reasonably well until external funding stopped and all data rapidly became outdated.

This paper presents the approach followed by the IDB, AECID, and IRC in supporting El Salvador, Honduras and Paraguay in the development of rural water monitoring systems. Through this process, a generic approach for institutionalizing monitoring systems was tested in the three countries.

OVERVIEW OF THE APPROACH

We define a monitoring system as the procedures for carrying out monitoring, including: i) objectives, ii) processes, iii) institutional arrangements, and iv) tools. One of the main tools of any monitoring system is the information system, which includes indicators, algorithms and information technologies such as data collection instruments, databases and visualization tools. A monitoring system is a broader concept tough, which also includes the definition of institutional roles and responsibilities.

To develop a monitoring system, participating actors must clearly define and agree on: i) procedures (what to do), ii) institutional arrangements (who does what), and iii) the financing framework (what does it cost to monitor and how costs will be covered over time). It also requires identifying whether institutions have the capacity to fulfil these responsibilities and provide resources.

The approach described in this paper follows a four-step approach for the development of a monitoring system (summarised in Figure 1).

Figure 1: Steps in the development of a monitoring system

Step	Summary
1 Analysis of current monitoring practices	Map current practices to assess (information or institutional) gaps and how a new monitoring system can address those.
2 Definition of the monitoring system	Define main components (objectives, processes, tools and stakeholders).
3 Definition of the institutional arrangements	Define detailed responsibilities for all steps in the process; ensure stakeholders have the necessary capacity.
4 Costing and responsibilities for financing	Assess monitoring costs under different institutional arrangements reach agreement on a financing mechanism.

Most monitoring systems require the involvement of a number of stakeholders. Developing a monitoring system is best applied through a multi-stakeholder process, for example through sector working groups (see Box 1). Such process needs clear leadership and coordination to bring all stakeholders on board and ensure the consistent application of the approach. This leadership role is typically played by the lead government agency for rural water.

Box 1: Organising a multi-stakeholder approach in Paraguay

In Paraguay, SENASA (the National Environmental Health Service) took leadership in developing the rural water monitoring system. For that purpose, it convened a working group formed by government agencies and donors, which provides strategic direction in the development of the system.

APPLYING THE APPROACH

Developing and institutionalizing a monitoring system should include four steps:

- Step 1 → Analysing current monitoring practices
- Step 2 → Defining the scope of the monitoring system
- Step 3 → Defining the institutional arrangements
- Step 4 → Identifying costs and responsibilities for financing

Step 1: Analysing current monitoring practices

Even if no formal monitoring system exists, there may be some monitoring activities going on, such as project implementation monitoring by non-governmental organizations (NGOs) or donors. There may also be informal information flows. A new monitoring system should build as much as possible upon these. This first step consists of making an inventory of current monitoring practices – both formal and informal. This can be supported by a matrix that maps current practices, differentiating between institutional levels as a basis for identifying strengths and weaknesses. Box 2 provides an example of this step.

Box 2: Analysis of existing monitoring activities in Honduras

Honduras had an existing a rural water monitoring system called SIAR, which quickly went unused after external support withdrew. Two years ago, the government joined a regional initiative called SIASAR (Rural Water and Sanitation Information System), an information system largely based on the strengths of the previous SIAR. The first step in developing the new system was to identify current monitoring arrangements and the sustainability issues that affected SIAR. This exercise resulted in the matrix below.

Step Stakeholder	Data collection	Processing	Analysis	Reporting	Identifying corrective actions
Service providers	On-going but unstructured	Without standard procedure or tool	Without standard procedure or tool	Annual reports to users	Some decision making tools for water quality and administration
Municipal Association of Water Committees	On-going but unstructured	Sometimes, but without standard procedure or tool	Without standard procedure or tool	Unknown	Unknown
Operation and Maintenance Technician	Using standard tool. Demand-based and depending on resources	Using SIAR	Using SIAR	To the service provider and national utility	Based on standard set of typical corrective measures
Regulation and Control Technician	Using standard tool	As above, but using other information system	By national regulator	Reports on website of national regulator	National regulator informs municipality to take action
Environmental Health Technicians	Using standard tool, but limited Resource	Data provided to Regional Health Secretariat	Unknown	Unknown	Unknown
NGOs and projects	Detailed assessments based on project needs	Based on own criteria	Based on own criteria	Internal	Feasibility assessment of Project
Honduran Social Investment Fund (FHIS)	Detailed assessments for pre-feasibility	Based on own criteria	Based on own and funders' criteria	To mayor and to funders	Go/no-go of the project

The analysis led to the following conclusions:

- Information on service providers is collected, but in a fragmented manner, and each organization collects data using its own instruments.
- Even though SIAR it is out of date and few stakeholders use it, it constitutes a useful basis to update, extend and improve upon.
- The information that is collected is not linked in a systematic manner. This is compounded by a reduction in resources for post-construction support.
- PATs, other than the official one, do not access data from SIAR.
- There is limited aggregation of information from service provider level to national level. This only happens in an ad hoc manner, and mostly for project design.

Step 2: Defining the scope of the monitoring system

The next step is defining the monitoring system, which consists of four sub-steps:

- *Sub-step 2.a → Setting up monitoring objectives*
- *Sub-step 2.b → Mapping stakeholders' roles and responsibilities*
- *Sub-step 2.c → Defining the process*
- *Sub-step 2.d → Developing the information system*

Sub-step 2a: Setting up monitoring objectives

Monitoring can serve various objectives, such as: 1) obtaining data for investment planning, 2) assessing service provision to target post-construction support activities, and 3) regulation. It is important to define which objective/s is to be met. That decision defines the scope of the information system and the type of information to collect (see Box 1 for the Paraguay example).

Box 3: Objectives of the monitoring system in Paraguay

- To provide information for corrective measures by: service providers, PATs, municipalities and sector agencies
- To provide a baseline for investment planning and resource allocation
- To identify trends over time
- To provide the information needed for reporting and provision of accountability between levels
- To establish benchmarks for service providers and authorities
- To act as information base for defining clear and simple messages and support communication between sector players

Sub-step 2b: Mapping stakeholders' roles and responsibilities

The second step is to map stakeholders and their possible roles in monitoring. This is done by listing general types of roles and responsibilities, and identifying who could fulfil those (see Table 1 for the outcomes of this exercise in Honduras). The general roles are:

- *System manager:* entity (or entities) that manages the information system, including the servers, software licenses and coordinates the processing of data.
- *Data collector:* entity (or entities) that conduct primary data collection
- *Validator:* entity (or entities) that check whether collected data is complete and doesn't contain errors.
- *Information user:* entity (or entities) responsible for result interpretation and identifying corrective measures. In sector monitoring systems, almost any actor could be a user.

- *The PAT:* entity (or entities) that is tasked with taking corrective actions, through post-construction support to services providers.

These five types of entities need to be involved in defining institutional arrangements.

Table 1: Example of stakeholder mapping with envisaged roles in Honduras

Institution	Roles				
	System manager	Data collector	Validator	Information user	PAT
Technical assistance provider (SANAA)	●	●	●	●	●
Policy making body (CONASA)				●	
Regulator (ERSAPS)			●	●	
Implementing agency (FHIS)		●	●	●	
Health Secretariat		●	●	●	●
Finance and Planning Secretariat				●	
Association of Municipalities of Honduras				●	
Municipalities		●	●	●	●
Associations of Water Committees		●	●	●	●
Water Committees		●	●	●	
NGOs		●	●	●	●

Sub-step 2c: Defining the process

The next sub-step involves the definition of the monitoring process, which includes:

- **Preparation:** refers to the liaison between data collectors, authorities and service providers
- **Data collection:** refers to collecting both primary and secondary data.
- **Validation:** refers to the review of data to identify and correct errors and omissions.
- **Processing:** refers to data transfer from data collection tools (e.g. a phone or paper) to a database. In addition, it could include the calculation of indicators through algorithms.
- **Publication:** refers to sharing results, in hard copy or online.

- **Interpretation and identifying corrective actions:** refers to the analysis of trends and correlations between data, and possible explanations of these trends. Corrective (and preventative) measures are identified.

All participants must agree on what each of these steps entails. For example, in Honduras, the steps of processing and publication of results were combined, as these were automated in the information system.

Sub-step 2d: Developing the information system

The final sub-step in defining a monitoring system is developing the information system. Different phases may be identified in the development of the information system. Many start with an initial development, in which a pilot is conducted to test and calibrate the system. This could be followed by collecting a baseline of all rural water systems in a country. The details of this process, such as the definition of indicators and algorithms and the selection of information technologies, fall outside the scope of this paper. It is worth mentioning, though, that developing an information system requires resolving a number of issues:

- **Links to existing information systems,** such as an urban water information system already in use. It needs to answer questions such as: Should this system be replaced or built upon? Are there possibilities to extend these systems to include rural water? Should links be made between systems? What should be the scope of a new rural water information system?
- **(Dis)aggregation of information:** Entities at different levels require different degrees of detail in their information. Algorithms can be used to (dis)aggregate data for different levels. Precise data requirements for each level need to be known.
- **Information technology requirements and resource implications:** the use of cell phones or tablets may imply a higher initial investment but reduce the time needed for data collection. On the other hand, new technologies require funding for maintenance. Technical capacity, time and cost requirements for these technologies need to be assessed in relation to available funding.

Step 3: Defining the institutional arrangements

In this third step, participating entities are assigned specific roles and responsibilities to play in the monitoring system. For example, both in El Salvador and Honduras, a nation-wide baseline was planned to be largely conducted in a centralised manner by national-level entities, but regular monitoring is expected to be decentralised to municipalities, as shown in Table 2. A similar matrix to the one presented in Box 2 can be used to allocate roles and responsibilities, ensuring that all steps are covered. It may be necessary to review and redefine roles and responsibilities as the monitoring system develops over time.

Table 2:
Matrix with proposed responsibilities for regular monitoring in El Salvador

Data collection	Self-reporting by service providers
Validation	In municipal Water Roundtables, bringing together municipal officials and water committees. ANDA (national utility) revises information to identity obvious errors and uploads to database
Processing	Automatized but under supervision of ANDA
Publishing of results	ANDA makes national synthesis report. Municipalities make local reports based on the results from database, where needed supported by ANDA
Analysis	Municipal Water Roundtables do this jointly
Identifying corrective measures	Municipal Water Roundtables do this jointly, supported by ANDA or other PATs

The different institutional arrangements established in the three countries may serve as a reference for similar decision-making elsewhere (see Box 4). Once the responsibilities are confirmed, further details can be added such as the frequency with which data collection is carried out and the tools to be used. The results of this work should be captured in a reference document like an operational manual or institutional guideline.

Box 4: Considerations for monitoring across the three countries

Data collection

- Self-monitoring by service providers. This would be a low-cost option, as the bulk of the work would be done by service providers themselves and many already do this in an informal manner. Providing service providers with standardized formats could greatly enhance this. However, there would be little incentive for service providers to take up this formal task and report to central information systems. Many may not have the capacity to do this work. In all three countries, it was decided that this modality would only be promoted in the medium term, once adequate capacity could be developed.
- By the municipality. In the context of decentralisation, municipalities often have a mandate for monitoring. Yet, similar to service providers, capacity for monitoring is limited, and many will need initial support. In all countries it was decided to give municipalities an oversight role over data collection, rather than doing this directly.
- By a centralised agency like SANAA (Honduras), ANDA (El Salvador) or SENASA (Paraguay). The advantage of this option would be that they have technical capacity for large-scale data collection. Besides, they would be able to mobilize additional capacity, e.g. contracted enumerators. However, in the three cases, this option was only considered feasible in a first baseline effort and not for regular monitoring rounds.
- By implementers. Both government agencies and NGOs that implement water projects regularly carry out assessments. This information could feed into a service delivery monitoring system. However, often their geographical scope is limited and they cannot collect data on a regular basis. In Honduras, it was decided that these agencies could contribute to the baseline, but not to regular monitoring.

Validation

Various modalities for validation were discussed:

- Spot checks by a supervisor to verify whether data is captured correctly
- By the administrator, who can check whether surveys forms are complete and do not have obvious errors (e.g. wrong use of units).
- Validation by municipalities and service providers. Once reports are generated, these local actors can check whether data about their services are correct.

In all cases, a combination of the three would be used, with spot checks only considered in the calibration phase, to see whether survey questions are clear and not open to ambiguities. Based on this, simple checks could be built into the software so that checks would be minimized.

Processing and publications of reports

The responsibility for this typically lies with the administrator, as it would be largely automatized in the information system. Though originally envisaged mainly as a supervisory role, in fact this appeared to be substantial during the

during the initial development phase in Honduras, as errors in indicator definitions and algorithms and content of reports needed to be adjusted.

Interpretation and corrective actions

As all monitoring systems are designed to be open, any interested institution could use the information for its own purposes. However, it was recognised that often an active dissemination and learning strategy is needed to make most use of the results. The discussions focused particularly on the role of stakeholders at decentralised level: municipalities, PATs and service providers. Three scenarios were identified:

- Local actors could access and use the data directly. However, many of these would not have the capacity or the incentive to do so. There would be a risk that the system would remain under used.
- Use only by a trained PAT. This PAT would interpret the data and identify corrective actions to be taken among the service providers in the area. Although this may be efficient, it would not build capacity with municipalities and service providers to analyse their own performance and act upon any issues identified.
- Facilitated interpretation. In this case, the PAT would facilitate a joint interpretation of results with municipal staff and service providers to plan for corrective actions. This modality is seen most relevant in the first rounds of monitoring so that capacity for data analysis can be built. Eventually, the expectation would be that the degree of PAT support would reduce and that this could be done within existing coordination platforms between municipality and service providers, such as the Water and Sanitation Committees in Honduras and the envisaged Water Roundtables in El Salvador.

In addition to the specific roles for each step, two overarching institutional arrangements need to be defined:

- **Administrator.** This role (as defined in Sub-step 2b) is crucial as the administrator not only manages the information system, but also plays a coordinating role ensuring that all steps are fulfilled and all stakeholders contribute. In each of the three cases, this role was envisaged to be filled by a centralised agency. It may even need a specific unit within the centralized agency, so it can have dedicated resources
- **Governing body.** In most cases, the exercise of defining the institutional arrangements will result in a large number of institutions to be directly involved, with possibly an even larger group of potential users. To ensure that this multi-stakeholder set up will continue working adequately, and even develop further, due consideration should be given to the governing body. One option could be to place the ultimate decision-making and oversight with the administrator, but that may disempower other stakeholders. An alternative could be establishing a governing body (in the form of a steering committee or working group) that represents the various stakeholders so that future decisions on the implementation and development of the monitoring system are taken with these interests in mind.

Step 4: Identifying costs and responsibilities for financing

A final step is identifying monitoring costs and defining responsibilities for financing. So far, very few references exist on monitoring costs. Pearce (2013) provides an overview of unit cost data for water point mapping, showing costs of around 0.10 US$/capita. Even though these provide a good first indication of the order of magnitude, these may not apply to Latin America, as they mainly refer to water points and not to piped systems, which are more common in this region. Besides, these often only refer to the mapping itself and do not include interpretation and corrective actions.

Therefore, specific detailed budgeting exercises were done for the three countries, differentiating between initial baseline and regular monitoring. This included all possible costs such as staff time, travel and material and equipment. It is important to quantify all time costs, also of government staff and service providers, even if these are often not considered a direct cost, as their salaries are paid anyway, or because this is a voluntary time dedication. An example is provided in Box 5.

Box 5: Costing of the baseline and regular monitoring in El Salvador

In El Salvador, a detailed budget was prepared for collecting the baseline, which would be carried out by the national utility (ANDA). This baseline exercise showed a cost of about 0.39 US$ per rural inhabitant. It was considered justifiable for conducting the baseline, but not feasible for regular monitoring. To test the feasibility of decentralizing the proposal to municipalities, a regular monitoring budget was also prepared, quantifying time of local government staff and water committees (valued at the equivalent of a minimum salary), travel costs, and assuming an annual monitoring frequency. These costs ended up being much lower at about 0.11 US$/person/year. On top of that, a one-off cost of building capacity of local stakeholders was added, equivalent to about 0.08 US$ per rural inhabitant.

The originally budgeted data can be validated through calibration or piloting. This requires that expenditures and time dedication are carefully tracked. Even though unit costs during a pilot are often relatively high, as it takes time for everyone to get used to the monitoring system and there may be still errors in the information system, it can still give an indication on the orders of magnitude or whether adjustments need to be made. In Honduras, two baseline pilots were done, which indicated costs of 0.24-0.34 US$ per person.

The costs are then used to confirm financing responsibilities. Costs could be shared by:

- **PATs.** Because of their mandate to provide post-construction support, PATs should monitor service providers in their area. They could initially take on these costs, particularly costs for their staff and travel, but may need to eventually recover costs from a national or local authority, depending on how the PAT is funded.

- **Municipalities.** They often have a formal mandate for monitoring and could take up a share of regular monitoring costs. In this way, the total costs of monitoring are shared among all municipalities in a country. The risk is that not all municipalities establish budget lines for this.
- **Service providers.** Similar to municipalities, dividing the costs among all service providers would lead to a low cost per service provider. But there is the same risk that they do not dedicate the time to it.
- **National level agencies.** This is where costs for initial development and baseline assessment are mostly covered, often through externally funded programmes. These groups may also cover the recurrent costs of administering the information system and providing support to the decentralised entities.

To verify whether these different institutions, particularly the decentralised ones, can actually assume monitoring costs, it may be necessary to do a feasibility check, by reviewing all recurrent costs that these institutions have around water (for example using a Life-Cycle Cost Analysis, proposed by Fonseca et al., 2011). The expected costs for monitoring can then be compared to these recurrent costs, and an assessment made on the feasibility of adding monitoring costs. Based on the results of this analysis, the proposed institutional set up and cost sharing mechanism can be confirmed, or adjusted, by choosing a different set up or changing the scope of the system, e.g. a lower monitoring frequency.

CONCLUSIONS

Service delivery monitoring can be an important contribution to rural water services sustainability. It may provide post-construction support agencies with information to target support activities to community-based service providers. Moreover, data can be used by service providers and municipalities to take corrective actions themselves, or use it for planning and/or regulation.

However many monitoring systems suffer from sustainability problems that limit their effectiveness. If it is not clear who is responsible for the various steps in monitoring and who is assuming the costs, systems may not get updated regularly or remain under-used. Institutionalizing a monitoring system as it develops ensures that responsibilities, including those for financing, are defined in a realistic manner and builds in a process to adjust these based on changing needs or capacity over time.

This paper provides a generic approach for defining a rural water monitoring system alongside its institutionalization into the sector. This approach, best applied in a multi-stakeholder process, under coordination or leadership by the relevant government agency, provides a series of steps going from an assessment of current practices to the detailing of institutional arrangements.

Based on initial application in El Salvador, Honduras and Paraguay, some first lessons were identified:

- Even in the absence of a country monitoring system, a range of monitoring practices may already exist that can be built upon. Mapping these systems opens up a wider group of stakeholders who could eventually be users of the information, and could contribute to the efforts and costs of data collection.
- Centralised options for monitoring, whereby national-level agencies do the bulk of data collection, may be appropriate for a baseline. However, this tends to be relatively expensive and is often only feasible when there is an externally-funded project or program to support it. For regular monitoring, it may be more feasible to consider decentralised monitoring by municipalities and service providers themselves, provided the system allows for aggregation to higher levels of scale. This also fits better with the mandates of these entities in the context of decentralisation. The disadvantage is that many of these entities will initially have neither the capacity nor the incentive to carry out all steps in monitoring and may need support.
- It is most effective to introduce sector-wide monitoring through a number of phases, including pilots, which implementers can document and analyse. This provides an important opportunity to test information systems, to see how institutional arrangements work, and validate projected costs. The iterative process also creates ownership with relevant stakeholders and increases their commitment to the process. Finally, it makes the costs of monitoring, and the financing of those costs, explicit, which in turn can be used to assess the feasibility of the proposed institutional arrangements. Through this iterative phased process, implementing parties can identify risks at an early stage and consider alternative options, so that the service delivery monitoring system is sustainable and effective in improving rural water supply service delivery.

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