

Public–private partnerships in Madagascar: Increasing the sustainability of piped water-supply systems in rural towns

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Longevity of piped water-supply systems remains an elusive goal in rural Madagascar. In 1999, the local enterprise Sandandrano negotiated the first public–private partnership (PPP) in the Malagasy water-supply sector. Other companies have followed suit and now there are at least 20 piped water systems under private management in the country, collectively providing services to an estimated 120,000 people in rural areas. This paper explores the evolution of the PPP model for the construction and management of piped water systems in rural Madagascar. Three case studies highlight how PPP has proven effective at sustaining service levels in three geographically diverse settings. Four key factors that have contributed to making the PPP model successful are discussed: political will, size and geographic location, latent demand, and donor support. The paper also shares recommendations for replicating the model in large rural towns where the opportunities are greatest, and the cycle of construction, mismanagement, and abandonment of piped water systems is most pervasive.

Keywords: PPPs, piped water supply, Madagascar, rural, sustainability, towns

PPP has proven effective at sustaining service levels in three geographically diverse settings

The rate of functionality for existing rural water supply systems is difficult to ascertain

CURRENTLY, MADAGASCAR HAS 20 MILLION inhabitants of which 70 per cent live in *communes*, the second lowest administrative division in Madagascar comprising groups of villages and smaller hamlets, designated by the government as rural. Water supply coverage rates in these areas are less than 30 per cent (World Health Organization, 2010), a situation exacerbated by the ongoing political crisis that began in January 2009. As such, the country is not on track to meet the Millennium Development Goal to halve the proportion of people without sustainable access to safe drinking water by 2015.

Established in 2008, the Ministry of Water has struggled to maintain a national database of improved water points. Consequently, the rate of functionality for existing rural water-supply systems is difficult to ascertain. A 2009 document published by the Rural Water Supply

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Network reported that 90 per cent of the estimated 2,500 boreholes in Madagascar were working properly (RWSN, 2009). Conversely, an exhaustive water points inventory conducted in 2010 by the USAID-funded *RANO HamPivoatra* project in 42 communes within five regions in the east and south of the country found a 20 per cent functionality rate for a sample size of over 400 improved water points including public standpipes connected to piped water systems, boreholes with hand pumps, and hand-dug wells (Randriambolanantenaina, 2010). While these results are primarily from low-population density areas, i.e. communities with less than 1,000 people, the surveys also included five large towns with between 4,000 and 7,000 people whose piped water-supply systems were found to be either partially functional or completely abandoned. These data suggest that community water management committees, the traditional management model instituted by public sector and NGO practitioners establishing these systems, have failed – for a variety of reasons that are not the focus of this paper – to keep water systems functional for more than a few years after construction.

A new management paradigm must emerge if improved water supply is to be sustainable

A new management paradigm must emerge if gains in access to improved water supply are to be sustainable in the context of rural Madagascar. To this end, a promising new public-private partnership (PPP)-based service delivery model, in which rural communes award contracts to a registered private sector company to assure the operation, management, and maintenance of a water system, typically serving a commune's largest town, has begun to gain traction in recent years. System operators establish a cost-recovery system that is profitable yet affordable and appealing for the communities they serve. There are now an estimated 20 piped water systems managed in this way in rural Madagascar.

This paper briefly describes the legal context of the rural Malagasy water sector that allows for private sector investment and management of public water supply systems. A brief history of the emerging PPP model is presented, along with case studies of three private sector companies managing water supply systems in different regions of the country. A discussion section identifies key factors for the model's success. Finally, conclusions and recommendations for replicating the model are presented, focusing specifically on what international donors could do to accelerate the establishment of PPP in large rural centres that are emerging throughout the island.

Legal framework of water supply in rural Madagascar

The Water Code (Law No. 98-029), passed in January 1999, sets the groundwork for decentralization of the Madagascar water sector. This

The Water Code states that public water supply infrastructure is the property of the commune

set of laws transformed the centralized regulatory framework that had existed since the country's independence from France in 1960, clearly emphasizing that potable water is a commodity that must be paid for and opening up the sector to private investment.

The Water Code states that public water-supply infrastructure is the property of the commune, and that it is the commune's responsibility to provide a water-supply service for the populations living in its territory. Section 46 of the Code provides that this service may be delegated to a third party via management agreements, leasing, or concession. Communes may, in exceptional circumstances, choose to assume the management responsibilities themselves provided that they have fulfilled certain criteria (e.g. having a multi-year investment plan specific for increasing access rates to improved water and sanitation) established by decree. Alarming, 13 years after the passage of the Water Code, there remains a great deal of uncertainty about how it is to be applied in practice. Numerous agencies cited in the decree to regulate and enforce its principles have yet to be created or lack the funding to effectively carry out their mandates. Indeed, the regulatory body that is intended to decide if a commune has successfully fulfilled the criteria required to assume management responsibilities as intended in the law does not yet exist.

Moreover, the role of state institutions responsible for providing oversight and support to rural communes, specifically the Ministry of Water, is now extremely limited. Lack of funding as well as other structural problems prevents the Ministry of Water from asserting an effective presence in rural areas. This situation has caused misconceptions about the roles of local government vis-à-vis the management of water supply infrastructure, as well as the rights and responsibilities of the water users. In this environment, commune leaders, if they are aware of this responsibility, are reluctant to assume their role of *maitre d'ouvrage* (owner/contracting authority) as intended in the Water Code and as a result lack the political will or capacity to respond when community water supplies fail.

A brief history of PPP in the Madagascar water-supply sector

The first PPP in the Madagascar water-supply sector was launched in 1999

The first PPP in the Madagascar water-supply sector was launched in 1999, three months after the passage of the Water Code, between Sandrandrano (a Malagasy term meaning the value of water) and the peri-urban commune of Sabotsy Namehana, 15 km to the north of the capital, Antananarivo. The goal of the project was to extend the services of the existing parastatal national power and water company JIRAMA to underserved neighbourhoods far from

the mainline. Sandandrano used private funding to add 25 public water points at strategic locations throughout the community. The commune, JIRAMA, and Sandandrano jointly signed a seven-year contract in which Sandandrano was responsible for assuring the proper management, maintenance, and cost recovery for each of the 25 public water points. The pricing of the water service included a 4 per cent tax on each litre of water sold payable to the commune as per the Water Code, the operating costs of maintaining the system, and a modest profit. In 2006 a seven-year extension was signed, and today the system has 35 public water points, distributing approximately 150,000 litres of water daily.

Likewise, in 2005 Sandandrano engaged in its first rural PPP with the commune of Ambohijanaka, located 20 km north of the capital. With support from the World Bank, the commune awarded Sandandrano a 25-year contract to construct and manage a new gravity flow piped water system that served 6,000 persons at that time. Within five years of system construction, the commune's population had increased by 25 per cent and was the site of numerous micro industries (poultry farming, for example) dependent on the water supply.

The overwhelming success of Ambohijanaka initiated the large-scale promotion of PPP in the Madagascar water supply sector. Beginning in 2006, other companies began to invest in and manage piped water systems in rural areas. In 2008 the PPP concept was cited in the Madagascar Action Plan as the cornerstone of the national strategy to reach the MDG for rural water supply.

Case studies

The following case studies highlight three examples of established PPP for the construction and management of piped water systems that are thriving in rural Madagascar. Each begins with a brief introduction of the firm involved, followed by a description of a community they serve and the types of service level offered, prices for water, etc. These case studies are meant to draw attention to the similarities that exist among communities successfully engaging in PPP that are in geographically and culturally diverse areas of the country.

Sandandrano is considered to be a pioneer in providing water services to underserved communities in Madagascar

Case study 1: Sandandrano

Sandandrano, S.A.R.L. is widely considered to be the main pioneer in providing professional water-supply services to underserved peri-urban and rural communities in Madagascar. Founded in 1998 by a 40-year old locally trained hydraulic engineer, Sandandrano was the first local company to negotiate a management contract with a commune on the periphery of Antananarivo to manage and operate public water

points connected to the JIRAMA network. To date, the company has invested over US\$400,000 in private funding to construct or rehabilitate piped water-supply systems in seven urban and rural communes, and is now responsible for providing sustainable water services to an estimated 200,000 people in rural and peri-urban areas.

Sandandrano was the first local company to negotiate a management contract with a commune

Sandandrano has brought many innovations to the Malagasy rural water sector. The company developed the concept of the semi-private 'social' water point (SWP) as a strategy to increase household water consumption and offer a service option in between private household connections and public water points. A SWP is a tap stand with a durable spigot and water meter that is shared by a group of 5 to 15 self-selecting households. Advantages of SWP are: 1) water service fees are typically lower than for private connections; 2) households have access to water at all hours, rather than the fixed hours for public water points; and 3) water points are installed at a convenient central location that is agreed upon by the participating households. For the small-scale service provider, this model presents considerable advantages in terms of return on investment and operating efficiency. The SWP option increases the professionalism of small-scale water service providers by providing a service delivery model that responds to the demands of a significant portion of clients who cannot afford a private connection and are unsatisfied with the restrictions and hassle of fetching water from a public water point. SWP is an intermediate step towards the long-term goal of each household having a private connection. Experience has shown that after one to two years of sharing a SWP, households start to demand a higher level of service and begin to invest in private connections, which benefits both public health indicators and the system managers' bottom line.

The Association of Private Sector Water Distributors seeks to increase professionalism in the private sector

Sandandrano also founded the Association of Private Sector Water Distributors in 2005. The aim of the organization is to increase drinking water supply coverage rates through the promotion of PPP to build and upgrade water supply systems in rural Madagascar. The association promotes the interests of small-scale companies working in the sector, and seeks to increase professionalism in private sector service delivery through greater links and exchange between established water distributors. The association organizes an annual general assembly and holds meetings throughout the year on an as-needed basis. In spite of receiving little recognition and support from the Ministry of Water, the association's membership has steadily grown from 9 original members to 17 companies as of May 2011.

Ambohibary. Ambohibary is a rural commune of 60,000 people located in the Vakinankaratra Region, 38 km north-east of the urban centre of Antsirabe. Working in the context of the European Union, Suez Environment Foundation and Agence Française de

Développement-funded Méddea Project implemented by the French NGO GRET, the commune awarded Sandandrano a PPP contract in 2009 to construct and manage a new water supply system for the commune's main town of 7,000 persons, whose economy is primarily agriculture-based (rice farming and small-scale animal husbandry). Sandandrano invested \$65,000 of private financing into the project. The system was operational beginning in March 2010.

Public response to the water service during its first year in operation was phenomenal

Public response to the water service during its first year in operation was phenomenal. The system currently has 239 household connections and 23 social connections (10 institutional and 13 shared). The current number of private connections represents a 130 per cent increase compared with the number of private connections installed at the end of construction. Two monoblocs – a public sanitation facility comprising two toilets (men's and women's), a shower, and laundry areas that are designed to be ergonomic and economical in terms of materials and space – are operated for 10 hours daily and serve as public water points. Water is priced at \$0.50 per 1,000 litres at the public taps and household connections, and \$0.25 per 1,000 litres at the social connections. The company employs eight full-time staff to manage the system, seven of whom are from the community itself.

Case study 2: AπR

AπR became a registered company in 2001, founded by a former high school science teacher who served as Sandandrano's operations manager for a large water-supply network in peri-urban Antananarivo from 1998 to 2000. The company was awarded its first management contract in late 2001 to manage the public water points connected to the JIRAMA network in a sprawling neighbourhood north of the capital.

AπR designed a customized software program for managing piped water-supply networks

In 2008, AπR designed a customized software program developed specifically as a tool for managing piped water-supply networks. The software automates the key aspects of system management (e.g. prints receipts and bills, produces monthly reports) and gives programme managers a simple way to track water sales and company expenditures on an ongoing basis.

Fihonana. Fihonana is a rural commune of approximately 20,000 persons located 45 km west of the capital on a mix of paved and secondary road. The commune's economy is dominated by agriculture as well as a mix of small-scale merchants, public sector employees, and day labourers. In 2007, the World Bank-funded FID project selected the commune's main town (population 5,000) as a pilot site for a PPP to rehabilitate and manage the town's piped water supply system. In November 2008, at the conclusion of a competitive bidding process, the commune awarded AπR a 15-year contract to manage the system.

In total, AπR invested over \$4,500 of private funds into system construction

Construction of the system lasted six months from November 2008 to June 2009, at which time the system had 60 household connections and 14 semi-private tap stands. Households requesting private connections were required to pay 50 per cent of the material cost for installing the connection, a fee largely dependent on the length of piping from the mainline to the respective household. In total, AπR invested over \$4,500 of private funds into system construction.

Today, the community has 73 private household and 24 semi-private connections. The system requires no water attendants; all connections are metered and regulated by individual households or groups of households sharing a water point. The system has a two-tiered pricing structure: \$0.25 per 1,000 litres for the household connections and \$0.13 per 1,000 litres for the semi-private connections. The company collects roughly \$200 annually in taxes within its fee structure and passes it on to the commune. This represents 4 per cent of the total revenues from water sales as mandated by the Water Code. Demand for water continues to rise. AπR is now investing in the expansion of the system to serve an adjacent village of 2,000 people.

Case study 3: Enterprise Velo

Enterprise Velo is one of the newest companies to join the Malagasy water-supply sector

Enterprise Velo is one of the newest companies to join the Malagasy water supply sector. A dynamic woman owner who studied management of urban and rural water supply at Madagascar's National Center for Water and Sanitation leads the company. Before incorporating the business she had worked with WaterAid and the Ministry of Water.

Within the context of the USAID-funded RANO HamPivoatra project implemented by Catholic Relief Services and CARE/Madagascar, Velo responded to a public call for proposals published by the commune of Anivorano Est seeking a private sector manager for the piped gravity flow water system serving the commune's largest town of 5,000 people. The company had no prior experience managing piped water supply networks, but presented the most financially and technically competitive offer and was awarded a 10-year management contract in February 2011.

Anivorano Est. As in the communes of Ambohibary and Fihonana, Anivorano Est uses a progressive pricing structure to differentiate the three service levels offered by the system. Water distributed via household connections is priced at \$0.50 per 1,000 litres, social connections are \$0.40 per 1,000 litres and public connections are \$0.35 per 1,000 litres. The project required households requesting a private connection to pay 50 per cent of the cost of the water meter as well as 100 per cent of the materials and installation costs of the piping beginning at the closest mainline branch. In an attempt to extend access to more vulnerable families, households sharing social

Table 1. Key metrics for each of the case studies presented

Commune	PPP partner	Private investment (\$)	No. of connections as of February 2012			Length of contract (years)	Volume of water sold semi-annually (m ³)
			Private	Semi-private	Public		
Ambohibary	Sandandrano	65,000	239	10	13	10	7,100
Fihonana	AπR	4,500	73	24	0	15	4,500
Anivorano Est	Velo	4,000	53	82	4	10	6,458

connections were required to contribute only 50 per cent of the cost of the water meter. A monobloc and a public laundry facility provide public access points to visitors and households not choosing to use the two higher service options. There are now 82 social and 53 household connections in Anivorano Est (see Table 1 for a summary of the case studies).

Discussion: Key factors for success

Considered together, these three case studies confirm that small-scale private sector operators can effectively provide piped water services to communities in rural Madagascar. The owners of the three companies have identified the following four factors as key to the approach's success.

Political will

Clearly, a key to the success of these case studies was the belief of the town mayors and other local politicians that engaging in a PPP in which residents pay for a professional water service would transform their communities for the better. A provocative decision of this magnitude is rare in rural Malagasy politics. Thirteen years after the passage of the Water Code, the idea that potable water is a commodity, has value, and should be paid for is a foreign concept to most politicians and citizens alike. The link between access to a potable water supply and improved health and well-being, while acknowledged to exist, is often deemed a low priority for budget-stretched households. Furthermore, households living in rural areas are resistant to paying taxes of any kind. Collecting a levy on a public service as essential as potable water in the face of a fickle electorate is risky for even the most beloved politicians.

In one commune, the mayor was threatened in letters written by the leader of an opposing political party after the decision to privatize

Local politicians believed that engaging in a PPP would transform their communities for the better

The idea that potable water is a commodity, has value, and should be paid for is a foreign concept

the water system. The irony is that this same political opponent was one of the first households to request and then pay to install a private connection in his home.

Size and geographic location

Importantly, the communities highlighted in each of the three case studies have populations of more than 4,000 people, and are situated within less than 50 km of a major urban centre. Residents in these places have probably visited friends and family in cities where payment for water is the norm. These towns' geographic conditions, which are favourable for exchange, commerce, and influx of information and new ideas, are not akin to many rural communes in Madagascar that are inaccessible by motorized transport for part or all of the year. Furthermore, each of the three communities shares the following characteristics:

- A significant portion (though still less than half) of the population derives its income from non-agricultural activities.
- There is a growing middle class with increased capacity to pay for professional services.
- Cellular phone networks exist.
- Public services (markets, health centres, primary and secondary schools, post offices, bus stations) are functional and well frequented.

Latent demand for modern services

The peri-urban characteristics of the communities described above imply that there was a latent demand for a modern water-supply service at the time of system construction. A great number of the community's population sought a level of service that could only be offered through a professionally run, modern water-supply system. In response, each of the three companies offered different levels of service according to personal preferences and willingness to pay. Households were able to choose the level of service most appropriate to their individual circumstance. To deliver such a service required a level of technical and managerial complexity that justified the need for a professional service provider.

Donor support

An international donor supported the establishment of the PPP in each of the three communes highlighted above. Generally, donors played two key roles that contributed to the success of the project: namely 1) financial support for the construction and/or extension of the piped

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water supply system; and 2) creating an enabling environment within the commune so both politicians and the majority of project beneficiaries would accept the PPP model.

The first, more commonly sought and recognized type of donor support came in the form of subsidizing a significant portion of the construction costs. The level of subsidy ranged from 60 to 95 per cent of the total system cost. In each case, donors paid subsidies directly to the contractor in the form of multiple payments that were dependent on the contractor hitting construction benchmarks written into the contract. The second type of donor support common in each case was towards increasing the capacity of the commune's mayor to assume his or her role as the *maitre d'ouvrage* as outlined in the Water Code. The donors manifested this type of support in different ways. To assure transparency, each donor insisted that the communes followed a public call for proposals process for selecting their private sector service provider to engage in the PPP. Both the Méddea and RANO HamPivoatra partners worked with their respective communes to develop multi-year water and sanitation business plans and anticipate continuing to support their respective communes until late 2013.

Recommendations

The following recommendations build on the modest successes PPP have had in increasing sustainability of piped water supplies in rural towns in Madagascar. They aim to simultaneously encourage new private sector entrepreneurs to join the sector and increase demand for professional water services in large rural towns where the model has proved successful.

These recommendations are aimed primarily towards bilateral donors who support the rural water supply sector in Madagascar. While bilateral aid to Madagascar remains severely constrained following the 2009 political crisis, bilateral donors will continue to play a key role in supporting the Ministry of Water and other implementing agencies, both financially and politically, to expand the PPP model into new areas. These recommendations assume that the Ministry of Water, but also the government in general, has the political resolve to encourage the application of the Water Code and further expand the private sector's role in supplying potable water in rural areas.

Encourage private sector participation in rural water supply

The formal private sector in Madagascar remains largely underdeveloped, and virtually non-existent in the water sector. Investing in and managing a public service is a foreign concept to most established businesses and young entrepreneurs alike. Innovative

projects such as Méddea and RANO HamPivoatra are bringing the PPP idea to the forefront, and encouraging a new generation of entrepreneurs to participate in the sector. During the first half of 2011 RANO HamPivoatra held a series of informational sessions in regional and district centres within the project zones to inform and educate potential entrepreneurs about the PPP model. More than 40 companies from across the country have manifested their interest in competing in a series of upcoming calls for proposals sponsored by the project. Companies new to the sector will require specialized training and ongoing support to assure professionalism. Capacity building for the next generation of entrepreneurs should be included within future bilaterally funded water projects targeting rural areas.

Donors and the Ministry of Water should support the expansion of the Association of Private Sector Water Distributors. This organization is an underexploited resource that could be the cornerstone of a thriving civil society capable of spearheading the expansion of the PPP model.

Likewise, reducing the tax burden on the private sector may be a springboard to increase their interest in the rural water supply market. For instance, the tax breaks offered to bilateral donors working in the sector could be extended to private investors. Waiving or reducing the 20 per cent value added tax (VAT) on private investment in public goods such as water supplies and construction materials may make the sector more attractive to private investment. Reducing taxes on the profits of companies offering social services such as managing public water supplies would likely have the same effect. With a more attractive market, rural communities would then have a larger, more competitive pool of providers to meet their enormous need.

Increase demand

While the first recommendation focused on increasing the supply of service providers, equal effort should be made to increase the demand for improved water services more broadly in Malagasy civil society. Information, education, and communication campaigns targeting district- and communal-level authorities aimed at increasing demand for modern water services should be an integral part of any future bilaterally funded rural water projects. Campaigns should include outreach to communities to inform them of their rights and responsibilities in terms of accessing a potable water supply. The principles outlined in the Water Code, the benefits of potable water, and the differences in service levels, as well as the rewards of working with the private sector, should be clearly articulated to rural communities in innovative ways such as short films, radio dramas, and SMS telephone messages. Where appropriate, the Ministry of Water and donors

Effort should be made to increase the demand for improved water services more broadly in Malagasy civil society

should arrange study tours for local authorities to visit a town with an established PPP to see first-hand the levels of service and coverage that are achievable.

Target large rural towns

An annual growth rate of 3 per cent between 1990 and 2009 (UNICEF, 2010) precipitated the emergence of large rural centres throughout the country with between 3,000 and 10,000 people that have characteristics of both rural and peri-urban communities. In these settings the local solidarity and family links that are the backbone of the classic community management model break down and communal associations are no longer able to guarantee the continuity of basic services or modify the level of service to fit the needs of an increasingly non-homogeneous society. There are now hundreds of towns in rural Madagascar with between 3,000 and 10,000 people, an estimated collective population of at least 7 million, which either currently do not have access to an improved water system or use water supply infrastructure that is intermittent and/or provides water that is not potable.

As demonstrated in the case studies presented above, these types of rural centre are ripe for the development of PPPs to invest in and manage piped water systems. Alarming, rural towns of this size have long been underestimated in Malagasy investment policies. Developing models for providing modern water services for these centres should be given high priority. Focusing future investments in emerging rural centres offers a genuine opportunity for the country to significantly increase rural water coverage rates over the next decade.

Focusing future investments in emerging rural centres can significantly increase rural water coverage rates

Emphasize service delivery

Large rural centres require water systems that offer multiple service options and pricing structures. Like their counterparts in urban areas, households in these communities have a high demand for private connections, or prefer to share a tap with their neighbours rather than fetch water from a communal water point. Most defunct piped water supply networks in rural Madagascar do not include private or semi-private connections, and thus do not match the demands of the rapidly growing and ever more demanding population. In future, all piped water systems constructed in towns with a population of more than 2,000 people should have multiple service options that include private and semi-private options. These types of service encourage water use, which leads to healthier populations as well as increased profitability for the system manager. Reducing the time spent walking to and from a public tap stand will improve livelihoods, especially for women and girls.

Conclusions

While still small in scale, the successes documented in this paper represent the building blocks of a progressive, fair, and sustainable decentralized water delivery model for underserved communities in rural Madagascar. It is clear from the three case studies highlighted above that PPP with private sector operators for the construction and management of piped water supply systems can thrive in rural Madagascar. The model offers a range of service options and tariff schedules to fit the needs of non-homogeneous, economically diverse communities that characterize hundreds of large rural towns throughout the country. At the same time, the model encourages rural employment, promotes accountability, transparency and good governance on the part of local authorities, and contributes to improvements in public health in the long term.

The model is still new, however, and is certainly not a 'silver bullet' to be applied without careful attention to the specificities of each potential site. Rural Madagascar is a non-homogeneous mixture of ethnicities, cultural traditions, and ecosystems. No one single management paradigm will be appropriate for all rural areas in the country. Nevertheless, given the mixed success of the community management approach and the persistence of low water coverage rates in rural areas, most notably hundreds of towns with populations between 3,000 and 5,000 persons without an improved water supply, enticing the private sector to invest in and manage piped water systems in large rural centres offers a viable strategy for sustainably increasing coverage rates in the short term.

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PPP for the construction and management of piped water-supply systems can thrive in rural Madagascar

The community management approach has had mixed success and low water coverage rates persist in rural areas
