

## Eastern Cape piloting of CSIR research to improve water services reliability

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Reference: BE05-PO-F

### Abstract

CSIR research has found that operations and maintenance partnerships, using the basic principles of franchising, could address many challenges in the operation and maintenance of water services. This was reported at the CSIR 2<sup>nd</sup> Biennial Conference held in 2008. Franchising provides appropriate training to people active on site, and also offers backup off-site skills, with incentives for finding people with the appropriate skills required. Findings indicate that many opportunities lie in the franchising of suitable elements in the water services value chain, and a selection of these has been modelled on paper.

The franchising concept is being piloted with considerable success in the Eastern Cape. Under the guidance of a franchisor, trainee franchisees are well advanced with initial cleaning and the routine maintenance of the sanitation facilities at 400 schools. Irish Aid is funding concept development, while the franchisees are paid by the provincial Department of Education from the normal departmental budgets for operation and maintenance. Service delivery has shown such a marked improvement that the Department is requesting rollout to a further 1 000 schools.

### The research questions

Throughout South Africa, people fill up their cars at a petrol station and eat food purchased at the local KFC or McDonald's, confident that these products contain no contaminants. In some parts of our country, however, they cannot be sure that the tap water is fit for drinking purposes and that the local stream is not polluted by effluent from sewers. Yet the oil from which petrol is made is imported, whereas the 'raw material', so to speak, for the clean water is usually sourced from relatively close by.

Two likely reasons for this are:

- The manager or owner of the retail outlet, and also the staff, know if they cannot provide food or petrol reliably every day, they will not be paid. If something goes wrong, it has to be corrected quickly. That is an "incentive".
- The staff of the outlet, the people responsible for producing the product (e.g. those who refine the petrol) and those who have to ensure it is delivered to the outlet, have received proper training to the level required for a specific task. They also have an obligation (such as a contract) to call on people with higher levels of expertise when these are needed. The experts called on have an equal obligation to provide that assistance. That is known as "capacity".

This paper highlights CSIR research that has addressed:

- The operational principles that make franchises, such as a food outlet or petrol station, work as well as it does; and
- Whether these principles can be applied to providing acceptable sanitation and water services.

## **Franchising principles**

Businesses such as petrol stations and food outlets are very often run by franchisees, participants in franchising partnerships. The principles of franchising partnerships in the generic sense (i.e. not specific to water services or other sectors) can be summarised as follows:

- Franchising is robust and able to ensure consistent quality products and services.
- Franchisors are obliged to provide the franchisees with specialist expertise and other forms of assistance.
- The success of franchises is based on replication of prior success, efficient logistics and a skilled and capacitated workforce.
- Small business franchises are relatively easy to establish.
- Franchisees are obliged to adopt the tried-and-tested systems and procedures of the franchisor, and to accept the quality control of the franchisor -- thereby assuring higher quality and greater efficiencies.

The cardinal elements of a franchise can be summarised as:

- identifying components of the value chain that are simple enough to systematise;
- discovering good practices;
- systematising the identified component(s);
- selecting franchisors and franchisees;
- identifying the financial and other risks to both franchisors and franchisees, and as far as practically possible, reducing those risks;
- providing start-up help, including initial training;
- preparing operations manuals;
- conducting ongoing research and development for the product or service and of the market dynamics; and
- continued support, training, control and discipline of the ongoing business.

Franchising is a way of accelerating the development of a business, based on proven, existing methodology. The franchise system firstly correlates and systematises the business, and then facilitates the setting up of the business, supporting and ensuring business discipline thereafter.

The key is the incentive, to franchisor as well as franchisee, to improve efficiency, provide improved service reliability and quality control -- thereby providing the assurance that service quality will be consistent.

## **Applying franchising principles to water services**

The rapid rate of construction and commissioning of new water services<sup>1</sup> infrastructure has severely challenged the public sector institutions in South Africa that are responsible for operating and maintaining this infrastructure. Innovative approaches are required. Even if all existing water services institutions were coping with the demand, there would be valid reasons to investigate alternative institutional models to establish whether alternatives could:

- be more cost-effective;
- allow existing role players to focus on their other responsibilities; and
- offer a range of other advantages, including greater local economic development.

The quality of the operation and maintenance of water services infrastructure in South Africa varies greatly between areas. As a result, the quality of tap water, sanitation, treatment works effluent, and other water products and services varies greatly.

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<sup>1</sup> In terms of the Water Services Act (South Africa 1997), "water services" means "water supply services and sanitation services".

Could the application of franchising principles, which is evidently able to guarantee consistent quality of other products and services, help to ensure consistent and satisfactory quality water services?

To address this question, the CSIR, with financial assistance from the Water Research Commission (WRC), has researched the application of franchising partnership principles to the operation and maintenance of water services infrastructure.

Worldwide, there is limited experience of the application of the franchising approach to water services infrastructure operation and maintenance, although some existing partnerships share general characteristics of the franchise approach.

A scoping study completed in 2005 (Wall 2005) found that franchising partnerships could alleviate and address many challenges in the management of water services. Simultaneously, franchising would support the development of local micro-enterprises and broad-based black economic empowerment (BBB-EE), all within the public sector service delivery environment.

The CSIR, the WRC and other partners<sup>2</sup>, have developed the partnership concept considerably since 2005, adapting principles of franchising to the operation and maintenance (O&M) of water services infrastructure (Bhagwan et al 2008, Wall 2008, Wall 2010, WRC awaiting publication).

Through such partnerships --

- owners of infrastructure can access the higher-level expertise in operations and maintenance needed and seldom found outside larger urban areas;
- micro-enterprises with the ability to provide locally-based service provider solutions can be created and nurtured.

The research and concept development in this field have been conducted by practitioners who have an 'on the ground' understanding of water services delivery, and who have consulted with practitioners in the conventional franchising sector (refer to FASA 2005, Illitschko 2005).

The main purpose of this paper is to report on developments over the past two years.

### **The case for water services franchising partnerships**

In the CSIR and WRC franchising partnership concept for improved water services infrastructure operation and maintenance, ownership of the water services infrastructure remains with the public sector.

The concept has been formulated with a view to improving water services operational quality and efficiency through introducing a new (to water services) supply-side operation and maintenance provider mechanism.

The question whether the principles of franchising could impact positively on the operation and maintenance of water services infrastructure in South Africa, may now be answered in the affirmative.

At present, the staff of many public sector water services infrastructure owners are capable of dealing with basic day-to-day operational needs, but not with anything more demanding than that. This results directly in frequent non-compliance with the specified performance standards (inter alia, see SAICE 2006, DWAF 2007, DWAF 2008, DWAF 2009, DWA 2009 and SAICE forthcoming.) For example, the 2006 "report card" review by the South African Institution of Civil Engineering (SAICE) of the state of infrastructure in South Africa assigned the grade of "C+" to water infrastructure of the major urban areas, while sanitation received a "C". The equivalent infrastructure in small towns and rural areas received "D" and "E", respectively, not far from the lowest-possible grade. SAICE found that, to a very significant extent, the

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<sup>2</sup> Hereafter: "the CSIR team" or "the research team".

difference was that infrastructure in major urban areas is generally maintained by skilled professionals, while the other areas often do not have access to these skills levels. (SAICE 2006)

Improvements would soon be seen if the generally under-qualified or under-resourced water services staff of municipalities and other water services authorities outside major urban areas could enjoy ongoing support, mentoring and quality control, and have quick access to skilled assistance when needed. If these authorities could enter into partnerships with franchisee micro-enterprises, improvement of water services quality and reliability would surely follow. A carefully designed set of authority/franchisor/franchisee arrangements, efficiently implemented, could go a long way in assisting in the water services provision environment.

Franchising might often not be a feasible alternative, but would in many situations offer the prospect of improved operation and maintenance of water services.

Given that the costs of the franchisor's higher levels of specialist expertise would be shared by several franchisees, the franchisor could afford to make this expertise available to each of them when needed, and provide other resources normally available only to larger water services authorities. This holds significant benefits for water services reliability.

An authority's competence to monitor performance and enforce contract compliance is key to effectively using the micro-enterprise sector. Furthermore, if a water services authority is short of management resources, it would be more efficient to use its existing resources to manage the work of a franchisee partner or contractor rather than trying to cope with the operational issues itself.

Franchising also offers opportunities to the micro-enterprise sector and for local economic development. While franchisees are micro-enterprises, their association with a franchisor gives them considerable advantages - reflected in the better service that they can provide - compared to stand-alone micro-enterprises.

There are precedents in South Africa of franchising partnerships for the operation and/or maintenance of water services infrastructure -- but these have only been on behalf of private sector owners of infrastructure (WRC awaiting publication). The longest-running of these is a Pretoria-based company called The Drain Surgeon which has provided plumbing and related services to urban households, businesses and industrial premises for 30 years. This well-known franchisor has become a nationally known brand, represented in most cities and major towns of South Africa.

Another example is a company that provides a range of high-end wastewater solutions in specific sectors of industry. Its franchisees are appointed by private clients to treat their wastewater streams for reuse or discharge to a natural watercourse in compliance with the requirements of the Department of Water Affairs. In this instance, the franchisees are typically university graduates, with degrees in chemistry or chemical engineering, and clients include mines and other heavy users of water, such as poultry processing plants.

### **The potential of franchising partnerships**

The concept of franchising partnerships is an attractive option for a number of reasons, in particular because it would address the lack of higher-level expertise often identified as a key to improvement of service, especially in the more remote areas. The essence of water services franchising partnerships is the creation of a pool of appropriate expertise upon which the water services authorities can draw, a restructuring of the local responsibility for operating the services, and the creation of a two-way obligation -- an obligation to call for assistance from the pool, and an obligation to respond rapidly to that call. All of this combined with incentive structures will ensure that it will happen.

In brief:

- On most days at the (say) treatment works, nothing out-of-the-ordinary would happen. Franchisee staff, who are appropriately skilled, are able to cope.

- When major maintenance or upgrading is needed, or when there is a breakdown, those staff know who to call at the franchisor in order to bring the higher level of skills needed.
- Staff would know that the franchisor will be obliged to help, because there would be a binding contract and a shared reputation.
- It would be a two-way obligation -- an obligation on the franchisee to ask for assistance, and an obligation on the franchisor to provide such assistance.
- Costs of the higher skills levels, which are needed only intermittently, would be spread across many sites -- thus the cost per site is low.

Franchisee water service providers, who depend for their livelihood on the success of their business, would have a strong incentive to perform.

The franchisees would be micro-enterprises. The franchisors would be any institutions, private sector, parastatals or non-governmental organisations, that have the required expertise, are willing to provide the service, and would not have a conflict of interest in providing the service.

There are already many potential sites for water services franchising partnerships, as much water services infrastructure currently in place is not being operated and maintained properly. Many of these sites fall under the jurisdiction of, or are owned by, water services authorities, but other sites belong to other public sector institutions such as schools and clinics. Assistance from the franchisor would be of particular value for areas away from the major urban centres. Few rural municipalities in South Africa can, for example, afford to employ competent qualified staff, and this leads to periodic unreliability of supply and frequent non-compliance with national standards relating to, for example, the quality of effluent from wastewater treatment works.

In summary, these partnerships are a means of --

- assisting infrastructure owners by providing expertise in water services infrastructure operations and maintenance that would very seldom be found outside the metropolises and larger urban areas;
- creating and supporting small, locally based and efficient service provider solutions.

Franchising partnerships can offer significant potential for improvement in public sector water services operational quality and reliability.

Water services operation and maintenance tasks with apparent potential for franchising include leak detection, borehole management, management of municipal treatment works, management of treatment package plants, meter reading, pit-emptying services, laboratory services, data management, demand and pressure control management, and site and property management. The CSIR has modelled some of the selected elements of the water services value chain that are suitable for small business as the components can be systematised readily (WRC awaiting publication). This modelling has drawn on first-hand knowledge of operating such elements in contexts as close as possible to franchising. It has also drawn on the understanding of the small number of franchises already active in the water services sector, and on the understanding of the large number of franchises in other fields. A substantial body of documentation of value to water services authorities, potential franchisors and potential franchisees is soon to be published (WRC awaiting publication).

Whereas a business based on a single element of the water services delivery value chain might not be viable, a franchisee might have a viable business by offering several water-related services, thereby achieving dual objectives, viz:

- economy of scale; and
- less dependence on one or a limited number of clients.

Should a water services authority require contractual recourse not only to the franchisee, but also to the franchisor, the franchisor could be a guarantor of the performance of the franchisee. If deemed necessary, this would require an additional contract that closes the loop between the franchisor and the authority. The authority may require this contractual assurance that the franchisee will be supported by

strong management and that the franchisor is able to make alternative arrangements to ensure continuity of service. This assurance could be necessary especially if the franchisor's expertise or track record is a significant reason for contracting with the franchisee, and the franchisee is a largely unknown quantity.

### **The need for pilots**

By 2008, development work had been taken to the point where the concept of franchising partnerships for the operation and maintenance of water services infrastructure had been thoroughly described, including guidelines on where and how it could work. The CSIR team anticipated that where the environment was favourable, potential franchisors would seize the opportunity and would do the detailed modelling to suit their abilities and the circumstances under which the concept could be applied.

It was also realised that pilot projects would be necessary. Only through piloting would unanticipated challenges be identified -- and overcome. While some public sector officials, when approached by members of the research team, said they would not consider franchising partnerships, others said it would be easier to convince their principals (municipal councilors in the case of municipalities) once a successful pilot had been completed (WRC awaiting publication).

### **Preparation for the pilot**

A few large water services providers have shown interest in franchising partnerships. Amanz' abantu Services (Pty) Ltd, a provider based in East London with a footprint covering the whole Eastern Cape, extrapolated the franchising concept into its well-established and appropriate expertise, and its track record of working successfully with rural and developing communities. It set up a subsidiary, Impilo Yabantu Services (Pty) Ltd, to be a franchisor, and started assessing the potential market, approaching selected owners of public sector infrastructure in the province.

Irish Aid, whose South African-based water services specialist had been convinced of the potential of the concept for several years, agreed to provide substantial funding for advocacy, situation-specific development for a pilot, and general support over the period 2009-2012. Irish Aid's intention was for the funding to be used to add value to public sector budgets -- that selected water services infrastructure operation and maintenance funding already available in public sector budgets but not being spent effectively and efficiently would be unlocked by franchising of the operation and maintenance.

Contrary to WRC and CSIR expectations that the public sector entity willing to pioneer a franchising partnership pilot would be a municipality, it was the Department of Education (DoE) of the Eastern Cape provincial government that was first to prove receptive. Its officials responsible for infrastructure indicated great interest in a pilot that would see franchisees doing routine cleaning and maintenance of school toilet facilities.

Early in 2009, a memorandum of understanding was signed between five parties: the DoE, Irish Aid, the CSIR, the WRC, and Amanz' abantu. In this memorandum it was *inter alia* stated that:

- The DoE wished to utilise small, locally-based enterprises, in partnership with an established provincially-based service provider, to provide identified maintenance services for its facilities;
- Research indicated that the franchising model would offer public authorities "a contractual mechanism for improved efficiency, flexibility and accelerated resource mobilisation";
- Amanz' abantu would contract with the DoE to set up and run a pilot programme based on the principles of franchising partnerships, for maintenance of school sanitation facilities in the Butterworth Education District;
- Impilo Yabantu would perform the role of the franchisor;
- From its budgets normally allocated for this, the DoE would provide the funding for maintenance of the facilities; and
- The WRC and the CSIR, funded by Irish Aid, would provide policy, technical and other assistance necessary to facilitate the pilot programme. This would include drafting the terms of reference,

formulating contractual documentation, monitoring progress and disseminating results with a view to replication in other areas.

The CSIR team had come to realise that the first pilots could be negotiated with infrastructure owners least resistant to change because:

- They had already realised that they were unable to operate and maintain their infrastructure ; and
- existing public sector jobs would not be threatened.

There was general consensus that most schools in the Eastern Cape, and especially the rural schools in that province, are unable to operate and maintain this infrastructure -- and that a prime reason in many cases was that no staff members had taken responsibility for the infrastructure.

### **School toilets and access to education**

The built infrastructure of many South African schools leaves a lot to be desired (SAICE forthcoming). While it is unacceptable that some schools have lacked facilities from the outset, it is even less acceptable that so much of the infrastructure provided has been neglected.

When water supply, sanitation<sup>3</sup> and hand-washing facilities are insufficient or non-existent, schools more readily become places where diseases are transmitted. Interventions at schools lead not only to safer learning environments, but are investments -- when one teaches a child, one teaches the whole community<sup>4</sup>. Improved sanitation and water facilities, hygiene education and the promotion of hand-washing inevitably lead to less sickness and improved school attendance. This is true not only in terms of fewer days absent from schools, but also increased classroom time each day.

### **Progress with the pilot**

A franchising partnerships model for the routine maintenance of water services infrastructure is being tested and evaluated at some 400 schools in the Butterworth Education District. Throughout, the Amanz' abantu and Impilo Yabantu team have worked closely with the DoE managers.

The pilot commenced in May 2009 by exploring the practicalities of managing the process and the allocation of tasks. Advertisements called for interested parties to respond, on condition that they were resident in the Butterworth area. This was stipulated for two reasons: the work would be done by local people from the communities concerned; and travelling time and cost to Butterworth and to the schools that they would be servicing would be minimised. Distinct areas, determined by accessibility and scope, were identified within the Butterworth District. An area was allocated to each franchisee, which had to have its home base within that service area.

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<sup>3</sup> With regard to sanitation specifically, the national DoE's statistics as at October 2008 reflect that, of the 24 751 public schools, 1 004 (4%) do not have sanitary facilities (Source: Parliament written reply question 1844, internal question paper 32 2008).

This statistic is misleading since, in the research team's experience, the sanitation facilities of a great number of schools in previously disadvantaged communities, especially in rural areas, are dysfunctional, unhygienic, or both. For all intents and purposes, these schools have no sanitation facilities.

In the Eastern Cape, for example, it was estimated that in 2006, of a total of 6 417 schools, 4071 had some form of pit toilet, but 80% of these were overflowing -- and therefore unusable. (Amatola Water 2006)

<sup>4</sup> "Schools need safe water and separate, clean sanitation facilities. .... Health education curricula are undermined if children are unable to practice what they learn about drinking safe water or washing their hands." (UNICEF 2005, page 12).

Prospective franchisees were screened and shortlisted ones interviewed. Those selected received initial training in East London during the first week of June. The trainee franchisees then met with the DoE Butterworth District staff and school principals to plan programme schedules and agree on work orders.

Impilo Yabantu also trained an in-house team to be the back-up should a franchisee withdraw, and to provide the franchisor with benchmark costs.

Five franchisees would have been sufficient for regular servicing of the school sanitation facilities in the Butterworth District, but, based on the assumption that a few might withdraw, eight were trained. Many of the trainee franchisees are in business on their own for the first time.

Impilo Yabantu set up an office and stores in Butterworth, and the cleaning and maintenance of school sanitation facilities started at the end of June 2009. Each trainee franchisee was supplied with basic cleaning equipment and protective clothing, a light delivery vehicle clearly sporting the Impilo Yabantu logo, and a digital camera. The purpose of the camera is to take photographs before and after the maintenance service; based on these photographs and sign-off of the works order by the school principal, trainee franchisees are paid. Spot-check visits to randomly selected schools are also undertaken by the franchisor.

A key component of the service provided by the trainee franchisee is that of inspection and reporting on the serviceability and suitability of the facilities. Reports are submitted to the district managers of the DoE following each visit, and repair and maintenance lists agreed on for the following visit. In this manner, ongoing service relationships are developed between the trainee franchisees, the school principals and the DoE's district managers.

By May 2010 the toilet facilities of most of the 400 schools in the Butterworth District had benefited from a first round of maintenance, and a second round had started.

The business decision has been taken that, even after a year of operation, the trainee franchisees should still operate as subcontractors managed by Amanz' abantu<sup>5</sup>. When Amanz'abantu and Impilo Yabantu are confident that the trainee franchisees no longer need the comfort and safety net of a subcontract arrangement, the switch will take place to a franchising arrangement, with the franchisees being appointed directly by the DoE for the small contracts. Once fully-fledged franchisees, they will be expected to manage their own interactions with the DoE, in particular monthly meetings with the DoE district officials and ensuring that the school principals are satisfied with the results.

Potential total turnover of the five Butterworth District franchisees is estimated at R4 million per annum. This is estimated on the minimum work needed for school sanitation, and assuming schools are visited on a six or seven-week cycle. If a school requests them to do additional work (e.g. add solid waste or water), or if they start working for other clients, their turnovers will increase accordingly.

The trainee franchisees are billing the schools (or the DoE on the schools' behalf) each time they do cleaning and maintenance. All the development costs, including developing the concept and the training schemes, giving training and preparing operations manuals are being funded by Irish Aid and by in-kind contributions of Amanz' abantu and the CSIR.

The trainee franchisees have taken loans to fund the capital outlay for vehicles and equipment. Because the banks prefer lending to franchisees than to stand-alone businesses, the franchisees have had no difficulty in obtaining loans. Franchisees will pay loans off from their income over the next few years. Due to the burden of the start-up costs, trainee franchisees are not expected to make net surpluses until the second or third year.

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<sup>5</sup> Because revenue streams are not yet firmly established, potential further work opportunities are still being explored, and training is incomplete.

Initially, Impilo Yabantu is receiving the works orders directly from the DoE and then instructs the trainee franchisees to perform the work. In effect, each order is a small contract. (For the preliminary round of maintenance, each order is between R2 000 and R5 000.)

Impilo Yabantu continues to provide structured learning in the form of on-the-job specific skills training and mentoring, and also skills and business training as needed. It is also responsible for quality assurance.

Progress with cleaner sanitation facilities in the schools that form part of the pilot project is evident. The franchising partnership concept, as applied in the Eastern Cape schools pilot, is greatly improving the state of sanitation and hygiene at the schools it has reached. The emphasis is on the quality and reliability of the service delivered, and the viability of the franchisor and franchisees.

The state of the sanitation facilities at the pilot schools has improved so much that the Department has requested the programme to be rolled out to a further three education districts, totalling 1 000 schools.

It is envisaged that once the system is working smoothly, franchisees will be able to offer their services to clinics, other public buildings, and to the private sector.

Furthermore, the programme is establishing and supporting locally based small enterprises (mostly women-headed) for the provision of appropriate and locally based service solutions. It is creating jobs and entrepreneurial opportunities, and upskilling rural people through facilitating workplace learning, in addition to improving school sanitation facilities.

### **Issues emerging from the pilot experience**

Apart from the need for constant attention to the billing and payment processes and to cash flow, a number of issues are emerging, which must in due course be addressed.

In the short term, the biggest issue is the need to address water facilities and solid waste disposal at the schools:

- Many of the schools have no solid waste facilities, and inevitably trash ends up in the toilets; and
- Most of the schools are not on a reticulated water supply system, and are thus reliant on rainwater harvesting. When the schools were built, gutters were in place to collect roof water and channel it to storage tanks. The gutters at many schools are, however, now broken -- therefore no collection, and no water in the tank. The tanks are in many instances broken or fouled, with taps often broken or missing. Many children have to bring water to school.

### **Lessons learned**

The principal lessons learned from progress with the pilot so far are:

- Task-specific concept development (for example the specifics of the business model, the training programme and the operations manuals) can be done only by a franchisor that knows the details of performance of that task, based on first-hand experience in the same or a similar community,
- Potential franchisees must be chosen on the basis of willingness to work hard and to commit to the business principles.
- More potential franchisees must be chosen for training than will be needed to undertake the work – attrition during the training period will reduce numbers.
- Because the water service is an essential service, provision must be made in the franchising agreement for prompt replacement of non-performing franchisees.

- Cash-flow problems will quickly put any small enterprise out of business. Careful attention must be paid to resolving any procedural issues around the payment process and ensuring prompt payment of invoices submitted by the franchisees.
- To facilitate rapid and dissension-free agreement that the work has been performed according to contract and that payment can be authorised, tasks must be as standardised as possible, and assigned standard prices.

When the pilot comes to an end, the research team will analyse the approach and the franchise model as developed initially, and adapt it to accommodate lessons learned.

## **Conclusions**

The franchising partnerships concept, as it is being applied in the Eastern Cape pilot, is very promising in terms of the quality and reliability of service delivered and the viability of the franchisor and franchisees. This pilot is benefiting from an extraordinary amount of management attention from Amanz' abantu, Impilo Yabantu, the CSIR and the WRC, made possible by the Irish Aid funding. This attention manifests in many ways, not least in the assistance given to trainee franchisees for ensuring that the processing of payments to them is running smoothly, and in the bridging finance they have received from Amanz' abantu.

This service delivery success is being noticed by municipalities in the area that have responsibilities for water services facilities at household level, with the result that exploration has begun of how the franchisees and/or franchisor can provide services to these municipalities.

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- WRC 1610/1/10: "Overview of the concept of franchising and its relevance to water services".
- WRC 1610/2/10: "Review of policy, regulation and legal aspects".
- WRC 1610/3/10: "Modelling of selected water services operational elements".
- WRC 1610/4/10: "Institutional review for the application of franchising".
- WRC 1610/5/10: "Establishing criteria for the selection of water service franchisors, partnerships and franchisees".
- WRC 1610/6/10: "Business analysis case study: schools sanitation O&M".
- WRC TT432/09 (1610): "“Going with the franchising flow”: An exploration of franchising partnerships for the operation and maintenance of water services infrastructure”.