Domestic wastewater treatment

Wastewater treatment – Tackling a wicked problem through dialogue and action research

At the heart of the wicked problem of dysfunctional wastewater treatment works (WWTW) is a set of complex political tensions between the constitutional right of local government to provide and earn income from water services, including WWTWs, the threats that dysfunctional WWTWs pose to water users and water resources, and the urgent question of who should, can and will take responsibility for dealing with those threats. In this article, Victor Munnik and Tally Palmer present a current attempt to address this issue through a series of action research dialogues.

Pollution from South Africa's WWTW has been a national priority concern for some years now. Dysfunctional WWTW threaten the provision of drinking water, the safety of people living downstream from WWTW and using water directly, as well as the health of aquatic ecosystems. To date, most interventions have focused on training and capacity building, emergency interventions and inspections. They have not addressed the political questions that constitute the dynamic of dysfunctional works.

In 2015, a Water Research Commission (WRC) project tackled this problem with a combination of political ecology, action research, social learning and complexity approaches (see box on political ecology). Our research question was: "Can dialogue, social learning in a community of practice formed from diverse stakeholders, practical co-operation and a better understanding of the position of WWTWs frontline staff as well as the responsible municipalities, lead to improvement in Green Drop scores and performance?"

The research was specifically framed in terms of the Green Drop incentive scheme, which originated in 2008. Some of the research team members had gained experience of this approach in the Rietspruit Catchment Forum (part of the Upper Vaal) in 2011 when a working group of the Rietspruit forum engaged with the Department of Water and Sanitation (DWS) and staff of the three Emfuleni WWTW. It was found that the Green Drop approach provided space for collaboration and developing trust between catchment forum members, the department, and WWTW staff, when elaborated into a seven step *Green Drop Support Campaign*.

In 2014, the Crocodile (East) Catchment Management Forum agreed to form the Crocodile Green Drop Support Campaign as a forum working group, in response to a proposal by the Rhodes University project team emanating from information gathered in interviews with stakeholders in the Rhodes University THRIP project: An Integrated Water Quality Management Process (IWQMP) for the Crocodile River Catchment.

In earlier research on the Crocodile River undertaken in 2011 and 2012, dysfunctional WWTW had been identified by stakeholders in the IWQMP project as a top priority among water quality issues. The research team became concerned that the wastewater treatment works' performance could be masking other water quality problems – such as increasing salinity from mines – which over the long term may turn out to be more serious.

Also, water users were asking why they should comply with stricter standards if government itself did not comply with the basics? The project was based on a theory of change, namely that as a result of a Green Drop support campaign:

- WWTW would achieve a higher profile locally, in public and with the municipality (councillors and officials). This would prevent the current practice of reallocating WWTW budgets to other priorities midyear, and inappropriate and inadequate procurement practices;
- Civil society would adopt a supportive attitude towards WWTW, on the basis of an in-depth understanding of their context and functioning. Staff responsible for WWTW would not be under general attack by civil society and other catchment stakeholders; instead efforts would be focused on identifying the bottlenecks in achieving a better green drop score, within the Green Drop programme.
- While there was clear support from national and regional DWS, and a focus by the Inkomati Usuthu Catchment Management Agency (IUCMA), the working group with broad stakeholder support needed to orient the support into productive channels, to avoid providing perverse incentives to municipalities.

The first Dialogue took place in January 2014, with the seventh taking place in February 2015. Attendance grew with each meeting and most relevant stakeholders were drawn in. This included TSB Sugar, the White River Irrigation Board, manganese mines and industries, municipal WWTW staff from the four local municipalities (Mbombela, Umjindi, Nkomazi and Emakhazeni), the IUCMA water quality team, DWS Green Drop national and regional staff, members of the Crocodile Forum including its chairperson, the South Kaap Farmers Association, university researchers, as well as senior managers from two out of the four targeted municipalities.

In the first meeting the CGDSC working group agreed on the following approach:

1. Understand each individual WWTW and its challenges. Understand Green Drop requirements in relation to the individual works.
2. Know and support the frontline staff.
3. Collective empowerment at process controller's level so that they can support each other.
4. Develop healthy challenges between municipalities
5. Understand the dynamics in the municipalities and get ward councillors on board
6. Work with the willing, attract the unwilling, look for sticks for the unwilling – in Berg River, farmers were affected economically and made a strong lobby group. Patience with local government may run out. Media can be used as a stick (Name and Shame).
7. Use tools from regulations, and pressure from central government
8. Approach rapid response unit for financial needs
9. Encourage industry and civil society to adopt a neighbouring wastewater treatment works

"The main problem was identified as a disconnect between the WWTW frontline staff and local government's top triangle: municipal manager, technical manager, finance manager."

Discovering drivers of WWTW dysfunctionality

The project created a safe space (including anonymity in dialogue minutes) in which to discuss the real obstacles to Green Drop improvements. The main problem was identified as a disconnect between the WWTW frontline staff and local government's top triangle: municipal manager, technical manager, finance manager.

Staff would be given responsibility for Green Drop performance, then not get budget or support, then do badly, and then be held responsible for the results by top management. This was very frustrating. It also mirrored the experience in the Upper Vaal, where the core finding was that the municipality did not take proper care of their WWTW and their staff.

This insight provided a trigger for growing solidarity and understanding between WWTW frontline staff and civil society counterparts who until then had taken a generally accusatory attitude. It was also important to recognise the dynamic inside local government. A municipal manager, who joined the dialogues later, made a frank contribution in which he explained that municipal managers are overworked ("our in-trays are overflowing"), and that the politicians they answer to have far more interest in interventions that are visible to their constituents, such as health clinics, roads and street lights, than in WWTW.

The Crocodile River, whose water quality has been affected by dysfunctional wastewater treatment.

Interventions by national departments

The working group then decided to explore what help could be offered by national departments. In co-operation with Association for Water and Rural Development (AWARD), the Rhodes team undertook a number of interviews with national government departments which revealed the following institutional and political landscape:

- Treasury is reluctant to intervene. Since its focus is on money flows, the quality of the effluent and other technical parameters are not visible to these officials. However, they have taken a keen interest in Green Drop developments, from a 'value for money' perspective.
- The Department of Co-operative Governance and Traditional Authorities (COGTA) has undertaken a Back to Basics programme, which holds the promise to motivate better performance of wastewater treatment works. However, it was noticeable in interviews with Municipal Infrastructure Support Agency (MISA), a supporting agency within COGTA that interventions in municipalities can only happen when welcomed by the municipalities.
- DWS arguably has the most responsibility and opportunity to intervene. In theory, the Green Drop scheme does not replace day-to-day compliance monitoring, and could itself trigger pre-directives, and court action (against poorest non-performing municipalities). In practice, this is limited by the number of officials on the ground, and the fact that Green Drop competes with other tasks on their agenda. DWS officials pointed out that a number of directives have been issued against municipalities, and have produced results. In addition, DWS has embarked on a Municipal Services Strategic Assessment (MuSSA) programme, in which municipalities self-report in a number of risk areas, including wastewater treatment.

The overriding picture that emerged from interviews is that all the national departments are bound by the constitutional autonomy of local government, which is, firstly, an equal sphere of government and, secondly, has the right (or is designed) to earn income from providing water and electricity services, which it defends jealously.

While the dialogues were in progress, the project team was also able to achieve practical outcomes. TSB, the sugar corporation and neighbour of Nkomazi municipalities, donated land and expertise to enable Nkomazi to refurbish one of their wastewater treatment works.

Staff from the Green Drop Unit came through from Pretoria on several occasions to explain Green Drop requirements and clear up questions. This was very well received as it was directly empowering to WWTW staff. The IUCMA compiled, as a result of its regular inspections in the area, a comprehensive report on WWTW, which provided an authorative baseline from which to question current practices and push for improvements.

The Crocodile dialogues proved, again, that the majority of

frontline staff at WWTW are keen to do their work properly, but need better support from local government to do so, in terms of routine procurement, maintenance and expansion of works, and staff provision. In particular, they need local government officials to be responsive to their needs before and during Green Drop inspections. The new emphasis of SALGA in supporting the Green Drop as part of SALGA's contribution to the implementation of the NWRS2 could make a major contribution here.

There is a substantial interest in civil society (or catchment citizens, other water users) to participate in finding solutions for this problem. Participants in the Croc GDSC attended 7 dialogues to grapple with the problem. Local participants have extensive local and technical knowledge.

Political and racial tensions are still present. They need to be addressed through careful facilitation. However, participants showed that they had the resources to deal with this, and develop trust relationships across class, racial and political lines.

There are many opportunities and programmes for technical and capacity building support for the operation of WWTW, but they do not address the political problems.

Conclusions

The fact remains that ongoing risk and degradation is also the business of other actors in the water sector. There is a constellation of interests and mandates around dysfunctional WWTW – although they are not currently all connected and working together. At the moment, local government is uniquely privileged in this constellation, although not capable and motivated to deal with the consequences of its neglect of WWTW.

A first potential policy response is to question whether local governments are capable of taking responsibility for WWTW, and that the responsibility should be moved to other actors, such as water boards. This has, in fact, happened in Bushbuckridge and, on a temporary basis, in the Upper Vaal.

Researchers were warned that such a trajectory would invite stiff resistance from organised local government, although the possibility of outsourcing the operation and maintenance (with some profit for local government built in) already exists. The broader political problem is whether local government has more responsibilities than it has a budget and capacity.

A second response is to sharpen the possibilities for intervention, and make that a concerted and coordinated effort by national government. A third is a more long-term building of citizens' power via catchment management agencies (and catchment forums), to hold local government to account, and also to support them.

These trajectories all rely on increasing public awareness and pressure on this issue. It requires raising the visibility of the WWTW issue by making the consequences clear through new and synthesised research focusing on the following:

1. Diarrhoea is a leading cause of child death between the ages of one and five. Contaminated drinking water is an important cause of diarrhoea. Water in river stretches immediately following dysfunctional WWTW is dangerous to users, who are the constituents of local government.
2. The impact of eutrophication on ecosystems is serious. Repeated oxygen depletion events, for example, lead to the impoverishment of ecosystem function and integrity, also reducing the ability of the river to self-purify.
3. Economic impacts include the threats to health in terms of costs to the public purse and to suffering families, to livelihoods, and threats to the marketing of contaminated products nationally and internationally.

This article is based on work done in WRC project K5/1098, Engaging a Complex Problem through a Community of Practice Approach: Improvement of dysfunctional WWWTW through a multi-stakeholder Green Drop Support Campaign, and Development and Implementation of An Integrated Water Quality Management Process (IWQMP) for the Crocodile River Catchment, a Rhodes University Institute for Water Research Technology and Human Resources for Industry (THRIP) project.

Using political ecology and cognitive justice approaches to address complexity

There is growing recognition, both in South Africa and internationally, that social science is necessary to deal with complex problems in the water sector. This project used, as a core analytic, the multi-disciplinary approach of political ecology, which brings together ecology (understanding the science of environmental dynamics), political economy (issues of power and money) as well as the politics of knowledge and representation, within an expansive social learning approach. Cultural Historical Activity Theory (CHAT) has proven to be accessible to natural scientists and students in a multidisciplinary setting.