

# The Governance of Urban Wastewater Treatment Infrastructure in the Greater Sekhukhune District Municipality and the Application of Analytic Eclecticism

Richard Meissner

*Council for Scientific and Industrial Research (CSIR),  
South Africa, P.O Box 395, Pretoria,  
0001, RMeissner@csir.co.za*

*Centre for Water Resources Research, University of KwaZulu-Natal, Private bag X01, Scottsville, 3209,  
Tel: +27-33-2605678, Website: <http://cwrr.ukzn.ac.za>*

The governance of urban wastewater treatment works goes beyond the daily maintenance and upkeep of such systems. The governance includes interested and affected parties (stakeholders) further afield than the immediate proximity of the plant. As the concept might imply, governance would be an activity that is the purview of government only. This is not the case. Individuals and communities living downstream from such infrastructure and scientists can also become part of governance, either voluntarily or by default. Because of the wide range of stakeholders involved in the governance of wastewater infrastructure, we need to understand how and to what extent they influence governance. More so, it will be important to look also into the consequences of their actions while directly or indirectly governing wastewater infrastructure. In order to move beyond the traditional conceptualisation of governance as a government activity, this paper will utilise the ethos of analytic eclecticism and in particular six theories to investigate and widen our understanding of urban wastewater treatment governance. The six theories are (1) everyday international political economy, (2) interactive governance, (3) liberal pluralism, (4) interest group corporatism, (5) interest group pluralism and (6) psychological constructivism. This will, I hope, assist practitioners in formulating better policies as well as implementing them. The case study area is urban wastewater treatment in the Greater Sekhukhune District Municipality located in South Africa's Limpopo Province. The Municipality faces a number of governance challenges like skills scarcity, a large geographic area to provide services to, rapid socio-economic development because of the mushrooming of platinum mines and a diversity of communities and other actors to providing services. The six theories all indicate different facets the actors employ or are affected by during the governing process. By employing the six theories, it becomes apparent that linear cause and effect relationships between the actors and the issue are impossible. It also shows that predicting the outcome of certain aspects, like the role of individuals, is impossible. It does paint, however, a fuller picture of what is happening in reality.

**Keywords:** analytic eclecticism, wastewater, Olifants River, Greater Sekhukhune District Municipality, theory, governance, individuals

## 1. Introduction

The operation and maintenance of urban wastewater treatment infrastructure do not only involve technical aspects. Governance is also vital. The understanding of governance of such infrastructure needs to go wider than the individual plant. Technical maintenance is part of a larger governance process. Governance involves a myriad of actors that are either directly or indirectly involved in the operation of such plants. Individuals and communities can influence wastewater governance. These actors can also be affected by the functioning of the infrastructure. Governance is defined as the result of interactive socio-economic and political forms of governing that result in problem solving and opportunity creation (Kooiman, 2008; Rhodes, 1996; Rosenau, 2006). Governance activities are a response to public needs and visions (Kooiman & Bavinck, 2013). This conceptualisation is a first step towards a better understanding of wastewater treatment governance in the Greater Sekhukhune District Municipality in South Africa's Limpopo Province.

A feature of South African water governance research is a tendency towards utilising single theoretical frameworks (e.g. Herrfahrtd-Pähle, 2010; Jacobs, 2009; Kingsford, Biggs, & Pollard, 2011; Meissner, 2004; Meissner & Turton, 2003; Pollard & Du Toit, 2008; Rogers, Roux, & Biggs, 2000; Stuart-Hill & Schulze, 2010) to analyse water governance issues and to base recommendations on. The risk of such an approach is that problems that should be seen as integrated and institutions understood as intrinsically linked are seen as separate (Meissner, Funke, Nienaber, & Ntombela, 2013). 'A silo mentality carries the potential of inducing theoretical myopia . . . through too narrow a focus on what is happening in the real world' (Meissner et al., 2013, p. 728). This is problematic and I believe could result in an overly large reliance on panaceas or cure-alls (Kooiman & Bavinck, 2013; Ostrom, 2007; Scholtens & Bavinck, 2013) to ameliorate problems. A panacea approach restricts understanding and has a debilitating impact on the practical application of theories. A dominant theoretical perspective could distract researchers from problems lurking in the shadows (Lake, 2011; Meissner, 2014). A promising remedy is analytic eclecticism. Analytic eclecticism is the paper's methodological foundation. Eclectic theorising can assist us in understanding inherently complex social, political (Katzenstein & Okawara, 2001/2002), environmental and psychological processes in governance.

The research for this paper is based on a number of fieldtrips conducted by a team of researchers from the Council for Scientific and Industrial Research's (CSIR) Water Governance, Water Ecosystems and Human Health Research Groups over a two year period. During this time, the researchers engaged with individuals; municipal officials; community leaders; companies; other researchers within the CSIR and regional, provincial and national government departments. The paper is divided into a number of parts. Analytical eclecticism is briefly discussed. I will then present six theories against which to analyse the case study. An investigation into the issue of wastewater treatment plants in the Municipality and how selected institutions, groups and individuals view or experience the issue follows. I will end with a discussion and conclusion.

## 2. Analytic eclecticism

Analytic eclecticism's purpose is to avoid paradigmatic compartmentalisation. This leads to a disjunction between the researcher and what he or she can offer the practitioner. Arguing from a particular paradigm or world view can become an obstacle to understanding even if it gives powerful insights (Lake, 2011; Meissner, 2014; Sil & Katzenstein, 2010a). Prior assumptions are the foundations of research. Research questions are developed and boundaries for investigation laid down using prior assumptions. Researchers then conduct analyses to reflect the prior assumptions. In this way, analysts coach paradigmatic progression in ever-increasing sophistication as arguments progress within a specific bounded research tradition (Sil & Katzenstein, 2010a). In other words, each paradigm and theory give rise to a particular research program that dictates, in advance, the factors and variables the analyst should consider, focus upon and for providing explanations. From a practical perspective, this is unsatisfactory. In all likelihood, researchers will not innovate nor consider the investigation of phenomena from different perspectives should they follow an a priori approach.

Explaining the complexities of real world problems become the victim and research diminishes the practical value of theory. Analytic eclecticism does not discard established paradigms. Instead it 'explores substantive relationships and revealing hidden connections among elements of seemingly [incompatible] paradigm-bound theories, with an eye to generating [new] insights that bear on policy debates and practical dilemmas. This requires an alternative way of thinking about the relationships among assumptions, concepts, theories, the organization of research, and real world problems' (Sil & Katzenstein, 2010a). To understand the complexities of real world problems better, it is necessary to step outside theoretical and paradigm boundaries and engage 'real world problems' from a multiple theoretical perspective by integrating or fusing their insights assisting practitioners (Sil, 2000; Sil & Katzenstein, 2010a) towards better decisions. This means that analytic eclecticism has no predetermined set of factors and variables it seeks to investigate. Instead, analytic eclecticism asks, in an open manner, what problems are pressing in the world in their own right and then seeks to understand and explain them. Figure 1 indicates analytic

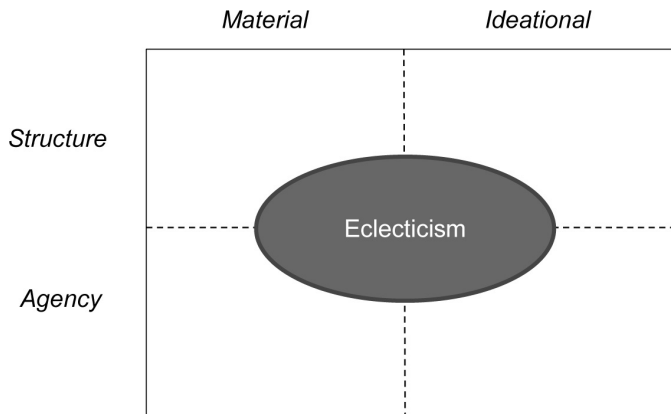


Figure 1. Eclecticism and the agency/structure and material/ideational divides (Adapted from Wendt, 1999; Sil, 2000; Sil and Katzenstein, 2010a)

eclecticism's position relative to the agency/structure and material/ideational divides of theories' emphasis.

### **3. Theories for Practice**

A myriad of social theories exists and choosing the theories to use and to ignore can be problematic. A random selection of theories can give the impression that, theoretically speaking, anything goes. I will therefore choose theories that I have been using over the years and that I am familiar with (e.g. Meissner, 2004, 2014; Meissner & Jacobs, 2014; Meissner & Ramasar, 2014). These theories are from international relations and political science. Another problem that could arise from this grouping of theories is the incommensurability of the group of theories. This need not be a problem. The theories I am choosing are not replacements of one another but rather supplements where one theory focusses on the structural and/or material aspects of wastewater treatment governance, like liberal pluralism, another theory, like psychological constructivism, focuses more on the agency and/or ideational factors and variables. I am also using theories that is to a lesser or greater extent applicable to the subject at hand.

Everyday international political economy and psychological constructivism explain the role and involvement of different actors, especially individuals. Everyday international political economy asks 'who acts and how do their actions produce and change the world . . . in various spatial dimensions?' (Hobson & Seabrooke, 2007). The question stands in contrast to 'who governs, who benefits and how is . . . order regulated' (Hobson & Seabrooke, 2007). This is the top-down view of political systems emphasising governors (municipalities) and the governed (citizens). Through everyday international political economy, actors that we see as power takers now become, to a certain extent, power givers (Hobson & Seabrooke, 2007). Societal structures (e.g. regulatory, economic and normative structures) restrict everyday actors' behaviour. Sometimes actors are victims and at other times agents. Actors always express agency, no matter how big or small. The structures are, to a certain extent, the product of everyday actions. The actions of subordinate everyday actors in power relations can take the form of negotiation, resistance or non-resistance occurring suddenly or over time. The acts shape, constitute and transform the political and economic environment around and beyond everyday actors (Hobson & Seabrooke, 2007).

Actors use a number of agential strategies, some of which comprise resistance (defiance, hybridised mimicry/mimetic challenge) and some of which do not (i.e. axiorationality). Defiance occurs when actors resist elite coercion through unconcealed resistance activities. Mimetic challenge entails the adoption of the normative discourse and/or characteristics of the dominant to camouflage their resistance challenges to the dominant's legitimacy. Hybridised mimicry happens when actors adopt the dominant's discourse and filter it through cultural lenses to produce something new and hybridised within the receptor society. Actors use axiorationality when they reflect upon conventions, norms<sup>1</sup> and

<sup>1</sup> Norms are 'social understandings of behavioural standards' (Klotz, 1995).

the interests that these conventions and norms inform. After reflection, they choose to act in accordance with broader intersubjective understandings of what is socially legitimate (Hobson & Seabrooke, 2007).

Psychological constructivism postulates that particular psychological attributes have an impact on actors, their relationships and the structures they create. The psychological attributes are spirit, appetite and reason. Spirit (motivating people to participate in civic life gives rise to self-esteem), appetite (the need for material things can corrupt) and reason are fundamental drivers with distinct objectives. These are the sources of typical forms of behaviour that have dissimilar implications for cooperation, conflict and risk-taking. Spirit, appetite and reason are requirements for and assist in the creation of distinct forms of hierarchies. These hierarchies sustain order. Real worlds are not smooth but lumpy because every actor has different motives for behaviour (Lebow, 2008; Hymans, 2010). One of the most important emotions in relations is affection, which gives rise to empathy or the way in which humans see others. Through empathy, we are able to recognise the benefits coming from close relationships. Through reason and affection, we look for cooperation. Affection and reason make us realise that self-restraint is essential for sustaining the environments in which close cooperation can blossom (Lebow, 2008).

Interactive governance, liberal pluralism, interest group corporatism and interest group pluralism will give insights into the governing system and how actors can change the system. Interactive governance is a combination of societal governance efforts. The combination of efforts is the result of increasing diversity, dynamics, complexity and major concerns like water scarcity. Day-to-day activities, such as drawing water from a river or flushing a toilet, are becoming more diverse, dynamic and complex (Kooiman, 2008). Governance is generally organised and routine and rarely harmonious and is typically interactive because of the democratic process (Kooiman & Bavinck, 2013).

Society is comprised of a large number of governing actors that are constrained or enabled by their surroundings. Actors are any social unit possessing agency or power of action, which includes individuals, associations, firms, governmental agencies and international organisations. Interaction is often more effective than governing alone. Values, principles and goals are not fixed but are at the same time developed and expressed as actors engage in social-political exchange. The negotiated goals are not stable but vary according to the relative strength of the participants that come and go (Kooiman & Bavinck, 2013).

Governability 'is the capacity to bring about, organize and carry out governing interactions in the face of societal and natural diversity, complexity and dynamics in terms of elements, modes and orders of governance as attributes' (Kooiman, 2008). Three main elements are at play in the governability project: the governors, the governed and all the external influences that influence the governing system or entity. These three variables add to varying degrees to governability. Diversity emphasises the qualities of actors in a system-to-be-governed, its governing system and governing interactions. Diversity is the source of innovation and creation and carries the potential of a system's destruction or disintegration. Dynamics deal with regularity and irregularity and hold the potential for change as well as disruptive consequences. Complexity deals with societal structures,

interdependencies and interrelations and is a condition for combining interdependencies. Scale has to do with space and time and represents the level where one can see the combined effects of diversity, complexity and dynamics at play. It is the interactions and interrelationships between economic, social, biophysical and the host of other components of the system-to-be-governed that constitute the system as a whole (Kooiman, 2008).

Three modes of governance exist: hierarchical governance, self-governance and co-governance (Kooiman, 2003, 2008; Scholtens & Bavinck, 2013). Hierarchical governance is also the mode of governance that is visibly not functioning very well as ever increasing rules and regulations do not live up to their expectations. Co-governance, such as public-private partnerships and co-management of resources, are emerging constantly and are becoming more prominent. Self-governance occurs when private entities and individuals start doing what governmental entities are supposed to do. The resilience of a system will depend, to varying degrees, on not only self-governance, co-governance or hierarchical governance, but a combination in the face of complexity, dynamics, diversity and scale (Kooiman, 2008).

With liberal pluralism, states are not the only important actors in politics and that economic interdependence and democracy reduce conflict (Oneal & Russett, 1997; Viotti & Kauppi, 1999). Actors such as various types of interest groups, private companies and international organisations are also important (Viotti & Kauppi, 1999). It is not only states and their government apparatus that can produce autonomous preferences in the face of societal problems. Non-state actors can also act in such an autonomous manner (Nel, 1999; Stone, 1994). States and the influence they receive from non-state entities are not solid actors that can withstand such influence indefinitely (Heywood, 1997; Stern, 2000). Two theories that fall under the liberal pluralist perspective are interest group corporatism and interest group pluralism.

Interest group corporatism places prime importance on the role of interest groups in society (Huggins & Turner, 1997) and how governments interact with them (Meissner, 2004). The government incorporates certain interest groups into decision-making processes. Economic and functional interest groups, like business associations and trade unions are examples. They have insider status. A small number of interest groups therefore have political power (Smith, 1993). Lobbying by these groups is minimal, because of the close ties between their leaders and government officials. Lobbying becomes almost obsolete (Wilson, 1983). Government tops the hierarchy (Sellars, 1997). Government is not a neutral moderator and actor and chooses which groups it will consult with, how and for what reason public policy should be implemented. There is no level playing field on which interest groups compete (Huggins & Turner, 1997; Sellars, 1997). The policy process depends on political incentives and sanctions from government to ensure interest group cooperation (Sadie, 1998; Streeck & Kenworthy, 2004; Wilson, 1990).

Interest group pluralism is the opposite of interest group corporatism. Interest groups are important vehicles to broaden citizen participation in the political process. Interest groups give citizens political representation (Huggins & Turner, 1997). Power is widely dispersed among interest groups (Ball, 1988) that exert influence over government processes. Interest groups are successful in influencing policy outcomes because they have

insider status to the governmental process (Moore & Roberts, 1992; Smith, 1993). This means that interest groups have little or no statutory contact with governmental decision makers and operate from outside the institutional structure of government to influence policy. This influence happens through political lobbying rather than direct involvement in decision-making (Wilson, 1983). Interest groups establish themselves around common interests and mutual threats (Davies, 1996). Any threat to society will produce interest groups that will respond to it or counteract the threat (Meissner, 2004). Interest groups have a counter balancing influence on the state’s disproportionate amount of power. Government practitioners react to the inputs from a wide variety of interest groups regarding certain issues and interests and attempt to strengthen their own power base accordingly. Interest groups can force the ruling elite to respond more effectively to a wide range of constituencies than a small group of influential individuals (Berry, 1997; Hague, Harrop, & Breslin, 1998; Moore & Roberts, 1992; Smith, 1993).

The six theories presented above are the foundation of a more nuanced framework to analyse water governance and politics in general. Situating the theories on the agency and structure and material and ideational divide indicates that only EIPE and psychological constructivism come near the centre where analytic eclecticism operates. The diagram also shows which divide is emphasised more by a particular theory. For instance, interest group pluralism’s position means that focuses more attention on agents and their agency than the material aspects they have in their possession.

Without this understanding and the integration between interactive governance and interest group pluralism, the desired state to which the Municipality could move towards would be difficult. Problem solving and critical theories from the interpretivist and rationalist paradigms could be mutually interdependent and constitutive of one another. Responses to problems give rise to problem solving theories. These theories make the

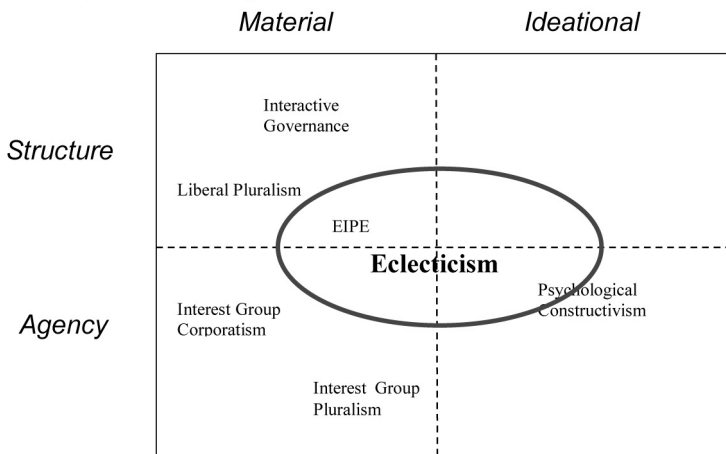


Figure 2. The theories’ location on the agency/structure and material/ideational matrix

relationships and institutions work more smoothly by dealing effectively with particular problems. Theorists argue that critical theories are apart from the world's order and investigate how that order came about. They question institutions and power relations by investigating their origin and then asking if they are changing. Critical theories present normative choices against the existing social and political order (Cox, 1996). The choices can contain opportunities for change. The theories I present here take into consideration actors and relationships at a large scale like the national level or those engaged in policy formulation (e.g. liberal pluralism) and fundamental social processes (e.g. psychological constructivism). To address problems requires critical thinking and problem solving that goes beyond paradigmatic boundaries. Analytic eclecticism offers an opportunity to build a more nuanced analytic framework drawing on a range of theories.

#### **4. Wastewater treatment governance in the Greater Sekhukhune District Municipality**

In this section, I will discuss the governance of wastewater treatment in the Greater Sekhukhune District Municipality using a framework for analysis developed by Scholtens and Bavinck (Scholtens & Bavinck, 2013). In the first part, I will demarcate the study area along a number of boundaries. These boundaries are the municipal governance boundary, the water management area in which the Municipality is situated and affluence or class boundaries manifesting around the issue of wastewater treatment and water provisioning. This is followed by a description of the natural system and the socio-economic system-to-be-governed and the governing system.

##### *4.1. The Greater Sekhukhune District Municipality*

The Municipality covers an area of 13 527.73 square kilometres (km<sup>2</sup>), with a population of some 1 083 555 people residing in 215 804 households. The District Municipality consists of five local municipalities: Elias Motsoaledi, Ephraim Mogale, Fetakgomo, Makhuduthamaga and Greater Tubatse (fig. 2) (The Local Government Handbook, 2013). The District Municipality is the water service authority meaning that it is legally responsible for the provisioning of water and sanitation services (Republic of South Africa [RSA], 1996). From a liberal pluralist perspective, the District Municipality is the main governing apparatus of the South African state in the area.

##### *4.2. Olifants Water Management Area*

An important environmental feature of the Municipality is the Olifants River. The river is a major source of water for various economic activities, including agriculture, domestic water, mining and sanitation (The Local Government Handbook, 2013). The Olifants River is a tributary of the Limpopo River, an international river shared by four countries: Botswana, Mozambique, South Africa and Zimbabwe. The Olifants River is shared



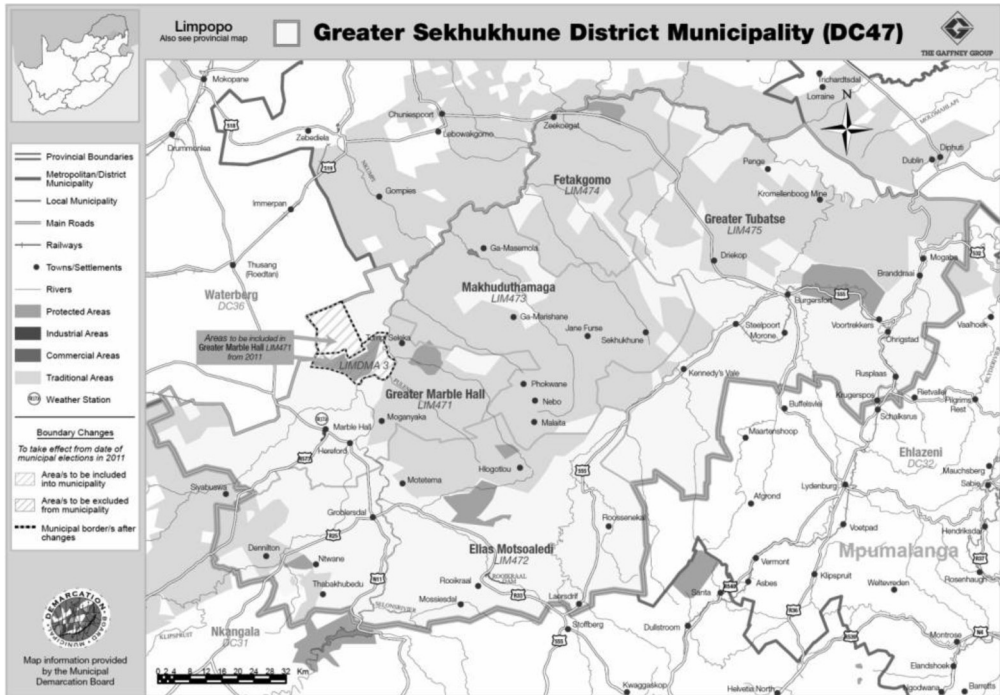


Figure 3. The Sekhukhune District Municipality with its five local municipalities (Source: Department of Cooperative Governance and Traditional Affairs [DCGTA], n.d., map produced by the Municipal Demarcation Board)

by South Africa (the upstream riparian state) and Mozambique (the downstream riparian state). As part of the Limpopo River basin, the Olifants River catchment is the largest sub-catchment in the Limpopo Basin. The Olifants basin stretches over about 85 000 km<sup>2</sup> of which 11 458 km<sup>2</sup> is located in Mozambique and 73 542 km<sup>2</sup> in South Africa. The Olifants River has its source in the Highveld region of South Africa. The river flows north, north eastwards and then eastwards towards Mozambique, where the Letaba River joins it immediately before it crosses the border between South Africa and Mozambique. The ephemeral Shingwedzi River joins the Olifants River downstream of Lake Massingir in Mozambique (Ashton, 2010; Ashton & Dabrowski, 2011). Figure 3 indicates the central location of the District Municipality in the Olifants River basin.

#### 4.3. *Affluent or class boundaries*

Our observations during the fieldtrips to the Municipality indicated that the population is characterised by a poor segment and affluent middle and upper class structure. The poor are mainly located in rural communities on the fringes of peri-urban centres like Groblersdal, Marble Hall, Steelpoort and Burgersfort. In these centres agriculture and mining are the main sources of employment. Mining is one of the biggest economic

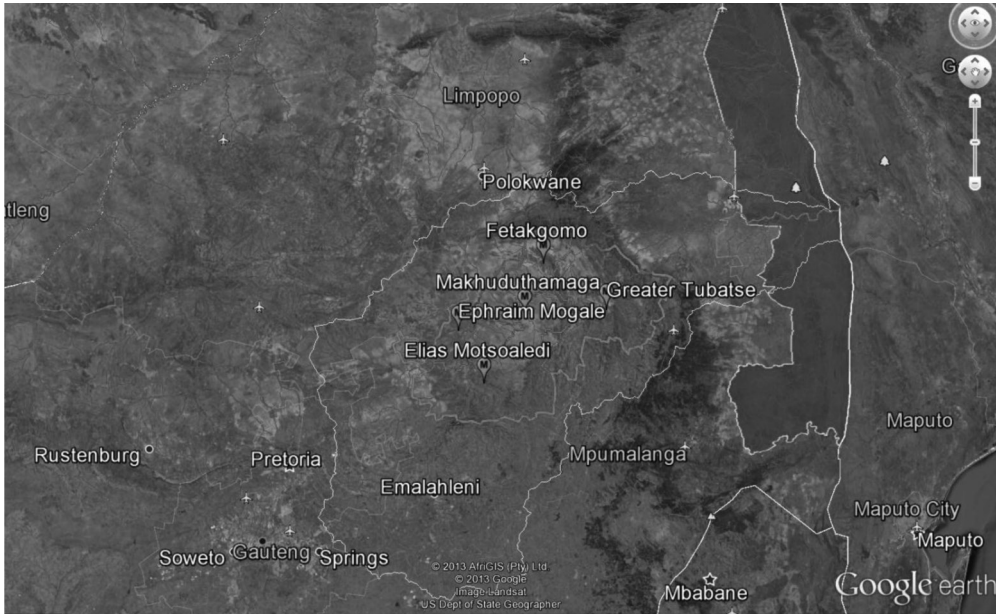


Figure 4. The Olifants River basin with the Greater Sekhukhune location therein

activities in the Municipality. The South African National Roads Agency (South African National Roads Agency Limited [SANRAL]) states that: ‘Although agricultural activities should contribute to the area’s economy, most farming is done on a subsistence basis and only 30% of the district’s land is utilized for commercial farming. The scarcity of water is one of the reasons why farmers do not do well. Another reason for the lack of farming activities is the fact that three quarters of [the] . . . Municipality is under land claim disputes that still need to be resolved’ (SANRAL, 2013). SANRAL (2013) further notes that in the rural areas extreme poverty is the order of the day, with a serious lack of skills and services being a reality. The unemployment rate in the Municipality is 50.9% (The Local Government Handbook, 2013). From an interactive governance perspective, the socio-economic profile of the Municipality could influence relations between the actors and the structures they create. The need for material resources (e.g. psychological constructivism) such as access to employment and basic services like water and sanitation are expected to be high on poor individuals’ and community agendas. This gives another dimension to relations between citizens, the Municipality and different economic sectors (i.e., dynamics, diversity and complexity as outlined by interactive governance). People will probably not only enact relationships at an inter-personal level between citizens and municipal officials (e.g. interest group pluralism) but also at a psychological level (e.g. psychological constructivism). ‘Appetite’ for employment opportunities and better living standards are one of the factors that could drive the poor and communities’ relationship with municipal officials.

#### 4.4. *Natural system-to-be-governed*

The natural system-to-be-governed focuses on the Olifant River's water quality. This river and its tributaries, like the Steelpoort River, are the main sources of water for the various economic activities in the Municipality. The state of the Olifants River's health is not good. This is especially true for its upper portion before it crosses into the Municipality. According to Oberholster (Groenewald, 2010) 'The Olifants River is definitely in [the] ICU [the intensive care unit]'. The dire state of the river is due to pollution from domestic, mining, industrial and agricultural activities. According to Ashton and Dabrowski (2011), 'While there is a gradual improvement in water quality with increasing distance down the Olifants River, tributary inputs of untreated or incompletely treated domestic effluent, as well as industrial and mining effluents, plus return flows from irrigated lands, ensure that the water quality remains poor'. All sectors are responsible for the river's poor water quality. The water quality therefore improves as the water flows towards Mozambique. Ashton and Dabrowski (2011) report that downstream sites compared to upstream sites experience periodic water quality problems. The situation is so severe that scientists describe the Olifants River as one of the most polluted rivers in Southern Africa, with Loskop Dam, just upstream from the Municipality, being a repository for pollutants from the River's upper portions (Oberholster, Myburgh, Ashton, & Botha, 2010). We cannot blame one sector for the state of the river's quality. This creates a practical dilemma with a bearing on policy debates, like analytic eclecticism notes. Because of the dilemma practitioners need to make difficult choices on how to ameliorate the situation. It is here where analytic eclecticism starts to play an important part especially by highlighting that not one theory or approach will serve as a silver bullet to the Olifants River's poor water quality since multiple stakeholders are dependent on its water and influence the river's water quality and ecosystems in general.

#### 4.5. *Socio-economic system-to-be-governed*

The Municipality is characterised as rural, which means that it is situated some distance from major urban centres like Pretoria or Nelspruit. The road network in the Municipality is not well developed except near the newly constructed De Hoop Dam in the Steelpoort River upstream from Steelpoort. This leads to the lack of accessibility to certain parts with a debilitating impact on socio-economic development. There is a general lack of economic bases and services of a reasonable standard in the rural villages (DCGTA, n.d.).

In terms of demographics and according to the census 2011 statistics, currently the Municipality has a population growth rate of 1.1%, which remained constant since the first inclusive census in 1996 (see table 1 for more information on the Municipality's demographic statistics).

The distribution of the population by population group is 98.7% Black, 0.1% Coloured, 0.2% Indian/Asian and 1% White. The age distribution of the population is 0-14 year olds 36%, 15-64 year olds 52.9% and the 65+ year olds 6.7% (Stats SA, 2012). The

Table 1  
Demographic Structure

	Census		
	1996	2001	2011
Dependency ratio <sup>2</sup> .	99.6%	89.2%	74.7%
Individuals with no schooling.	44.5%	42.7%	20.9%
Individuals with grade 12/matric education.	11.7%	11.2%	21%
School attendance for those between ages 5 and 24 years.	74.2%	–	81.3%
Unemployment rate.	61.6%	61%	51.6%
Average household income	R15 520.00	–	R45 977.00
Population living in formal dwellings.	67.4%	77.4%	88.7%
Population living in informal dwellings.	5.3%	5.9%	6.8%
Population living in traditional dwellings.	27.2%	16.4%	3.8%
Population using electricity for lighting and cooking.	37.8%	63.6%	86%
Population with access to piped (tap) water inside the dwelling or yard.	19.8%	–	40.1%
Population with access to piped (tap) water on a communal stand.	33.7%	36.7%	35%
Population with no access to piped (tap) water.	45.1%	–	24.8%
Households with a flush of chemical toilet.	4.4%	7.6%	8.6%
Households with no toilet facilities.	20.2%	16.9%	5.1%

Source: (Statistics South Africa [Stats SA], 2012).

statistics regarding households with or without toilet facilities are important especially considering the link between it and the governance of wastewater treatment.

The dynamics in the statistics (as outlined by the interactive governance theory) is mainly due to the growth of the mining sector in the Municipality. Some of these dynamics are the change in income over the past two decades and the percentage of people using electricity (e.g. increase in appetite that does not necessarily corrupt behaviour). The mining industry is concentrated in the Greater Tubatse Local Municipality along the Dilokong Corridor (R37 and R555 roads). According to the District Municipality's integrated transport plan for 2007, the Local Municipality is most probably one of the fastest growing areas in South Africa (GSDM, 2007, 2012). According to *The Local Government Handbook* (2013), precious metals in the Municipality include platinum, chrome, manganese and vanadium, with some 18 platinum mines operating in the Municipality. The Municipality also has the largest platinum group metal reserves in the world. There is the potential for disruptive consequences emanating from the demographic dynamics (according to the interactive governance theory). A large proportion of the citizens are poor with service delivery at Municipal level not up to standard. The members of communities that are affected by poor service delivery could start protesting violently against service delivery including

<sup>2</sup> The dependency ration is the burden borne by those who are in working age group (15-64) to support those aged 0-14 and 65+ [52].

water provisioning. Even so, it is not a given that this scenario will play itself out, it is merely an example of disruptive consequences. When added to the psychological variables mentioned earlier, those who feel deprived and on the margins of socio-economic development could vent their frustration through means other than cooperative endeavours. Should the deprived perceive corruption to be at the root of the service delivery problems they could get what they want through instrumental reason (according to psychological constructivism) by changing the political structure of the Municipality through the electoral process. A scenario like this would be anathema to interest group corporatism's assumption that the state holds a disproportionate amount of resources and more in line with interest group pluralism's explanation of interest groups as balancing forces.

#### 4.6. *Governing system*

The governing system is composed of institutions, informal and formal rules and regulations (Scholtens & Bavinck, 2013) as well as norms at a variety of levels of scale: individual, communal, local, and national (Lui, Chuenpagdee, & Sumaila, 2013) and transnational (Meissner, 2005). The governing system does not only revolve around the Greater Sekhukhune District Municipality (e.g. according to liberal pluralism). There are also some 74 traditional leaders with a potential bearing on the governance of the Municipality and the issue of wastewater treatment systems. This is not to mention the Limpopo Provincial Government, national government departments like the Department of Water and Sanitation (DWS) and the Department of Rural Development and Land Reform (DRDLR) (The Local Government Handbook, 2013) and the rural communities (e.g. interest group pluralism and everyday international political economy). If one includes individual community members with a bearing on the issue of wastewater treatment, it is not impossible to conceive of a governing system that is interactive, although not harmonious (e.g. interactive governance theory) (Kooiman & Bavinck, 2013). What is also important is that the researchers from the CSIR became part of the governing system, not by their own choosing, but by default. People's expectations of experts in a certain field facilitate an interdependent power relationship between the researcher and those that are 'researched' or observed. This is not to say that the researcher or scientists will always and under all circumstances have a positive impact on the governing system (e.g. everyday international political economy). There are variables we cannot control such as people's perceptions and expectations of the researcher (e.g. critical theories). Scientists can have a positive impact on the governing system, and sometimes the positive outcomes boils down to plain luck (more of this later on). What's more, the observed can use the scientist's influence as a resource to get concessions from other stakeholders in the governing system.

*4.6.1 Institutions* The Constitution of the Republic of South Africa (Act 108 of 1996) stipulates that the provision and management of water services is the function of municipalities. The Constitution is also clear about the role and function of the DWS in that it is the custodian of the country's water resources (RSA, 1996). The Constitution tasks the

DWS with the management of bulk water resources. The Act directly related to the issue of wastewater treatment systems is the country's National Water Act (No. 36 of 1998) (RSA, 1998a). The National Water Act adopts an integrated approach to water resources management and utilisation to promote the protection, use, development, conservation, management and control of all the country's water resources, both surface and groundwater resources (Jacobs, Meissner, & Ntombela, 2011). These and other acts constitute the hierarchical governance structure, as explained by interactive governance theory, around urban wastewater treatment plants.

Not only is the issue of wastewater governed by formal national regulation and acts, there is also the National Green Drop Certification Programme, which is administered by the DWS. The Programme's role and function is to ensure that wastewater treatment systems comply with minimum national norms and standards, good performance and the efficient use of resources as well as good contracting practices. The programme's main aim is to ensure that all wastewater discharges meet specified minimum standards to protect human health and the environment. The Programme awards a score to wastewater treatment facilities based on their compliance with wastewater legislation and best practice requirements. If a treatment facility of a water service authority (Municipality) does not comply a 'purple drop' instead of a 'green drop' is applied. The certification process is done on a biannual basis (Ntombela, 2013). The Greater Sekhukhune District Municipality does not fare well in the Green Drop process. According to the 2013 Green Drop assessment report, the Municipality is one of two local governments with all of its 17 plants in a high and critical risk position (Department of Water Affairs [DWA], 2013). It is possible that the Green Drop programme, as part of the hierarchical mode of governance, is not working well since it does not live up to its expectations (e.g. interactive governance theory). In the context of the Green Drop certification, there are of course other institutions too that play a part in the governance of wastewater. They include the Municipality itself, the CSIR and the Lepelle Northern Water Board with a stake in the wastewater treatment systems.

**4.6.1.1 The Greater Sekhukhune District Municipality** The Municipality is a category C municipality, which is a municipality with municipal executive and legislative authority in an area that contains more than one municipality. According to the Local Government Municipal Structures Act (No. 117 of 1998), a district municipality has the function of, and powers over, the bulk water supply and bulk sewerage purification works and main sewage disposal (RSA, 1998b). According to the Greater Sekhukhune District Municipality, it has a 'mammoth responsibility of providing water and sanitation to many villages' that depend on rivers and boreholes for water (Stats SA, 2012). These functions were previously performed by local municipalities but through the Local Government Municipal Structures Act (No. 117 of 1998) this was amended so that district municipalities could perform a developmental role, especially in the severely disadvantaged rural communities. Public administration experts have questioned this change since it gives effect to the constitutional obligations of municipalities to render services. On the other hand, the reality

of a lack of capacity makes this a difficult function for district municipalities to perform (Zybrands, 2011). This situation is another example of a practical dilemma and policy debate that analytic eclecticism attempts to address by finding new insights.

**4.6.1.2 Council for Scientific and Industrial Research** Researchers from the CSIR conducted a number of field visits to wastewater treatment works in the Municipality in 2012 and 2013 as part of the CSIR's Water Sustainability Flagship Project. The purpose of the visits was to ascertain the 'established relationship between governance, human settlement, [wastewater treatment] and downstream users' (CSIR, 2012). One of the components under this objective was to investigate the policy context, institutional arrangement, decision processes and the biophysical impacts of the infrastructure on downstream communities (CSIR, 2012). It was because of the investigation in these different aspects that I chose an eclectic approach to generate new insights. The stakeholders we conducted interviews with ranged from individual plant operators and collectivities such as rural communities. Because of the range of different stakeholders, I decided that a mon-theoretical approach for generating new insights would not suffice due to the complex ontological character of the issues involved.

One of the interventions from the CSIR was to convene a one day workshop in September 2013, hosted by the Municipal Manager. The workshop included representatives from the national and provincial offices of the DWS, Lepelle Northern Water Board, the Municipality and GaManoke community. The purpose of the workshop was to reiterate, at the strategic decision making level, the importance of properly managed wastewater treatment plants for improved water quality. A second purpose was to identify actions to improve the state of the infrastructure. Some of the actions included a new water services development plan to replace the outdated one. This plan serves as a tool that guides water infrastructure investment. Officials also expressed the need for an asset management plan of available infrastructure and the securing of resources to implement identified plans. Officials responsible for wastewater treatment also wanted to see the ring fencing of financial resources for maintaining individual plants (Ntombela, 2013). In other words, the officials argued from a problem solving theory perspective where the actions they proposed was for the purpose of making the Municipality work more smoothly to address the problems.

**4.6.1.3 Lepelle Northern Water Board** Lepelle Northern Water Board is the contractor to the Municipality providing potable water as well as wastewater services in terms of a bulk service contract. The Board runs three plants in the Municipality: Marble Hall, Steelpoort and Burgersfort. The Board upgraded Steelpoort and have similar plans for the Burgersfort plant. Lepelle Northern Water upgraded the Marble Hall facility in 2012. Lepelle also participates in the Green Drop Assessment (A. Netshidaulu and T. Mowkati, personal communication, 2012). A direct consequence of this is that private sector involvement is able to assist with the running of the three wastewater treatment works. Since Lepelle Northern Water runs the three plants it does not mean that all three plants are operating as

they should. The Steelpoort Plant was totally dysfunctional before refurbishment. As mentioned earlier, the Burgersfort Plant is treating more wastewater than it was designed for originally (Zanele, personal communication, 2012). At the Marble Hall plant, the honey suckers that collect wastewater from elsewhere in the Municipality are dumping their waste in the last pond and not at the inlet. This means that untreated wastewater exits the plant almost directly after it has entered the plant, with harmful effects on the environment (K. van Breukelen, personal communication, 2013). Co-governance does not always lead to desirable outcomes (e.g. interactive governance theory).

#### *4.6.2 Groups and individuals*

**4.6.2.1 GaManoke Community** As stated, the CSIR implemented ‘downstream interventions’, which focus on the health and social aspects of improperly treated sewage. These interventions focus on the implementation of interim measures in GaManoke community situated just outside Burgersfort. The community members often have to rely on river water that is sometimes contaminated with effluent from improperly functioning treatment works (Ntombela, 2013). In GaManoke’s case, the Burgersfort and Steelpoort plants are of particular concern.

The CSIR team implemented two interventions: we introduced two types of household water treatment methods with the hope of improving the quality of drinking water in the community and the improvement of the community’s agency regarding wastewater governance and access to water. We also held knowledge sharing sessions with the community explaining the benefits of a healthy river and personal hygiene in the prevention of communicable diseases. The rationale behind the interventions is that the Municipality is working hard to secure water supplies, but there are challenges that often lead to delays in delivering clean water (Ntombela, 2013). These challenges are sometimes outside the Municipality’s control. For instance, during our visit to the community, members took us to the Steelpoort River and the purification plant that supplies water to the community’s reservoirs. On arrival at the site, they indicated that thieves had stolen the electric transformer that supplies electricity to the pumps in the river (fig. 4). They had been requesting the electricity supplier, Eskom, to fit a new transformer (fig. 5). Without the transformer, the plant is inoperable resulting in water shortages. We visited one of the reservoirs and it was completely dry. One member said that from time-to-time they experience problems with the reservoirs when there is water. Children swim in the reservoirs and also throw objects into it blocking the plumbing that leads to water shortages.

Because the transformer was stolen and the purification plant was inoperable, people resorted to buying water from water vendors at a very high price: R50 for 210 litres. The water vendors source their water either from boreholes situated on their land in the village or the Steelpoort River itself. The boreholes are privately owned and the owners therefore charge a rate. People also travel to the river to collect water directly from it or do their washing in the river (fig. 6). Travelling to the river can be a safety hazard. People are not only exposed to poisonous snakes and insects, but also violent crime, including rape and armed robbery.





Figure 5. The pumps in the Steelpoort River supplying water to GaManoke ©Richard Meissner



Figure 6. The missing transformer at the GaManoke water purification plant ©Richard Meissner

As already indicated, the community had requested Eskom on numerous occasions to replace the transformer. We were supposed to have a meeting with the municipal manager from the Greater Tubatse Local Municipality to interview him about the situation. The ward councillor responsible for GaManoke organised the meeting. Eskom fitted the transformer after the municipal manager put pressure on Eskom to replace the



Figure 7. Women from GaManoke doing washing in the Steelpoort River ©Richard Meissner

transformer before the CSIR's meeting with him. It is not impossible that the proposed meeting prompted the Municipal Manager to convince Eskom to fit the transformer, as the timing of the transformer's fitment coincided with the meeting. However, the meeting never took place since the Municipal Manager kept on postponing it. The CSIR team had to leave the study area after its week-long field visit. Two days after our visit to the pump station, Eskom replaced the transformer and the community started to receive water. This is an indication of the role of the CSIR in urban wastewater governance and I describe it as co-governance (e.g. interactive governance theory). The CSIR acted as a catalyst to have the transformer replaced.

**4.6.2.2 Individuals** The individuals discussed under this theme are directly involved with wastewater treatment. I have changed their names to ensure their anonymity.

Jacob, a plant operator, indicated to us that he does not get any support from the Municipality. He also mentioned that the Municipality 'eats money' and 'does nothing'. This is a sign of his frustration of not effectively operating the plant. Since he told this to the CSIR team, he is most probably expecting the team to assist him in getting more support from the Municipality. Jacob works with dilapidated equipment (e.g. the diversion sluices are corroded and so too is the rake with which he removes solid waste). When available he doses the water with chlorine and removes solid waste from the inlet grids.

Zanele is part of a team of operators working at another wastewater treatment plant. Her duties include quality control of water exiting the plant, administration and occupational health and safety. She works overtime, especially when the plant is under pressure to perform during and after rainfall events. She has in-depth knowledge of the plant's operation with a degree in Biotechnology. Since Zanele is part of a team and the plant is quite sophisticated compared to Jacob's plant, it is not an easy task isolating her actions and the consequences these have on the operation of the plant. The administrative and technical

realities of the plant's operation combine to create a complicated if not a complex system (e.g. interactive governance theory). In such a system it would be difficult to isolate those small events that have large consequences. Nevertheless an individual's perception, knowledge, norms base, culture, work ethic and principles do have an impact on such a system. It should also be mentioned that the design of the plant has a direct impact on its operation, which is sometimes out of Zanele's hands. The plant's technical specifications can therefore be a hindrance in the operator performing his/her duties optimally. Some general observations would therefore be in order. Zanele's knowledge and skills base contributes to the plant's relative successful operation, although it is currently operating at a much higher capacity than originally catered for. When we asked her why the plant is working better than the other plants we visited, she said that it is because a private firm operates and maintains the plant whereas the others are the Municipality's responsibility (e.g. interest group corporatism and interactive governance theory). This indicates a discourse of private investment working better than public governance and management. It would appear that Zanele is able to perform her duties more effectively than Jacob.

Robert is a manager in the Municipality and has extensive knowledge of wastewater treatment. He said that there is a role for the Municipality to play in securing jobs. Outsourcing might not always be a good thing, especially in light of shedding jobs. This is indicative of the discourse of governance with government in partnership with the private sector as argued by interactive governance theory. Robert also acknowledged that the Municipality's wastewater treatment infrastructure faces challenges and they are operating poorly. Zanele indicated that Robert will make unannounced visits to inspect the plant. Should something be out of place he instructs its immediate rectification. Robert, just like Jacob, invokes the discourse of disenfranchisement when complaining about not having access to a budget to tackle the issue of wastewater. According to Robert he made the recommendation for the upgrading of one of the plants because 'politicians don't know how things work and therefore they might go for something and not go for other things.' In other words, politicians have different priorities. Robert also mentioned that his department is not well equipped to analyse water samples and he sends them to private laboratories. He expressed the view that the CSIR would be able to assist in this regard and the challenge he is experiencing with incomplete data, especially regarding a real-time monitoring system.

## **5. Discussion and conclusion**

In this paper, I showed that a link exists between analytic eclecticism, problem solving and critical theories. The central element in all three frameworks is problems and their amelioration. Analytic eclecticism calls for the integration between problem solving and critical theories. Through the investigation, we discovered that urban wastewater treatment infrastructure is not the only problem. Within the Olifants River basin, upstream pollution from mining, industrial and urban wastewater has given the Olifants River a negative environmental health status. We have also discovered that the provisioning of water in GaManoke and other parts of the Municipality is another challenge. From an

interactive governance perspective, the problems surrounding the Olifants River and the provisioning of water is diverse, complex and dynamic. Scientists have, for a long time, contemplated these problems especially the pollution of the river and have suggested solutions (e.g. Ashton, 2010; Ashton & Dabrowski, 2011; Oberholster et al., 2010). The efforts by the scientists indicate the diversity, complexity and dynamics of the problems. To give effect to analytic eclecticism's integration call we also need to consider the origin of the problems from a critical theory perspective. From this perspective, we can argue that the Municipality's pollution and water provision challenges are due to not only upstream pollution or a lack of capacity. The Local Government Municipal Structures Act also plays a role. This Act resulted in a wider geographical separation between the Municipality and citizens. In my opinion, this has had a debilitating impact on communication as well as people's perceptions of the Municipality's service delivery capabilities. In other words, the Act has contributed to the non-harmonious governance of wastewater treatment and water provisioning. The intention with the Act was most probably to make the system work more smoothly. Instead, it likely worsened the problem, meaning that structures can at times be part of the problem instead of the solution, however, good the intentions of regulators might be. By looking at the problems from both a problem solving and critical theoretical perspective can assist us in understanding what is going on in reality better and how we can go about addressing the situation. Explaining the problem through interactive governance theory gives a more nuanced sense of the real world problem's character.

Everyday international political economy and psychological constructivism have also highlighted insights at an individual level. The individuals have expressed their agency around the issue in various ways. Jacob saw the visit by the CSIR as an opportunity to express his dismay with the support he receives from the Municipality. Robert used the contact with the CSIR in a similar manner. For them, the CSIR researchers became some sort of 'resource' they utilised to try and bring about change in the Municipality. Jacob's perceived material reality influenced the way in which he interacted with the CSIR. This discourse-materiality (Cloud, 1994) influenced the way he tried to change the situation at the plant. By criticising the Municipality he wanted to highlight the incompetence of his superiors and how it affects his work performance. He employed power through spirit, which motivated him to participate in 'civic life', in an informal setting to have the Municipality give him more assistance. He used his criticism rhetoric to indicate to the CSIR whose fault it is that the plant is not working properly. In this way, Jacob tried to persuade the CSIR to raise this issue with the Municipality. It was at this psychological and cognitive level that Jacob exercised power over his superiors. By doing so, Jacob stood in a psychological relationship (Lebow, 2008; Morgenthau, 1948) with the CSIR and his superiors even though they were not physically present. Jacob's criticism gives the impression that he is not very loyal towards the Municipality. According to Hart and Thompson (2007), loyalty is an attitude in the minds of individuals. Loyalty is constructed by perceived reciprocal obligations. Reciprocal obligation is a key feature of loyalty (Kumar & Shekhar, 2012). For Jacob to be loyal to the Municipality, the Municipality must be loyal to him. According to psychological constructivism spirit, appetite and reason are requirements for

hierarchies and assist in hierarchies' creation. It would appear as if spirit was, in Jacob's case, a measure to create a level or horizontal hierarchy between himself and his superiors. The reciprocal dimension of loyalty could also explain the overall negative perception the different actors have towards one another. Robert utilised the scientific expertise of the CSIR to lobby for change in terms of budgetary resources *and* the perception Municipal officials have of wastewater treatment plants. The workshop was organised in direct response to Robert's assertions and an attempt to change the structural dynamics within the Municipality to improve administrative procedures around wastewater treatment. It can be said that Robert's strategy is axiorationality. He took the hierarchical structure norms and conventions of the Municipality into consideration, reflected upon what the CSIR can bring to the table (in terms of expert knowledge) and then choose to use the CSIR to try and convince his superiors to make financial resources available and change their thinking. Robert's 'resistance' was informed by the norm that strategic decisions in a Municipality is appraised at a level higher than the position he holds. Yet, Robert cannot do as he pleases, and his behaviour is restricted by the regulatory and normative structure of the Municipality. Robert was able to 'jump' from one scale to another by utilising the CSIR as a 'voice' in this regard. Whichever way Jacob and Robert expressed their dismay towards the Municipality or administrative procedures, they expressed agency no matter how small and whatever manner as explained by everyday international political economy.

Jacob is a good example of directly expressing his frustration with the Municipality to the CSIR. Although his comments to the CSIR were small, and had no immediate impact on the quality of the plant's water quality, the CSIR did take his comments into consideration when they assessed the governance situation. His sudden resistance and criticism of the Municipality was an indication to the researchers that all is not well with the plant and the resources made available to Jacob by the Municipality. This was later communicated to the Municipality. The CSIR therefore acted as an indirect conveyor of Jacob's resistance, frustration and criticism. This says something about the role of scientists in society. Scientists are often perceived as objective pursuers of facts or truths. Apart from this role, and as the case of Jacob indicates, scientists can also play the role of transmitters of fundamental psychological processes such as Jacob's frustration towards the Municipality. It is up to the scientist if he or she would like to do so and how to interpret Jacob's reaction. The choice will boil down to the scientist's paradigmatic stance; a rationalist would likely dismiss it while an interpretivist would use it as some or other indicator. The case of Jacob indicates that science is not a passive and objective bystander. Individuals can use science as a lobbying and communication instrument and not always as a source of new knowledge or understanding. What I mean is that, in general, rationalism would be an unlikely candidate to take Jacob and Robert's stance towards wastewater governance into account. By using a more critical theory perspective, the scientists were better equipped to understand and interpret Jacob and Robert's criticism of the Municipality and administrative procedures.

Zanele is part of a team that operates a plant under the control of Lepelle Northern Water. Because the plant is under private sector custodianship, she is convinced that this is

the reason why it works better than those under the Municipality's direct control. Through this discourse, Zanele is arguing for better wastewater treatment through private-public partnerships or co-governance as explained by interactive governance theory. Seeing this discourse from a liberal pluralist perspective indicates that it is not only the Municipality that is the most important actor. Lepelle Northern Water also has a role to play in defining the governance structure and bringing material resources to the governing table. For her, Lepelle Northern Water is more efficient because it is a privately owned company and not a government entity. There is a general perception that the private sector is much more efficient than government because of the market principle being a check and balance and 'defines' what efficiency is and what it is not. Yet, the plant at which Zanele works has not been upgraded in a while. This would imply that the market mechanism is not always the most efficient to force the government structure to become more effective. It depends on the terms on which the co-governance structure is built, like contractual obligations and revenue collection. If the Municipality is unable to secure funding for the upgrade, it is unlikely that Lepelle Northern Water will be able to upgrade the plant. This means that the Municipality is constrained by its surroundings; a large part of the population is poor or unemployed that can make revenue collection a problem. In this regard, interactive governance teaches us that governing actors are constrained or enabled by their surroundings or environment. The Municipality is therefore unable to produce autonomous preferences because it stands in a contractual relationship with Lepelle Northern Water. Because of the market mechanism, Zanele sees the plant in a different light; a perception that is also informed by status and prestige. Linked in this way to the plant's perceived efficiency, Lepelle Northern Water is elevated to a higher status than the Municipality. What's more, the fact that Robert finds fault with the plant on his unannounced visits, is another indication of Zanele's view of reality being influenced by the perceived status and prestige of Lepelle Northern Water. Looking at Jacob, Robert and Zanele it appears as if formal education is not an independent variable and that their skills base is not the determining factor in the governance of wastewater. Psychological attributes have a bigger role to play than formal education, it seems. Jacob has no formal training, while Zanele and Robert have. Other factors are also responsible for the state of governance and not the apparent lack of skills. One such factor is the understanding senior municipal officials have of urban wastewater treatment plants.

The Olifants River dominates the Municipality's water landscape. The status of the river gives it a particular prominence in the minds of scientists and practitioners. These actors place a lot of attention on the remediation of the Olifants River. From a scientific perspective, the rationale for the CSIR's involvement in the Municipality rests on the River's polluted status and to implement measures to remedy the situation. This can have an enabling effect on the Municipality and other stakeholders as expressed by interactive governance theory. Assistance from the CSIR can assist the Municipality in devising better governance mechanisms to tackle the pollution of the river from their wastewater treatment systems. The other side of the coin is also true. Because the Olifants River has such a sensitive prominence on the country's environmental agenda, those actors developing other resources in its basin will be sensitive and even over-sensitive to how they

exploit resources. Mining operations can be negative to the environment in general and water in particular. The acid mine drainage debate in South Africa indicates this. Because it is not seen as an environmentally friendly industry, mining companies will likely share the blame for pollution. It is possible that this is the reason for the one mining company threatening the Municipality with legal action should the wastewater treatment plant continue to pollute the river. That said it is not only the surroundings constraining or enabling governing actors. It is also the perceptions generated by a particular environment, in this case the status of the Olifants River influencing actors' action and governance modes. Legal action is after all a way of governing an issue, since it resembles the principle of non-harmonious interaction and a tactic used by interest groups to influence government policy. That the mine is threatening the Municipality with legal action indicates to me that the mine is not part of an arrangement akin to interest group corporatism. It is more a case of interest group pluralism where the mine acts as a balancing force to remedy, what it perceives as poor governance of wastewater, through legal means. It is therefore not only the biophysical environment and conditions existing in it that can have this enabling or constraining influence. It is also about the perceptions of actors operating in that environment and the way they interact with the environment that can have enabling and/or constraining influences. Actors' perceptions are self-constitutive and generated by public opinion about the state of the environment and the reason for the state of the environment. What is more, the mining company perceives the poor state of the Municipality's wastewater treatment plant as a threat to the water resources it depends on for a number of purposes. This is another indication of a situation that resembles interest group pluralism instead of interest group corporatism.

The Municipality is located in the centre of the Olifants water management area. It is therefore downstream from the upper Olifants basin, where most of the pollution originates but upstream from the Mopani District Municipality, the Ehlanzeni District Municipality, the Kruger National Park and Mozambique. The effluent generated within the Greater Sekhukhune District Municipality's wastewater treatment plants can adversely affect these downstream neighbours. The Municipality's capability to govern wastewater can have an impact on its downstream neighbours. The traditional upstream-downstream polarity becomes irrelevant; everybody is downstream from everyone else. This is especially the case when considering the mining company's threat of legal action against the Municipality because the mining company is downstream from some of the Municipality's wastewater treatment plants. If one actor pollutes a river it will affect its downstream neighbour be it another municipality, a national part, another country or mine. Yet, the polluter is also affected by upstream pollution from another actor. In other words, it is a circular and not a linear path of water use and pollution. This adds another layer of complexity to the governance process. Governance structures are already complicating the process that places control over wastewater management in the hands of the Municipality and not the five local municipalities. If one adds the role interest group pluralism can play in the governance structures, it is probable that the governance structures are complex. The situation where the District Municipality has control over the wastewater treatment plants

and not the local municipalities means that there are vast geographical distances between the administrative seat of the Municipality in Groblersdal and the individual plants in the rural areas. The answer to this dilemma is the establishment of depots in the five areas to oversee the management of the plants. This means that the Municipality is able to govern the wastewater treatment plants at an appropriate scale. Yet, by looking at interest group pluralism in, this does not mean that the Municipality will always be able to govern the wastewater treatment plants in a harmonious fashion.

The governance of wastewater is interactive but not always harmonious. During our research we noticed that the various collectivities have different perceptions of one another. These perceptions are mainly negative, with only a few positive perceptions noticeable. The threat of legal action by the mining company is a case in point. Another instance is one community that harbours a negative perception towards the Municipality. They argue that the Municipality does not care about their water woes. The Municipality has a negative perception towards communities. Officials say that communities do not always understand the Municipality's plans around water provisioning and when communities do not receive water their frustration boils over and they blame the Municipality. This negative perception indicates that the linkages between the different actors are not always cooperative, although our research did uncover collaborative endeavours between the Municipality and some of the mines. The linkages between the different parties are essential for interactive governance to be placed on a sound footing. Instead, the linkages are fueling a dynamism that is not conducive to collaboration and coordination among the stakeholders. This is another indication of interest group pluralism manifesting itself around the matter of wastewater treatment and water provisioning. It is not impossible that the different actors tried to exert influence over the Municipality through the CSIR research team indicating that the interest groups are influencing through lobbying a third party and not the Municipality directly. It is also an indication that the interest groups have no statutory contact with the Municipality and operate apart from the institutional structure of the Municipality to influence policy. Said differently, it is likely that the groups we had discussions with are not incorporated by the Municipality into its decision-making processes and have no insider status as explained by interest group corporatism.

Because wastewater treatment is in the hands of the Municipality, with some plants operated in partnership with Lepelle Northern Water, the Municipality is dominant in governing wastewater. Here we find a more corporatist governance arrangement. This control finds authority through the Constitution and the Municipal Structures Act. Even though the Municipality is dominant, our research unearthed a mixture of potential 'governors' within the issue area that can assist in the governing process other than the Municipality, the five local municipalities and DWS. Parties with a potentially direct voice in the matter include various mining companies, the Loskop and Hereford Irrigation Boards, rural communities, traditional leaders, small business owners, and companies of all shapes and sizes drawn to the region because of increased socio-economic development.

The variety of spatial dimensions presented in the paper is important in terms of governance. The dimensions are drivers of the problem, like households having increasing



access to sanitation and the infrastructure not being able to cope with the demand as well as socio-economic development within the Municipality. The spatial dimensions can also be the source where interactive forms of governing can emanate from. Since the Olifants water management area is one of the boundaries, the governance of wastewater treatment can spill over into the transboundary river domain. This could bring in the realities of international cooperation and even contestation between Mozambique and South Africa. The issue therefore no longer remains a local or even national issue but one that can become transnational. The pollution of the Olifants River will get another status; that of being a transnational problem. This has not happened yet. Contestation between Mozambique and South Africa over the quality of the Olifants River could potentially play itself out in the future. Should Mozambique decide to act on the matter of water pollution from South Africa, the issue can become a matter at the transnational scale. The matter can be resolved through the Limpopo Watercourse Commission (LIMCOM). In 2003, the four basin states of the Limpopo River basin established LIMCOM through a multilateral agreement. The Commission plays a technical advisory role with the Commission advising the riparian states on the uses of the Limpopo River, its tributaries and its waters. The Commission can also advise the states on protection measures, the preservation and management of the river (LIMCOM, 2003). From a liberal pluralist perspective it will not only be up to states to tackle the problem of pollution. According to LIMCOM's website, the Commission is still developing its strategic framework and plan. These will guide future technical programmes and interventions in the Limpopo River (LIMCOM, 2014). At a multilateral level it is unlikely that Mozambique and South Africa will be able to tackle the issue of water pollution through LIMCOM. Yet, non-state entities can also prevent the matter becoming a transnational issue. Non-state entities in the agricultural, industrial, mining and urban sectors should realise that they do not have to wait for nods from the states and their governments to tackle the problem. They can act autonomously because they have autonomous preferences according to liberal pluralism.

At this stage, it would appear as if the Municipality is following a corporatist approach through its partnership with Lepelle Northern Water as already mentioned. This partnership does not extend to all 17 plants, with only a few being governed in this manner. There is therefore a mixture of self-governance and co-governance being practiced, with self-governance dominating. It is therefore a case of limited corporatism regarding wastewater governance in that there is only one functional interest group involved, Lepelle Northern Water. Plans are underway to bring other plants into this co-governance arrangement. The Municipality is likely to see increased diversity, dynamics, complexity and the blossoming of issues other than poverty and climate change. With socio-economic development there is the potential of increased pollution, traffic congestion in places like Steelpoort and Burgersfort and the increasing income gap between the rich and the poor. The Municipality's corporatist stance would appear anathema to the increased diversity of actors, the dynamics they bring about as well as those emanating from the natural environment and the socio-economic systems as well as the increased complexity brought to bear on day-to-day activities such as tapping water from a river and flushing a toilet. What I

mean by this is that, although assisted by the CSIR, the Municipality is governing alone in an increasingly diverse, dynamic and complex environment. There is no guarantee that its relationship with the CSIR will be permanent. The overly limited corporatist stance seems to be a poor fit for the realities on the ground. The Municipality could consider communicating more closely with communities. This will not be an easy task because of the spread of the geographical area and the Municipal Structures Act creating distance between the Municipality and the citizenry.

Following the theory of interactive governance it would appear as if the Municipality should rather change tact, so to speak, and broaden its societal participation and governance. It is possible that should this become the case more optimal goals for ameliorating the issue could be negotiated, with a potential positive knock-on effect on the negative perceptions held by many stakeholders. A potential way forward for the Municipality is to follow the pluralist route. This could widen the Municipality's power base since it would be able to tap into a variety of knowledge bases other than Lepelle Northern Water's and the CSIR's. This could have a positive effect on its governability but it is not to say that it will bring about an overnight positive change in its governability. The diversity brought on by an inclusive process, could also paradoxically lead to destruction and disintegration. Since it is not possible to say for certain what will be the future outcome, it might be possible for stakeholders to understand what change is, how change manifests and what its potential consequences could be. When switching over to a co-governance mode, the Municipality should not be under any illusion that the combined interdependencies between the governing system and the system-to-be-governed could potentially be subject to disruption. A thorough understanding of change and the ambiguity it can generate could go a long way in offsetting potential disruptions. It is in this context of change and ambiguity that researchers could develop scenarios for the Municipality on the various aspects of governing wastewater within a pluralist governance arrangement.

Members of GaManoke exhibit the assumptions outlined in psychological constructivism. This is not to say that the other individuals outside GaManoke do not. In GaManoke, spirit, appetite and reason become visible through the case of the stolen transformer that had various knock-on effects throughout the community. The contact the community and the ward councillor had with Eskom and the Local Municipality means that the community has the ability to act as a communal interest group to influence the behaviour of various actors. In this way, instead of being victims of criminals and a cumbersome governing process, the community can become change agents. This indicates that the 'spirit' is present in driving community members to participate in civic life. Water is not only a natural resource required for life. It is also vital for self-esteem and other safety and security considerations. The indignity some community members suffered through crime when visiting the river became real during the episode of the stolen transformer. Why the transformer was stolen in the first place is still not clear. Some members accused the security company responsible for looking after the equipment in the first place. Others, say it was a group of young people up to no good. Then there is also the possibility that water vendors were responsible. Whatever the case may be, the transformer contains oil

and copper. Both are valuable commodities. The oil can be used in household welding machines and the copper has a substantial scrap metal value. It is quite possible that 'appetite' with its corrupting effect, played a role in the transformer saga. The situation led to disorder at the household and, to a certain extent, the communal levels. People had to walk long distances to get water or pay large sums to water vendors for the resource. Community members had to make substantial physical, psychological (heightened risk and fear of exposure to violent crime and poisonous snakes and insects) and financial investments to adapt to the changing situation.

The adaptation does not happen automatically and is a factor of the availability of physical, psychological and financial resources. The case also shows that resilience is not always increased by adaptation. The means to adapt can erode resilience. Those unable to adapt, such as the very young and elderly, will have to rely on other community members to assist them in their predicament. The situation that developed had an impact on community members' physical, psychological and financial abilities. In other words, it had a negative effect on their resilience. Adaptation leading to resilience is not always straightforward, neat and tidy. The utilisation of different resources can lead to an erosion of resilience even when people adapt to a new situation.

Because it took a while to have the transformer replaced, this indicates how the different forms of reason can rarely create a balance, if ever. Whatever the 'reason' for stealing the transformer to satisfy appetite, it had an impact on other community members' strategic calculations. Reason does not always lead to desirable outcomes. This type of disorder can also lead to regularity (people know when to visit the river for washing) and predictability (criminals know when people are likely to visit the river for washing).

Even so, it is not impossible that the CSIR had people reflect on the consequences of others' behaviour. One of the CSIR's recommendations to the community was to establish a community police forum as a means to manage vandalism against the water infrastructure. This could assist in gathering information about criminal activity, and liaising more closely with the South African Police Services. A more robust community could be in the offing. This could also lead to a more emphatic community, around water resources and the general prevention of crime, but a forum of this nature will be no guarantee. Psychological constructivism spotlights the reason for people's behaviour. As a critical theory, it gives us an understanding of the social power relations around the issue of the stolen transformer. The theory also explains how abnormal behaviour leads to lower resilience in the community.

Spirit, appetite and reason have an influence on scientists too. The particular paradigm a scientist adheres to influences his or her spirit, appetite and reason for getting involved in issues. Instrumental reason was one of the drivers for the CSIR to organise the workshop. The CSIR wanted to assist the Municipality and show the worth of science in the external world. The workshop was convened within a critical/opportunity creation paradigm.

In South Africa a municipality is regarded as the tier of government closest to the people. Individuals are aware of this. They will interact with a municipality first should a

problem of service delivery arise. There are things a municipality does not have control over. Vandalism of water infrastructure is one. To have the transformer replaced community members did not only interact with the Municipality but with Eskom too. This indicates that community members can link issues to the appropriate institutions that deal with such issues. The nature of the problem will define with whom community members will more likely interact. By reflecting on the type of problem, the community was able to identify the responsible authority to interact with. The nature of the problem produced practical or reflective reason. Practical reason was not only a product of those who perpetrated the theft of the transformer. Reflective reason also came about when the missing transformer had knock-on effects throughout GaManoke's water supply system and the relationships between individuals and individuals and the natural environment.

In this paper, I did not present a miracle cure to the governance issues facing the Municipality, but a deeper understanding of what is going on around the issue of wastewater treatment. The six theories played different roles in this quest for a better understanding. With a number of problem solving and critical theories in hand and by using analytic eclecticism, researchers will be able to describe the finer nuances of a situation like wastewater treatment governance at local government level. This is a much better proposition than the one existing where researchers use mono-theoretical explanations.

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