Social and Environmental development of the Silvermine River

The environmental governance of the Silvermine river by various stakeholders

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Introduction

Environmental governance is a concept that refers to placing sustainable development first, when it comes to the management of all human activities. This includes social, economic and political activities (Brandes, Brooks and Gurman, 2011). Sustainable development refers to an organisational principal that seeks to meet human development goals whilst at the same time maintaining the abilities of natural systems. Natural systems that help provide natural resources and ecosystem services that an economy and society depend on.

The main idea surrounding environmental governance is to ensure that there is a desirable result in an area. That even through constant development; resources that are used from nature to meet human needs are never undermined. This ensures that the stability of natural systems is kept (Shaker, 2015). Environmental governance has roots in many parts of the world. In England, environmental governance emerged under the ideas of "Sustainable Forest Management" in the 17th century. Sustainable Forest Management was a response to the growing concerns over England's timber depletion. Scholars such as John Evelyn argued that it would be within every land owner's best interest to plant trees, stopping the cycle of overexploitations of natural resource. What followed was the conscious behaviour of many states and citizens in Europe, most of whom agreed upon better governance of natural resources. The state leading by example and where the state would fail, environmental groups would be there to place pressure (Grober, 2007).

In South Africa, post-apartheid, there too has been a need to protect natural resources. But not only that; there has been a need to protect social interests as well. Based on South Africa's apartheid past and plans for a sustainable future, the South African government has been steadfast on delivering social and environmental changes. Knowing now that the two co-exist together. However, it has never always been this way. After the apartheid regime, it was vital to help restore the lives of previously disadvantaged individuals (PDI). This is where programs such as GEAR (growth, employment and redistribution) were initiated. It was also vital to rethink of environmental issues, and change policies of the past (McDonald, 2004). But for a long time, it seemed like improvement of the social was always going to be more important than that of the environmental. That was up until the environment was redefined as key to helping empower PDI. This immediately changed the developmental discourse to be inclusive of ecological issues. Many trade unions, nongovernmental organisation, academics and many others, quickly adopted this new approach which not only challenged social policies and practices but now also environmental policies and practices of

the past. Most environmental initiatives then became top priority for the South African governments plans to rebuild, post-apartheid (McDonald, 2004). But the government did not partake on environmental governance on their own

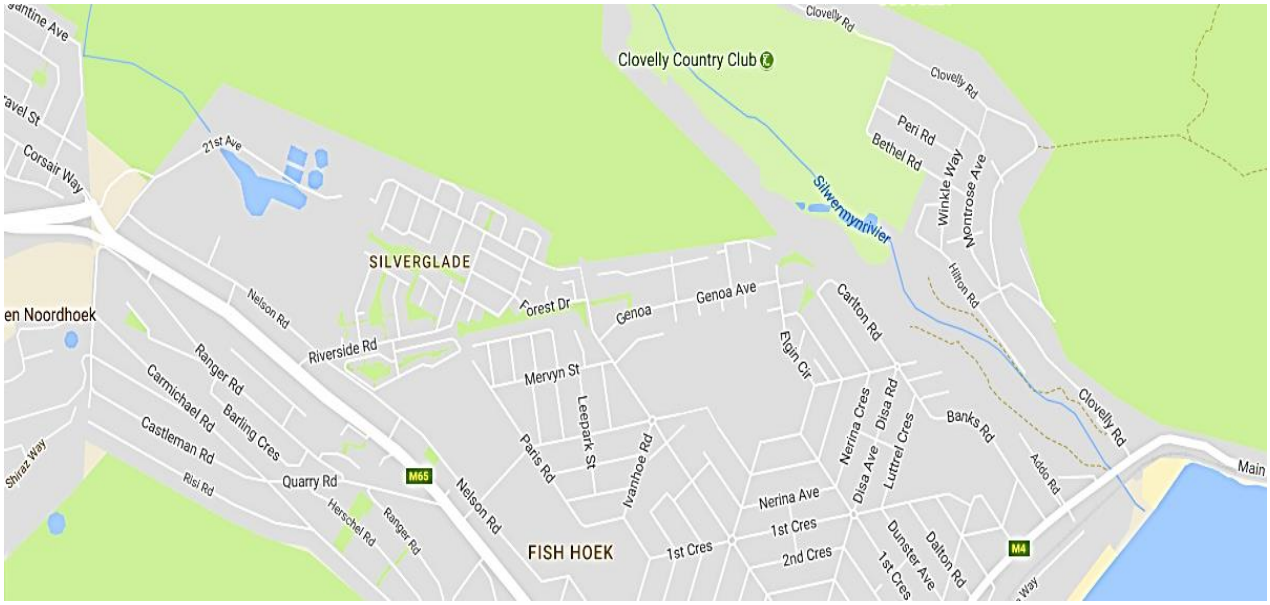
In South Africa, there has been an increase with regards to businesses playing their role in social and environmental change. Business partake in Cooperate Social Responsibilities (CSR). This relates to being more involved or the investment of the company's time and resources in social projects. Social projects that greatly advance the communities and environment in which the business operates. This has become a core feature in most business plans and proposals (Fig, 2007). CSR became a very important state obligation under the Companies Act No. 71 of 2008. Now most businesses recognized the need for it. It has become a known growing business trend globally too and companies realise that they must adhere to CSR, in order to assist the government with social and environmental governance (Porter and Kramer, 2011).

It can be said that there is a joint venture for both the South African government, businesses and citizens to actively ensure that different regions, towns, cities and wards are well maintained and nurtured to benefit the current and future generations. A good example of this can be taken from Cape Town's recent water situation. The city of Cape Town's government realised back in 2005 that Cape town water supply would run out by March 2018, should a plan not be drawn up to ensure sustainable management of water supply. In May 2017, the city realised that the plan they put into place was not working and thus a new one had to be drawn up immediately (Dolley, 2017). Whenever there is a water crisis or shortage, the poor suffer the most. A clear case can be observed in some of Cape Town's poorest areas such as Beaufort West, where the local damn is currently at 0% capacity. Now there are emerging cases were the poor are stealing water from outside houses to help their situation. Also in Beaufort West sewage water is being recycled to reusable water, some residents are only able to take baths once a day, guesthouses have removed bathrooms from rooms and municipals swimming pools have had to be closed. Meaning workers must find new jobs. Cape Town's water crisis is a huge social and environmental problem (Saal and Cowan, 2017). Due to the severity of the water conditions and the short space of time in which to act upon extremely low water level, the city of Cape Town's government has required the assistance of residence and business alike to help with sustainable water management (Saal and Cowan, 2017).

This report seeks to put environmental governance into perspective within the context of the Silvermine Wetlands. Silvermine Wetland is home to the Silvermine River which is used by several stakeholders between Clovelly and Fish Hoek where the river flows through. All these stakeholders make use of the river and therefore are tasked with the engagement and governance of the river. This report reflects on the extent to which these stakeholders engage with, and govern the Silvermine River. Ensuring that it aids social, economic, political and environmental development in the Fish Hoek, Clovelly area. The report further seeks to analyse how different stakeholders work together to ensure environmental governance. By using the Silvermine River as a case study this report aims at highlighting why environmental governance for sustainable development is important and why the state, business and residents of an area need to take it seriously in order to ensure social and environmental development.

Background

Map 1. Silvermine River Catchment Area



Google maps (2017)

The Silvermine River is a naturally perennial river approximately 12 kilometres in length, rising at an altitude of 640 m in the Steenberg Mountains north-west of Fish Hoek. The catchment area covers approximately 21 square km. The river flows south-east across the Steenberg Plateau before cutting south through a deeply incised valley where it is joined by

many small tributaries that drain the surrounding mountains. In its lower reaches, it meanders through unconsolidated sediments before entering False Bay towards a small estuary in the north-east corner of Fish Hoek Bay at Clovelly Beach. The stretch between this point and Clovelly Country Club was the focus of this case study. It is one of the few rivers in the Cape Peninsula considered to have a high conservation status (Southern Waters, 2000)

According to Walter (n.d.) he states that "a great deal of time and effort was spent in trying to persuade officials that there were better options for the lower river than canalization". In 1987, researchers Kim Kruyshaar and Mike Silberbauer, produced a document entitled "A case for the retention of the Silvermine River as a natural river system". This was widely circulated, and possibly brought about the first change in official thinking as to the future of the river. Kruyshaar followed this up in 1990 with another document entitled "Silvermine River Wetland Project". An enormous amount of study went into it, and it set out the basic outlines of the overall wetland management project**.** This laid the foundations for the preservation of the river and the development of one of the most valuable assets of the Fish Hoek Valley (Walter, n.d.)

There was a fire in 1992 which destroyed close to 675 hectares of land and vegetation within the Silvermine Nature Reserve along the main catchment area of the Silvermine River. This led to probable risks of flooding in the next winter season in Lower Fish Hoek and Clovelly. The fire caused a crisis increasing flooding vulnerability because of loss of vegetation that limits water surge. High Volumes of water in the river had increased to 20% to 40% more than the past rainy season. And potential flooding threatened nearby emerging housing and road development in areas.

As the prospect of a flooding occurrence intensified CSIR (Council for scientific industrial research) was commissioned to consider the problem, and came up with a document that recommended the widening and deepening of the river as a short-term solution, whilst waiting for a more integrated and comprehensive catchment study. The Wild Life Society and the Silvermine River Society opposed the idea of widening and deepening of the river which would turn the natural river into a canal. The need for action was underlined in mid-1992 when heavy rains resulted in severe flooding in Fish Hoek. Therefore, these floods led to the beginning of the partnership and integration between Cape Town City Council and residents of Fish Hoek and Clovelly which culminated in the flood management scheme and wetland development which we see today in the area. Such a cooperation of

different stakeholders could be worked on to the benefit not only the growing population but the environment too (Walter, n.d.).

Methodology

This report is focused on obtaining information on how different stakeholders engage with and govern the Silvermine River. The method selected would need to assist both researchers in obtain data on different stakeholders around the Fish Hoek and Clovelly Area.

Sampling

The sample population for this report is taken as residence of Fish Hoek and Clovelly Area where the Silvermine River runs through. The sample sizes come mainly from four stakeholders in these areas. These stakeholders are the members of the Riverine Rovers, the Clovelly Golf Club management, the homeless residents and Stormwater officials.

Sampling Criteria

The first group selected for this study was the Riverine Rovers. Members of the Riverine Rovers were selected based on the work they do on the Silvermine Wetlands. Some of these members have also been long-term residents within Fish Hoek, making their knowledge of the area quite useful to note. The second group Selected for this study was the Cloverlly Golf Club management. The current groundsman at the club was used in the study based on the information he holds on how the golf club actively makes use of the Silvermine River. The third group selected for the study was any homeless resident of Fish Hoek that lived near the exit of the Silvermine River. The perspective of the homeless was necessary to analyse, as it provided a lens in which to view how the river caters not only for the upper and middle class in society but also for the poorest residents of Fish Hoek. Apart from this, the perspective of the homeless and the relationship held with the Silvermine River would help reveal some social and environmental issues in the area. Lastly the fourth group used in the study was Storm Water Officials. Stormwater is responsible for any flood prevention planning in the area and the maintenance of the Silvermine Wetlands. Therefore, it was necessary to analyse input from one of the organisation members.

Table 1. Sample Eligibility

Riverine Rovers: Current or old members of the Riverine Rovers, who reside in the Fish Hoek area
Clovelly Golf club management: Any current active member or representative of the Clovelly Golf Club.
Homeless Residence: Any resident of Fish Hoek that does not have a home and stays in any parts near the Silvermine Wetlands river
Stormwater officials: Any member of management within the organisation

Data collection approach

For the basis of this report, the relationship that different stakeholders have with the Silvermine Wetlands river is being studied. This relationship is checked under the context of a need to better manage water supplies in the Cape Town area for social and environmental development. Such information can be gathered via observation, interviews, questionnaires, surveys, checklists and or critical incidents and work diaries (Hartley, 1999:10). This report makes use of single or group interviews as a data collection approach. Using interviews with selected members of the different stakeholders identified, this report will be able to give feedback on the extent that not only how the state, but how different residents and business are playing (or not playing) an active role in managing the Silvermine Wetlands River.

Data analysis approach

This report makes use of the phenomenological data analysis technique to analyse all the interviews done. The phenomenological method is good for when one has done a semi-structured interview. This is because the method is often used to analysed structured data – from casual conversational interviews with respondents that have clear directional purpose (Kvale & Brinkmann, 2009:27). This method seeks to gain an understanding of an interviewee's lived experience on the basis that this may help interpret a phenomenon (Kvale & Brinkmann, 2009:27).

To begin the data analysis, each of the four main interview questions were grouped into key categories. These four categories were identified as; Knowledge of Silvermine river; River relations (use of Silvermine river), Contribution towards maintenance and development of the Silvermine river and Managerial issues related to the Silvermine river. Once these categories were identified, interview responses were then transcribed, and key themes were

highlighted. Each theme discovered was then analysed in a discussion of the findings. The information gathered was used to answer the key questions in the research area of this report. That is the information gathered helped to determining the engagement and governance of each stakeholders with the Silvermine River. Bringing to light the clear interests that the different stakeholders have and how these interests may conflict which one another. This is a good starting point for further research and analysis on what can be done differently to allow all stakeholders to work together to ensure that the Silvermine River is well governed. As the river is the source for social and environmental development in the area.

Table 2. Categories for Data Analysis

Research Questions	Category
• What can you tell us about the Silvermine Wetlands river?	**Knowledge of Silvermine river**
• What relationship do you have with the Silvermine River?	**River relations**
• What do you ensure the protection of the wetlands and the maintenance of the Silvermine River?	**Contribution towards maintenance and development**
• What do you think should be done to maintain and develop the Silvermine River?	**River Management**

Data Analysis

The responses from the four different stakeholders, provided great insight into different ways that the Silvermine river is governed and engaged with. It is to be noted that at no point were entire boards or a large group interviewed. The respondents interviewed each represented the organisation that they were a part of.

Table 4. Profile of respondents interviewed in the research study

Respondent Code	Organisation	Position	Gender	Race
Stakeholder 1	Stormwater	Official	Male	White
Stakeholder 2	Clovelly Golf Club	Patrol Guard	Male	White
Stakeholder 3	Riverine Rovers	Various	Male/Female	White
Stakeholder 4	Homeless	Beach guard/cleaner	Male	Coloured

Stormwater Official

Knowledge of Silvermine river

a. Flooding

The interview managed to bring about the fact that the lower Silvermine wetland was prone to flooding. And if a flood were to occur it would prove disastrous for the Fish Hoek and Clovelly Area. This would affect people's livelihoods. The flow of water during flooding periods at the lower Silvermine River, had to constantly be monitored by channelling the flow of water through water tunnels that ensured most of the water enters through the tunnels, and the excess water will submerge in the wetland and gabion ponds.

River management

There are suggestions that the lower part of the Silvermine River be dredged. However, this lower part is a small part which means that if there is a likelihood of a major flooding the other part which is not dredged is likely to be affected by more siltation. Siltation from the Stormwater drain must be lessened by deepening the mouth of the Stormwater drains. Also, there was a need to excavate and dredge from two gabions ponds towards the end of the river, to ensure the flow of water into ocean and to lessen flooding. Furthermore, the dredging when done in February 2018 (which is being delayed by breeding of leopard tods), if completed, the next dredging will only be done in the next 5years.

Stakeholder 1 articulated the delay in the completion of the Maintenance Management Plan by a local environmental consultancy of the lower Silvermine, as the reason for a delay

to do the dredging in the area. There are indications that the stakeholders divided the Silvermine River and wetlands into segments for easier management. As the river passes through the golf club, the golf club owners manage the segment that passes through the golf club. This is also done on the part of the river which passes through the nearby National Park while the municipality also manages the other segments of the river. The river is divided into three segments. However, this setup has seen the sustainable management of the river and wetlands being affected negatively. As the different stakeholders undertake their business operations, siltation is increased as there is no coordination among the stakeholders.

> *We have done the Maintanance Management Plan of the Silvermine river and one of the estuary but because of the breeding of the leopards tods we have a memorandum of understanding not to do dredging till they have finished breeding.* **[Stakeholder 1]**

River relations

Stakeholder 1 indicated that the Stormwater department is the overall overseer of all the wetlands in the South Peninsula of Cape Town. As Stormwater, stakeholder 1 explains how there is a need to manage the Silvermine River as it can be used to draw water for firefighting when there is fire within the surrounding areas of Fish Hoek and Clovelly. Also, there was emphasis on Stormwater making sure that drainage pipes are free from silt to dispose water into the lower Silvermine and to ensure that dredging has been done to avoid flooding that will affect human livelihood.

> *We need to make sure that the river is clear, and the flow of water is smooth to allow that the river flows to the estuary and feeds in the ocean. And also, to allow the fire department to draw water in the wetland in case of a fire that will burn the nearby houses and in Simon's Town because sea water has salt it affects the putting off of fire.* **[Stakeholder 1]**

Contributions towards maintenance and development of the river

a. Funding

Stakeholder 1 noted that funds to maintain and develop the lower Silvermine River are never enough. This can be noted by the amount of money being allocated for the dredging process and the need to use city of Cape Town's dredging equipment to cut costs. Stakeholder 1 also

revealed that river management in Cape Town requires proper budgeting as the current budget set at R4 million for Stormwater has been cut down due to the current drought with resources being diverted to the desalination plant. Stakeholder 1 further emphasised that the budget is also being cut down for the management of South Peninsula wetlands and conversation areas because of Western Cape question of drought which is now leading to the construction of the Desalination plant that cost millions of dollars.

> *R200 000 is never enough probably it's just going to cover transport cost however the City of Cape Town has excavators that will be of use to do the dredging than to hire. Also our budget has been cut due to the Cape Town drought that has led to the City of Cape Town to cut all department budgets.* **[Stakeholder 1]**

Clovelly Golf Club

Knowledge of Silvermine river

a. Drought

Stakeholder 2 pointed out the current Cape Town drought has more or less affected the issue of freshwater generally and the river flow. In case of a drought the golf club makes use of boreholes and they pump in water to reservoirs that are within the river channel. This highlights that the groundwater that feeds the boreholes will still function because of the river water area underground and the constant refilling of reservoirs using borehole water shows how drought has led to the depletion of river water on surface flow.

> *I have watched dry cycles since my arrival in Clovelly so for me this a normal natural thing happening because the Silvermine river has dried 87 times. And there was a section of the river that was bedded to the golf course which turned into a totally dry perch prior to my arrival.* **[Stakeholder 2]**

b. Flooding

Flooding was one of the main issues pointed out where it was regarded that within Silvermine there is a 5 year flooding cycle. To the golf club when the river floods, it floods the golf playing area which affects their operations and income flow. At the same time, it fills reservoirs and increases groundwater water table within the golf course area. The flooding was said to come with a lot of silt from the source of the river upstream and other sediments raising the river bed that further promotes the already there flooding and some of the water runs downstream to lower Silvermine and some is helped to decrease through daily irrigation of the golf course grounds and infiltration by typhus weeds.

> *So there is a 10 year cycle in 1993, 2003 and 2013 which was the thick of the wet period there was the bursting of the river banks and flooded part of the golf course and at that stage we started the Maintenance Management Plan and I am expecting a flood in 10 years' time in 2023.* **[Stakeholder 2]**

River relations

Stakeholder 2 conducted managed to bring out the close connection between the part of the river that passes through the Clovelly Golf Club and the environmental jurisdiction. The golf club has a relationship with the river that allows them to draw water from the river as it passes through the reservoirs constructed within the river channel. This allows the river to feed in and out the reservoirs as it flows downstream to the Silvermine wetlands.

> *The golf course primarily has 8 boreholes that pump into this reservoir or dams whatever you can call them. When the dams get full they spill back to the river. Historically we have utilised river water if there is excess river water.* **[Stakeholder 2]**

Contributions towards maintenance and development of the river

a. Funding

Stakeholder 2 showed that there is a bigger challenge in terms of funding in trying to manage the river from the golf club's perspective. The golf club is facing challenges to raise funding to get the dredging of silt in their jurisdiction before another flood or another rain season comes. Stakeholder 2 insisted that the golf club requires a lot of funds that are currently unavailable. However, if the club do kick start the dredging of silt, they want to cut costs.

It cost about R1million to R1.5 million of alien removal then the earth moving phase cost R1 million to R1.5 million we talking about really big big money and right now we paid for the Maintenance Management Plan for 300 000 and right now we don't have the current resources to do anything about the silt in the golf club jurisdiction. **[Stakeholder 2]**

River management

Stakeholder 2 articulated how the river is managed as it flows through the golf course boundaries. There was a river management plan by the golf club which could not be at the interviewers' disposal, hence information was taken at face value. Despite not viewing such documents, stakeholder 2 indicated that they have boreholes that they use to irrigate their grounds so as to not strain the river water levels in periods of drought. Also, it was explained how the golf club refills the reservoirs with borehole water in drought periods. This is how the golf club tries to manage the river and still reach a consensus with the ward 64 municipality.

Stakeholder 2 notes how the siltation happening upstream on the golf club area will affect the lower Silvermine dredging process due February 2018. If the next rains come after the Council have dredged the lower Silvermine and nothing has been done to dredge the upper part; silt is going to run down to the lower banks of the river and accumulate again in the newly dredged lower area. Stakeholder 2 managed to point out that in periods of high rains, flooding can prolong in the golf club grounds and soak the area. Hence, it's an advantage to have groundwater storage systems in the form of borehole and reservoirs that in turn can be of use in the long run during periods of less rain. However, stakeholder 2 pointed out that this will lead to sediment accumulation that will be coming from the mountains where the river starts and this surely increases more flooding risks because of a raised river bed. When they aim to do the silt dredging issue the golf club hope to use the silt dredged from their part of the river for golf club landscape developments.

The river is 50 % 50 % co owned by the City of Cape Town and the golf club as it passes through the golf club area. The other half is theirs and the other half is to our management, so how do you divide a water course like that? Its difficulty. We started a Maintenance Management Plan in 2013 after the flooding that affected the golf club. **[Stakeholder 2]**

Riverine Rovers

Knowledge of Silvermine river

a. Flooding

Stakeholder 3 acknowledged that there used to be a canal system that was put into place that helped channel the river water to different parts as it flows towards the ocean. However, the councillors of the city failed to maintain this plan and what ended up occurring is the flooding that Fish Hoek experienced in the 90s. The flood happened mainly because there was a build-up of branches and sand in the one channel that the river had to pass through. Therefore, when there was an excess of water being prevented from flowing, the water spilled over into the surrounding residential area.

> *…this was built as an excellent idea, but unfortunately the councillor has not done any maintenance on it Um, now it is absolutely useless as flood control method. Um, reeds are growing down there…* **[Stakeholder 3]**

The risk of future flooding in the area is cause by the huge siltation problem. The original bed that was meant to spread water to different areas is now full of reeds and does not assist in any way, as it rather now slows down the flow of the river water. When the flow is slowed down, siltation is easily deposited in the area. During a period of increase water flow due to high runny season, this silt is what will cause the flood in the area as it restricts adequate water flow towards the ocean.

River relations

Stakeholder 3 lives and is involved in different green programs that help sustain the Silvermine wetlands. As residence members in the area, their concern has been to ensure that no natural disaster that could be prevented occurs in the area as it will affect them and their neighbours' livelihood.

Contributions towards maintenance and development of the river

As a group of friends Riverine Rovers makes use of personal funds and donation to hire a green warden. This is a man that was previously hired by the alien's invasive species unite. When his contract ran out, the Riverine Rovers hired them himself and they are the only ones paying him to keep the area clean.

> *…and our group the friends group, we got a man down there. That was employed by the alien invasive species unite. And he works as a green warden, once a week….* **[Stakeholder 3]**

The Riverine Rovers group is community based and self-funded, however it does a lot to create jobs for individuals who are hired to maintain and manage areas around the river. The part near towards the end of the river is maintain fully through the efforts of the Riverine Rovers members

River management

Stakeholder 3 felt like the Silvermine river maintenance is mismanaged by previous council, who failed to maintain the ditch or bed system that assisted in preventing future floods. They also felt that the homeless people using the lower part of the river for sanitation purposes have polluted the river water, and they feel that the homeless people are the reason why some animals such as the otters do not come to the area anymore. There is a lot of pollutions, often the litter gets caught up in the river and that also cause a problem for the river flow.

Homeless

Knowledge of Silvermine river

b. Drought

Stakeholder 4 revealed how the homeless who stay near where the Silvermine River exists into the ocean, have not really experienced any drought in the area.

> *…mismanaged no, can't be cause this water is running straight. The water is running straight to the sea water…* **[Stakeholder 4]**

Stakeholder 4 mentions how the water continues to flow and that if the flow slows down from where the river starts. This is probably due to a blockage where the golf club uses the water to up keep the golf club.

> *…the block stopping is there by the golf club, because they is also taking from this water. To fill up they dams to run the Golf club.* **[Stakeholder 4]**

The claim here was that any mention that the water flow to the river has been blocked up, is a lie. Stakeholder 4 says that the river continues to flow frequently even with little rain, and that when the river flow is slowed down, it is mainly because the flow is being restricted near the golf club. The blockage will be there.

River relations

Stakeholder 4 spoke on how the water that runs from the river, that is found near the ocean is not drinkable. However, often some Xhosa people come to the area to collect the water. The suggested use of the water here is unknown but stakeholder 4. The belief is that the water is valuable to sangomas.

> *…most of the African people they come to the beach here, they experience their things. Sangomas, they work here, they send their people maybe to take some water, they go there, I don't know what the meaning of that…* **[Stakeholder 4]**

During the interview it was established that most homeless do not drink, bath or wash their clothes in the river and when they need to make use of toilets, there are government toilets nearby. The issue was that there are usually reports made by nearby resident members whenever it is seen that the area is being polluted by homeless people, therefore is becomes difficult to do such activities.

Contributions towards maintenance and development of the river

Some of the homeless people are tasked by the city to clean up area near the beach and ensure the protection of those who visit the beach. Some of this homeless people are given such tasks as a rehabilitation program, for it was identified that some are ex-convicts.

> *…most of the guys here was ex-prisoners. Who was sent into the society to give another second chance in life.* **[Stakeholder 4]**

River management

Stakeholder 4 suggested that he is unaware of any mismanagement that is occurring in the area in relation to the Silvermine river. The role of some of the homeless has been to assist in keeping the area by the beach clean and ensuring residents safety. Stakeholder 4 acknowledge however that not all homeless do this. These are the ones that get reported and are often kicked out of the area. As the homeless they do their part at the bottom of the river to ensure that the river is free of litter and pollution by cleaning the beaches. They are tasked and paid by the city and this is how they can earn a living.

Table 5. Themes based on categories

Category	Theme
• Knowledge of Silvermine river	• **Flooding** • **Drought**
• River relations	• **Business maintenance** • **Nature protection** • **Spiritual/traditional**
• Contributions towards maintenance and development of the river	• **Cleaning** • **Funding**
• River management	• **Mismanagement** • **Pollution** • **Uncooperative** • **Assistance**

Discussion/Findings

Knowledge of Silvermine river

From the stakeholders interviewed, which includes Riverine Rovers members, Stormwater representative, Clovelly Golf club groundsman and a homeless representative; the shared knowledge surrounding the Silvermine river was consistent. Most stakeholders knew where about the river starts, flows through and where it exits into the ocean. The inconsistencies in knowledge surface when certain stakeholders are unaware or misinformed about actual natural scientific occurrences in the area. This causes some stakeholders to place the blame of certain shortcoming with regards to the river governance of the Silvermine River on other stakeholders.

River relations

Each stakeholder makes use of their river for their own needs. However, some stakeholders argue that not all who make use of the river, contribute towards its maintenance and substance, and are therefore a liability to the river. Again, this is where misinformation is spread about one stakeholder on another (be it true or not) and what this simply does is create a case of every stakeholder for themselves. This doesn't help when there is a large emergency such as the previous flood that occurred in the Fish Hoek area. That saw different stakeholders all working together since the flood affected everyone. If stakeholders spread misinformation about one another in relation to the governance of the Silvermine River, there seemingly results in lack of unity amongst stakeholders.

Contributions towards maintenance and development of the river

Each stakeholder had a fair amount of contribution towards the maintenance and sustainability of the Silvermine river, however some stakeholder contribution was able to not only ensure environmental but also social development in the area. Whilst other stakeholders seemed to only contribute to the maintenance and sustainability of the river if it suits their own needs. Where funding became a problem, this would be the only time stakeholders come together to try and resolve an issue e.g. siltation issue, in the areas in which the river flows. It

is also clear that certain managerial initiatives to maintain and sustain the river are only done within the best interest of the stakeholders and not others per say

River management

There is an indication of water pollution within the Silvermine River and Silvermine wetlands. Freshwater shortage is on the increase in the City of Cape Town. Coordination among the water conservation stakeholders as well as water managers is lacking. This has resulted in increased siltation as well as water pollution within the Silvermine river and wetland area. There is also an indication of financial shortage and budget constraints in as far as water management is concerned in the City of Cape Town.

Conclusions

The major thrust of this report was to get a comprehensive picture of how environmental governance and engagement influences sustainable livelihoods. The paper focused on the Silvermine Wetlands between Clovelly and Fish Hoek. Several stakeholders benefit from the Silvermine River, among them the City's municipality, the local golf club operators as well as the residents. These stakeholders have differing responsibilities towards the management and maintenance of the Silvermine River. This report was thus aimed at analysing the extent to which several stakeholders engaged with and governed the Silvermine River and its ecosystem while simultaneously ensuring that it enhances social and environmental development in the Fish Hoek and Clovelly area.

The analysis made in this report covers a gap in literature on how different stakeholders work together to maintain, sustain and manage the Silvermine River. The analysis also indicates how conflict of interest may result in the mismanagement of the river and other natural resources within the Silvermine wetlands.

To get a clear understanding of the issues at play here, a sample population was purposively selected to generate enough data with respect to the main phenomenon being studied. Four stakeholders were then interviewed. The researchers employed a phenomenological approach in a bid to come up with data rich in validity and reliability. The data was then analysed to show how each of the stakeholders contributed towards

maintenance and development of the Silvermine river and governance issues related to the Silvermine river.

Carolan (2005) states the need to understand multiple meanings of the concept of nature. Nature, in the context of environmental action, can refer to the object of nature's protection. Such as protection of wild animals, plants and landscapes as it is experienced and dealt with in everyday life. Understanding that nature is important to human bodies and humans are important for natures sustenance.

This report concludes that the lower Silvermine Wetland is prone to flooding. The flooding of the Silvermine Wetland would directly result in the flooding of the nearby residential areas of Fish Hoek and Clovelly. This flooding would disturb the operations and livelihoods of the residents nearby. The study also concludes that monitoring of water flow by channelling the flow of water through water tunnels so as to ensure that most of the water enters through the tunnels at the lower Silvermine River should be intensified. This means that the excess water will submerge in the wetland and gabion ponds and the impact of the flooding at the lower end of the river is minimised. This is particularly important to save life and sources of livelihoods as it is an effective Disaster Risk Reduction strategy.

Balzer (2016) suggests that all stakeholders should participate in active water management, a need to strengthen the leadership role of Government and governance functions. There is also a need for additional water resource development, inter-basin transfers and regional bulk water distribution infrastructure. Competition for scarce water resources is increasing across all water uses sectors, which are, agriculture, industry, power generation, mining, commercial, domestic and environment. Policy recommendations include Shift from surface water-centred to a more diverse water supply portfolio approach that better utilizes the existing natural and physical infrastructure. An upscale effort to implement Water Sensitive Urban Design into new city-wide development projects is also recommended. There is also a need to work collaboratively with diverse stakeholders to address ongoing social challenges while adapting to a more water sensitive city. There is a need to deal with these challenges, which the municipal officials acknowledge are a national challenge

Political objectives and actors are one of the major questions related to political ecology, seen in the Silvermine River case. "Material characteristics of non-human nature and its components impinge upon the world of human struggles and are entwined within them, and so are inevitably political" Robbins (2012, [online]). People, institutions,

communities, and nations assemble and participate in the networks that emerge, leveraging power and influence, just as non-human organisms and communities do. This is why there is a need to avoid governance that is dominating. In other words, governance by humans that is detrimental to the conservation of the of the environment. In this case the Silvermine River. There is need to conserve and control stakeholder engagement in river management.

It is conclusive that the Silvermine River be dredged. Siltation from the Stormwater drain must be lessened by deepening the mouth of the storm water drains. The study also concludes that there is a need to excavate and dredge from two gabion ponds towards the end of the river, to ensure the flow of water into ocean and to lessen flooding. Financial resources are not sufficient enough to maintain and develop the lower Silvermine River. The budget allocation towards river management being extended to the Cape Town City municipality is insufficient. The current budget for Stormwater has been cut down due to the drought, with resources being diverted to the desalination plant in the city. The Stormwater Department has the oversight mandate to all the wetlands in the South Peninsula of Cape Town. While the Stormwater department plays an oversight role there is a close connection between the part of the river that passes through the Clovelly golf club and the golf club environmental jurisdiction. The operators of the golf club draw water from the river as it passes through the reservoirs which they constructed within the river channel. This allows the river to feed in and out the reservoirs as it flows downstream to the Silvermine wetlands.

Siltation in the river course is one of the major drivers of flooding in the Silvermine Wetland area. The original bed that was meant to spread water to different areas is now full of vegetation which slows down the flow of the river water. Siltation is easily deposited in the area due to the low velocity. There is reason to believe that the previous councils have failed to sustainable manage the Silvermine Wetland and subsequently the Silvermine River. The previous council failed to maintain the ditch or bed system that assisted in preventing future floods. It has been reported that the homeless people living close by to the Silvermine River have also been polluting the river water. Evidently resulting in animal life that was being supported by the river such as otters have migrated leading to a disturbance in the ecosystem.

There is a critical need for collective governance of the Silvermine River from all stakeholders involved. All stakeholder have to realise the following: firstly, there is a need to facilitate a differentiated but cohering discussion of natural and social phenomena. Secondly,

to addresses both descriptive and emancipatory concerns. Thirdly, to address the complex relationship between world and word or ideational and material aspects of reality. In other words, conducting research for better insight to understanding a issue/event, rather than just spreading rumours. Lastly, to recognises depth of subjectivity. If all these aspects are put into consideration there is bound to be a working network between various stakeholders within the Silvermine context that realise what issues they are and how to govern these issues adequately.

In this report it has been noted that coordination among the water conservation stakeholders as well as water managers is lacking. This has resulted in increased siltation as well as water pollution within the Silvermine River and wetland area. The river water is polluted to the extent that it cannot be used for any domestic purposes. There is lack of coordination from all the stakeholders benefiting from the Silvermine River. This is a clear indication of the conflict between the humans and the natural ecosystem. Although the people are benefiting directly from the river, little is being done to protect the river and the life and vegetation it supports. The authorities, the local residents and the corporate world are all turning a blind eye to the deteriorating conditions within the river.

According to Ostrom (1990) there are condition that helps to account for the success of institutions in sustaining the Common Pool Resources (CPR), such as the need to monitor and engage stakeholders. In this case, stakeholders should all come together and have a collective arrangement on the engagement and governance of the Silvermine River, since it is a CPR. It helps in facilitating a sense of affiliation to nature since its benefitting everyone involved. The failure by the stakeholders to coordinate and support the life of the Silvermine River is a cause for concern, and efforts should be put towards making this a national issue. Advocacy should be of paramount importance here as the river is being suffocated whilst little is being done to support its life. This river is a source of environmental, social, economic and even political livelihood and, yet little is being done to guarantee its relationship with the stakeholders continues into distant future. Although there are indications each stakeholder had a fair amount of contribution towards the maintenance and sustainability of the Silvermine River more must be done to create an environment where the river survives without any disturbances.

The social, economic and ecological linkages need to be understood since they are implicated in environmental change. Sustainability has become part of the global world. It’s

imperative, meeting our needs in ways that do not undermine the ability of either ourselves or other people to do the same, now or in the future. Hence River management, relations, maintenance and development of the Silvermine river is pertinent for the future generation. Lockie (2015) asserts that "Legal management of natural resources and meaningful action to address poverty and other forms of inequality need to be accepted as being in the long-term self-interest of communities, businesses and institutions" Conclusively some stakeholders' contributions are sufficient enough to bring about social and economic development. It is however prudent to state that stakeholders come together to resolve maintenance issues relating to the Silvermine River It is also clear that certain managerial initiative to maintain and sustain the river are only done within the best interest of the stakeholders and not others per say. Which has proven to be a problem.

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