Investigation into the improvement of payment for water services within Siyanda Township area of eThekwini

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Background

South Africa is a water scarce country, and water scarcity has led the country to also strengthen its focus on water demand management. One of the potential outcomes of water demand management is a greater return on investment through water loss control and water use efficiency. South Africa loses billions of Rands per year to non-revenue water, and still has a relatively high capita of water use. In low-income areas, apparent losses are more noticeable through high non-payment for water services, and water theft through illegal connections to fire hydrants or meter tampering.

Project description

In this project the water billing data will be data mined for trends in consumption and interrelationships between consumption and arrears. A questionnaire will be used to assess customer satisfaction to understand the problem and develop suitable interventions.

Key questions for this project:
- Are customers satisfied with the service they have been receiving?
- How effective is the Debt Relief Programme and flow limiters in mitigating non-payment for water services?
- How can analyzing the billing data help understand the problem of non-payment in this community?
- From gaining further understanding of the problem, then what suitable interventions could be developed to significantly improve payment for water services?

To successfully address the problem of non-payment will definitely lead to greater revenue generation, increased water conservation, and greater understanding of demand management.

Methodology

The order of work is to do data mining on the water billing data, and some of those insights discovered may help structure a questionnaire to assess customer satisfaction and awareness. After this, suitable interventions could be developed. The project will also test nudge experiments in the community.
- Data mining:
  - Conditioning data and doing consistency checks in Microsoft Excel and Access. Most analyses and graphing will be done in the statistical program R.
- Questionnaire:
  - Questionnaires will be quantitative in nature, and administered face to face.
  - Quota design (convenience sampling)
- Nudge experiments:
  - Randomized field experiments over a three month period, treatment groups are mailed letters.
  - Target people who have not been paying their water bills, and measure response (i.e. bill collection).

Consumption (kL/day)	Arrears (Rands)	Flow limiter	Disconnection status
0,125	0		9
0,375	2477,06		3
0	1597,16	I	0
0,25	0,96		0
0,438	0	I	9
0,313	457,39		3
0,313	179,39	I	9
0,375	1811,37	I	9
0,375	358,52		3
0,313	0		0

Figure 4: Sample of MS Access water billing data for August 2014.

Motivation

Siyanda Township is a low income area about 20 km away from Durban CBD. The houses were provided with a semi-pressure water supply (roof-tank) and waterborne sanitation. Like most low-income areas, Siyanda Township has a high level of non-payment for water services leading to tens of millions of Rand being owed to the eThekwini Water and Sanitation (EWS). Durban falls under the eThekwini Municipality.
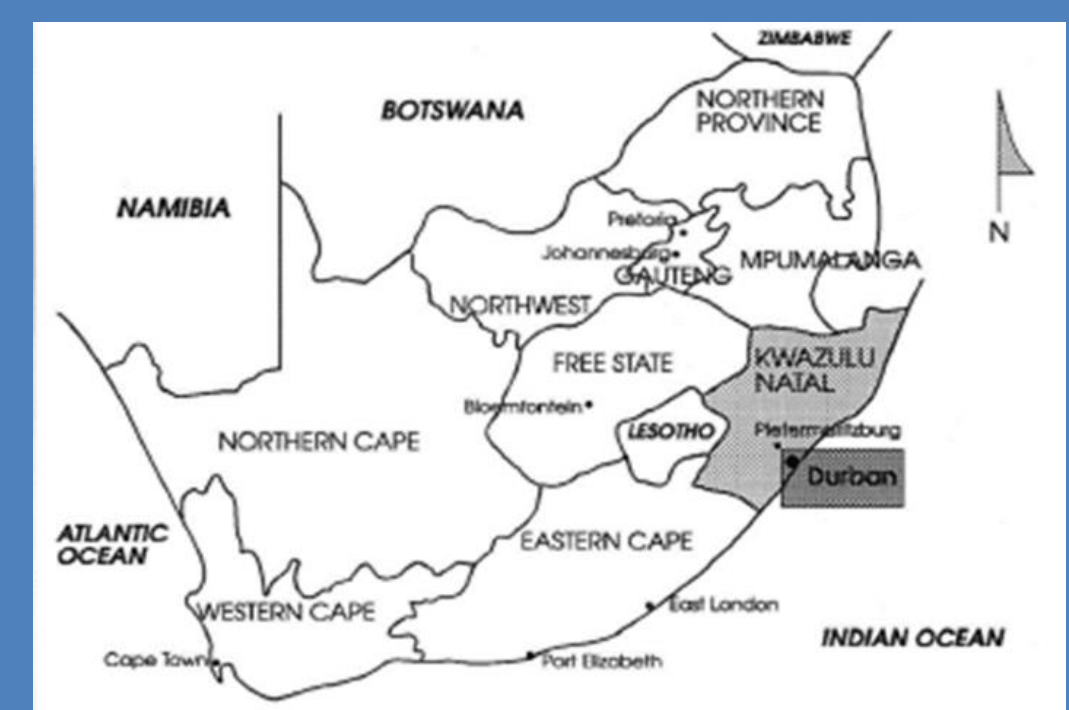

Figure 1: Roof tank option (Sansom, 2004).   Figure 2: Locality of Durban (Van Horen, 1996).

The EWS offers customers flow limiters (devices that limits water to certain amounts) to be able to manage their water consumption. Customers who struggle with their water arrears and finances can opt into the Debt Relief Programme to work with the utility in settling their water arears.
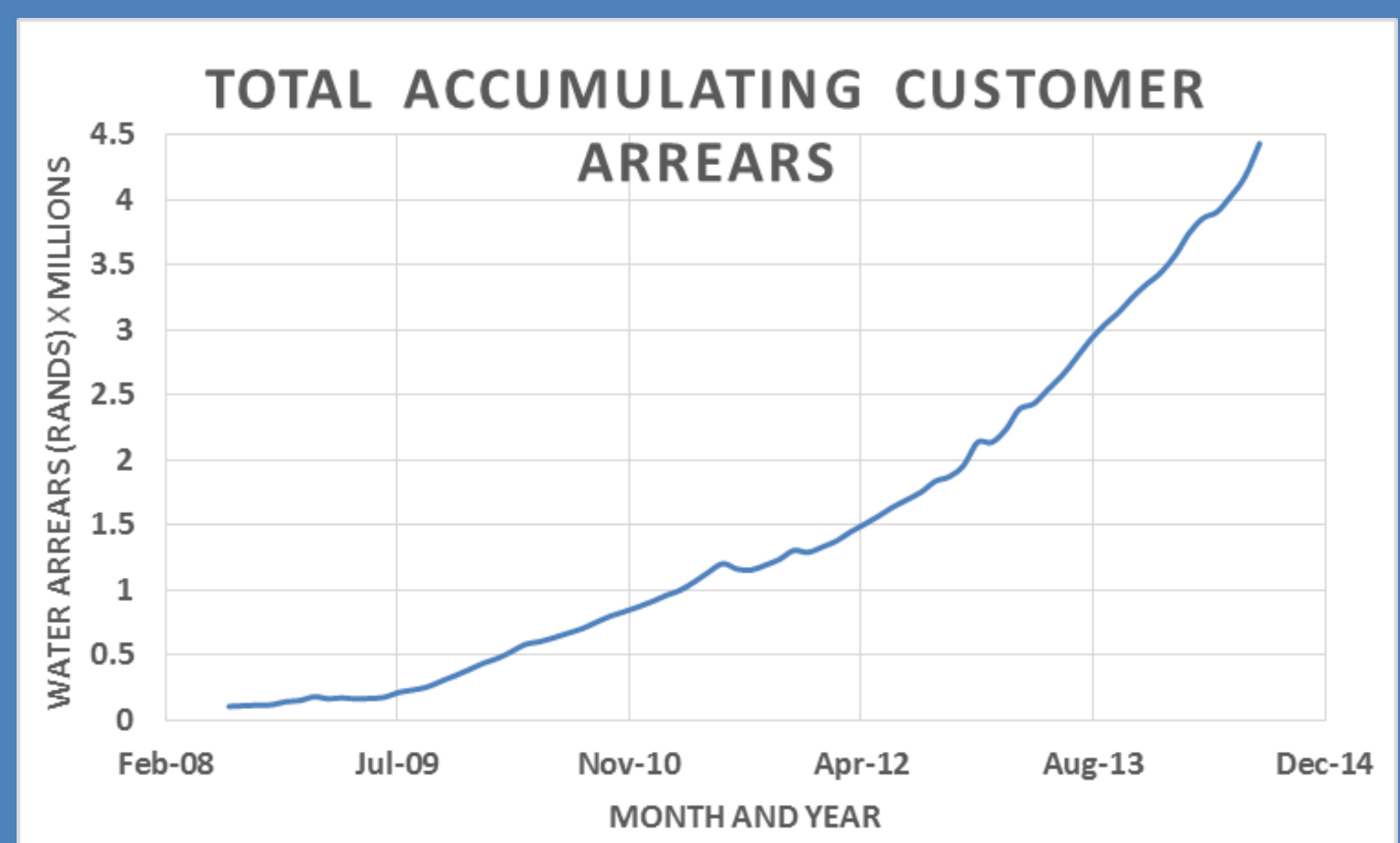

Figure 3: Total accumulating arrears from July 2008 to August 2014.

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References

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