

# An investigation into the enforcement and compliance of wastewater regulation in Zimbabwe

Cassian Mandizvidza, Scott Ncube, Khulumani Sibanda

**Abstract**— The aim of this research was to assess the level of compliance among the regulated polluters and also the effectiveness of enforcement by the regulating authority culminating in the identification of the factors which positively affect compliance and enforcement as well as the factors which negatively affect compliance and enforcement. The Table of the Eleven methodology was employed. Two questionnaires which were mirror images of each other and based on the Table of Eleven questions were administered to ten agents from the target group (industries) and to nine enforcement agents from the Environmental Management Agency and the local authority. Field observations were also done in which the researcher was a non-participant observer. The iT-11 version was then used to process the data and two outputs were produced which are compliance profile and compliance estimates. The compliance profile results showed the factors strongly encouraging compliance, weakly encouraging compliance, strongly encouraging violation and strongly encouraging violation. The compliance estimates showed the different categories in which the target group can be placed. The level of compliance was found to be low-40% (Target group perspective). The general lack of acceptance of the policy objectives was found to be the major factor hindering compliance. To improve the situation this research recommended the introduction of subsidies and incentives to the target group, enhancing stakeholder participation in policy formulation, making sanctions more deterrent and improving the access to technology on cleaner production.

**Index Terms**— Waste water, Management, Enforcement, Compliance, Regulation, Effluent, Khami catchment, Sewage Treatment Works.

## 1 INTRODUCTION

THE Zimbabwean government places great importance on protecting the environment and its people from contaminated water. However this is being undone by the constant discharge of untreated wastewater mainly in urban areas and their peripherals. The discharge of untreated wastewater has actually reached unprecedented levels in Zimbabwe for the years following economic meltdown that has been going on since the beginning of the past decade. This has led to “water supply problems, unpleasant odors and taste in tap water, death of fish, and increased growth of weeds, as well as the escalation of water borne diseases, such as diarrhea, cholera, and dysentery [1].” Although there have been cholera outbreaks reported in the past, the 2008 outbreak was alarming with over 4 200 people having lost their lives through the disease and over 10 000 people getting the infection [2]. Dilapidated infrastructure has been a problem as the country is struggling not only to replace it but also to maintain it. Part of the problem is associated with enforcement issues of the Zimbabwe Water Act (2000) and compliance by effluent contributors, the largest being the industries.

The aim of this research is therefore, to assess the level of compliance among the regulated polluters, their response to legislation with particular reference to part 3 and 4 of the Environmental Management (Effluent and solid waste Disposal) Regulations, (2007), and find out how the attitude of different polluters towards this Act have an effect on the future of the water resources.

## 2 STUDY AREA AND BACKGROUND

The study area of this research focused on the Khami catchment in which the Khami dam is located. It is 20km to the

west of the city of Bulawayo. Khami dam was commissioned in 1928 to impound water to supply the city of Bulawayo for domestic and industrial purposes. Its water storage capacity was increased to 3.437 cubic meters after it was upgraded in 1933. Khami dam was decommissioned in 1988 because the quality of raw water had deteriorated tremendously [3]. Up to date the works are still out of commission. All signs of nutrient enrichment are evident, the surface water looks green and sometimes resembles thick pea soup. Khami dam receives effluent from the Southern Area Sewage Treatment Works (SASTW) which treats sewage generated from residential areas and wastewater from industrial areas. The reservoir also receives flows from Khami River which in turn receives highly polluted water from Phekiwe and Kwelameva rivers as well as from other smaller streams [3]. The streams originate within an industrial site. Phekiwe River’s drainage area is dotted with many industries. In the city of Bulawayo and Zimbabwe in general most of the industrial waste water is discharged into the city sewer line where the quality is regulated by the local authority before discharging it into the natural environment. The Environmental Management Agency (EMA) regulates both the local authority and other waste generators not connected to the sewer line. According to [3] the causes of pollution that led to the decommissioning of the Khami dam were the discharge of poor quality effluent from the Southern Areas Sewage Treatment Works (SASTW), the urbanization and industrial activities and the storm water runoff. What actually exacerbated the situation was lack of enforcement of existing wastewater management regulations. As things stand, the amount of effluent being discharged to the dam is increasing day and night.

### 3 APPROACH

In this research qualitative methodology was employed applying the Table of Eleven. The Table of Eleven is a model developed in the field of behavioral sciences by the Dutch Ministry of Justice [4]. It is comprised of eleven dimensions, five of which cater for issues related to compliance while the remaining six cater for enforcement issues. The Table of the Eleven is very flexible hence its application in different ways such as the evaluation of enforcement and formal analysis of the enforcement activities and improvement of the quality of legislation in its developmental stages [4].

Spontaneous compliance factors relate to those factors which refer to why a target group would still comply even in the absence of enforcement by authorities.

#### 1) Knowledge of rules

- a) Familiarity with rules
- b) Clarity of rules

*Explanation:* Not having a good knowledge of the rules will result in people violating them without the intention to do so. When the legislation is not clear enough mistakes may be made.

#### 2) Costs/ Benefits

- a) Financial/ economic costs and benefits
- b) Intangible costs and benefits

*Explanation:* This has to do with the advantages and disadvantages which are financial/economic and intangible on the compliance behavior. Their expression can be in terms of time, money and effort. There are four different classes which are cost of compliance, cost of violation, benefit compliance and benefit violation.

#### 3) Extent of acceptance

- a) Acceptance of the policy objectives
- b) Acceptance of the effects of a policy in the regulated community

*Explanation:* The degree of acceptance of the policy intended by the government has got to do with how fair and sensible it is as well as the standards arising from it. Acceptance may also relate to the possible effects the rule is likely to have in general or to one's own specific situation. The way the policy is implemented may also play a role.

#### 4) The target group's respect for authority

- a) Official authority
- b) Competing authority

*Explanation:* Some people just follow the instructions from the government; they just abide by the law. This sub-dimension has to do with the target group's respect for authority in general. The respect for authority is sometimes linked to authority of the implementing or enforcement body. This sub-dimension Competing authority does not deal with the target group's

government's intentions.

#### 5) Non-official control (social control)

- a) Social control
- b) Horizontal supervision

*Explanation:* The formal kind of control by the target group or professional group of their own members when it comes to non-governmental control is called horizontal supervision. Non-governmental control can also be informal control in respect with the standards set. Social control also takes place by the community, inside or outside the target group: relatives, friends, colleagues, internal or external auditors, nearby companies, competitors.

Enforcement dimensions highlight the sanctioning of the policy and also the risk of the target group being caught during inspections.

#### 6) Risk of being reported

*Explanation:* This has got to do with a situation whereby violation is exposed, not as a result of government supervision but for example through tipping off, coincidence or complains.

#### 7) Risk of inspection

- a) Records of inspection
- b) Physical inspection

*Explanation:* The risk of inspection is determined by the frequency of inspection of target group members. Knowledge of inspection policy and the visibility of inspection will in practice make the objective risk of inspection differ from the subjective risk of inspection.

#### 8) Risk of detection

- a) Detection in a records inspection
- b) Detection in physical inspection

*Explanation:* The different forms of inspection will lead to the discovery of violation; however this will depend on the kind of violation perpetrated and also the thoroughness of the inspection. In some cases it is easy to discover a violation, while it is difficult to trace the culprit. The ratio between the number of violations detected and the number of violations actually committed gives the objective risk.

#### 9) Selectivity

*Explanation:* This has to do with the degree to which the inspectors manage to inspect those breaking the rules more often than those complying with the rules.

#### 10) Risk of sanction

*Explanation:* It refers to the risk, as estimated by the target group, of a penalty being imposed if an inspection shows that a rule has been violated. A special investigating team, the police, the public administration or the court may impose a penalty upon detecting a violation.

#### 11) Severity of the sanction

*Explanation:* The harshness of the penalty concerns the duration of the detention, the amount of penalty or the effort needed to repair the damage done. The loss of respect/reputation as a result of being found on the wrong side of the justice system is an additional intangible disadvantage of the sanctioning process.

## 4 RESULTS AND ANALYSIS

### 4.1 Results from enforcement officials and Industries

Figure 1 and Figure 2 show percentage responses to the table

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- C. Mandizwidza holds a masters in Environmental science degree.
  - S. Ncube holds a masters in Environmental Science degree
  - K. Sibanda holds a PhD in Computer Science and his research interests include Intelligent Systems, Indigenous Knowledge, ICT for development and Internet of Things: [khulumani.sibanda@gmail.com](mailto:khulumani.sibanda@gmail.com)

attitude towards respect for the official authority, but with respect for their own standards or values, which may relate to their religion or habits. These may not be agreeable with the

of 11 dimensions by the Industries and enforcers respectively.

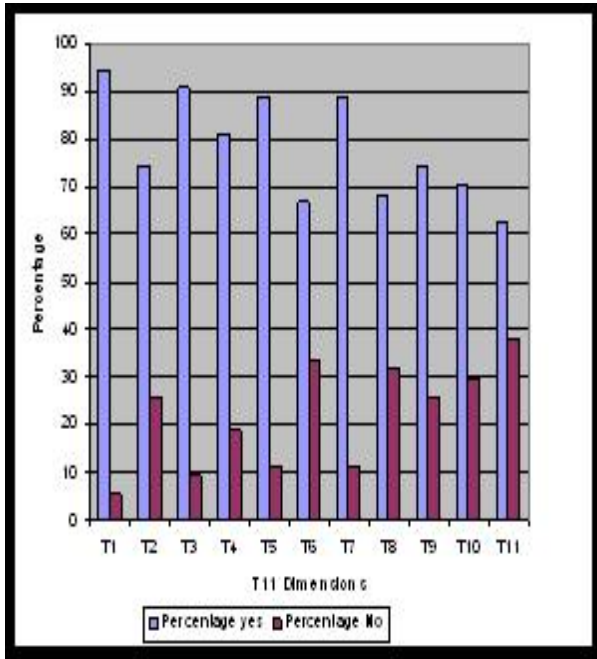


Figure 2: Percentage responses to T11 Dimension for the Industries

### 4.2 COMPLIANCE PROFILE: ENFORCER'S PERSPECTIVE

Figure 3: Compliance profile: Enforcer's perspective

Figure 3 represents the motives for compliance test was carried out a compliance profile which reflects the view of the enforcers concerning the behavior of the target group was produced.

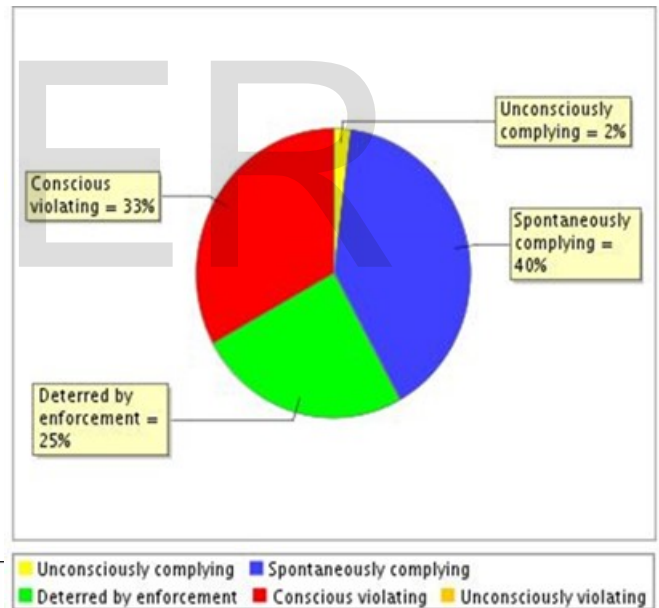
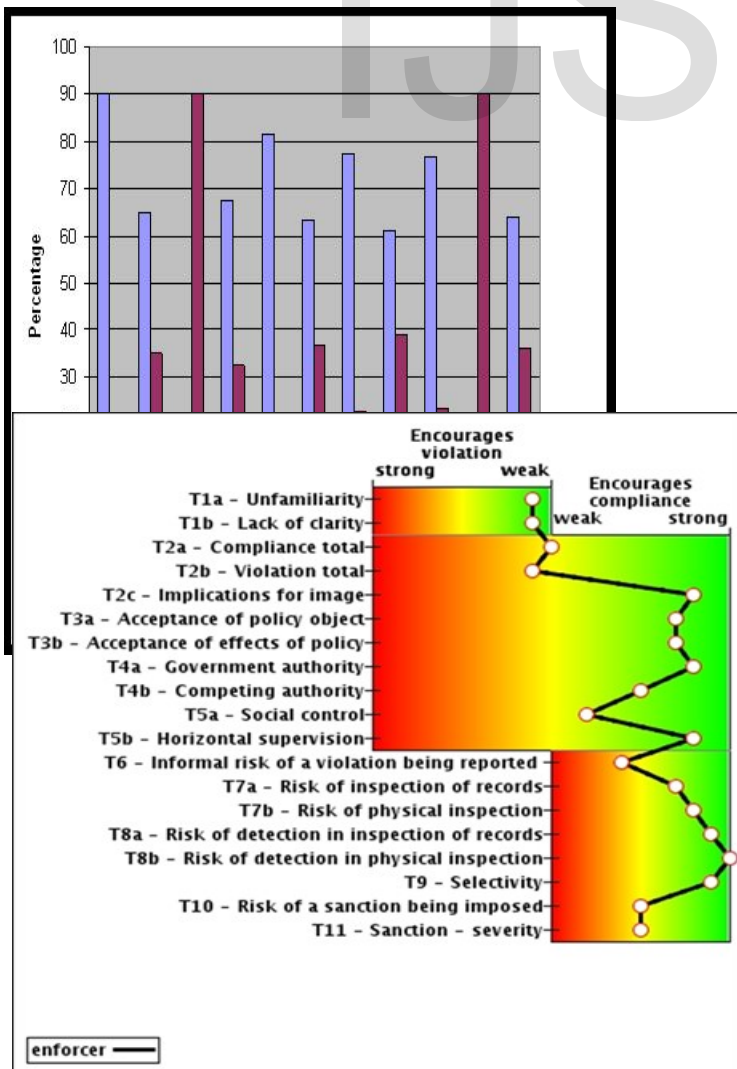


Figure 1: Percentage responses to T11 Dimension for the Enforcers

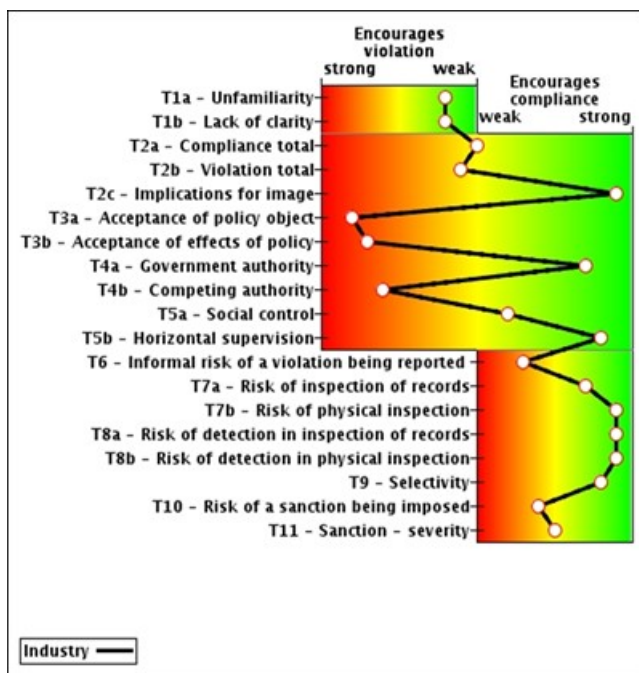


**Figure 4: Compliance estimate: Enforcer’s perspective**

The compliance estimate tool of the Table of Eleven was used to categorize the target group according to their compliance or non-compliance behavior. This was done by making use of the results of the questions asked to the enforcers and finally figure 4 was produced. The categories obtained are the spontaneously complying, deterred by enforcement, unconsciously complying and consciously violating. The large and well established companies were said to be making up a larger portion of the spontaneously complying category owing to the huge investments made in setting up the on-site pre-treatment plants compared to the smaller industries. This category constitutes 40% of the Industries. The ‘new players’ as they were referred to by some of the enforcers are the small Industries which have not accumulated much money to really invest in pre-treatment of the waste however they are putting effort because of fear (deterred by enforcement). They constitute the largest portion of the category of those deterred by enforcement which is 25%. Some small Industries which are sprouting are ‘trying their luck’ as they were referred to by some enforcers, they do not have their own buildings, they are renting. They consciously violate the wastewater disposal legislation. They are not willing to build the pre-treatment plants, they constitute the bulk part of the category of those who consciously violate (33%) compared to the larger industries. These results are just estimates made by the enforcers interviewed using their own experience so they are not objective results.

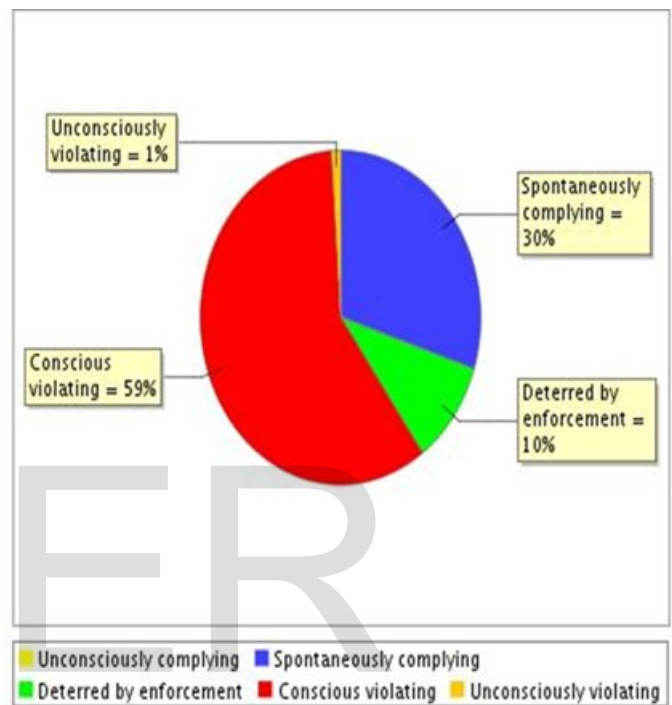
**4.3 Compliance profile: The target group (Industries)**

The motives for compliance test was carried out and it produced a compliance profile that shows the views of the target group (Figure 5).



**Figure 5: Compliance profile: Industry perspective**

**4.4 Compliance estimate; Target group’s perspective**



**Figure 6: Compliance estimate: Target group’s perspective**

The Compliance estimate tool of the Table of eleven was used to categorize the target group according to their compliance or non-compliance behavior. This was done by making use of the results of the questions asked to the target group. A chart was produced (Figure 6). The categories which were produced are: Spontaneously complying, Deterred by enforcement, Conscious violating and unconsciously violating. The small industries constitute a larger portion of the category that consciously violates the legislation compared to the large industries. The bigger industries constitute a larger portion of the category that spontaneously complies with the legislation compared to the smaller industries. The smaller companies constitute the bulk part of those who are deterred by enforcement compared to the larger industries. The results are just estimates of the target group that was interviewed, they are not objective.

**4.5 Comparison of the compliance profiles**

The compliance profiles of the enforcer and the target groups were superimposed and a comparative compliance profile was produced (Figure 7).

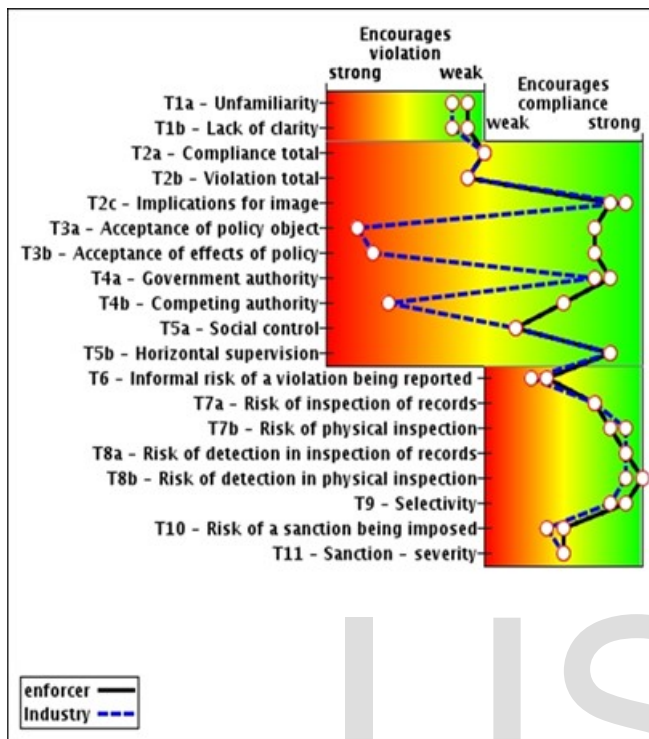


Figure 7: Comparison of compliance profiles

According to the comparative compliance profile there most noticeable discrepancies are in the sub-dimensions T3a, T3b and T4b. The target group is of the view that the sub-dimensions which are acceptance of policy objective (T3a), acceptance of effects of policy and competing authority (T4b) are encouraging strong violation of the wastewater disposal legislation whereas the enforcers are of the view that the sub-dimensions T3a and T3b encourage strong compliance and T4b encourage weak compliance. According to the enforcers there are no dimensions which encourage strong violation. The other difference is that in the target group's perspective sub-dimension of risk of a sanction being imposed (T10) is encouraging weak compliance where as in the enforcer's perspective it is in the neutral zone. The researcher's opinion is that the target group's views reflect the reality because of the high level of pollution going on.

## 5 DISCUSSION

According to the target group's perspective the dimensions which are encouraging strong violation are: Acceptance of policy objective (T3a), Acceptance of effects of policy (T3b) and competing authority (T4b).

The majority of the respondents, mainly from the small industries (90%) do not regard the policy (and the principles based on it) as reasonable and also they do not share responsibility for putting the policy into practice. They feel that they

were left out when the policy was put into place. The minority who regard the policy as reasonable (10%) are mainly from the bigger industries which have got the power to influence the law makers. The researcher also believes that this is a major reason why policies are not accepted. Target groups are more likely to adapt their practices in line with a policy when they have been involved in its formulation (upstream engagement). The regulated community should not be treated as passive targets but as active partners in the process of change. When there is stakeholder participation the policy tends to get legitimacy and support that help to cast away any resentment by the regulated community. When a top down approach is adopted there will be considerable amount of resentment among the target audience which will seriously undermine levels of compliance [5, 6]. The other reasons for non-acceptance of the policy which were mentioned by the industries are the economic motives and practicability. It is only the requirements that are economically and technically feasible that are enforceable in the long run [7].

The majority of the respondents (90%) do not regard the way the policy objective is being put into practice as acceptable. They believe that it is a burden on a developing country. It is important to ensure that the relevant skills, resources and capacities are available for organizations to take on the additional duties that come with a new policy initiative. When this is not considered, less fruits will be enjoyed from such a policy. In this case some skills on cleaner production technology were not taught so they are lacking in the industries. A similar situation happened in the United Kingdom when capacity and skills were not considered in the development of the Framework for Sustainable Development in the Government Estate, and so it did not work out as expected and one policy officer who was interviewed described it as having lacked the 'teeth' to seriously improve the environmental performance of each Government department [5]. The policy is also said to have lacked a substantial incentivising instrument. These aspects appear not to have been considered in the formulation of the wastewater disposal legislation of Zimbabwe.

The values of the target group as an Institution are not in line with the effluent disposal legislation according to 80% of the respondents and this is attributed to the fact that the Industries only focus on making profit and consider pre-treatment of wastewater as a side job. Most of the Industries do have the SHE-Officers who should steer the company along the lines of waste minimization and pre-treatment of wastewater but this does not appear to be happening. There could be some resistance from the management. Non-acceptance of the policy itself could also be another contributing factor. There is need for the companies to change their culture. Corporate Environmental Responsibility (CER) needs to be integrated into the management and decision making structures of the companies. It must be supported at the Board and /or Chief Executive Officer (CEO) level, and remuneration and bonus packages for CEOs and Directors must be based on an assessment of their performance in making their companies more ecologically sustainable [8].

According to the enforcers' perspective the target group accepts the policy objective as well as the effects of the policy. They also believe that the values of the target group as an In-

stitution are in line with the effluent disposal legislation. The researcher does not believe that the enforcer is being honest on this aspect given that wastewater is seen flowing along the streets in some cases. It is the opinion of the researcher that the enforcer is only trying to be defensive, it wants to portray the image that all is well probably due to political reasons.

## 6 CONCLUSION

The level of compliance with the wastewater regulation was assessed and based on the compliance estimates according to both the target group and the enforcer perspectives the following sub groups were revealed:

### 6.1 Target group perspective

- The spontaneously compliant people; those who know the rules and would comply with them off their own accord even if there were no enforcement actions-30%
- The people deterred by enforcement; those who know the rules and who would break them, but rather decide not to do it due to the enforcement activities-10%
- Consciously (calculatingly) non-compliant people; those people who knowingly break the rules and consciously accept the risk of being caught-59%
- Unconsciously non-compliant people; those who break the rules because they do not know the rules well-1%.

Therefore in total, 40% of the industries (target group) are perceived to comply with the regulation whereas 60% do not. This is a very low level of compliance.

### 6.2 Enforcers' perspective

- The spontaneously compliant people; those who know the rules and would comply with them off their own accord even if there were no enforcement activities-40%
- The people deterred by enforcement; those who know the rules and who would break them, but rather decide not to do it due to the enforcement activities-25%
- Consciously (calculatingly) non-compliant people; those people who knowingly break the rules and consciously accept the risk of being caught-33%
- Unconsciously compliant people; those people who do not know the rules very well and who unknowingly comply with them-2%

Therefore in total, 67% of the industries are perceived to comply with the regulation whereas 33% do not according to the enforcers' perspective. This can be viewed as satisfactory compliance. It is the researcher's conclusion that the compliance estimate of the target group's perspective reflects the reality basing on the observations made in the field. Therefore the level of compliance with the wastewater regulation in the Khami catchment is very low.

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