

Effects of Zambia Revenue Authority Non-Intrusive Scanner Machines on Tax Compliance in Zambia: A Case of the Kapiri Mposhi Weigh Bridge

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ABSTRACT

The purpose of this study was to determine the effects of Zambia revenue Authority Non-Intrusive Scanner machines on tax compliance in Zambia-Case study Kapiri Mposhi weigh Bride. It was against this background that this study was conducted to determine the effects of Zambia revenue Authority Non-Intrusive Scanner machines on tax compliance in Zambia-Case study Kapiri Mposhi weigh Bride. The study adopted a descriptive case study design and targeted 110 respondents composed of 10 custom officers and 100 passersby trucks at kapiri weigh bride. The results of the study revealed that out of the 110 respondents from this research, 77 respondents which represented 77% responded that, scanner machines have great impact on revenue collection. The association between non-intrusive scanners and revenue increase was found to be significant with p values ($0.027 < 0.05$). There was also a difference in the revenues collected before and after, and since the revenues collected after the introduction of non-intrusive scanners machines has positive coefficient in relation to the revenues collected before the introduction of non-intrusive scanners machines, it was then concluded that non-intrusive scanners have a positive effect on total revenue collected.

The findings pointed out that non-intrusive scanner machines are effective when there is consistency in their operation while scanner downtime was found to affect revenue collection strongly on the negative way. Despite some inconsistencies the results obtained from this study revealed that many taxpayers want the non-intrusive scanner machines to continue being used as the solution to the delayed traffic at the weigh bridge. It was recommended that the number of scanners to be increased to cover more trucks as well as reducing congestion at the scanning unit and delays.

Keywords: nonintrusive scanners, revenues, tax compliance, zambia revenue authority, quality, impact

I. INTRODUCTION

Tax is defined as economic obligations imposed by the governments on natural and legal persons or citizens (Tuay & Güvenç, 2007). Tax compliance is a major problem for many tax authorities and it is not an easy task to persuade taxpayers to comply with tax requirements even though tax laws are not always precise according to James & Alley (2014). Tax and revenue compliance can be referred to as the process in which revenues returns required to be submitted to the revenue authorities are filed at the appropriate time with the accurate tax liability as required under the tax laws and regulations of a country (Friedman, 2011).

Zambia is facing particular tax performance challenges that need to be addressed urgently (JCTR, 2011). The ratio of tax revenue to Gross Domestic Product (GDP), often used as a basic measure of the performance of a tax system, has been on the decline, from 19.2 percent in 2000 to 15 percent in 2009 (JCTR, 2011). Underlying this overall decline in this performance measure is a slow change in the structure of tax revenue (i.e. the different sources of tax revenue). The recent global recession of 2008/2009 highlighted the dangers of relying on trade taxes. However, the best alternative, that is, reliance on consumption taxes, especially domestic VAT, have been declining in performance. The country, therefore, has continued to rely on income taxes as the major sources of tax revenue. (JCTR, 2011, Taxation System in Zambia,

II. REVIEW OF LITERATURE

Global Perspective of Non-Intrusive Systems

According to a report by the Global Alliance for Customs Performance and World Economic Forum in 2016, developing nations have implemented comprehensive customs reforms that encompass both physical infrastructure as well as

institutional changes. In South Sahara Africa (SSA), hard infrastructure reform is typically associated with improvements such as transportation systems including roads, rails, airports and seaports alongside Information Communication Technology (ICT) integration along with access to reliable power sources. Soft infrastructure has been linked with harmonization of border procedures while taking measures towards elimination of corruption among officials stationed at checkpoints aided through ICT enabled tools. Customs agencies face pressures from different fronts; besides improving performance demands they must also meet compliance necessities efficiently within tight resource constraints which require modernization strategies delivering agility security, transparency using empowering technology instead restrictive approaches.

Non-intrusive imaging through x-ray scanners has advanced in China, but it still faces some challenges. China Customs has implemented centralized image processing (CIP) to tackle these issues including enhancing security access control and trade facilitation as well as addressing manpower resource shortages due to the growth of freight volume and professional requirements for NII scan image analysis since 2010. According to World Customs Organisation (2018), in 2017 alone, China handled over 105 million TEUs of sea cargo and approximately another thirty-four million via land borders which posed operational difficulties related to efficiency clearance enhancements whilst strengthening risk prevention strategies within their operations.

Regional Perspective of Non-Intrusive Systems

Despite experiencing rapid growth in trade over the past decade, intra-African trade has remained sluggish due to limited Customs Performance and industrialization. In order to promote economic growth and alleviate poverty and unemployment across participating nations, it is essential for factor mobility between borders as well as policy coordination. To achieve this objective effectively, member states should initiate a range of measures including promoting common solutions towards enhancing Custom Performance capabilities while enabling seamless movements of goods and individuals through joint programmes among various countries (WTO 2015).

According to Njinkeau, Dominique and Hartmann (2015), customs delays in Africa are caused by the reliance on manual processes for documentation or computerized scanned systems that lack sufficient electricity or repair capacity. The resulting delay increases the probability of traders resorting to "facilitative payments," which refers to bribes paid to customs officials in order to expedite their goods' clearance through border checkpoints.

Local Perspective of Non-Intrusive Systems

In 2018, the Government through the Zambia Revenue authority introduced non-intrusive scanner machines in all borders including Kapiri Mposhi weigh bridge to help reduce the cost of doing business and improve on tax compliance, Statistics as per ZRA Annual reports for 2017 to 2021 show that revenue has tremendously increased in proportion to many scanned trucks and public buses in a day, apart from Kapiri Mposhi where the records are not improving. Statistics in 2019 show that 249 trucks were scanned and 6 discrepancies were recorded without corresponding revenue. However, the information showing on ZRA website on the annual reports from 2017 to 2022 shows the following statistics, In 2021 the government records tremendous increase in revenue of K18, 698,145.62, Nakonde been the highest with total revenue of K14, 569,755.90. We see no movement at Kapiri Mposhi weigh bridge. It is in this vein why the researcher wants to find this gap. In 2019, the government raised, K1, 691,726.88 thrice the total revenue raised the previous year. This showed a tremendous improvement in revenue collections. Nakonde border showing the most raised revenue of K581, 701.53. At this point we see the first ever record of Kapiri Mposhi showing 249 scanned trucks and 6 discrepancies. The ZRA annual report does not show any corresponding revenue for Kapiri Mposhi as the others.

Systems Customs clearance procedures, regulated by recipient country governments, may change over time and can be quite complex. Failure by importers to master local customs clearance procedures, or customs procedures that are themselves prone to breakdowns, may cause long delivery delays, stock shortages, and even stock-outs, (Louis, 2011). The customs authority concentrates on physical inspection and paperwork, in the second, the customs authority works to reduce fraud and maximize revenues, and in the third, the customs authority works to facilitate trade through internal checks, process management and the development of electronic data exchange. According to Akinyi and Mupelwa (2017), a "Single Window" is a paradigm of governance, introduced by the customs department in Zambia, in which traditional structures of government are transformed into new arrangements that best serve the needs of citizens and businesses.

The Single Window is understood as an ideal system, the highest standard of excellence in the area of delivery of public services. As part of the „Single Window“ approach, citizens and businesses receive government services through a single interface. The complex organizational arrangements that go into service delivery are made transparent to the consumers of those services, resulting in increased efficiencies and a reduction in transaction costs. Gitaru (2017) indicates that the Revised Kyoto Convention is the generally accepted reference point for the key principles of customs modernization.

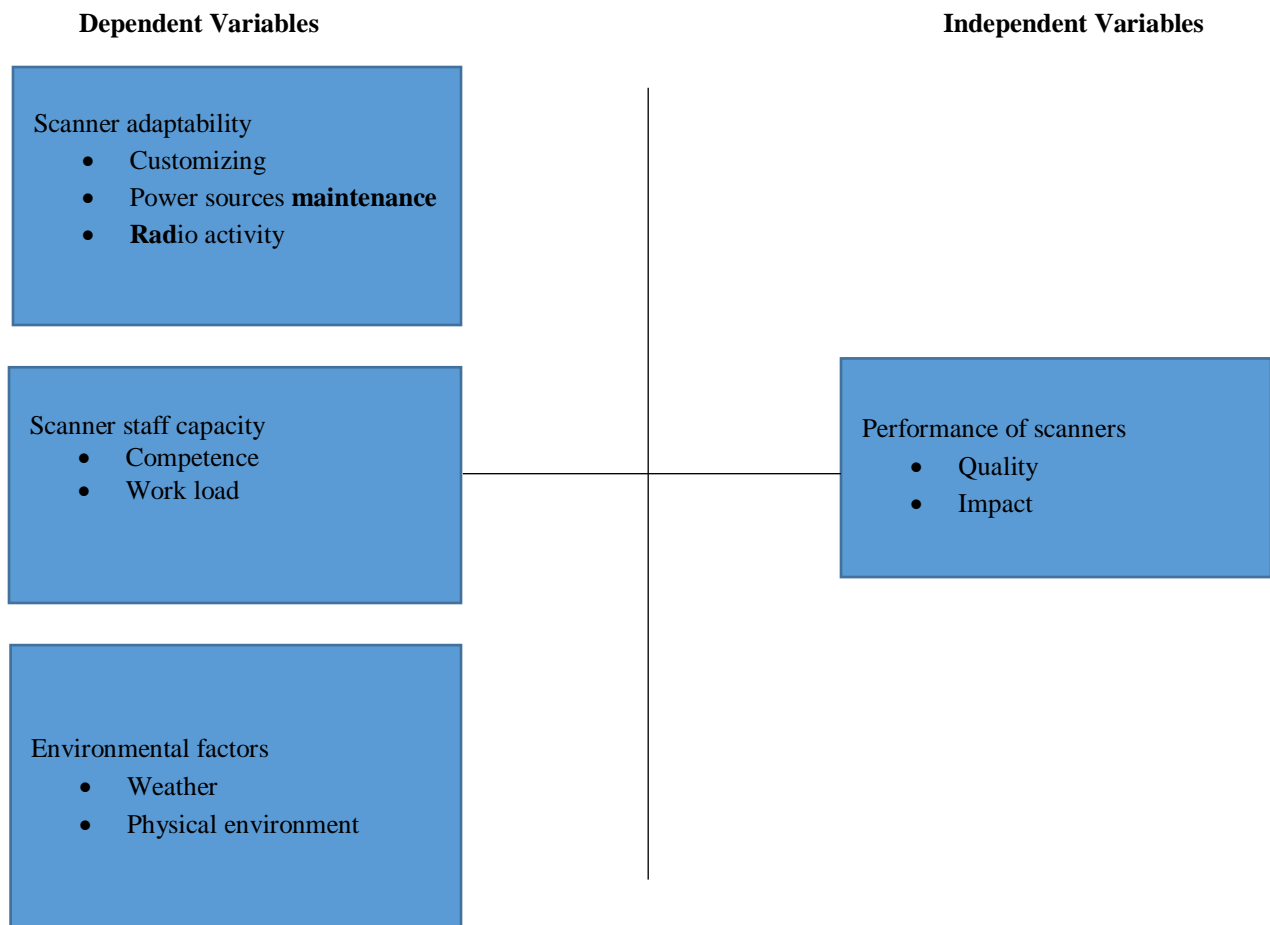
III. THEORETICAL FRAMEWORK

Theoretical Framework

This study was based on two theories which was Human Capital Theory and Technology Acceptance model. Human Capital Theory- This model attributes great importance to education's role in organizational productivity, justifying why organizations invest heavily in their employees through recruitment initiatives aimed at specific skill sets, comprehensive training programs and retention strategies designed to reduce employee turnover (Kozak 2014). Technology Acceptance model -the goal of this model is to explain how external factors influence user acceptance while attempting to understand their behavior regarding perceived utility and usage of the facility. "Perceived usefulness" refers to one's level of trust in a process' ability to improve operations leading towards better outcomes through technological integration, whereas "perceived ease-of-use" measures an individual's belief that integrating technology into a given task will increase ease-of-use for more efficient processes (Nasri & Charfeddine, 2012).

Conceptual Framework

A conceptual framework is a collection of interconnected theories or ideas that explain how a phenomenon operates and its relationship with its parts (Svinicki, 2010). Represented in the form of a diagram, this description helps to visualize hypothetical connections. It provides the foundation for comprehending interconnection causalities or correlations within observations and their interpretations. This research aims to use multiple regression analysis as means of measuring correlation between scanner technology aspects, ICMS systems and cargo tracking system regarding Zambia's customs department performance. Figuratively speaking in figure six; there are four major operational methods utilized by revenue authorities aiming towards enhancing profit gain through effective management. Among these include: Cargo Tracking System(ICMS), Scanner Technology. The efficiency and effectiveness such activities will be evaluated based on actual money collected during border controls' duration times cleared goods take before shipping out from ports. And finally contingent business factors concerning trade facilitation.



The results to the variables above were as stated on the diagram below:-

ZRA Assessment on the Variables

Respondents	Quality	Impact	Competence	Workload	Weather	Physical environment	customising	power
Empl 1	x	✓	x	✓	x	x	✓	✓
Empl 2	✓	x	✓	✓	✓	x	x	x
Empl 3	x	✓	✓	✓	✓	x	x	✓
Empl 4	x	✓	✓	✓	✓	x	x	x
Empl 5	✓	✓	x	✓	x	x	x	✓
Empl 6	✓	✓	✓	✓	✓	✓	✓	✓
Empl 7	✓	x	x	✓	✓	✓	✓	✓
Empl 8	x	✓	✓	✓	x	✓	✓	✓
Empl 9	x	x	✓	✓	x	✓	✓	✓
Empl 10	x	✓	✓	✓	x	✓	✓	✓
x	6	3	3	0	5	5	4	2
✓	3	7	7	10	5	5	6	8
Percentage								
x	60%	30%	30%	0%	50%	50%	40%	20%
✓	40%	70%	70%	100%	50%	50%	60%	80%
Scale								
Result	Symbol of Score							
Good	✓							
Not Good	x							
I don't know	-							

Taxpayer on the Variables towards Scanner Machine

Respondents	Quality	Impact	Competence & TRAINING	Workload	Weather	Physical environment	customising	power	
Good	✓	35	61	51	78	65	91	27	52
Bad	x	40	31	38	4	30	7	28	21
I don't know	-	25	8	11	26	5	2	45	27
✓		100.00	100.00	100.00	108.00	100.00	100.00	100.00	100.00

The variables results in cated that impact, competence, workload, weather, physical environment, customising and power scored above average. The only variable that scored below average was quality on ZRA staff assessment and Taxpayer Assessment.

Shows that impact, competence, workload, weather, physical environment and power scored above average and quality and customizing scored below average.

IV. METHODOLOGY

Mixed method was determined in this study. Both quantitative and qualitative) design was used simultaneously with an inductive as well as deductive theoretical drive (Morse, 2003). Primary data was collected through self-administered structured questionnaire and secondary data was collected from monthly and annual report. The benefit of using the mixed method is that we could explore nuances of the exit process and service provision through the use of a survey questionnaire without being intrusive, while learning from the vast trends and experiences over the years through the use of interviews, thereby maximizing the strengths of each method (Johnson & Turner, 2003). The study targeted 110 respondents composed of 10 custom officers and 100 passerby's trucks at kاپiri weigh bride. Cluster sampling method was used to select 10 ZRA staff from a population of 25 staff in clusters of 5 by getting 2 from each cluster and 100 from a poulation of 500 Taxpayers. This was collected by having 10 clusters composed of 50 each. From each cluster 10 was picked to arrive at 100.The result were collected using questionnaires and interview guides.

V. DISCUSSION AND FINDINGS

The main purpose of this research was to investigate effects of ZRA non-intrusive scanner machines on tax compliance in Zambia-Case study Kapiri Mposhi weigh Bridge. Survey through questionnaires was conducted as well as structured interviews. Data gathered was analyzed using Microsoft Excel. The results of analysis of the research points to the fact that when the Machines are fully operational effectiveness is archived although the borders have experienced many breakdowns, and the level of effectiveness has been compromised leading to low turnout of scanning and revenue collection.

Impact of Non-Intrusive ZRA Scanners on Tax Compliance in Zambia

Out of the 110 respondents from this research, 77 respondents which represented 77% responded that, scanner machines have great impact on revenue collection of the government from Kapiri weigh bridge and 33 respondents representing 33% responded against, meaning that the scanner machines did not contribute positively to revenue collection at kapiri mposhi weigh bride. Reference can be made from the records from Figure 4.1.7, Page 62 from ZRA staff and Taxpayer respondents. Although this information contradicts with reference Appendix V8 which was collected from ZRA annual reports from 2013 when most scanners were operationlised to 2022 .The information shows no significant impact has occurred during this period compared to the time before the installation of these scanners. The compliance levels do not concede with the research response, records show out of a total traffic of 4,014,924.00 trucks that passed through the 8 borders including Kapiri weigh bridge only 881,287.00 trucks were scanned using the scanners, representing 21.95%. The recommended rate of impact from the researcher's analysis was 50% and above. This shows an overall picture despite the breakdowns from kapiri weigh bridge. The question that still stands is why there still low turnout of scanned trucks? Does this mean that those trucks unscanned still pass through the border without any inspection. In this case =3,133,637.00 did not pass through the scanners in spite passing through the borders. The number of physical inspections is still high. Which exposes the inspections to human handling which can lead to corruption. This low turnout could be as a reason of downtimes of machines from kapiri and other regions experiencing the same. Bakshi (2011) argued that downtime detracts the ability to protect the revenue system against illegal and undeclared items. Diligent year- round operation with compliance ensures continued revenue generation. Scanner operations have to be consistent at least every day. This is necessary to check for the flow of traffic across different borders. Accuracy should be the factor in achieving well set operations.

It is important to check and ensure vehicles are correctly positioned and scanned. The scanner operators analyse images created. All data is collected and analysed. As quoted from Bashi theory, this agrees that the many downtime experienced at the kapiri weigh bridge could hinder compliance. This could also hinder efficiency and predictability of the revenue. It is therefore, cardinal that all borders work together to find the reason why kapiri is the most affected with breakdowns. The system theory quoted under theories states that firms should not work in a vacuum. A system is defined by structures and purpose, expressed through its functioning and sub-system when changed the functioning of the entire system can be predicted (Reben.2018).

The Efficient Non-Intrusive Scanner Machines on Tax Compliance at Kapiri Mposhi Weigh Bridge

Findings of this research reviewed ZRA non-intrusive scanners at kapiri weigh bridge are only effective when used consistently, using 2015 and 2016 as examples the kapiri weigh bridge recorded highest revenue. In comparison with Kazungula for instance in 2015 kapiri recorded K1,545,798.70 and 2016, K2,738,795.10 compared to K34,588.00 and K28,326.60 in the same periods at Kazungula border. The difference is quite huge as compared to Kazungula. kapiri is the central town where almost all trucks pass. In periods where kapiri is not getting anything other borders are getting higher revenue like Chirundu in 2017 collected K15,389.00,2018 collected K500,591.60,2019 collected K288,882.10,2020 collected K4,376,776.26 and in 2021 collected K3,329,806.75.This shows that When these machines are down the government is losing huge income, probably some of it could be going to people's pockets as they maybe physical inspections prone to corruption. This is in agreement to what Wolfe, Brunnelli and Horowits (2013) theory states that cargo scanning, or non-intrusive scanners are more effective, cost efficient and saves time as compared to inspecting physically. He says the system creates deterrent effect, can detect special nuclear materials, and can reduce congestion at port (Wolfe et al., 2013). This can only be archived when they is consistence in there usage. This theory explains exactly why ZRA has gaps in their revenue collection. Some months where the scanner system was used exhaustively, showed positive results, same applies in months where they experienced a number of breakdowns, the collections of revenue was negatively affected check appendix V6. Although Wolfe Brunnelli believes that scanner machines result in efficiency and productivity, Anderson, Bauer (2022) contradicts that such technology, radiation may be both damaging and devastating. Radiation may disassemble atoms and cause DNA damage in cells, leading to potentially serious side effects, including cancer to users if not careful in the usage. Ultraviolet light from the sun may damage skin cells and increase the risk of melanoma or other cancer. Higher exposure of ionizing radiation may damage organs and cause blood diseases or neurologic disorders. As long as staff and taxpayer are exposed to the radiation light from the scanners then we can't rule out the possibility of danger to them. It can be summarized that by using scanner machines technology the government has increased its revenue

base as seen in Appendix V6. There is no evidence of the side effects from the staff so far although cautioned by Anderson, Bauer (2022).

Human resources -based theory quoted from literature review, also state that possession of the strategic resources offers an entity golden chance of developing competitive advantage over all its competitors. Resources are usually viewed as the set of capacities and assets, both intangible and tangible that when competitive scarce, inappropriate, or superior they have the possibility of generating values from the diversification. In addition, resources are usually input into an organisations production process for example the capital equipment, skills of individual staffs, finance, talent, and patents.

Response from the Taxpayer towards the Non-Intrusive Scanner Machines at Kapiri Mposhi Weigh Bridge

The statistics show that out of 110 respondents 77 recommended the government to continue with the scanner machines and 33 had an opinion that these machines delayed the traffic at the weigh bridge, so they needed to be removed from these centers. From the above response taxpayers still have faith in the machines despite breakdown at kapiri weigh bridge. This can be related to the concept of the Technology Acceptance model highlighted under theories.it states that Technology Acceptance Model suggests that acceptability of a new technology is determined by issues such as the perceived usefulness and perceived ease of use (Mutisya, 2016).

This implies that, most users perceive non-intrusive scanners as machines which could easy and smoothen the process of goods and trucks scanning and ultimately increase tax compliance among taxpayers. This finding is consistent with Technology acceptance model theory by Davis, (1989. Davis (1989) introduced TAM to forecast the reason why users accept or rejects information technology and ways to improve the acceptability. TAM was suggested to help explain the casual relationship between external elements of user's acceptance and the real technology application while attempting to know the user's behaviour about the utility facts and utilization of the facility perceived by him or her. Perceived usefulness is described as the degree to which someone trusts that the utilization of technology in a process will improve operations contributing to better results. Perceived ease of use is described as the degree to which someone considers that employment of technology in a process improves user- friendliness and the efficiency of the processes (Nasri & Charfeddine, 2012).

VI. CONCLUSION

This study was aimed at establishing the extent of tax compliance in Zambia at the borders with the introduction of ZRA non-intrusive scanners. In order to achieve this aim, the study raised three objectives, the first objective was to determine the impact of Non-intrusive Scanner machines on tax compliance, and the results obtained revealed that non-intrusive scanner machines had great impact in the years where operations was consistent, reference can be seen on Kapiri weigh bridge maximised revenue in 2015 and 2016 showing the highest revenue earner surpassing all the other 7 borders as per Appendix V6. The impact in terms of quality, workload, competence, weather environment and power, it was concluded that non-intrusive scanners at Kapiri weigh bridge has neglected the service delivery for customers at the weigh bridge. The quality of the service is not a priority for now, attention is in many other things other than service delivery. In terms of competence training was fairly bad, the aspect of congestion at the border was as a result of not having competent workforce.

Based on the response from the taxpayers, it was revealed that the only training that was done in the institution is when the Scanners were initially introduced however, since then very little has been done to improve the picture of the staff relating to the scanner training. Regarding the work load, it was established that non-intrusive scanner quickens the process of goods and trucks scanning and ultimately increase tax compliance among taxpayers.

Lastly, it was concluded that scanner machines have no or if any, minimal, side effects on the community, customers, and environment as such and in terms of power supply, it was observed that scanner machines are well taken care of interms of power supply.

The second objective was to investigate the efficient non-intrusive scanner machines are on tax compliance at Kapiri mposhi Weigh Bridge. The study concluded that the non-intrusive scanner machines are very efficient in improving tax compliance, however, the machines are only efficient when used consistently. The non-intrusive scanners at Kapiri imposhi were inconsistent and not very efficient due to breakdowns which exposes the weighbridge to physical inspection making the whole process inefficient. However, despite some inconsistencies the results obtained from this study revealed that many taxpayers want the non-intrusive scanner machines to continue being used as there are solutions to the delayed traffic at the weigh bridge.

Recommendations for Further Studies

Based on the outcome of this study, the study recommends that:

- The government improves the quality of service to enable or encourage the taxpayer to be compliant with the tax. This can be done thorough consistent training of staff and it can reduce the time and costs incurred in verification and clearance of cargo at the weigh bridge.

- In order to improve the quality and impact scanners, the government shouldn't be complacent with this development but engage in more research and development so as to find better ways to improve the services at the weigh bridge.
- Monitoring and continuous maintenance of the integrated scanner management system and the integrated customs management system to reduce system downtime for faster image analysis. Improvement in system integration will lead to faster information sharing and processing of data, increasing the efficiency of managing clearance data.
- It was also recommended that the government increase the number of scanners in borders where there is a lot of activity. When the scanners are fully operational they are effective and reduce workload.
- The government should modernize the kapiri mposhi weigh bridge shelter just to protect the equipment from any unforeseen damages.
- It was recommended that the government through ZRA should engage in research and development to have a better understanding of the customer who happens to be a taxpayer.
- The researcher further recommends that consistent supply of power be done on the weigh bridge to avoid any interruptions. Have also alternative energy like solar energy to supplement the days when there are any interruptions, along with consistent Audits at the border to reduce on corruption by staff.

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Appendix - 2022 ZRA Annual Reports

PORT	2013	2014	2015	2016
CHIRUNDU	155,901.00	0.00	204.00	5,486.00
CHANIDA	N/A	325,068.9	151,193.60	40,197.20
LIVINGSTONE	0	0.00		0.00
KAPIRI MPOSHI ENFORCEMENT	0	71,703.00	1,545,798.70	2,738,795.10
KASUMBALESA	N/A	832.00	4800.00	266,598.50

Appendix - Revenue table from 2013 to 2022 from Scanner Activity

Port	2017	2018	2019	2020	2021	2022
Chanida	0.00	155,640.00	117,261.05	474,328.70	116,901.12	599,832.7
-Chirundu	15,389.00	500,591.60	288,882.10	4,376,776.26	3,329,806.75	3,139,508
Kapiri	0.00	0.00	0.00	0.00	0.00	0.00
Kasumbalesa	0.00	51,900.00	0.00	13,091.00	0.00	0.00
Katima	328,720.20	182,421.40	434,504.00	56,023.98	330,091.65	79,125.8
Kazungula	14,933.00	65,348.80	327,550.20	1,025,100.70	334,413.90	329,213.01
Mwami	0.00	0.00	1,828.00	5,913.38	17,176.30	0.00
Nakonde	0.00	0.00	581,701.53	1,273,513.13	14,569,755.90	4,178,103.2
Totals	359,042.20	955,931.80	1,691,726.88	7,224,747.15	18,698,145.62	8,325,782.71