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THE EVIDENTIAL VALUE OF *CARCASS* TRACES IN COMBATING STOCK THEFT IN SOUTH AFRICA

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ABSTRACT

This qualitative exploratory study closely look at the evidential value of *carcass* traces in combating stock theft in South Africa. It was confined to the selected areas of KwaZulu-Natal (KZN) Province of South Africa. The Deoxyribonucleic Acid (DNA) technology, DNA testing, DNA profiling or Genetic fingerprinting refers to a technique adopted to identify and distinguish livestock by their DNA samples, focusing on patterns uniqueness of DNA sources (*Carcass*, fingerprints, footprints, hair, skin cells, blood, bodily fluids, pieces of clothing and fibres, alike). About 49 participants were purposively sampled, all from the KZN Province. The data was collected through Key Informant Interviews (KII) and Focus Group Discussions (FGDs). The inductive thematic methods was employed for data analysis. This study established that crime scenes involving livestock should be investigated using the same principles as any other crime scenes. It is also confirmed that every time contact is made with another person, place, or object, it results in an exchange of physical materials, *carcass* includes. Summarily, no matter where a stock thieve criminal go or do, by coming into contact with *carcass*, they can leave evidence behind, including the mentioned various DNA sources, which could positively lead to the scientific reconstruction of events, interpretation of observations and measurements from the stock theft scenes to collect physical evidence. For recommendations, the Anti-Stock theft structures should avoid mistakes in the recovering of stock theft scenes, sample collections or test procedures. They should ensure that the results are accurate by following all procedural measures, lay down guidelines for maintaining the chain of custody to ensure that the DNA tests become conclusive, and they should further provide detailed information about discovered *carcass,* while placing more emphasis on this type of evidence.

Keywords: *Carcass* traces, Combating stock theft, Deoxyribonucleic Acid technology, Evidential value, KwaZulu-Natal Province

INTRODUCTION

Dean (2020) highlight that cattle, sheep and goats worth more than R1,2 billion were stolen in South Africa during the 2018/2019 financial year, according to statistics by the National Stock Theft Prevention Forum (NSTPF). It is also revealed that this figure applied to the value of animals stolen, and did not account for additional costs such as the judicial process, farmer costs, recovery costs and policing, among others. Approximately 30 000 livestock were reported stolen for this period. Moreover, the value of the cattle that were stolen was about R900 million (Constituting approximately R200 million worth of sheep stolen and R100 millions of goat). The biggest losses that were actually reported to the police occurred in the KZN Province, where the most cattle were stolen; followed by the Eastern Cape (EC),

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where the target was mostly sheep; and thereafter the Free State (FS), where thieves targeted both cattle and sheep.

Chelin (2019) provides that the most significant problem remains that only 20% of stock theft cases are reported across South Africa, meaning that the real figure of this crime is unknown. Stock theft is often not reported owing to lack of trust in the South African Police Service (SAPS). Moreover, this crime is becoming a global phenomenon. In the United States (US), approximately 85% of stock theft is not reported, and in the United Kingdom (UK), the figure is at about 87%. Most stock theft related crimes are committed resulting from greed by organised syndicates [of the almost 30 000 cases of stock theft recorded in the 2018/2019 financial year, about 87% involved some form of organised crime] as opposed to a crime of need by poverty-stricken individuals trying to survive. According to [Richard] Chelin (2020) - A researcher at ENACT Africa: Enhancing Africa's capacity to respond more effectively to transnational organised crime, an organisation working in partnership with the Institute for Security Studies [ISS] (in Dean, 2020), the threat of growing transnational organised crime involving stock theft is posed by syndicates who are increasingly stealing cattle in South Africa, taking them over the border to Lesotho for a cooling-off period, and then selling them back to South Africa.

Subsequently, as initially stated, stock theft is evidently becoming a worldwide lucrative business that has become a growing challenge, with more complexities to combat. From a South African perspective, this problem is not new for livestock farmers. The available reviewed research contend it is as old as agriculture itself, the South African History Online (2019) highlights that the African farmers arrived in Southern Africa [South Africa included] around 250 *Anno Domini* (AD) meaning 'In the year of Our Lord,' which is about 1 000 years ago, from further north in Africa. They were Bantu-speaking people and lived in an era that archaeologists call the Iron Age. For a long time, many people believed that African farmers arrived in South Africa at the same time as European settlers and new research proves that they were here hundreds of years before the Europeans. Moreover, the recorded cases of this crime in this country can be traced as far back as 1806 and this crime affects the livestock farmers and industries in all nine provinces of South Africa (Clack, 2013, Dall, 2020, Geldenhuys, 2012, Geldenhuys, 2010, Peires, 1994, Pitcher, 2019, Lombard, 2015, and Lombard, van Niekerk, van Rooyen & Ogundeji, 2017) and it is recorded that during the 1990s stock theft reached an unprecedented peak in the new South Africa (NSTPF, 2019).

Moreover, solving and reducing the number of crimes of stock theft are paramount globally at present based on economic trends and capital incentives in order to maintain sustainability, profitability and food security and the emotional effect it has on the agricultural community (NSTPF, 2019). As a recourse, Maluleke (2018) avers that different technologies can be adopted in combating stock theft, and these strategies are becoming increasingly valuable to the operationalisation of the South African Criminal Justice System (CJS). However, the value of using technology in combating stock theft is vague to most livestock farmers. Instead, they revert to conventional methods, such as brand-marking and tattooing. These conventional techniques have not really proffered an enduring solution to the menace of stock-theft in South Africa.

Furthermore, Maluleke (2016) expresses that existing literature propagates a variety of methods in combating stock theft across South Africa and elsewhere. However, DNA technology has been designed to revolutionise modern science and to enhance conventional

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methods of combating stock theft. Maluleke (2017) also highlights that this technology was introduced in 1996 across South Africa through the partnership between the South African Police Service (SAPS) and the Animal Genetics Laboratory (AGL) of Animal Research Council (ARC) - Animal Production Institute (API) to combat stock theft and it was envisaged to be a powerful tool in assisting the livestock farmers in most hit areas. This introduction relies on providing accurate evidence against potential stock thieves. However, the practicality associated with the use of this system remains elusive to the potential livestock farmers. Equally, it should be noted that limited studies have been done to explore the challenges facing the implementation of DNA technology in combating stock theft in the selected areas of KZN and other provinces of South Africa, in essence; Stock theft, as a rural crime, has over the years either been under researched or not been researched in any depth by academics, researchers and scholars in the field of Criminology and CJS.

According to the NSTPF (2016:32), the evidence found at stock theft scenes may include the following: *Carcasses,* Vehicles, Firearms, Sources of DNA such as blood, bloodstains, hair, meat or other tissues, Fingerprints, Footprints, Equipment(s) used during the commission of stock theft; and Clothes. It also suggested that the slaughtered *carcasses* must not be removed until the meat has been sampled and the stock theft scene photographed (NSTPF, 2016:32). Lochner and Zinn (2015:34 & 35) provide that a scene can naturally be classified into five types, namely: **1)** Primary (The place or area in the immediate vicinity of the occurrence or incident and where the majority of physical evidence, proving the elements of the crime under investigation would be found); **2)** Secondary (This can be a location, not in the same vicinity as the primary scene, and some distance from the primary scene); **3)** Extended (A scene where several unlawful actions occur at different places while the offence is being committed); **4)** Macroscopic (The classification of a scene based on its size, this is not just a scene but can also include livestock *carcasses)*; and **5)** Microscopic (Any small or minute object or piece of physical evidence related to the case being investigated). For the purpose of this study, the typical stock theft scenes where *carcass* can be found, includes the 'outdoor, indoor and mobile.' Accordingly, this can be divided as follows:

i. The livestock may be found at the location where they were slaughtered *(Outdoor and indoor scenes);*
ii. The livestock may be slaughtered in a specific location to be transported by a suspect to another location for selling (*Mobile scenes*); and
iii. The livestock may be stolen and moved to another location and to another owner for further illegal rearing, which may later be discovered *[Mobile scenes]* (Maluleke, Mokwena, & Olofinbiyi, 2019:109-110).

Mainly, Mazikelana (2019:1) contends that cases of stock theft continue to hog the lime light in the livestock sector in Zimbabwe, South Africa included. Discussions among local livestock farmers show that this crime has become a big issue that is giving them sleepless nights. Thieves now transport *carcasses,* instead of live animals because it is obviously easier to conceal *carcass* even in a small car than transporting a 'whole' live animal. In addition, a live animal has to have at least some semblance of accompanying paperwork even fake ones to pass through road checkpoints. These may not be easy to acquire and let alone passing them for genuine papers in all the checkpoints. It is thus becoming common for these farmers to wake up to remains *(Carcass)* of their animals that have been left behind by thieves after they have skinned and transported the *carcass*. What is usually left is the offal left overs and the rumen contents.

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Mazikelana (2019:1) further shares that in some cases, an unexpected appearance of a passerby disturbs stock thieves and they flee the area leaving behind significant chunks of meat and offals. This stolen meat easily finds a captive market in many shady Butcheries that are in Towns. Once the meat is in the Butchery it is sold to unsuspecting customers and the trail of your animal gets cold and never to be found again. Importantly, a fight against stock theft should be market-driven, meaning law enforcement officers should frequently inspect Butcheries and find out if they are selling meat that has been slaughtered or obtained from registered sources. Butcheries get their meat from two main sources. They either, buy animals direct from farmers and slaughter at registered abattoirs or they buy meat from meat wholesalers who are also abattoir operators. In both situations, there is enough supporting documents to trace the source of the meat.

Considerably, these are the documents that police officers should look for and if they are not available, a red flag should be raised as such a Butchery is likely to be the market of the stolen animals that are slaughtered in the dead of the night. However, an encouraging intervention of this kind will help to nail some of the stock thieves. Scientists from an institution of higher learning in Bulawayo are prepared to offer DNA profiling services for the carcass remains and compare them with *carcass* that may be recovered from illicit Butcheries. This will provide conclusive evidence that a court needs to link the person found with the stolen meat to the *carcass* remains on your farm and therefore your animals (Mazikelana, 2019:1).

Practically, the author (Mazikelana, 2019:1) was informally informed that the DNA profiling done on some *carcasses* found somewhere in *Magwegwe* (Bulawayo, Zimbabwe) has been positively linked to some *carcass* remnants at a farm in *Esigodini* (Previously known as Essexvale, is a Town in the Matabeleland, South Province of Zimbabwe). In simple terms, this means the meat found in some Butchery in *Magwegwe* belong to animals that were stolen and slaughtered at a farm in *Esigodini*. This therefore, means farmers should not angrily throw away the pieces of meat belonging to their slaughtered animal when they find them at the farm but keep them somewhere in the fridge as you may need to take them for DNA profiling to match them with some *carcasses* that could be recovered elsewhere.

Consequently, this is the kind of technology and science use that should be applauded as it provides solution to some critical challenges facing farmers. This means it may get easier to convict even the most sophisticated of stock thieves, for example; talking of stock thieves in the mould of *Shanyaugwe* [Which borders Beitbridge and Gwanda districts of Zimbabwe] graduates who were born and bred in a livestock thieving community. It is the livestock farmers' call through their representative bodies to support this useful DNA intervention with resources so that the institution can be able to provide this important service. Exercise of this kind comes at a cost and individuals do not want the cost to be the inhibitor to such a critical intervention. DNA profiling of suspected stolen *carcasses* will certainly revolutionalise the stock theft landscape. Therefore, such developments should be shared with the police anti-stock theft department so that they are aware of this important use of DNA profiling (Mazikelana, 2019:1).

Subsequently, all investigative activities regarding the stock theft scene must be carefully recorded and documented (Pena, 2000:57). With the notion that 'when two objects came into contact with the other, each of these objects would leave or transfer particles to the other, termed 'Locard's Exchange Principle,' as coined by the French Scientist Edmond Locard (1877-1966). To offer clarity, Kirk (1953) expresses this principle as follows:

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> "*Wherever he steps, whatever he touches, whatever he leaves, even unconsciously, will serve as a silent witness against him. Not only his fingerprints or his footprints, but his hair, the fibres from his clothes, the glass he breaks, the tool mark he leaves, the paint he scratches, the blood or semen he deposits or collects. All of these and more bear mute witness against him. This is evidence that does not forget. It is not confused by the excitement of the moment. It is not absent because human witnesses are. It is factual evidence. Physical evidence cannot be wrong, it cannot perjure itself, and it cannot be wholly absent. Only human failure to find it, study and understand it can diminish its value."*

In addition, the weather conditions are one of the major factors that can compromise outdoor stock theft scenes. For example, in extreme hot or cold temperatures, the decomposition rate of a *carcass* will be affected, complicating the investigator's job of determining the time of death. If it is windy, important trace evidence can be scattered, making it more difficult to find. Snow also complicates the process of finding trace evidence as well as recovering bullets and cartridges and it is much more difficult to cast foot impressions in snow than it is in soil or sand (Boisa, 2013:8 & 9). Other DNA materials, for example blood and hair, can easily be transferred between the livestock and suspect and to the environment. This contact of the suspect with the livestock and the crime scene will leave physical evidence, proving his/her presence at the crime scene (Stock theft). Depending on the crime, there may be two crime scenes, namely the livestock *carcass* and the location where the stock theft occurred (Boisa, 2013:13-14).

Particularly, the NSTPF (2019) and Maluleke (2016) further points out that stock theft is a neglected agricultural crime by researchers in the field of humanities and related disciplines. (Manganyi, Maluleke & Shandu, 2018) also confirm the lack of criminological attention placed on this rural crime. As the current study presents, the existing knowledge on the use of DNA technology on *carcass* found on stock theft scenes should be interpreted, disseminated and implemented correctly by relevant stakeholders, if the country seeks to effectively address the current challenges associated with this crime, Maluleke (2018).

REVIEW OF BRIEF LITERATURE

The Use of Deoxyribonucleic Acid Technology in Combating Stock Theft in South Africa

Maluleke (2016) finds that "inadequate knowledge and application of the use of DNA technology in combating stock theft in South Africa" exists. For this study; the selected areas of KZN Province included Bulwer, Ladysmith and Utrecht, which were prone to stock theft, further causing long-term pain and suffering to the local livestock farmers and other responsive stakeholders to this crime.

Generally, available studies on stock theft have focused only on the prevention of stock theft, using the conventional methods. However, no study has been done on the use of DNA technology in combating stock theft in the KZN Province and other provinces of South Africa. Similarly, this crime may seem to be a minor crime to South African citizens, further allowing this subject to be largely ignored. However, the existing literature proposes a variety of methods of combating stock theft across South Africa and globally. One of those solutions has been DNA technology. For the purpose of this study, DNA technology makes it possible

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to provide a means of irrefutable identification of livestock. It was established that all livestock have a unique DNA profile. In the event that livestock are stolen, illegally relocated or even slaughtered, biological samples of such livestock can simply be taken and their DNA profile compared to those of the reference samples in order to verify their identity, effectively linking criminals to crime scenes.

Thus, the advantage of this practice lies in identification of criminals with incredible accuracy when biological evidence exists, and it can also clear suspects and exonerate persons who have mistakenly been accused or convicted of crime, making it increasingly vital to ensure accuracy and fairness within the CJS. Importantly, the scientific study and evaluation of evidence found at a stock theft scene have helped in solving related cases resulting in the apprehension of potential stock thieves. To this end, the locations to obtain DNA evidence are vast, which consist of clothing, bodily fluids (Semen, saliva, sweat, blood), fingerprints, tissue, skin cells and hair roots, among other things.

Practically, these scenes differ from the next, and each must be approached with its own merits. It can never be prescribed to the first investigator, by means of rules and regulations, on how to proceed with each case. This paper further reveals the value of criminalistics (DNA materials) and policing in investigating stock theft in the selected SAPS Stock Theft Units (STUs) of KZN Province by confirming that the accuracy of this application is beyond doubt and when done in the correct way, the tests conducted are infallible, Maluleke, Mokwena and Olofinbiyi (2019).

RESEARCH METHODOLOGY

In this current doctoral study, the selected sample consisted of 49 participants in order to explore strategies on the use of conventional and technological methods in combating stock theft in the selected areas of the KZN Province by various stakeholders (Refer Table 1).

Table 1: Selected study sample

Stakeholders	Number of KII and FGDs
Department of Agriculture, Forestry and Fisheries (DAFF) – The DAFF Assistant Directors: Animal Technicians and Animal Production officials – KIIs	2
SAPS STUs, Ladysmith – FGDs	12
SAPS Provincial Co-ordinator, Durban Central – KII	1
SAPS STU Detective, Utrecht – KII	1
SAPS STU Commander, Pietermaritzburg – KII	1
Livestock farmers - Utrecht (Newcastle); Ladysmith; and Pietermaritzburg, FGDs	24:8
Anti-Stock Theft Associations' managers, KIIs	5
Community Police Forums (CPF) chairs, KIIs	3

Source: Researcher's illustration (2016/2017)

As indicated in table 1, the sample of this study was purposively selected from selected three areas in the KZN Province, namely: Utrecht (Newcastle); Ladysmith; and Pietermaritzburg

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and Durban Central. A voice recorder and field notes were used to supplement information gathered during the adopted semi-structured interviews. The collected data was analysed according to the thematic method by reducing data into themes, sub-themes, categorising, and transcribing it verbatim to facilitate the process. Literature studies was also reviewed to supports the empirical findings.

The overall consisted of selected participants stemming from 'Anti-Stock theft structures.' Their strategies were explored for the use of DNA technology in combating stock theft in the selected areas within KZN Province. This study was descriptive and exploratory in nature, and accomplished by means of the application of documentary study, FGDs and KIIs. All study participants were drawn from KZN Province. Non-probability: Purposive sampling was used as the participants of FGDs and KIIs were chosen haphazardly. The criterion used for selection of the sample was based on the number of SAPS years of service, which translate to experience and knowledge on stock theft. All these participants were Africans speaking different languages; some were fluent in *IsiZulu* and English, other languages of understanding were used during this process.

FINDINGS AND DISCUSSIONS

The basis of this study was centred on the roles and competencies of the SAPS and other relevant stakeholders in combating stock theft through the use of DNA technology, and understanding the successes and challenges of combating stock theft with the use of this modern technology in South Africa and KZN Province in particular, focusing on the indicated selected areas *Supra*. The premise of this study was also focused on highlighting inadequate knowledge and application of the use of DNA technology in combating stock theft in South Africa, relying on the selected areas of the KZN Province.

Moreover, the purpose of this study was *to explore the value of DNA technology in combating stock theft in the KZN Province, based on the evidential value of carcass found in the stock theft scenes*. The guiding research question of this study was: *What value does DNA technology add to the police's role in combating stock theft?* This was linked to the evidential value of *carcass* found in the stock theft scenes.

This study revealed the dire need for the use of DNA technology to combat stock theft in South Africa generally and in KZN Province specifically. The selected areas in the KZN Province were chosen as learning grounds, from which shortfalls and outcomes of previous methods employed to combat stock theft were used to inform current work, and to improve future work in the use of DNA technology to combat stock theft in the province and elsewhere. DNA technology is easily accessible by means of the establishment of effective partnerships between the CJS and the relevant stakeholders, and using communal intervention systems to break the culture of isolation and move into a collaborative approach towards stock theft-combating strategies. It is important to simultaneously establish mechanisms to transfer Knowledge Management (KM) and share strategies, including the integration of conventional methods with available technologies, sharing the results of preliminary investigations and how DNA technology was used, and to inform stakeholders of court procedures.

This study also found challenges associated with the use of DNA technology to combat stock theft in South Africa. These challenges include, but are not limited to the following aspects: **1)** Chain of custody in terms of handling of the exhibits from the crime

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scene to the Forensic Laboratory [FL]. **2)** Lack of general knowledge about the use of DNA technology by SAPS investigating officers and other relevant stakeholders contributes to sample degradation and contamination, which negatively influence prosecution rates. This is perpetuated by **3)** A lack of awareness of, and interest in, the use of this application far exceeding its use in practice.

The adequate knowledge application of using DNA technology in combating stock theft was not clear to most study participants, thus instead of using this application they reverted to using conventional methods, such as brand-marking and tattooing, with more emphasis placed on the current legislative framework of the Stock Theft Act (No. 57 of 1959) and Animal Identification Act (No. 6 of 2002) respectively, while invalidating the use of the new the Criminal Law (Forensic Procedures) Amendment Act (No. 37 of 2013) (Referred as the 'DNA Act' in this study) and other related international Acts (World Organisation for Animal Health standards - OIE standards). This study further found that the effective use of DNA technology in combating stock theft could provide a positive and significant contribution to ensuring the safety and protection of livestock, as well as the economies of South Africa communities.

The Six (06) challenges and themes were identified in this study, namely: **1)** Common usage of conventional methods to combat stock theft, **2)** Delay in obtaining DNA evidence feedback from the responsible laboratories, **3)** Inadequate knowledge and application of the use of DNA technology, **4)** Lack of capacity and resources to combat stock theft, **5)** Insufficient methods and techniques to combat stock theft and **6)** Limited prioritisation of the stock theft scourge.

Based on the findings of this study, and the analysis of the data available in the literature and the selected study participants, it was possible to design a conceptual framework depicting the integration of conventional methods for combating stock theft with the use of the initial outlined Radio Frequency Identification (RFID), Wireless Sensor Node / Network (WSN), Wireless-Fidelity (Wi-Fi) and ZigBee and DNA technology, as well as the involvement of the relevant stakeholders. In essence, the developed conceptual framework consisted of Five (05) components, namely: **1)** KM, **2)** Available devices, **3)** Preliminary investigation phases, **4)** DNA technology analysis, and **5)** Court procedures and conviction rates in combating stock theft in South Africa.

Maluleke (2016) submits that DNA technology should be effectively used in the fight against stock theft. The livestock farmers should be heavily advised to use different technologies, along with conventional methods, in the fight against this crime. The integration of conventional and technological methods in branding and identifying [small/big] livestock is essential in combating stock theft. Unfortunately, the use of DNA technology is not as widespread as it could be in KZN Province. Thus, different technologies, coupled with DNA technology are becoming "an increasingly important component of the CJS, and that unfortunately, the value of using this technology in combating this crime is not clear to most livestock farmers in the selected areas, who preferred conventional methods, such as branding and tattooing, while eschewing RFID, WSN, Wi-Fi, ZigBee and DNA technology.

Importantly, Maluleke (2016) shares that the effective use of technologies (DNA in particular) in combating stock theft can provide a positive and significant contribution to ensuring the safety and protection of livestock, as well as the [livelihoods] of South Africa's livestock farming communities. Collecting DNA evidence from individual animals and storing the samples so that ownership of the animals could be later confirmed was crucial for

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investigation and subsequent conviction. During the study fieldwork, livestock farmers indicated a need for the establishment of a stock theft forensic laboratory in the KZN Province, in order to decrease the time taken to submit DNA samples to laboratories in Cape Town, Port Elizabeth or Pretoria. Increasing the ease of access could improve the likelihood of adoption of this technology. To extend the use of DNA technology in the investigation of stock theft, this study recommended that more SAPS STUs members be trained in the use of this technology, and that each STU in selected areas in the KZN Province should have designated technology experts working closely with local livestock farmers and forensic laboratories for effective DNA evidence analysis.

It is envisaged that the findings of this study will be used to, **a)** Understand the diverse experiences in conducting future research studies on the use of DNA technology against stock theft, **b)** To create educational materials, or design future improvements and interventions systems, **c)** To assist the SAPS and other relevant stakeholders in providing services related to combating stock theft, and; **d)** To inform further policies relating to the use of DNA technology. Notably, inadequate knowledge and application of the use of DNA technology to adequately respond to stock theft cases where there is no *prima facie* [On the first appearance] evidence before the SAPS STUs members in the initiation of investigations to further carry out an arrest should be reconsidered as the DNA technology can be positively used to link the potential suspects with the crime in question. In light of this finding, DNA technology is widely used internationally and locally to solve stock theft cases to combat stock theft in the specified areas plagued by this scourge in the KZN Province can be very problematic.

At the same time, it is acknowledged that there are no plans to establish the SAPS Stock Theft Forensic Laboratory (STFL) in the province. The participants also stated that it is difficult to deal with the high prevalence of stock theft in the selected areas of the KZN Province. They indicated that the available stock theft statistics in this study do not lie. They questioned the analysis performed by the SAPS after recording the-said statistics. They mentioned that it is a waste of time to release those statistics because they do not complement the available strategies to combat stock theft in the selected areas. As a result, the operations of the Division of Crime Intelligence (DCI) are compromised. The DCI manages crime intelligence and analyses crime information, and provides technical support for investigations and crime prevention operations. This division contributes to the neutralisation of crime by gathering, collating and analysing intelligence information that leads to an actionable policing activity.

CONCLUSIONS AND RECOMMENDATIONS

It is *concluded* that in identifying the strategies for improving the inadequate knowledge and application of the use of DNA technology in combating stock theft in South Africa, while effectively using *carcass* left on stock theft scenes; it was clear that knowledge of the application of DNA technology in combating stock theft was limited from the participants' perspectives. The researcher recommends that more SAPS STUs members be trained specifically in the use of DNA technology. It would be best if each SAPS STU in the selected areas of KZN Province could have designated DNA technology experts working along with the respective forensic laboratories across the country. This will assist the SAPS STUs tremendously with their investigation of stock theft, for example in instances when livestock

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is stolen, illegally relocated or even slaughtered, by being able to use biological samples to link a potential suspect to the crime in question, or to exonerate an innocent person. It is also recommended that for the effective policing of stock theft by the SAPS STUs in selected areas of KZN Province (Newcastle – Bulwer, Ladysmith and Pietermaritzburg) the application of criminalistics (DNA) evidence should be incorporated. This procedure could produce the desired results with regard to an increase in high-quality maintenance of the chain of custody during the investigation of these cases (Maluleke, Mokwena & Olofinbiyi, 2019).

For recommendations; Maluleke (2016) also expresses that it is common knowledge that the use of DNA technology on *carcass* during investigations has proved to be a solution to the stock theft epidemic by providing rapid means of identification, therefore DNA technology should be used as a confirmatory forensic tool in animal identification. The value of this application is gaining momentum daily as an effective tool to be used in most forms of combating, investigations and prevention, irrespective of either criminal or civil nature. Furthermore, the researcher recommends that a specific National Instruction be added to the Crime Scene Policy (CSP), which specifically contains a full description of how to use DNA technology for combating stock theft, as well as for which stock theft cases an expert is required. Other relevant stakeholders should also be trained in this application to enable the mobilisation against stock theft in the selected areas. Combating of stock theft in the selected areas of KZN Province requires the relevant stakeholders to maintain and strengthen their deliberations on special law enforcement operations and to ensure that 'hot spots' are stabilised and criminal elements are addressed.

The consulted literature indicates that the DNA Act, 2013 came into effect on 31 January 2015. This Act ensures that the creation of the National Forensic DNA Database of South Africa will function effectively, not only as a tool for gathering incriminating evidence, but also for gathering evidence to eliminate suspects and to safeguard against wrongful convictions / arrests as stated previously or other miscarriages of justice. On 27 January 2015, the Minister of Police appointed the Forensic Oversight and Ethical Board. This Board will monitor the implementation of the DNA Act, 2013 with regard to the attendance and processing of crime scenes, the collection and storage of exhibit material and DNA samples, as well as the performance of the SAPS Forensic Science Laboratory (FSL) and the National Forensic DNA Database of South Africa. These amendments will facilitate the use of DNA technology in combating stock theft in South Africa, selected areas in the KZN Province included.

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