

**ASSESSMENT OF THE CURRENT STATUS OF WILDLIFE CAPTIVE
FACILITIES IN TANZANIA**

ZENA GERALD MNG'ONG'O

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**A DISSERTATION SUBMITTED IN PARTIAL FULFILLMENT OF THE
REQUIREMENTS FOR THE DEGREE OF MASTER OF ECOSYSTEMS SCIENCE
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ABSTRACT

Wildlife captive facilities (WCF) in Tanzania include; wildlife ranches, wildlife farms, proposed orphanage centers, and zoos. However, information on species composition, abundance, the users of different WCF, costs and benefits of operating WCF is scarcely known in Tanzania. The study was conducted in 71 WCF found in 16 regions of Tanzania, within five TAWA Management zones. Key informant interview was used to collect data from either WCF (owners, managers, care takers) and Conservation officers from TAWA. Direct observation and counts were used to collect data on the types and numbers of animal species respectively. Descriptive statistics was used to determine frequency and percentage of type and purpose of establishing WCF, origin of species and number of users of WCF. Cost-benefit analysis of WCF was analyzed through Gross Profit Margin. The results showed that Tanzania has a total of 71 WCF, (28 active and 41 dormant and 1proposed orphanage center) and the major purpose of establishing WCF were business and community services (education and recreation). About 182 different species are housed in different captive facilities. The most abundant species are Crocodiles (*Crocodylus niloticus*) (279), Impala (*Aepyceros melampus*) and (172), Wildebeest (*Connochaetes taurinus*) (111). The major sources of animals are capturing from wilderness and acquiring from other Wildlife captive facilities. The main users of WCF are both local and foreign visitors. Annually 223 404 local visitors and 1 781 foreign visitors visit WCF. Main source of revenue in WCF is visiting fees. Most WCF run under loss, specifically zoos by 78.9%. Also, WCF facing the following challenges; Long process to streamline investment and high costs of operation, lack of consultancy, poor relationship between investors and moderator, and lack of banks recognition to the investors. Generally, the study recommends further studies on monitoring the existence of WCF with emphasis on the international standard requirements for establishing, operating and managing of WCF.

DECLARATION

I, Zena Gerald Mng'ong'o hereby declare to the Senate of the Sokoine University of Agriculture that this dissertation is my original work and it has neither been, nor concurrently being submitted for higher degree awards in any other institution.

Zena Gerald Mng'ong'o
(MSc. Candidate)

Date

The above declaration is confirmed

Prof. R.P.C. Temu
(Main Supervisor)

Date

Dr. N.E.J Mbije
(Co-supervisor)

Date

Dr. A. Kitegile
(Co-supervisor)

Date

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LIST OF ABBREVIATIONS AND ACRONYMS

NP	-	National Parks
SUA	-	Sokoine University of Agriculture
TANAPA	-	Tanzania National Parks
TAWA	-	Tanzania Wildlife Management Authority
WCF	-	Wildlife Captive Facilities
WMA	-	Wildlife Management Area
GR	-	Game Reserve
OA	-	Open Area
GCA	-	Game Controlled Area
NR	-	Nature Reserve
FR	-	Forest Reserve
NCA	-	Ngorongoro Conservation Area
CBA	-	Cost and Benefit Analysis

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background Information

The animal world is at peril as a result of global environmental changes (Boonstra, 2013). The change in climate land use and land cover, deforestation, and degradation has resulted in a disruptive impact on organisms including wild animals (Acevedo-Whitehouse and Duffus, 2009). This has culminated into changes and depletion of habitats qualities for wild animals thus threatening survival and in some cases leading to extinction (Keulartz, 2015). In response to the ongoing challenges of In- situ conservation, wildlife captivity began to turn attention to the conservation of wildlife and endangered species in the 1970-1980s (McGregor Reid and Zippel, 2008).

Globally many wild animal species have been established in captivity (Leus, 2011). These include wildlife ranches, wildlife farms, wildlife breeding facilities, wildlife orphanage centers, sanctuaries and zoos (Kirkwood, 1996; Mooers, 2017; Wildlife conservation regulation, 2020). The captivity was influenced by various purposes including education, conservation, breeding programs research, farming and attraction for Leisure and business (Corkeron, 2009; Leus, 2011). With continuing human pressure on the environment, captive or semi-captive management is likely to become a component in the conservation of an increasing range of wild animal species in the world (Zimmermann, 2010).

In developing countries, visiting natural tourist attractions such as national parks, nature reserves and other protected areas is considered expensive (Caro and Davenport, 2016). However, it is reported that The World Association of Zoos and Aquarium attracts 60 million people per year which exceeds nearly half the number of people visiting national

parks, protected areas, baseball, basketball and football games (WAZA, 2005), as they are in close proximity to urban centers. Demographic survey indicates that approximately quarter of the world population lives in towns (Rosner and Wesołowska, 2020) . Besides offering leisure, wildlife captive facilities play an important role to build a connection between human especially in urban areas and natural world (Keulartz, 2015) through creation of awareness about the value of nature and conservation of natural resources (Corkeron, 2009).

In the face of global challenges, Tanzania has an extraordinary institutional record in establishing protected areas (PAs)(Caro and Davenport, 2016). Mainland Tanzania which covers an area of 942 433 km² has gazetted 22 national parks (NPs) under TANAPA (TANAPA, 2020). This is in addition to the 169 553 km² areas comprising of Game Reserves(GRs), Game Controlled Areas(GCAs) and open areas(OAs) (TAWA,2020; Musika et al., 2021). Moreover, Nature Reserves (NRs), a new level of PA has been created to upgrade the protection of key Forest Reserves (FRs) which is the best chance to reduce habitat loss and increase species protection (Geldmann et al., 2013). In order to reach out to a wider community especially those located in urban areas, several captive facilities exist in Tanzania. This is in addition to many PAs distributed in different locations and some of the world's greatest wonders contributing to tourism and national income (Wade et al., 2001).

Tanzania harbor number of Wildlife captive facilities (WCF) although the exactly records of these facilities is not known. It is estimated to be about 6 ranches, 35 wildlife farms, 28 wildlife zoos located in different regions (Wildlife conservation regulation, 2020).

Furthermore, the country is still lacking captive breeding sites, and there is only one proposal for the establishment of an orphanage center to be located at Doma, Morogoro (Ngilangwa et al., 2018).

Under Tanzania Wildlife Management Authority (TAWA) through Wildlife Policy and Wildlife Conservation Act No.5 of 2009; the information about establishment, qualification of registration, revocation, cancellation, suspension of registration, de-registration, monitoring and evaluation of wildlife captive facilities are well presented and covered (TAWA, 2020). However, information on the number, purposes of establishing wildlife captive facilities, and management of wildlife captive facilities in different regions of Tanzania is still scarce. Therefore, this study aimed at documenting all types of captive facilities in Tanzania for future reference.

1.2 Problem Statement and Justification

1.2.1 Problem statement

Wildlife captive facilities (WCF) are legally established across different parts of the world primarily for tourism and community services like education, recreation and research (Kirkwood, 1996; Mooers, 2017; Wildlife conservation regulation, 2020). Tanzania has several types of wildlife captive facilities; including zoos, wildlife farms and wildlife ranches. Despite its legal status, to date, there is scarce information on number, species composition, abundance and origin of their animal species in these potentially lucrative facilities in Tanzania. Also, information about users of WCF, costs and the revenues generated from wildlife captive facilities is not well covered in the literature, since most of the studies on wildlife focus more on national parks, wildlife management areas, game controlled areas and game reserves (Caro and Davenport, 2016). Thus, a site-specific study to understand the status of WCF for management options is of importance. Therefore, this study focused on exploring the current status of wildlife captive facilities found in Tanzania mainland.

1.2.2 Justification of the study

The findings from this study are useful to policy makers, in identifying potential of these facilities so as to design appropriate management initiatives for facilitating conservation and act as information centers of all attractions found in Tanzania. This goes in line with boosting investors' confidence in venturing into WCF. Furthermore, the study findings may open up international recognition for Tanzania wildlife captive facilities thus promote tourism both at domestic and international level. Lastly but not least, the study may be used in convincing local community to engage more in the establishment of WCF as a source of income as well as center for educating conservation science.

1.3 Objectives of the Research

1.3.1 Overall objective

The overall objective of this research was to assess the current status of wildlife captive facilities in Tanzania.

1.3.2 Specific objectives

- i To identify the types, status and purpose of establishing wildlife captive facilities in Tanzania.
- ii To assess the species composition, abundance and source of species in wildlife captive facilities.
- iii To identify the users of wildlife captive facilities
- iv To conduct the cost-benefit analysis of running these facilities for the past five years

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 General Overview

Keeping Wildlife in captivity has been necessitated in several countries after their natural habitats have been altered, diminished or taken over by human population growth (Kirkwood, 1996; Mooers, 2017). Animals in captivity have various benefits such as, entertainment and commercial purposes (Kirkwood, 1996), and provision of conservation education and research (Conde, 2013; Kirkwood, 1996; WAZA, 2015). There are various facilities to accommodate wildlife in captivity. These include wildlife ranches, wildlife farms, wildlife breeding facilities, orphanages centers, sanctuaries and zoos (Kirkwood, 1996; Mooers, 2017; Wildlife conservation act, 2009).

2.2 Type and Purpose of Wildlife Captive Facilities in Tanzania

2.2.1 Types of Wildlife Captive Facilities

Tanzania has several Wildlife captivity facilities including; wildlife ranches, wildlife farms, and 1proposed orphanages and zoos (Kirkwood, 1996; Mooers, 2017; Wildlife conservation regulation, 2020). These categories are classified based on size and purposes (Corkeron, 2009).

A wildlife ranch usually has an area ranging from 2000 to 25 000 hectares, with multipurpose consumptive or non- consumptive complementary uses of wildlife (Kirkwood, 1996; Wildlife conservation regulation, 2020). Wildlife ranches are divided into fenced and unfenced or open ones. Fenced wildlife ranches are enclosed and may cover 10 000 to 15 000 ha (Lungren, 2000; Mossman and Mossman, 1976; Wildlife conservation regulation, 2020). Unfenced/open wildlife ranches are not fenced and may cover about 15 000 to 25 000 ha (Lungren, 2000; Mossman & Mossman, 1976).

Game farms are also kept for consumptive or non-consumptive (Pasmans and Hebinck, 2017; van der Merwe and Saayman, 2005; Wildlife conservation act,2009); and have areas ranging from 500 to 2 000 hectares.

Breeding facilities are areas set aside for wildlife rearing for commercial purposes (Mooers, 2017; Wildlife conservation regulation, 2020). Although there are about 336 registered captive breeding facilities globally (Nijman *et al.*, 2018), including 91 in South Africa. there are no breeding facilities established in Tanzania.

Orphanage facilities are areas set aside to take care of incapacitated or injured wild animals, or young animals without parental care (Frssaf, 2008; Wildlife conservation regulation, 2020). Tanzania is about to establish one orphanage center to be located at Doma, Morogoro (Ngilangwa *et al.*, 2018).

A zoo is a collection of wild animals, typically in a Park or gardens for the study, conservation or display to the public (Davey, 2007; Mennen *et al.*, 2016). Animals in such zoos are confined in large areas which resemble their natural habitats (Hacker and Miller, 2016). It is estimated that globally there are 10 000 Zoos (Davey, 2007; Mennen *et al.*, 2016), 200 of these zoos are found in 48 countries of Africa including 28 in different regions of Tanzania (Wildlife conservation regulation, 2020). Zoos are of various types depending on location and purposes such as education and entertainment (Mehta and Singh, 2018). These types include urban, suburban, safari, petting, birds garden and aquarium zoos (Mehta and Singh, 2018; Nekolný and Fialová, 2018).

Furthermore, for approval of running WCF such as ranch, farm, breeding facility, zoo or sanctuary activities and orphanage centers, the following procedures must be adhered to (Wildlife conservation regulation, 2020).

Qualification for registering wildlife ranch, farm, breeding facility, zoo or sanctuary:

- i. The applicant is a holder of a right of occupancy over the land intended to be used as a wildlife ranch, farm, breeding facility, zoo or sanctuary;
- ii. The applicant is a citizen of the United Republic of Tanzania and in the case of a body corporate at least 51% of the shares are held by citizens of the United Republic of Tanzania;
- iii. The proposed activity conforms to the land use plan of the area or the use is approved by the relevant local government authority;
- iv. The business plan relates to the proposed undertaking an Environmental Impact Assessment certificate for wildlife captive facility;
- v. The applicant is prepared to micro-chip or to mark each specimen of a species as per procedure,
- vi. The application is in line with the guidelines issued by the Director General,
- vii. The applicant has paid the required fees, complied with other relevant laws, and
- viii. Any other requirement that the Director General may consider necessary.

Registration of a wildlife orphanage facility

- i. The applicant is a holder of a right of occupancy over the land intended to be used as wildlife orphanage facility
- ii. The applicant has an approved veterinary clinic managed by veterinary officers
- iii. The applicant has hired or engaged a veterinary officer with wildlife knowledge
- iv. The applicant has holding ground set out for holding rescued animals while undertaking parental care or treatment.

- v. The proposed activity conforms to the land use plan of the area or the use is approved by the relevant local government authority
- vi. The applicant has submitted a project proposal containing, among other things, the type of animals that can be accommodated
- vii. The application is in line with the guidelines issued by the Director General
- viii. The applicant submits an Environmental Impact Assessment certificate for the proposed facility
- ix. The applicant is a government institution or a non - profit making organization
- x. The applicant has complied with other relevant laws and
- xi. Any other requirement that the Director General may consider necessary.

2.2.2 Purposes of establishing Wildlife Captive Facilities in Tanzania

Majority of WCF are established for business purposes and community services such as recreation, education and conservation purposes (Harvey, 2020). This is due to the fact that running WCF is an investment which, besides recreation, education and conservation which are community and ecosystem services, needs to sell products and services in order to generate profit. A similar purpose was observed when the first WCF (Saanane Island Zoo) was established in Tanzania (Achard and McCulloch, 1967). The main purpose of Saanane WCF was to support community with services such as important educational needs, teaching young people about the diversity, conservation, and significance of the wildlife of their country (Achard and McCulloch, 1967) and also WCF's must sell products and services in order to get income (Harvey, 2020). Nevertheless, due to illegal hunting and other in-situ wildlife conservation challenges, some WCF (Tabora game park and Ruhila Zoo) are established by the Government for conservation purposes specifically to create public awareness of the value of nature and build a strong relationship between communities and wild animal. Similar findings were reported in other studies (see Corkeron, 2009; Leus,

2011; Hacker and Miller, 2016) that zoos and aquariums play an important role in building natural relationships between humans and wildlife.

2.3 Species Composition, Abundance and Source of Animal Species in Wildlife

Captive Facilities of Tanzania

Species composition and abundance of animal species in captive facilities depend on size of WCF culture, economic status of owners and perception of the owners, visitors and public about keeping wildlife in captivity (Corkeron, 2009; Nijman *et al.*, 2018; Pasmans and Hebinck, 2017).

The major source of animals in captivity is the wilderness, however, some may be obtained from other wildlife captive facilities during culling and after some wildlife captive facilities stop operating due to various reasons such as failure to abide laws and regulations of running WCF (Corkeron, 2009; Nijman *et al.*, 2018). Also other sources of animals in captivity such as confiscated animals, injured animals, rescued animals from abusive owners and stray animals (Nijman *et al.*, 2018). According to wildlife conservation regulation of 2020, approval of capturing animals for keeping in WCF from their major sources, the following procedures must be adhered;

Procedure of capturing animals in the Wild

- i. An operator of wildlife captive facility intending to acquire parent stock from the wild shall apply for a parent stock capture permit to the Director General.
- ii. Capturing of parent stock shall be conducted in accordance with the Wildlife Conservation (Capture of Animals) Regulations.
- iii. An operator of a wildlife captive facility shall submit to the licensing officer a copy of the capture permit issued from the Director General;

- iv. Operator should carry out capturing of a parent stock under the supervision of officers approved by the Director General and pay all the necessary costs incurred in the process;
- v. Operator should permanently mark the acquired parent stock in the modality set by the Director General.
- vi. An operator of a wildlife captive facility shall not dispose of any parent stock without the consent of Director General.

Procedure of Capturing animals in Other Wildlife Captive Facilities

An operator of a wildlife captive facility, other than a wildlife orphanage facility, who intends to conduct consumptive use of wildlife shall adhere to the following conditions:

- i. Submission to the Director General of a list containing the number of animal species to be hunted in respect of tourist or resident hunting;
- ii. Payment to the Authority of 10% of game fee payable for every animal hunted in the wildlife.

2.4 Users of Wildlife Captive Facilities of Tanzania

Users of wildlife captive facilities depend on environmental appearance, types of animals and activities conducted which attract visitors (Corkeron, 2009; van der Merwe and Saayman, 2005). The main purposes of users to visit these facilities are entertainment, education and research purposes (Conde, 2013; Kirkwood, 1996; WAZA, 2015). This users of WCF can be either student (low level to high level students), researchers, tourists and businessman (Leus, 2011; Mennen *et al.*, 2016).

2.5 Cost-benefit Analysis of Wildlife Captive Facilities of Tanzania

Evaluation of cost-benefit analysis of wildlife captive facilities is conducted through all running costs and income generated in captivity facilities (Harvey, 2020). Running costs involve construction and maintenance costs, management costs and other contributions to different activities like conservation, and community development (Harvey, 2020). For example, the World Association of Zoos and Aquarium spend US \$350 million per year for conservation (Harvey, 2020; WAZA, 2005). Income generated involves all money giver activities like visiting fees and other services payments (Harvey, 2020). For example, captive facilities contribute \$180 million per year as revenue generated (Harvey, 2020; WAZA, 2005).

CHAPTER THREE

3.0 MATERIAL AND METHODS

3.1 Study Area

The study was conducted in sixteen regions of Tanzania, within TAWA management zones. The regions are; Arusha, Kilimanjaro, Manyara in the Northern zone, Dar es Salaam, Tanga, Pwani, Morogoro in the Coastal zone, Bukoba and Mwanza in the Lake zone, Iringa, Mbeya, Ruvuma, Lindi in Southern zone, and Shinyanga, Tabora and Kigoma in the Western zone as indicated in fig.1 below.

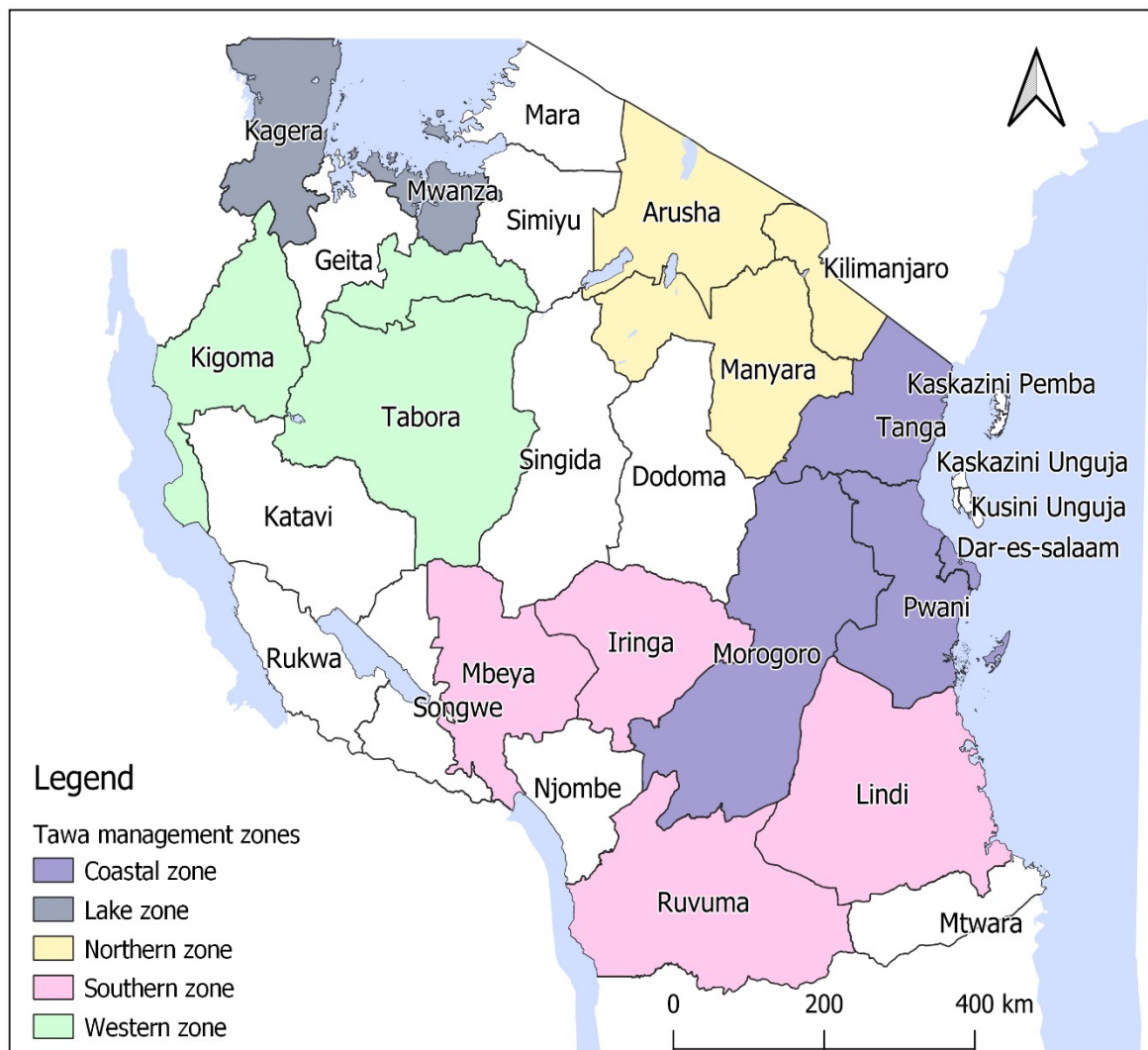


Figure 1: Map of Tanzania showing the study sites

3.2 Methods

3.2.1 Sampling design

The sampling frame included a list of registered wildlife captive facilities from TAWA and Wildlife regulations for running captive facilities which were used to reflect conservation and management of the facility from Wildlife Conservation Act No 5 of 2009 and Wildlife Conservation Regulation of 2020. All Wildlife captive facilities (WCF) in sixteen regions of Tanzania, within 5 TAWA management zones were visited by zone and region in a duration of 120 days once in each WCFs in order to establish which WCF are operating and which are non-operating (Active and dormant).

3.3 Data Collection

Data were collected from each WCF visited through Key informant interviews on January to April 2021, on each TAWA management zone 5 – 10 days were spent for data collection. From each WCF visited, at least one respondent was selected. A total of 120 days were spent in data collection in all WCFs and each WCF was visited once. Key informants include; owners, managers, caretakers of WCF and TAWA officers responsible for captive facilities. A well-prepared checklist with a set of 12 questions was administered to the selected key informants from each WCF which makes total of 71 key informants (Appendix 22). Direct observation and direct count were used to collect information about the type of species and the total number of individual animal species found in different wildlife captive facilities respectively.

The information collected included; history of the WCF, the current status (dormant or Active) of the facility, species present, information on the total cost and revenue generated in WCF.

3.4 Data Analysis

Descriptive statistics was used to determine frequency and percentage of type and purpose of establishing WCF, origin of species, number of users visiting WCF. Also, Cost-benefit analysis of WCF was analyzed through Gross Profit Margin to get Profit Margin ratio.

$$\text{Gross Profit Margin} = \frac{\text{Revenue} - \text{Costs}}{\text{Revenue}} \times 100\%$$

Animal species data were computed to produce species composition and abundance of different WCF. The results are presented in form of tables and figures for easy interpretation.

CHAPTER FOUR

4.0 RESULTS

4.1 Types, status and purposes of establishing wildlife captive facilities in Tanzania

4.1.1 Types and status of wildlife captive facilities in Tanzania

The result shows that currently there are 71 wildlife captive facilities in Tanzania which includes wildlife farms, wildlife ranches, zoos and Proposed orphanage centers (Still in proposal action). But 42 WCF are dormant (not operating) and 28 which is about 39% are active (still on operation) and 1 proposed orphanage center as indicated in Appendix 1. These facilities were dominated by wildlife farms (34) of which only 11 making 45% are active and zoos (29) out of which 14 are working (Figure 2A and 3 and Appendix 1). While most of these facilities are located in Coastal and Northern TAWA management zones and most of the active facilities were in Coastal zones (Figure 2B and 3 and Appendix 1).

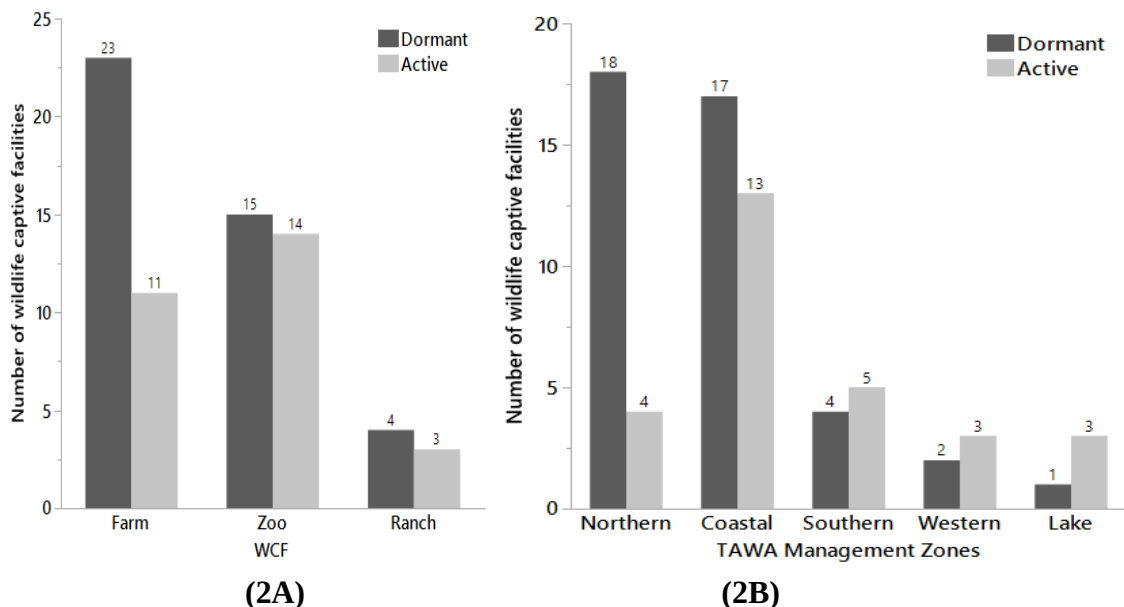


Figure 2: Wildlife captive facilities in TAWA management zones. (2A) Types and status of WCF; (2B) Status of WCF per zone

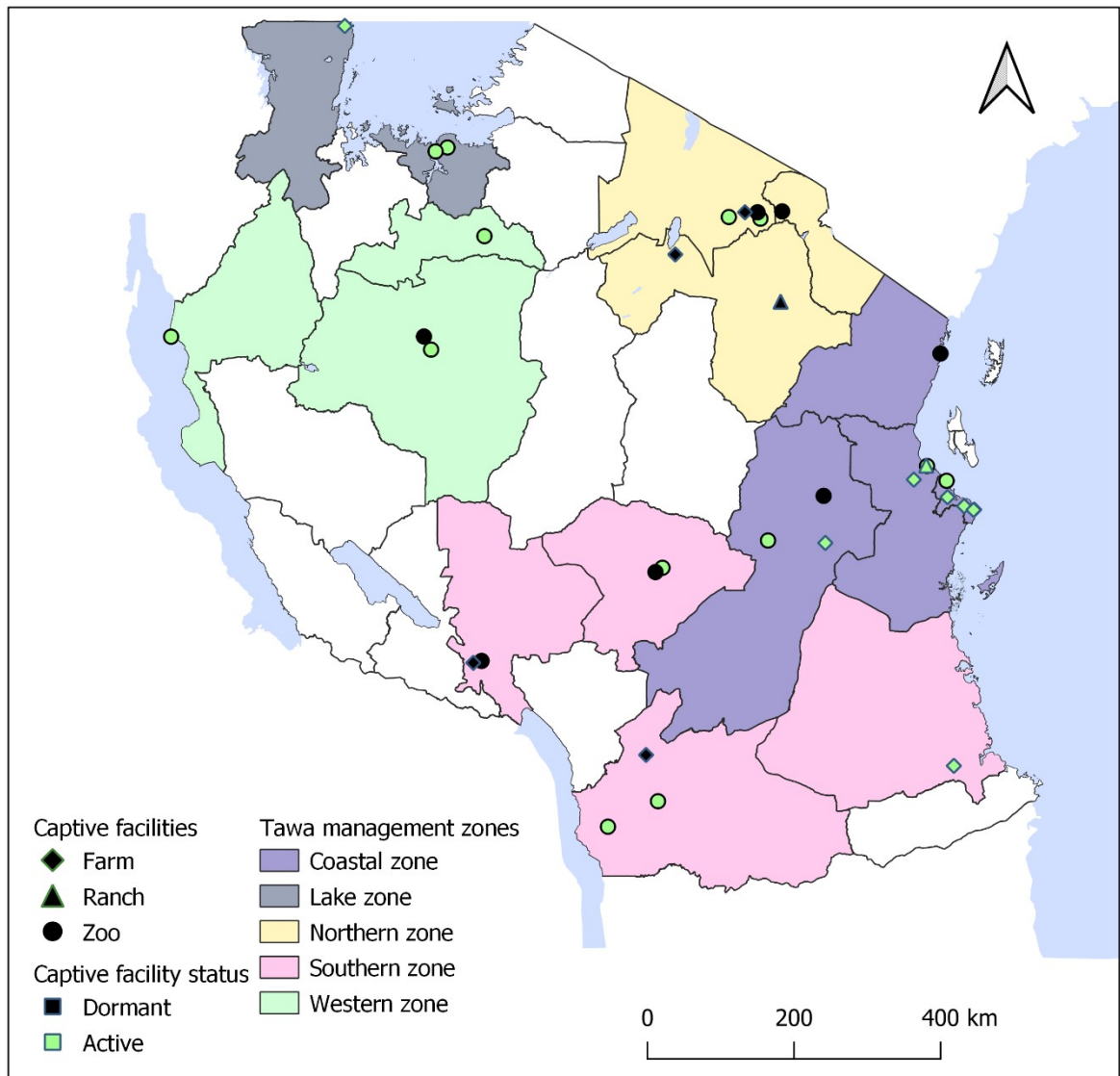


Figure 3: Map of Tanzania showing spatial distribution of WCF

4.1.2 Purposes of establishing wildlife captive facilities in Tanzania

The result shows that there were various reasons and purposes for establishing different wildlife captive facilities. Although in general, business was the major purpose of establishment of WCF by 31% followed by recreation 28.2%, education 21.1% and conservation by 19.7% as shown in figure 4A. In the northern zone, business was the major reason for the establishment of captive facilities by 9.86%, whereas recreation was the major reason for the establishment of facilities in the coastal zone by 11.26% and western zones by 2.81% (Figure 4B and Appendix 2).

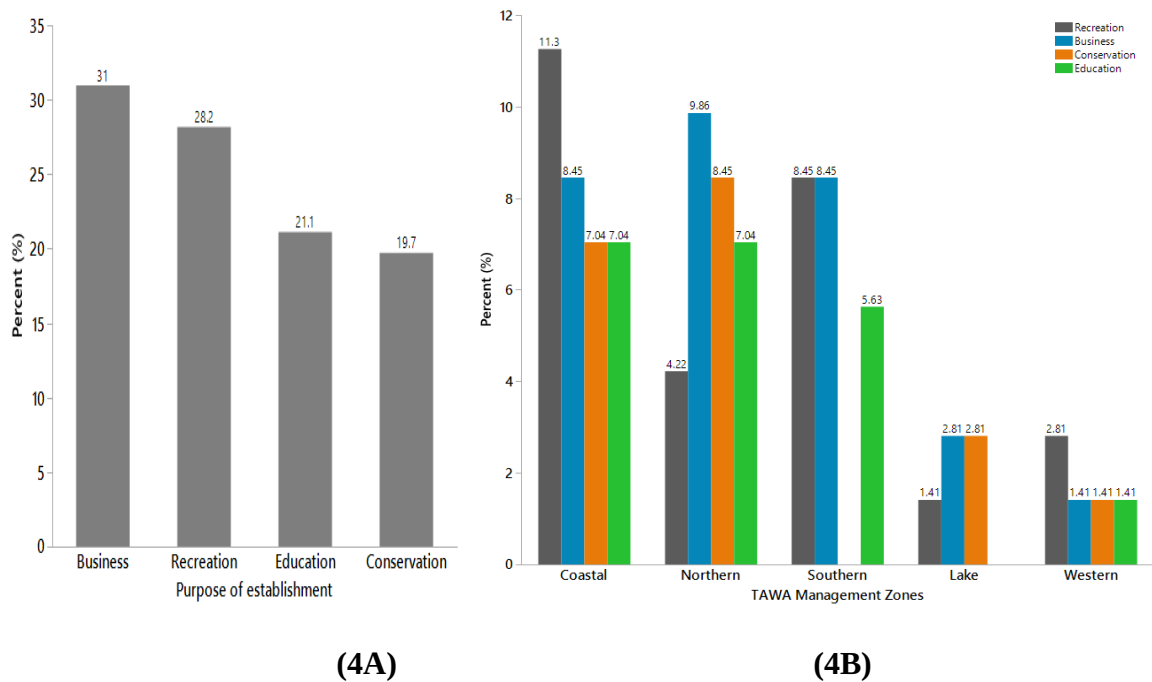


Figure 4: Purposes of establishing different WCF. (4A) General purposes of establishing WCF; (4B) Purposes of establishing WCF per zones

4.2 Species Composition, abundance and source of species in wildlife captive facilities of Tanzania

4.2.1 Species composition and abundance

A total of 1759 animals belongs to 182 different species, and 35 families were encountered from 28 active WCF in the five TAWA management zones. However, the species composition and abundance vary between zones and from one WCF and another, while crocodiles being more abundant species overall, and coastal zone having higher species composition. (Tables 1-9, Plates 1-5 and Appendices 3-7).

4.2.1.1 The TAWA Coastal zone

TAWA Coastal zone has three regions, (Dar es Salaam, Morogoro and Pwani regions) with a total of 66 animal species widely distributed in different types of WCF while *Crocodylus niloticus* is the most dominant specie in this zone. In the Dar es Salaam Region, the study identifies 61 animal species in two types of captive facilities (Appendix 3-5), and Plates (1 and 2B). Morogoro Region has 18 different animal species in two types of wildlife captive facilities and Pwani Region, two animal species in one type of captive facility were identified as presented in Tables (1and 2) and Plate 2B.

Table 1: Species composition in Morogoro Region wildlife captive facilities

Region	Facility	Owner	Species	Common name	Family	Total
Morogoro	Farm	Abood zoo	<i>Bubalus bubalis</i>	Water buffalo	Bovidae	3
			<i>Bugeranus caruncu- latus</i>	Wattled crane	Gruidae	1
			<i>Equus quagga burchellii</i>	Burchell's zebra	Equidae	1
			<i>Pavocristatus</i>	Peacock	Phasianidae	8
			<i>Struthio camelus</i>	Ostrich	Struthionidae	4
			Total			17
	Zoo	Mikumi Snake Park	<i>Ahaetullanusuta</i>	Vine snake	Colubridae	6
			<i>Bitis arietans</i>	Puff adder	Viperidae	6
			<i>Boaedon capensis</i>	Brown house snake	Lamprophiidae	1
			<i>Crocodylus niloticus</i>	Nile crocodile	Crocodylidae	3
			<i>Dendroaspis angusticeps</i>	Green mamba	Elapidae	2
			<i>Dendroaspis polylepis</i>	Black mamba	Elapidae	2
			<i>Kinixys belliana</i>	Hinged back tortoise	Testudinidae	40
			<i>Liasis olivaceus</i>	olive python snake	Pythonidae	3
			<i>Malaclemys terrapin</i>	Diamond back terrapin	Emydidae	4
			<i>Naja haje</i>	Egyptian cobra	Elapidae	1
			<i>Naja mossambica</i>	Mozambique spitting cobra	Elapidae	2
			<i>Python sebae</i>	African rock	Pythonidae	2

		<i>Stigmochelys pardalis</i>	python Leopard tortoise	Testudinidae	2
				Total	74

Table 2: Species composition in Pwani Region wildlife captive facilities

Region	Facility	Owner	Species	Common name	Family	Total
Pwani	Farm	Buibui	<i>Aepyceros melampus</i>	Impala	Bovidae	29
			<i>Struthio camelus</i>	Ostrich	Struthionidae	22
		KJM	<i>Aepyceros melampus</i>	Impala	Bovidae	29
			<i>Struthio camelus</i>	Ostrich	Struthionidae	22
				Total	51	



Plate 1: Some animal species at Dar es Salaam Zoo in Dar es Salaam region. A) Young crocodiles (*Crocodylus niloticus*); B) Aldabra tortoise (*Aldabrachelys gigantea*)

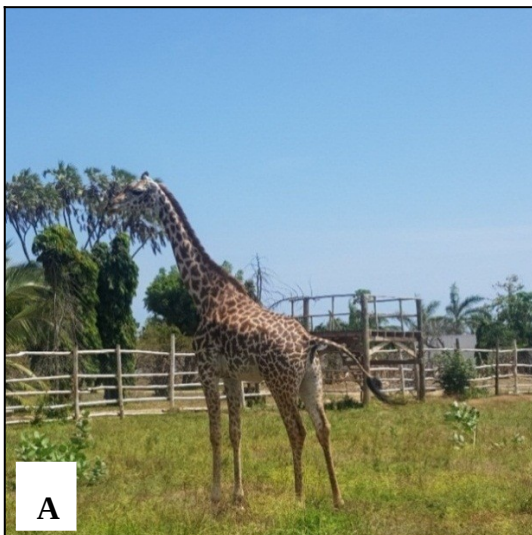


Plate 2: Some animal species in Coastal zone Captive facilities. A) Giraffe (*Giraffa camelopardalis*) at Lake holding farm- Dar es Salaam; B) Ostrich (*Struthio camelus*) at Abood farm – Morogoro

4.2.1.2 The TAWA Southern zone

TAWA Southern zone has four regions (Iringa, Mbeya, Ruvuma and Lindi regions) with a total of 41 different animal species widely distributed in different types of WCF while *Colobus guereza* is the most dominant specie in this zone. The study indicates that there are 10 different animal species in one type of captive facility in Iringa region (Table 3). In Mbeya, Ruvuma and Lindi regions, there are 22, 25 and six different animal species on one type of captive facility respectively as presented in Tables 4 and 5, Plate 3 and Appendix 6.

Table 3: Species composition in Iringa Region wildlife captive facilities

Region	Facility	Owner	Species	Common name	Family	Total
Iringa	Zoo	Mkwawa magic site	<i>Colobus guereza</i>	White monkey	colobus Cercopithecidae	1
			<i>Colobus satanas</i>	Black monkey	colobus Cercopithecidae	2
			<i>Crocuta</i>	Spotted hyena	Hyenidae	1
			<i>hystrix cristata</i>	Crested porcupine	Hystricidae	4
			<i>Malaclemys terrapin</i>	Diamond back terrapin	Emydidae	3
			<i>Numida meleagris</i>	Guinea fowl	Numididae	5
			<i>Papio cynocephalus</i>	Yellow baboon	Cercopithecidae	1
			<i>Python sebae</i>	African rock python	Pythonidae	1
			<i>Stigmochelys pardalis</i>	Leopard tortoise	Testudinidae	5
			<i>Struthio camelus</i>	Ostrich	Struthionidae	3
				Total		26

Table 4: Species composition in Mbeya region wildlife captive facilities

Facility	Owner	Species	Common name	Family	Total
Farm	Ifisi	<i>Aepyceros</i>	Impala	Bovidae	4

		<i>melampus</i>				
		<i>Cercopithecus mitis</i>	Blue Monkey	Cercopithecoid	ea	2
		<i>Connochaetes taurinus</i>	Wildebeest	Bovidae		3
		<i>Crocodylus niloticus</i>	Nile crocodile	Crocodylidae		3
		<i>Crocuta Crocuta</i>	Spotted hyena	Hyaenidae		2
		<i>Equus quagga burchellii</i>	Burchell's zebra	Equidae		1
		<i>Galago moholi</i>	Moholi bushbaby	Galagidae		1
		<i>hystrix cristata</i>	Crested porcupine	Historicide		5
		<i>Malaclemys terrapin</i>	Diamond back terrapin	Emydidae		4
		<i>Pavo cristatus</i>	Indian peafowl	Phasianidae		4
		<i>Pelecanus onocrotalus</i>	Pelican	Pelecanidae		1
zoo		<i>Piliocolobus spp</i>	Red colobus	Cercopithecoid	ea	2
		<i>Potamochoerus larvatus</i>	Bush pig	Suidae		1
		<i>Psittaciformes spp</i>	Parrot	Psittacidae		2
		<i>Python sebae</i>	African rock python	Pythonidae		2
		<i>Rhamphiophis oxyrhynchus</i>	Rufous beaked snake	Lamprophiidae		2
		<i>Stigmochelys pardalis</i>	Leopard tortoise	Testudinidae		6
		<i>Struthio camelus</i>	Ostrich	Struthionidae		2
		<i>Taurotragus oryx</i>	common eland	Bovidae		2
		<i>Tragelaphus imberbis</i>	Lesser kudu	Bovidae		2
		<i>Tragelaphus sylvaticus</i>	Cape bushbuck	Bovidae		3
		<i>Tragulus kanchil</i>	lesser mouse deer	Tragulidae		1
				Total		81

Table 5: Species composition in Lindi region wildlife captive facilities

Region	Facility	Owner	Species	Common name	Family	Total
Lindi	Farm	Rondo wildlife breeding facility	<i>Aepyceros melampus</i>	Impala	Bovidae	6
			<i>Alopochen aegyptiaca</i>	Egyptian goose	Anatidae	3
			<i>Equus quagga burchellii</i>	Burchell's zebra	Equidae	2
			<i>Madoqua kirkii</i>	Kirk's dik-dik	Bovidae	6
			<i>Nanger granti</i>	Grand gazelle	Bovidae	4
			<i>Taurotragus oryx</i>	Common eland	Bovidae	2
				Total		23

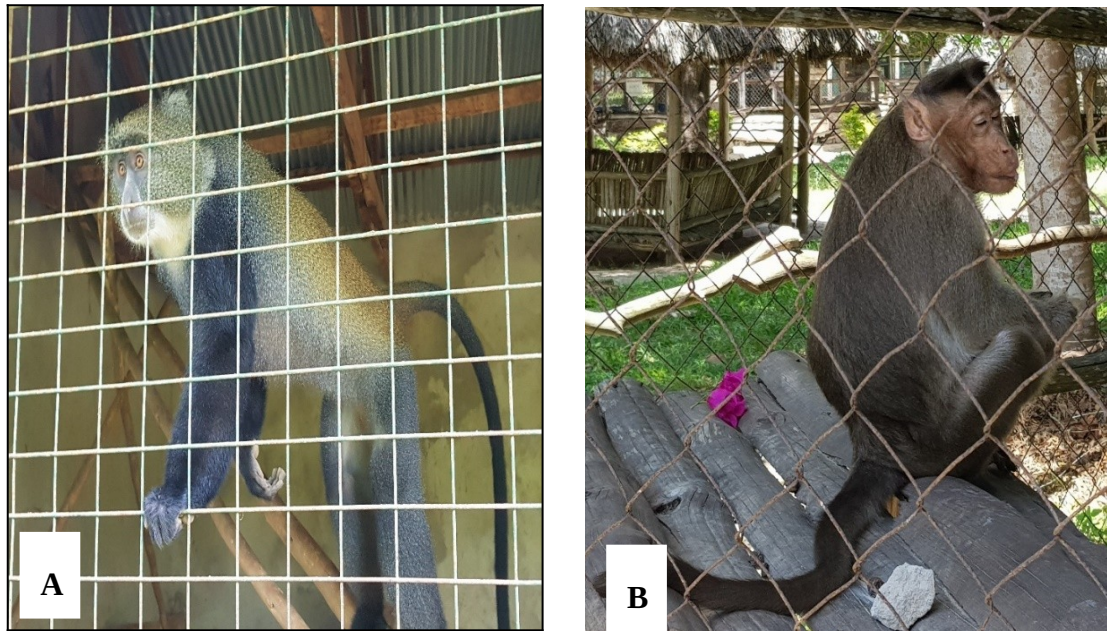


Plate 3: Some animal species in Southern zone Captive facilities. A) Blue monkey (*Cercopithecus mitis*) at Lugali zoo-Ruvuma; B) Olive Baboon (*Papio anubis*) at Ifisi zoo-Mbeya

4.2.1.3 The TAWA Lake zone

TAWA Lake zone has two regions Mwanza and Kagera, with a total of 20 different animal species widely distributed in one WCF while *Tragelaphus strepsiceros* is the most dominant specie in this zone. 20 animal species in one type of WCF were recorded in Mwanza Region as presented in Table 6 and Plate 4.

Table 6: Species composition in Mwanza region wildlife captive facilities

Region	Facility	Owner	Species	Common name	Family	Total
Mwanza	Zoo	Kassa zoo	<i>Bitis arietans</i>	Puff adder	Viperidae	2
			<i>Bitis gabonica</i>	Gaboon viper	Viperidae	1
			<i>Bitis nasicornis</i>	Rhinoceros viper	Viperidae	3
			<i>Crocodylus niloticus</i>	Nile crocodiles	Crocodylidae	4

	<i>Crocuta crocuta</i>	Spotted hyena	Hyenidae	2
	<i>Dendroaspis angusticeps</i>	Eastern green mamba	Elapidae	2
	<i>Dendroaspis polylepis</i>	Black mamba	Elapidae	1
	<i>Dispholidus typus</i>	Boomslang	Colubridae	2
	<i>Liasis olivaceus</i>	Olive python snake	Pythonidae	1
	<i>Naja haje</i>	Egyptian cobra	Elapidae	1
	<i>Naja nigricollis</i>	Black spitting cobra	Elapidae	2
	<i>Naja pallida</i>	Red spitting cobra	Elapidae	2
	<i>Panthera leo</i>	Lion	Felidae	1
	<i>Papio cynocephalus</i>	Yellow baboon	Cercopithecidae	4
	<i>Pseudaspis cana</i>	Mole snake	Pseudaspidae	2
	<i>Python sebae</i>	African rock python	Pythonidae	4
	<i>Rhamphiophis oxyrhynchus</i>	Rufous beaked snake	Lamprophiidae	2
			Total	36
	<i>Aepyceros melampus</i>	Impala	Bovidae	1
Waghi II zoo	<i>Tragelaphus strepsiceros</i>	Greater Kudu	Bovidae	5
	<i>Equus quagga burchellii</i>	Zebra	Equidae	4
			Total	10



Plate 4: An Impala (*Aepyceros melampus*) at Wag-hill Zoo in Mwanza

4.2.1.4 The TAWA Northern zone

TAWA Northern zone has four regions (Tanga, Arusha, Kilimanjaro and Manyara regions) with a total of 45 animal species widely distributed in different types of WCF while *Connochaetes taurinus* is the most dominant species in this zone. 44 different species were recorded in three different type of wildlife captive facilities in Arusha region as presented in Table 7 and Appendix 7. In Kilimanjaro Region, five different species were recorded in one type of wildlife captive facility as indicated in Table 8 and Plate 5.

Table 7: Species composition in a Ranch in Arusha Region

Region	Facility	Owner	Species	Common name	Family	Total		
Arusha	Ranch	Dolly Estate Kilimanjaro Golf Development Ltd	<i>Aepyceros melampus</i>	Impala	Bovidae	92		
			<i>Connochaetes taurinus</i>	Wildebeest	Bovidae	102		
			<i>Equus quagga burchellii</i>	Burchell's zebra	Equidae	31		
			<i>Eudorcas thomsonii</i>	Thomson's gazelle	Bovidae	36		
			<i>Litocranius walleri</i>	Gerenuk	Bovidae	19		
			<i>Nangergranti</i>	Grant's gazelle	Bovidae	34		
			<i>Taurotragus oryx</i>	Common eland	Bovidae	51		
			<i>Tragelaphus imberbis</i>	Lesser kudu	Bovidae	14		
							Total	379

Table 8: Species composition in Kilimanjaro Region

Region	Facility	Owner	Species	Common name	Family	Total
Kilimanjaro	Zoo	Machame zoological garden	<i>Loxodonta africana</i>	African Savannah Elephant	Proboscidae	6
			<i>Aepyceros melampus</i>	Impala	Bovidae	6
		TPC	<i>Connochaetes taurinus</i>	Wildebeest	Bovidae	2

<i>Equus quagga burchellii</i>	Burchell's zebra	Equidae	4
<i>Eudorcas thomsonii</i>	Thomson's gazelle	Bovidae	6
TOTAL			18



Plate 5: Elephants (*Loxodonta africana*) feeding at Machame Zoological Garden in Kilimanjaro Region

4.2.1.5 The TAWA Western zone

TAWA Western zone has three regions which are Kigoma, Tabora and Shinyanga regions, with a total of 10 animal species widely distributed in different types of WCF while *Aepyceros melampus* is the most dominant specie in this zone. In Tabora Region, eight different animal species were recorded in one type of captive facility, five different animal species were recorded in Shinyanga Region and five animal species were recorded in Kigoma region in one type of captive facility as presented in Table 9.

Table 9: Species composition the Western zone

Region	Facility	Owner	Species	Common name	Family	Total			
Tabora	Zoo	Tabora game park	<i>Equus quagga burchellii</i>	Burchell's zebra	<i>Equidae</i>	2			
			<i>Struthio camelus</i>	Ostrich	<i>Struthionidae</i>	1			
			<i>Pavo cristatus</i>	Peacock	<i>Phasianidae</i>	7			
			<i>Redunca redunca</i>	Red buck	<i>Bovidae</i>	2			
			<i>Phacochoerus africanus</i>	Warthog	<i>Suidae</i>	7			
			<i>Kobus ellipsiprymnus</i>	Waterbuck	<i>Bovidae</i>	2			
			<i>Connochaetes taurinus</i>	Wildebeest	<i>Bovidae</i>	4			
			<i>Cephalophinae</i>	Common duiker	<i>Bovidae</i>	1			
								Total	27
			Shinyanga	Savanna plain zoo		<i>Aepyceros melampus</i>	Impala	<i>Bovidae</i>	2
<i>Equus quagga burchellii</i>	Burchell's zebra	<i>Equidae</i>				1			
<i>Nangergranti</i>	Grand gazelle	<i>Bovidae</i>				4			
<i>Kobus ellipsiprymnus</i>	Waterbuck	<i>Bovidae</i>				6			
<i>Pavo cristatus</i>	Peacock	<i>Phasianidae</i>				2			
						Total	15		

Kigoma	Kigoma	<i>Connochaetes</i>	Wildebeest	<i>Bovidae</i>	6
	Hill Top	<i>taurinus</i>			
	Wildlife	<i>Equus quagga</i>	Burchell's	<i>Equidae</i>	8
	Breedin	<i>burchellii</i>	zebra		
	g	<i>Aepyceros</i>	Impala	<i>Bovidae</i>	20
		<i>melampus</i>			
		<i>Nangergranti</i>	Grand	<i>Bovidae</i>	7
			gazelle		
				Total	41

In general, the results show that dominant species (In terms of owners' preference and abundance) vary between WCF and zones. But the following species are dominant in most WCFs; *Crocodylus niloticus* (276), *Aepyceros melampus* (172), *Connochaetes taurinus* (111), *Taurotragus oryx* (69), *Struthio camelus* (63), *Pavo cristatus* (58) and *Stigmochelys pardalis* (53). Despite species abundance and most preferred species, the study revealed peculiar species (not common in most WCF) among WCF, which are *Loxodonta africana* (6), *Giraffa camelopardalis* (1) and *Macaca radiata* (1).

4.2.2 Source of animals found in the wildlife captive facilities

The study intended to explore the source of wildlife in the WCF. It found that acquiring wildlife from other captive facilities and capturing from the wilderness such as Wildlife management area (WMA), Game reserves (GR) Game controlled area (GCA), Nature reserves (NR), Corridor areas and other protected areas were the major source of different parent stocks housed in wildlife captive facilities as shown in figure 5A and appendices 8-15. However, WMAs were the main sources of high number of different species in different WCF as shown in (figure 5A and 5B) and (appendix 8-15).

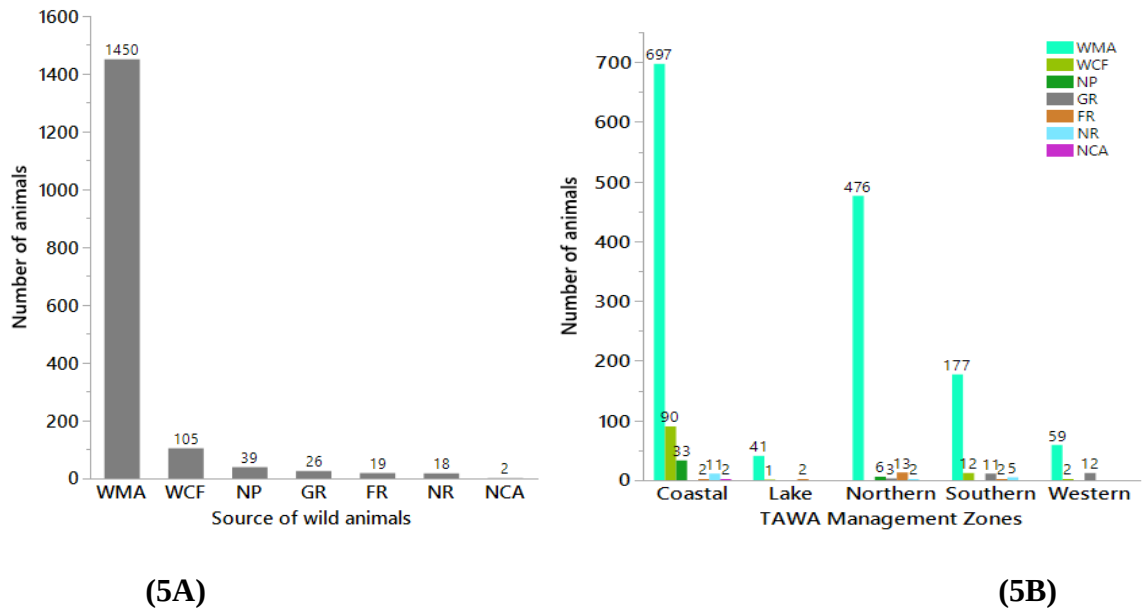


Figure 5: Source of animals in the wildlife captive facilities. (5A) General source of animals in WCF, (5B) Source of animals in WCF per zone

4.3 Users of Wildlife captive facilities

The results show that the main users are both local and foreign visitors. In average, about 223 407 local visitors and 1 781 foreigner visitors visit different WCF found in five TAWA management zones annually (Table 10). It was further found that coastal, northern and lake zones are the leading zones with high number of local visitors of about 201 004; 10 200 and 7 500 respectively followed by southern zone with 3900 visitors and western zones with 800 visitors visiting annually.

Table 10: Type and number of visitors visiting Zoo wildlife captive facilities

Zones	Region	Foreign visitors per year	Local visitors per year
Coastal	Dar es salaam	20	200001
	Morogoro	1	1
	Pwani	500	1002
	Tanga	0	0
Lake	Mwanza	212	7500
Southern			

	Iringa	0	500
	Lindi	0	3
	Mbeya	0	600
	Ruvuma	50	2800
Western			
	Tabora	0	800
Northern			
	Arusha	998	10200
Total		1781	223407

4.4 Cost-Benefit Analysis of Running these wildlife captive facilities for the past five years

The findings show that different costs are incurred and revenues are collected when running wildlife captive facilities. However, the total running cost for wildlife captive facilities includes the cost incurred in the establishment, operational costs and feeding cost as reported in appendices 16,17,18,19,20 and 21. Likewise, it was found that visiting fees is the only source of revenue in wildlife captive facilities especially zoos.

This source of revenue is from local and foreign visitors as shown in appendix 21 in all facilities that allow people to visit. Also, the Gross profit margin for WCF in five years is indicated in the table 11.

Table 11: Gross profit margin of Wildlife Captive Facilities (WCF) in 5yrs

Costs and Benefits	Farms	Ranch	Zoo
Average benefits (TZS)	0	0	476,212,262
Average costs for five years (TZS)	159,427,273	179,500,000	851,724,545
Gross margin	-159,427,273	-179,500,000	-375,512,283
Average costs to			
Average establishment cost	94,454,545	118,500,000	226,909,091
Average operational cost	8,858,182	11,200,000	98,213,091
Average feeding cost	3,027,273	1,000,000	26,154,545

Average benefits from			
Local visitors (annually)	0	0	48,897,444
Foreign visitors (annually)	0	0	46,287,057
BC Ratio	0	0	0.304295122
Gross profit margin	0	0	-0.788539718

CHAPTER FIVE

5.0 DISCUSSION

5.1 Types, status and purpose of wildlife captive facilities in Tanzania

According to the results WCF involves zoos, wildlife farms, wildlife ranches and proposed orphanage centers. Most of WCF were categorized under wildlife farms, followed by zoos and then wildlife ranches. This is because according to Wildlife Conservation Act No. 5 of 2009, investors engaged in the export of wild animals were required to own a registered wildlife captive facility under the Wildlife Division (WD) to support the business. Therefore, the requirement accounted for establishment of many WCF. Also, most WCF were found in town areas. This is attributed by positive tourism perception, good transportation facilities, high population and conservation awareness. The findings are similar to WAZA (2015) who reports that the distribution of wildlife captive facilities in Europe was mainly influenced by good tourism perception, conservation awareness, population, and good transportation facilities where less travelling is involved. Though most of wildlife farms were found to be dormant compared to zoos and wildlife ranches. This might be due to farms occupy large area and require high running cost and the major means of earning money was through exportation of live animals which was ban while zoo could earn money from visiting fee from visitors (Barnes and Jones, 2012). Also, Location of WCF led to dormancy of some WCF especially near the tourism circuit because most of tourists prefer to visit the natural tourism attractions like National parks rather than WCF.

On the other hand, zoo is the leading facility with high number of active WCF. This is because after abolition of live animal trade in 2015, zoos activities were not affected by the abolishment of that trade because zoo favor both business scheme and community services (Wade *et al.*, 2001). Also, lack of restriction rules in size of establishment and allowing visitors to visit any time compared to farms and ranches. Unclear definition of types and pur-

poses of WCF in Wildlife Conservation Act No.5 Of 2009 and Wildlife Conservation Regulation of 2020, lack of knowledge to most investors of types and purposes of WCF (Nijman *et al.*, 2018) which cause wrong performing activities of types of WCF example Machame zoological garden is a zoo while performing activities of Orphanage centers . This forces many investors to invest more in zoos than farms and ranches.

According to the results, 31% of wildlife captive facilities were established for business purpose. Most of WCF which were operating for the purpose of recreation, education and conservation were also performing business as the major purpose, since WCF is an investment which needs to sell products and services in order to generate profit (Cloete *et al.*, 2007). A similar purpose was observed when the first WCF (Saanane Island Zoo) was established in Tanzania (Achard and McCulloch, 1967; Harvey, 2020). Although there are some WCF which perform private recreation such as Abood farm, Lake holdings and Nyati corporation.

Nevertheless, due to illegal hunting and other in-situ wildlife conservation challenges, some WCFs such as Tabora game park and Ruhila Zoo was established by the Government for conservation purposes specifically to create public awareness of the value of nature and build a strong relationship between communities and wild animal. Similar findings were reported by other studies (see Corkeron, 2009; Leus, 2011; Hacker and Miller, 2016) that zoos and aquariums play an important role in building natural relationships between humans and wildlife.

5.2 Species composition, abundance and source of species in Wildlife captive facilities

Many wildlife captive facilities were highly occupied with abundant species of Crocodiles, Impala and Wildebeest as detailed in the results. This is because of low running cost, low

feeding costs and production costs where some of species are reproduced within WCF. Moreover, the abundance of Crocodile and Impala was attributed by their high ability to adapt to the environment once captured as reported by (Achard and McCulloch, 1967). Also, species like Elephant, Giraffe and Bonnet Macaque were found in few facilities because of the owners' interests and special attention required during capturing and keeping them in the facility. It was further noted that owner's economic status and perception about wildlife express the type and number of animals to be kept in captivity. This observation concur with the reasons suggested by WAZA (2015) that the number and type of animal in the captive depends on the ability of the owner to incur the management costs and priority. Also, some WCF play a role of other type of WCF that's why having some species which are rare to occur in WCF like Machame zoological garden play a role of Orphanage center while registered as zoo that's why they have species like Elephants.

Source of animals in wildlife captive facilities

Capturing animals in the wilderness were the major source of animals in the WCF these wilderness areas are all reserved areas where peoples are legally allowed to capture and hunt animals for different purposes like WMA (Geldmann *et al.*, 2013). Ever since the establishment of the first zoo in Tanzania, capturing wild animals from the wilderness was regarded as the main source of wild animals in the captive facilities as reported by Achard and McCulloch (1967). Though majority of the animal species were captured from the different WMAs such as Longido – Enduimet, Randilen and other WMA. This is because t WMAs have high population of animal species which favor easy capturing of animals due to the surrounding community have high essence of conserving animals and also legally WMA is allowed to capture animals by permit (TAWA,2020). Also, even interns of zone WMA is the major source of animals in different WCF despites the low number of species found in that zones. However, capturing animals from other WCF is also regarded as another source

of wild animals in WCF. According to Wildlife Conservation Act No.5 of 2009, when a person wants to quit operations in WCF due to various reasons such as fail to operate or mis-obey laws and regulation of operating WCF animals are returned to the government through Tanzania Wildlife Management Authority (TAWA). Thus, animals in that WCF may be shifted to other wildlife captive facilities. Also, overpopulation through reproduction from parent stocks within WCF and violation of law may lead to transfer of animals from one captive facility to another. For example, some of the wildlife captive facilities were reported to acquire animals from Africa Animals (T) Ltd and Mapinga snake park. Also injured, rescued and stray animals are kept in WCF in order to save the life of that animals before making the final decision whether to return in the wilderness or to be kept in WCF (Redmond, 2010).

5.3 Users of wildlife captive facilities

The main users of WCF were local and foreign visitors. Majority of the visitors were local visitors because most of WCFs are found near their place and accessible. Students are the one visiting frequently the WCF mainly to learn about the environment, wildlife conservation and for leisure (Hacker and Miller, 2016). Also, types of animals kept in the facilities may reflect the number of visitors (D’Cruze *et al.*, 2019) . For instance, Dar es Salaam Zoo and Kassa zoo which seem to have most attractive animals such as Leopard and Lions tend to have a high number of visitors. Also, WCF with unique species which are rare found in the natural areas like snakes like Meserani, Mikumi and Kaole snake parks also have high number of visitation both local and foreign (Benjaminsen *et al.*, 2013). Moreover, WCF located on Non-Tourism Circuit (areas with few natural attractions) and Season of the year (holiday) tend to have high number of visitors as most of official activities are seized and people tend to use WCF for leisure, learning and be connected to the nature like Coastal zone attracts more than 211 204 visitors annually. Generally, type of captivity, location,

season of the year, type of animals in the captivity and other attraction facilities within WCF may determine the number of visitors. This findings is also reported by other scholars (van der Merwe and Saayman, 2005; Corkeron, 2009; WAZA, 2015). Furthermore, zoos were the only facility with a high number of visitors than other WCF. This may be attributed by the regulation in which zoos allow visitors to visit at any time (Gusset and Dick, 2011).

5.4 Cost and Benefit Analysis of wildlife captive facilities of Tanzania

The cost and benefits in WCF were obtained through all running costs and revenue collected by different activities conducted in the facilities. The main sources of income in wildlife captive facilities were visiting fee for both local visitors and foreign visitors. The visiting fee varies from 1000 TZS to 10 000 TZS depending on the type of visitors. The revenue collected in WCFs were found to fluctuate according to the number of visitors which also depend on the type of WCF, types of animals, locations and season of the year. Similar findings were reported by Corkeron (2009) and Saayman (2005) that environmental appearance, seasons, type of WCF, types of animals and activities conducted in WCF can attract the number of visitors in WCF. Meanwhile, majority of WCF which allow visitors to visit any time specifically zoos and other WCF with peculiar species such as Giraffe and attractive species like Lions, Leopard and Crocodiles were able to collect high revenue. For example, Dar es Salaam Zoo with attractive species collect the revenue of 1 933 675 000/=TZS while WCF Wag-hill Zoo with herbivores such as wildebeest, Common eland and Impala generated less revenue of 57 650 600/=TZS.

Additionally, establishment, feeding and management costs were the major costs incurred when running WCF. Though it was found that feeding costs may determine the type of animal in captivity and may also predict the income generated in the captive in terms of profit or loss (Cloete *et al.*, 2007). This is because expenses of feeding costs in WCF with

carnivores is high compared to WCF with herbivores. Example, Dar es Salaam Zoo spends 360 000 000/=TZS on feeding while Meserani Snake Park spends 3 500 000/=TZS on feeding annually. However, some of WCF which allows visitors throughout the year were able to recover a percentage of the operational cost and generate profit. This was a different case for facilities with restricted visitation which were found to run under loss as the operational cost was greater than the income generated. Generally, WCF run under loss, specifically zoos whose 78.9% of the total cost are obtained from other investments.

CHAPTER SIX

6.0 CONCLUSIONS AND RECOMMENDATIONS

This chapter presents conclusions based on the findings as well as challenges and recommendations of the study.

6.1 Conclusions

The types of WCF depend on the main purposes of establishment which change from time to time due to changing purposes and area of these WCF. The study identified three types of WCF in Tanzania namely zoos, farms and ranches with only 39% active.

Although the establishment purposes of WCF determine the types of WCF, the study indicates that most WCF are established for business (31%) and recreation (28.2%). Most species in wildlife captive facilities originate from the wilderness specifically from the Wildlife Management Areas which are most protected from poaching through surrounding community having good spirit in conservation of wildlife animals. A few species were revealed to originate from other wildlife captive facilities which are either overpopulated or closed due to different reasons such as failure of management or infringement of operation.

This study shows that species composition and abundance vary according to preference and income of owners. Also, different species composition attracts different visitors which helps to satisfy their needs. Though most wildlife captive facilities with attractive species (Carnivores) have a large number of visitations, most of them are local visitors. This is because most foreign visitors especially conservators discourage keeping animals in cages if are fit rather, they encourage keeping animals in a free-range, thus they prefer visiting national parks and other protected areas. Most users of these captive facilities are local

visitors (students, researchers, workers, governmental and non-governmental Institutions). Also, visitors vary from zone to zone. Zones with non- tourism circuit have high visitation as the WCF is the only facility which connects peoples with nature and wildlife.

Further, this study shows that the running costs of keeping animals in captive facilities depend on the types of captive facilities and species composition. Free-ranging captive facilities have low running costs compared to closed or caged captive facilities due to that all animals must be provided with each and everything. Also, captive facilities keeping carnivores have high running costs, outstanding to feeding costs and giving shelters due to the nature of that animals. Moreover, it was established that income generated in most WCF are visiting fees collected from visitors. Most visitations done in WCF facilitate revenue collection even if the income generated is lower than the cost incurred though some of them manage to cover some costs.

6.2 Challenges

The following are the challenges facing WCF which are: -

High costs of operating WCF, lack of consultancy of WCF, lack of knowledge to the community about WCF, poor relationship between investors and moderator of WCF, lack of banks recognition to the investors running WCF, low knowledge to the investors and WCF keepers about types and purposes of WCF and long process to streamline the investment and start services.

6.3 Recommendations

The study recommends the following:

- i Education should be provided to the communities and investors to create awareness about wildlife captive facilities. This involves giving education to the investors, WCF keepers and community about categories of WCF and how it operates and their values.
- ii Creation of new model of investment which is Public and Private Partnership (PPP) for proper running of WCF profitably.
- iii Establishment of private WCF consultancy under moderator of WCF (TAWA) in order to help easy development of WCF business or investments
- iv Further studies and continued monitoring of the existence of wildlife captive facilities are needed, with emphasis on understanding the international standard of establishment and management of wildlife captive facilities.

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APPENDICES

Appendix 1: Types and status of wildlife captive facilities of Tanzania

Zone	Region	Active				Dormant			
		Farm	Ranch	Zoo	Total	Farm	Ranch	Zoo	Total
Coastal	Dar es salaam	4	0	2	6	3	0	0	3
	Morogoro	1	0	1	2	1	1	1	3 1*
	Pwani	3	1	1	5	8	1	1	10
	Tanga	0	0	0	0	3	0	2	5
Northern	Arusha	0	1	1	2	2	0	5	7
	Manyara	0	0	0	0	1	2	0	3
	Kilimanjaro	0	1	1	2	1	0	2	3
Southern	Iringa	0	0	1	1	1	0	1	2
	Lindi	1	0	0	1	0	0	0	0
	Mbeya	1	0	1	2	0	0	0	0
	Ruvuma	0	0	2	2	1	0	1	2
Western	Kigoma	1	0	0	0	0	0	0	0
	Shinyanga	0	0	1	1	0	0	0	0
	Tabora	0	0	1	1	0	0	2	2
Lake	Bukoba	1	0	0	1	0	0	0	0
	Mwanza	0	0	2	2	0	0	0	0
	Total	11	3	14	28	23	4	15	42

❖ 1* Proposed Orphanage center located at Doma -Morogoro in Coastal zone

Appendix 2: Purposes of establishing different wildlife captive facilities

Zone		Farm	Ranch	Zoo	Total	%
Coastal	Business	2	1	3	6	8.45
	Conservation	1	0	4	5	7.04
	Education	1	1	3	5	7.04
	Recreation	2	1	5	8	11.26
Northern	Business	1	1	5	7	9.86
	Conservation	0	1	5	6	8.45
	Education	1	1	3	5	7.04
	Recreation	0	2	1	3	4.22
Southern	Business	1	0	5	6	8.45
	Conservation	0	0	0	0	0
	Education	0	0	4	4	5.63
	Recreation	1	0	5	6	8.45
Western	Business	0	0	1	1	1.41
	Conservation	0	0	1	1	1.41
	Education	0	0	1	1	1.41
	Recreation	0	0	2	2	2.81
Lake	Business	0	0	2	2	2.81
	Conservation	0	0	2	2	2.81
	Education	0	0	0	0	0
	Recreation	0	0	1	1	1.14
	Total	10	8	53	70	100

**Appendix 3: Species composition in Dar es Salaam region wildlife captive facilities
(Nyati Corporation Limited farm)**

Region	Facility	Owner	Species	Common name	Family	Total
Dar es Salaam	Farm	Nyati Corporation limited	<i>Aepyceros melampus</i>	Impala	Bovidae	6
			<i>Connochaetes taurinus</i>	Wildebeest	Bovidae	4
			<i>Equus quagga burchellii</i>	Burchell's zebra	Equidae	6
			<i>Eudorcas thomsonii</i>	Thomson gazelle	Bovidae	7
			<i>Nangergranti</i>	Grant's gazelle	Bovidae	7
			<i>Struthio camelus</i>	Ostrich	Struthionidae	2
			<i>Taurotragus oryx</i>	Common eland	Bovidae	4
					Total	36

**Appendix 4: Species composition in Dar es Salaam region wildlife captive facilities
(Bahari Zoo)**

Region	Facility	Owner	Species	Common name	Family	Total
Dar Es Salam	Zoo	Bahari zoo	<i>Aldabrachelys gigantea</i>	Aldabra tortoise	Testudinidae	9
			<i>Colobus guereza</i>	White colobus monkey	Cercopithecidae	1
			<i>Colobus satanas</i>	Black colobus monkey	Cercopithecidae	2
			<i>Crocuta Crocuta</i>	Spotted hyena	Hyenidae	2
			<i>Hyaena hyaena</i>	Stripped hyena	Hyenidae	1
			<i>Kinixys belliana</i>	Hinged back tortoise	Testudinidae	1
			<i>Panthera leo</i>	Lion	Felidae	1
			<i>Python sebae</i>	African rock python	Pythonidae	1
			<i>Stigmochelys pardalis</i>	Leopard tortoise	Testudinidae	19
					Total	37

Appendix 5: Species composition in Dar es Salaam region wildlife captive facilities (Dar es Salaam Zoo)

Region	Facility	Owner	Species	Common name	Family	Total
Dar Es Salam	Farm	Dar es salaam zoo	<i>Aepyceros melampus</i>	Impala	Bovidae	4
			<i>Aldabrachelys gigantea</i>	Aldabra tortoise	Testudinidae	27
			<i>Balearica regulorum</i>	Grey crowned crane	Gruidae	4
			<i>Bitis arietans</i>	Puff adder	Viperidae	2
			<i>Bubo africanus</i>	Spotted eagle owl	Strigidae	2
			<i>Bycanistes brevis</i>	Silvery cheeked hornbill	Bucerotidae	4
			<i>Cercocebus njei</i>	Sanje mangabey	Cercopithecidae	1
			<i>Cercopithecus mitis</i>	Blue monkey	Cercopithecidae	3
			<i>Chelonoidis nigra</i>	Giant tortoise	Testudinidae	5
			<i>Chlorocebus gerythrus</i>	Vervet monkey	Cercopithecidae	3
			<i>Colobus guereza</i>	White colobus monkey	Cercopithecidae	2
			<i>Columba guinea</i>	Speckled pigeons	Columbidae	17
			<i>Crocodylus niloticus</i>	Nile crocodile	Crocodylidae	259

		<i>Crocuta crocuta</i>	Spotted hyena	Hyenidae	5
		<i>Cylindrophis ruffus</i>	Red-tailed pipe snake	Cylindrophidae	1
		<i>Dendroaspis gusticeps</i>	Green mamba	Elapidae	2
		<i>Dendroaspis polylepis</i>	Black mamba	Elapidae	3
		<i>Dendroperdix sephaena</i>	Crested francolin	Phasianidae	1
		<i>Dispholidus typus</i>	Boomsnake	Colubridae	1
		<i>Ephippiorhynchus senegalensis</i>	Saddle billed stork	Ciconiidae	1
		<i>Equus quagga burchellii</i>	Burchell's zebra	Equidae	2
		<i>Gyps rueppellii</i>	Ruppell's vulture	Accipitridae	1
		<i>Haliaeetus vocifer</i>	African fish eagle	Accipitridae	2
		<i>hystrix cristata</i>	Crested porcupine	Hystriidae	25
		<i>Kinixys belliana</i>	Hinged back tortoise	Testudinidae	8
		<i>Leptoptilos crumenifer</i>	Marabou stork	Ciconiidae	5
		<i>Macaca radiata</i>	Bonnet macaque	Cercopithecidae	1
		<i>Malaclemys terrapin</i>	Diamond back terrapin	Emydidae	3
		<i>Malacochersus tornieri</i>	Pancake tortoises	Testudinidae	1
		<i>Mycteria ibis</i>	Yellow billed stork	Ciconiidae	6
		<i>Naja haje</i>	Egyptian cobra	Elapidae	2
		<i>Naja mossambica</i>	Mozambique spitting cobra	Elapidae	2
		<i>Panthera leo</i>	Lion	Felidae	8
		<i>Panthera pardus</i>	Leopard	Felidae	3
		<i>Papio Anubis</i>	Olive baboon	Cercopithecidae	8
		<i>Papio cynocephalus</i>	Yellow baboon	Cercopithecidae	8
		<i>Pelecanus erythrorhynchus</i>	White pelican	Pelecanidae	4
		<i>Procavia capensis</i>	Rock hyrax	Procaviidae	12
		<i>Pternistis leucoscepus</i>	Yellow necked spurfowl	Phasianidae	18
		<i>Python sebae</i>	African rock python	Pythonidae	8
		<i>Sagittarius serpentarius</i>	Secretary bird	Sagittariidae	1
		<i>Spilopelia senegalensis</i>	Laughing dove	Columbidae	23

			<i>Stigmochelys pardalis</i>	Leopard tortoise	Testudinidae	14
			<i>Streptopelia capicola</i>	Ring necked dove	Columbidae	8
			<i>Streptopelias emitorquata</i>	Red eyed dove	Columbidae	1
			<i>Struthio camelus</i>	Ostrich	Struthionidae	6
			<i>Taurotragus oryx</i>	Common eland	Bovidae	8
			<i>Torgos tracheliotos</i>	Nubian vulture	Accipitridae	3
			<i>Varanus exanthematicus</i>	Savannah monitor lizard	Varanidae	5
			<i>Varanus niloticus</i>	Nile monitor lizard	Varanidae	3
					Total	546

Appendix 6: Species composition in Ruvuma region wildlife captive facilities

Region	Facility	Owner	Species	Common name	Family	Total
Ruvuma Zoo		Lugali Zoo	<i>Alopochen aegyptiaca</i>	Egyptian goose	Anatidae	4
			<i>Balearica regulorum</i>	Grey crowned crane	Gruidae	3
			<i>Chlorocebus pygerythrus</i>	Vervet monkey	Cercopithecidae	1
			<i>Colobus guereza</i>	White colobus monkey	Cercopithecidae	4
			<i>Crocodylus niloticus</i>	Nile crocodile	Crocodylidae	3
			<i>Crocuta crocuta</i>	Spotted hyena	Hyenidae	1
			<i>Gyps africanus</i>	White backed vulture	Accipitridae	6
			<i>hystrix cristata</i>	Crested porcupine	Hystricidae	8
			<i>Kobus ellipsiprymnus</i>	Water buck	Bovidae	2
			<i>Litocranius walleri</i>	Gerenuk	Bovidae	6
			<i>Malaclemys terrapin</i>	Diamond back terrapin	Emydidae	4
			<i>Panthera leo</i>	Lion	Felidae	1
			<i>Panthera pardus</i>	Leopard	Felidae	1
			<i>Papio anubis</i>	Olive Baboon	Cercopithecidae	7
			<i>Pavo cristatus</i>	Indian peafowl	Phasianidae	23
			<i>Pseudaspis cana</i>	Mole snake	Pseudaspidae	2

		<i>Python sebae</i>	African rock python	Pythonidae	2	
				Total	78	
	Ruhila zoo	<i>Aepyceros melampus</i>	Impala	Bovidae	2	
		<i>Bitis arietans</i>	Puff adder	Viperidae	2	
		<i>Chlorocebus pygerythrus</i>	Vervet monkey	Cercopithecidae	1	
		<i>Dendroaspis polylepis</i>	Black mamba	Elapidae	3	
		<i>Equus quagga burchellii</i>	Burchell's zebra	Equidae	1	
		<i>hystrix cristata</i>	Crested porcupine	Hystricidae	2	
		<i>Madoqua kirkii</i>	Kirk's dik-dik	Bovidae	2	
		<i>Manis gigantea</i>	Giant pangolin	Manidae	2	
		<i>Papio cynocephalus</i>	Yellow baboon	Cercopithecidae	4	
		<i>Python sebae</i>	African rock python	Pythonidae	3	
		<i>Tragelaphus sylvaticus</i>	Cape bushbuck	Bovidae	2	
					Total	24

Appendix 7: Species composition in a Zoo in Arusha region

Region	Facility	Owner	Species	Common name	Family	Total
Arusha	Zoo	Meserani Snake Park	<i>Atherisceratophora</i>	Usambara bush viper	Viperidae	3
			<i>Bitis arietans</i>	Puff adder	Viperidae	3
			<i>Bitis gabonica</i>	Gaboon viper	Viperidae	4
			<i>Bitis nasicornis</i>	Rhinoceros viper	Viperidae	2
			<i>Boaedon capensis</i>	Brown house snake	Lamprophiidae	4
			<i>Bubo africanus</i>	Spotted eagle owl	Strigidae	1
			<i>Crocodylus niloticus</i>	Nile crocodile	Crocodylidae	4
			<i>Crotaphopeltis hotamboeia</i>	Herald snake	Colubridae	2
			<i>Dendroaspis angusticeps</i>	Green mamba	Elapidae	4
			<i>Dendroaspis polylepis</i>	Black mamba	Elapidae	2
			<i>Dispholidus typus</i>	Boomslang	Colubridae	4

		<i>Elapsoidea loveridgei</i>	East Africa garter snake	Elapidae	1
		<i>Gongylophis colubrinus</i>	Kenyan sand boa	Boidae	1
		<i>Gyps africanus</i>	White backed vulture	Accipitridae	1
		<i>Kinixys belliana</i>	Hinged back tortoise	Testudinidae	3
		<i>Liasis olivaceus</i>	Olive python snake	Pythonidae	1
		<i>Malaclemys terrapin</i>	Diamond back terrapin	Emydidae	7
		<i>Malacochersus tornieri</i>	Pancake tortoise	Testudinidae	6
		<i>Mecistops cataphractus</i>	Slender snouted crocodile	Crocodylidae	2
		<i>Meliera xcanorus</i>	Chanting goshawk	Accipitridae	1
		<i>Najahaje</i>	Egyptian cobra	Elapidae	4
		<i>Naja melanoleuca</i>	Forest cobra	Elapidae	1
		<i>Naja mossambica</i>	Mozambique spitting cobra	Elapidae	3
		<i>Naja nigricollis</i>	Black spitting cobra	Elapidae	3
		<i>Naja pallida</i>	Red spitting cobra	Elapidae	3
		<i>Natrix natrix</i>	Grass snake	Colubridae	1
		<i>Nerodia cyclopion</i>	Green water snake	Colubridae	1
		<i>Psammophis subtaeniatus</i>	Stripe sand snake	Psammophiidae	5
		<i>Pseudaspiscana</i>	Mole snake	Pseudaspididae	2
		<i>python sebaesebae</i>	Northern African rock python	Pythonidae	3
		<i>Rhamphiophis soxyrhynchus</i>	Rufous beaked snake	Lamprophiidae	3
		<i>Spalerosophis arenarius</i>	Red spotted royal snake	Colubridae	1
		<i>Stigmochelys pardalis</i>	Leopard Tortoise	Testudinidae	7
		<i>Thelotornis capensis</i>	savanna vine snake	Colubridae	2
		<i>Varanus exanthematicus</i>	Savannah monitor lizard	Varanidae	2
		<i>Varanus niloticus</i>	Nile monitor lizard	Varanidae	1
				Total	98

Appendix 8: Origin of wildlife in housed in Dar es Salaam Zoo WCF in Dar es Salaam found in the Coastal zone

Region	Name of WCF	Scientific name	Common name	Family name	Total	Origin
Dar es salaam	Dar es salaam zoo	<i>Aepyceros melampus</i>	Impala	Bovidae	4	Pugu Hill Nature reserve and Nalika WMA
		<i>Aldabrachelys gigantea</i>	Aldabra tortoise	Testudinidae	27	Africa animal (T)
		<i>Balearica</i>	Grey	Gruidae	4	Nalika WMA

	<i>regulorum</i>	crowned crane			
	<i>Bitis arietans</i>	Puff adder	Viperidae	2	Ukutu WMA
	<i>Bubo africanus</i>	Spotted eagle owl	Strigidae	2	Ngorongoro conservation Area
	<i>Bycanistes brevis</i>	Silvery cheeked hornbill	Bucerotidae	4	LongidoEndui met WMA
	<i>Cercocebus sanjei</i>	Sanje mangabey	Cercopithecidae	1	Burunge WMA
	<i>Cercopithecus mitis</i>	Blue monkey	Cercopithecidae	3	Mbomipa WMA
	<i>Chelonoidis nigra</i>	Giant tortoise	Testudinidae	5	Nalika WMA
	<i>Chlorocebus pygerythrus</i>	Vervet monkey	Cercopithecidae	3	Burunge WMA
	<i>Colobus guereza</i>	White colobus monkey	Cercopithecidae	2	Africa animal (T)
	<i>Columba guinea</i>	Speckled pigeons	Columbidae	17	Randilen WMA
	<i>Crocodylus niloticus</i>	Nile crocodile	Crocodylidae	259	LongidoEndui met WMA
	<i>Crocuta Crocuta</i>	Spotted hyena	Hyenidae	5	Pugu Hill Nature reserve
	<i>Cylindrophis ruffus</i>	Red-tailed pipe snake	Cylindrophidae	1	Nalika WMA
	<i>Dendroaspis gusticeps</i>	Green mamba	Elapidae	2	LongidoEndui met WMA
	<i>Dendroaspis polylepis</i>	Black mamba	Elapidae	3	Randilen WMA
	<i>Dendroperdix sephaena</i>	Crested francolin	Phasianidae	1	Nalika WMA
	<i>Dispholidus typus</i>	Boomslang	Colubridae	1	Nalika WMA
	<i>Ephippiorhynchus senegalensis</i>	Saddle billed stork	Ciconiidae	1	LongidoEndui met WMA
	<i>Equus quagga burchellii</i>	Burchell's zebra	Equidae	2	Randilen WMA
	<i>Gyps rueppellii</i>	Ruppell's vulture	Accipitridae	1	Wami-Mbiki WMA
	<i>Haliaeetus vocifer</i>	African fish eagle	Accipitridae	2	Zanzibar WCF
	<i>hystrix cristata</i>	Crested porcupine	Hystricidae	25	Mbomipa WMA
	<i>Kinixys belliana</i>	Hinged back tortoise	Testudinidae	8	Tarangire
	<i>Leptoptilos crumenifer</i>	Marabou stork	Ciconiidae	5	Wami-Mbiki WMA

		<i>Macaca radiata</i>	Bonnet macaque	Cercopithecidae	1	Ukuta WMA
		<i>Malaclemys terrapin</i>	Diamond back terrapin	Emydidae	3	Pugu Hill Nature reserve
		<i>Malacochersus tornieri</i>	Pancake tortoises	Testudinidae	1	Pugu Hill Nature reserve
		<i>Mycteria ibis</i>	Yellow billed stork	Ciconiidae	6	Outside the country
		<i>Naja haje</i>	Egyptian cobra	Elapidae	2	Pugu Hill Nature reserve and Saanane NP
		<i>Naja mossambica</i>	Mozambique spitting cobra	Elapidae	2	Pugu Hill Nature reserve
		<i>Panthera leo</i>	Lion	Felidae	8	Wami-Mbiki WMA
		<i>Panthera pardus</i>	Leopard	Felidae	3	Wami-Mbiki WMA
		<i>Papio Anubis</i>	Olive baboon	Cercopithecidae	8	Randilen WMA
		<i>Papio cynocephalus</i>	Yellow baboon	Cercopithecidae	8	Nalika WMA
		<i>Pelecanus erythrorhynchos</i>	White pelican	Pelecanidae	4	Makao WMA
		<i>Procavia capensis</i>	Rock hyrax	Procaviidae	12	makao WMA
		<i>Pternistis leucoscepus</i>	Yellow necked spurfowl	Phasianidae	18	Nalika
		<i>Python sebae</i>	African rock python	Pythonidae	8	Mbomipa WMA
		<i>Sagittarius serpentarius</i>	Secretary bird	Sagittariidae	1	Randilen WMA
		<i>Spilopelia senegalensis</i>	Laughing dove	Columbidae	23	Tarangire
		<i>Stigmochelys pardalis</i>	Leopard tortoise	Testudinidae	14	LongidoEndui met WMA
		<i>Streptopelia capicola</i>	Ring necked dove	Columbidae	8	Nalika WMA
		<i>Streptopelias emitorquata</i>	Red eyed dove	Columbidae	1	LongidoEndui met WMA
		<i>Struthio camelus</i>	Ostrich	Struthionidae	6	Randilen WMA
		<i>Taurotragus oryx</i>	common eland	Bovidae	8	Nalika WMA
				Total	546	

Appendix 9 Origin of Wildlife housed in different WCF found in Dar es Salaam region within Coastal zone

Region	Name of WCF	Scientific name	Common name	Family name	Total	Origin
Dar es salaam	Bahari zoo	<i>Aldabrachelys gigantea</i>	Aldabra tortoise	Testudinidae	9	Ukutu WMA
		<i>Colobus guereza</i>	White colobus monkey	Cercopithecidae	1	Makao WMA
		<i>Colobus satanas</i>	Black colobus monkey	Cercopithecidae	2	Ngarambe WMA
		<i>Crocuta crocuta</i>	Spotted hyena	Hyenidae	2	Makao WMA
		<i>Kinixys belliana</i>	Hinged back tortoise	Testudinidae	1	Ikona WMA
		<i>Panthera leo</i>	Lion	Felidae	1	Ikona WMA
		<i>Python sebae</i>	African rock python	Pythonidae	1	Ngarambe WMA
		<i>Stigmochelys pardalis</i>	Leopard tortoise	Testudinidae	19	Ikona WMA
	Lake holdings	<i>Aepyceros melampus</i>	Impala	Bovidae	1	Randile n WMA
		<i>Alopochen aegyptiaca</i>	Egyptian goose	Anatidae	1	Burunge WMA
		<i>Ardeotis kori</i>	Kori bustard	Otididae	4	Randile n WMA
		<i>Balearica regulorum</i>	Grey crowned crane	Gruidae	14	Burunge WMA
		<i>Connochaetes taurinus</i>	Wildebeest	Bovidae	3	Makame WMA
		<i>Equus quagga burchellii</i>	Burchell's zebra	Equidae	23	Wami-Mbiki WMA
		<i>Giraffa camelopardalis</i>	Girrafe	Giraffidae	1	Ikona WMA
		<i>madoquakirkii</i>	Kirk's dik-dik	Bovidae	16	Burunge WMA
		<i>Nanger granti</i>	Grant's gazelle	Bovidae	1	Burunge WMA
		<i>Pavocristatus</i>	Peacock	Phasianidae	6	Randile n WMA
		<i>Pelecanus erythrorhynchos</i>	White pelican	Pelecanidae	6	Randile n WMA

		<i>Phoenicopterus roseus</i>	Flamingo	Phoenicopte riformes	4	Randile n WMA
		<i>Sagittarius serpentarius</i>	Secretary bird	Sagittariidae	4	Makame WMA
		<i>Struthio cgalus</i>	Ostrich	Struthionida e	6	Randile n WMA
		<i>Taurotragus oryx</i>	common eland	Bovidae	6	Burunge WMA
Total					132	

**Appendix 10: Origin of Wildlife housed in WCF found in Morogoro and Pwani
Region within Coastal zone**

Region	Name of WCF	Scientific name	Common name	Family name	Total	Origin
Morogoro	Abood zoo	<i>Bubalus bubalis</i>	Water buffalo	Bovidae	3	LongidoE nduimet WMA
		<i>Bugerus carunculatus</i>	Wattled crane	Gruidae	1	LongidoE nduimet WMA
		<i>Equus quagga burchellii</i>	Burchell's zebra	Equidae	1	LongidoE nduimet WMA
		<i>Pavo cristatus</i>	Peacock	Phasianidae	8	LongidoE nduimet WMA
	Mikumi snake park	<i>Struthio camelus</i>	Ostrich	Struthionida e	4	LongidoE nduimet WMA
		<i>Ahaetullanasuta</i>	Vine snake	Colubridae	6	Wami- Mbiki WMA
		<i>Bitis arietans</i>	Puff adder	Viperidae	3	LongidoE nduimet WMA
		<i>Colobus satanas</i>	Black colobus monkey	Cercopithecidae	6	LongidoE nduimet WMA
		<i>Crocodylus niloticus</i>	Nile crocodile	Crocodylidae	40	LongidoE nduimet WMA
		<i>Dendroaspis angusticeps</i>	Green mamba	Elapidae	1	LongidoE nduimet WMA
		<i>Kinixys belliana</i>	Hinged back tortoise	Testudinidae	2	LongidoE nduimet WMA
		<i>Liasis olivaceus</i>	olive python snake	Pythonidae	2	Kitonga forests
		<i>Malaclemys terrapin</i>	Diamond back terrapin	Emydidae	3	LongidoE nduimet WMA
<i>Naja haje</i>	Egyptian cobra	Elapidae	2	LongidoE nduimet WMA		
<i>Naja mossambica</i>	Mozambique spitting cobra	Elapidae	2	LongidoE nduimet WMA		

		<i>Python sebae</i>	African rock python	Pythonidae	2	LongidoE nduimet WMA
		<i>Stigmochelys pardalis</i>	Leopard tortois	Testudinidae	1	Arusha snake park
Pwani	Buibui	<i>Aepyceros melampus</i>	Impala	Bovidae	1	LongidoE nduimet WMA
		<i>Struthio camelus</i>	Ostrich	Struthionida e	29	Cactus Internatio nal Ltd
	KJM	<i>Aepyceros melampus</i>	Impala	Bovidae	29	LongidoE nduimet WMA
		<i>Struthio camelus</i>	Ostrich	Struthionida e	22	Cactus Internatio nal Ltd
Total					193	

Appendix 11: Origin of Wildlife housed in WCF found in the Northern zone

Region	Name of WCF	Scientific name	Common name	Family name	Total	Origin
Arusha	Dolly Estate Kilimanjaro Golf Development Ltd	<i>Aepyceros melampus</i>	Impala	Bovidae	92	Randilen WMA
		<i>Connochaetes taurinus</i>	Wildebess	Bovidae	102	Randilen WMA
		<i>Equus quagga burchellii</i>	Burchell's zebra	Equidae	31	Randilen WMA
		<i>Litocranius walleri</i>	Gerenuk	Bovidae	19	Randilen WMA
		<i>Nangergranti</i>	Grant's gazelle	Bovidae	34	Randilen WMA
		<i>Nangergranti</i>	Thomson's gazelle	Bovidae	36	Randilen WMA
		<i>Taurotragus oryx</i>	common eland	Bovidae	51	Burunge WMA
		<i>Tragelaphus imberbis</i>	Lesser kudu	Bovidae	14	Randilen WMA
	Meserani snake park	<i>Atherisceratophora</i>	Usambar bush viper	Viperidae	1	Makame WMA
		<i>Bitis arietans</i>	Puff adder	Viperidae	6	LongidoE nduimet WMA
		<i>Bitis gabonica</i>	Gaboon viper	Viperidae	4	Usambara forests
		<i>Bitis nasicornis</i>	Rhinoceros viper	Viperidae	1	Ikona WMA

		<i>Boaedon capensis</i>	Brown house snake	Lamprophiidae	4	Makame WMA
		<i>Boaedon capensis</i>	Brown house snake	Lamprophiidae	1	Ukutu WMA
		<i>bubo africanus</i>	Spotted eagle owl	Strigidae	2	Makame WMA
		<i>Crocodylus niloticus</i>	Nile crocodile	Crocodylidae	1	Randilen WMA
		<i>Crotaphopeltis hotamboeia</i>	Herald snake	Colubridae	2	LongidoEnduimet WMA
		<i>Dendroaspis angusticeps</i>	Green mamba	Elapidae	1	LongidoEnduimet WMA
		<i>Dendroaspis polyepis</i>	Black mamba	Elapidae	5	Nalika and Burunge WMA
		<i>Dispholidus typus</i>	Boomsnang	Colubridae	4	LongidoEnduimet WMA
		<i>Elapsoidealoveridgei</i>	East africa garter snake	Elapidae	1	Ikona WMA
		<i>Gongylophis colubrinus</i>	Kenyan sand boa	Boidae	1	Makame WMA
		<i>Kinixys belliana</i>	Hinged back tortoise	Testudinidae	3	Makame WMA
		<i>Liasis olivaceus</i>	olive python snake	Pythonidae	1	Randilen MWA
		<i>Malaclemys terrapin</i>	Diamond back terrapin	Emydidae	2	Lake Tanganyika
		<i>Malacochersus tonieri</i>	Pancake tortoise	Testudinidae	1	LongidoEnduimet WMA
		<i>Mecistops cataphractus</i>	slender snouted crocodile	Crocodylidae	3	Makame WMA
		<i>Melierax canorus</i>	Chanting goshawk	Accipitridae	1	Ikona WMA
		<i>Naja haje</i>	Egyptian cobra	Elapidae	4	Ikona WMA
		<i>Naja melanoleuca</i>	Forest cobra	Elapidae	1	Usambara forests
		<i>Najamossambica</i>	Mozambique spitting cobra	Elapidae	3	Pwani
		<i>Najanigracollis</i>	Black spitting cobra	Elapidae	3	Randilen WMA
		<i>Naja pallida</i>	Red spitting cobra	Elapidae	3	LongidoEnduimet WMA

		<i>Natrix natrix</i>	Grass snake	Colubridae	4	Usambara forests
		<i>Nerodia cyclopion</i>	Green water snake	Colubridae	7	LongidoEnduimet WMA
		<i>Psammophis subtaeniatus</i>	Stripe sand snake	Psammophiidae	1	Randilen WMA
		<i>Pseudaspiscana</i>	Mole snake	Pseudaspidae	2	Makame WMA
		<i>python sebae</i>	Northern African rock python	Pythonidae	5	Uyumbu WMA
		<i>Rhamphiophis oxyrhynchus</i>	Rufous beaked snake	Lamprophiidae	2	Makame WMA
		<i>Spalerosophis arenarius</i>	Red spotted royal snake	Colubridae	3	LongidoEnduimet WMA
		<i>Stigmochelys pardalis</i>	Leopard tortoise	Testudinidae	7	Makame WMA
		<i>Thelotornis capensis</i>	savanna vine snake	Colubridae	2	Makame WMA
		<i>Varanus exanthematicus</i>	Savannah monitor lizard	Varanidae	1	Makame WMA
		<i>Varanus niloticus</i>	Nile monitor lizard	Varanidae	4	Lake Victoria forests
Kilimanjaro	Machame zoological garden TPC	<i>Loxodonta africana</i>	Elephant African Savanna Elephant	Proboscidae	6	Serengeti NP
		<i>Aepyceros melampus</i>	Impala	Bovidae	6	LongidoEnduimet WMA
		<i>Connochaetes taurinus</i>	Wildebeest	Bovidae	2	LongidoEnduimet WMA
		<i>Equus quagga burchellii</i>	Burchell's zebra	Equidae	4	LongidoEnduimet WMA
		<i>Eudorcas thomsonii</i>	Thomson's gazelle	Bovidae	6	LongidoEnduimet WMA
Total					501	

Region	Name of WCF	Scientific name	Common name	Family name	Total	Origin
Iringa	Mkwawa magic site	<i>Colobus guereza</i>	White colobus monkey	Cercopithecidae	1	Mbomipa WMA
		<i>Crocuta crocuta</i>	Spotted hyena	Hyenidae	5	Dar es salaam zoo
		<i>hystrix cristata</i>	Crested porcupine	Hystricidae	1	Mbomipa WMA
		<i>Malaclemys terrapin</i>	Diamond back terrapin	Emydidae	3	Dar es salaam zoo
		<i>Numida meleagris</i>	Guinea fowl	Numididae	2	Makame WMA
		<i>Papio cynocephalus</i>	Yellow baboon	Cercopithecidae	3	Dar es salaam zoo
		<i>Stigmochelys pardalis</i>	Leopard tortoise	Testudinidae	4	Mbonipa WMA
		<i>Struthio camelus</i>	Ostrich	Struthionidae	5	Mbonipa WMA
Mbeya	Ifisi zoo	<i>Bubo africanus</i>	Spotted eagle owl	Strigidae	2	Lukwati and Piti game reserve
		<i>Bycanistes brevis</i>	Silvery cheeked hornbill	Bucerotidae	3	Lukwati and Piti game reserve
		<i>Cercopithecus badius</i>	Red colobus	Cercopithecidae	2	Udzungwa forests
		<i>Chlorocebus pygerythrus</i>	Vervet monkey	Cercopithecidae	2	Ikona WMA
		<i>Colobus guereza</i>	White colobus monkey	Cercopithecidae	3	Ikona WMA
		<i>Columba guinea</i>	Speckled pigeons	Columbidae	1	Ikona WMA
		<i>Crocuta crocuta</i>	Spotted hyena	Hyenidae	8	Ikona WMA
					5	Lake Rukwa
		<i>Equus quagga burchellii</i>	Burchell's zebra	Equidae	2	Ikona WMA
			Zebra	Equidae	4	Ikona WMA
		<i>Malaclemys terrapin</i>	Diamond back terrapin	Emydidae	6	Ikona WMA
			Diamond back terrapin	Emydidae	1	Lukwati and Piti game reserve
		<i>Mycteria ibis</i>	Yellow billed stork	Ciconiidae	2	Ikona WMA
<i>Papio cynocephalus</i>	Yellow baboon	Cercopithecidae	1	Ikona WMA		

		<i>Pavocristatus</i>	Peacock	Phasianidae	3	Ikona WMA
		<i>Pelecanus erythrorhynchos</i>	White pelican	Pelecanidae	2	Burunge WMA National Park
					2	Lukwati and Piti game reserve
		<i>Pternistis leucoscepus</i>	Yellow necked spurfowl	Phasianidae	1	Ikona WMA
		<i>Python sebae</i>	Python	Pythonidae	2	Ikona WMA
		<i>Rhamphiophis oxyrhynchus</i>	Rufous beaked snake	Lamprophiidae	4	Uyumbu WMA
		<i>Sagittarius serpentarius</i>	Secretary bird	Sagittariidae	1	Lukwati and Piti game reserve
		<i>Varanus exanthematicus</i>	Savannah monitor lizard	Varanidae	2	Lukwati and Piti game reserve
Total					81	

Appendix 13: Origin of Wildlife housed in WCF found in Lindi and Ruvuma Region within the Southern zone

Region	Name of WCF	Scientific Name	Common name	Family name	Total	Origin
Lindi	Rondo wildlife breeding facility	<i>Aepyceros melampus</i>	Impala	Bovidae	3	LongidoE nduimet WMA
		<i>Alopochena egyptiaca</i>	Egyptian goose	Anatidae	2	LongidoE nduimet WMA
		<i>Equus quagga burchellii</i>	Burchell's zebra	Equidae	4	LongidoE nduimet WMA
			Burchell's zebra	Equidae	6	LongidoE nduinment WMA
		<i>Madoqua kirkii</i>	Kirk's dik-dik	Bovidae	1	LongidoE nduimet WMA
		<i>Nangergranti</i>	Grand gazelle	Bovidae	6	LongidoE nduimet WMA
		<i>Taurotragus oryx</i>	common eland	Bovidae	1	Dar es salaam zoo
Ruvuma	Lugali zoo	<i>Alopochenae gyptiaca</i>	Egyptian goose	Anatidae	6	LongidoE nduimet WMA

		<i>Balearica regulorum</i>	Grey crowned crane	Gruidae	5	LongidoE nduimet WMA
		<i>Chlorocebus pygerythrus</i>	Vervet monkey	Cercopithecidae	4	Nalika WMA
		<i>Colobus guereza</i>	White colobus monkey	Cercopithecidae	23	LongidoE nduimet WMA
		<i>Crocodylus niloticus</i>	Nile crocodile	Crocodylidae	1	Makao WMA
		<i>Crocuta crocuta</i>	Spotted hyena	Hyenidae	2	LongidoE nduimet WMA
		<i>Gyps africanus</i>	White backed vulture	Accipitridae	1	LongidoE nduimet WMA
		<i>Kobus ellipsiprymnus</i>	Water buck	Bovidae	3	LongidoE nduimet WMA
		<i>Litocranius walleri</i>	Gerenuk	Bovidae	2	LongidoE nduimet WMA
		<i>Malaclemys terrapin</i>	Diamond back terrapin	Emydidae	7	LongidoE nduimet WMA
		<i>Panthera leo</i>	Lion	Felidae	4	LongidoE nduimet WMA
		<i>Panthera pardus</i>	Leopard	Felidae	4	Randilen WMA
		<i>Papio anubis</i>	Olive baboon	Cercopithecidae	3	Makame WMA
		<i>Pavo cristatus</i>	Indian peafowl	Phasianidae	8	LongidoE nduimet WMA
		<i>Pseudaspis piscana</i>	Mole snake	Pseudaspidae	2	Makame WMA
		<i>Python sebae</i>	African rock python	Pythonidae	4	Makame WMA
	Ruhila zoo	<i>Aepyceros melampus</i>	Impala	Bovidae	2	LongidoE nduimet WMA
		<i>Bitis arietans</i>	Puff adder	Viperidae	2	Makame WMA
		<i>Chlorocebus pygerythrus</i>	Vervet monkey	Cercopithecidae	1	Makame WMA
		<i>Dendroaspis polylepis</i>	Black mamba	Elapidae	3	Nalika WMA
		<i>Equus quagga burchellii</i>	Burchell's zebra	Equidae	1	Burunge WMA
		<i>hystrix cristata</i>	Crested porcupine	Hystricidae	2	Nalika WMA
		<i>Madoqua kirkii</i>	Kirk's dik-dik	Bovidae	2	LongidoE nduimet WMA
		<i>Manis gigantea</i>	Giant pangolin	Manidae	2	Mbarang' andu

						WMA
		<i>Papio cynocephalus</i>	Yellow baboon	Cercopithecidae	2	Nalika WMA
		<i>Python sebae</i>	African rock python	Pythonidae	3	Makame WMA
		<i>Tragelaphus sylvaticus</i>	Cape bushbuck	Bovidae	2	Nalika WMA
Total					125	

Appendix 14: Origin of Wildlife housed in WCF within Lake zone

Region	Name of WCF	Scientific name	Common name	Family name	Total	Origin
Mwanza	Kassa zoo	<i>Bitis arietans</i>	Puff adder	Viperidae	2	LongidoEnduimet WMA
		<i>Bitis gabonica</i>	Gaboon viper	Viperidae	2	LongidoEnduimet WMA
		<i>Bitis nasicornis</i>	Rhino viper	Viperidae	2	LongidoEnduimet WMA
		<i>Crocodylus niloticus</i>	Crocodiles	Crocodylidae	1	LongidoEnduimet WMA
		<i>Crocuta crocuta</i>	Hyena	Hyenidae	4	LongidoEnduimet WMA
		<i>Dendroaspis angusticeps</i>	Eastern green mamba	Elapidae	1	Lake Victoria forests
		<i>Dendroaspis polylepis</i>	Black mamba	Elapidae	2	LongidoEnduimet WMA
		<i>Dispholidus typus</i>	Boom slang	Colubridae	2	LongidoEnduimet WMA
		<i>Liasis olivaceus</i>	Olive grass	Pythonidae	4	LongidoEnduimet WMA
		<i>Naja haje</i>	Egyptian cobra	Elapidae	1	Lake Victoria forests
		<i>Naja nigricollis</i>	Black spitting cobra	Elapidae	2	Makao WMA
		<i>Naja pallida</i>	Red spitting cobra	Elapidae	2	LongidoEnduimet WMA
		<i>Panthera leo</i>	Lion	Felidae	1	Bahari zoo
		<i>Papio cynocephalus</i>	Baboon	Cercopithecidae	1	LongidoEnduimet WMA
		<i>Pseudaspis piscana</i>	Moll snake	Pseudaspisidae	2	LongidoEnduimet WMA
<i>Python sebae</i>	Python	Pythonidae	3	LongidoEnduimet WMA		

		<i>Rhamphiophisox yrhynchus</i>	Rufous snake	Lamprophiidae	2	LongidoEnduimet WMA
	Wag hill lodge	<i>Aepyceros melampus</i>	Impala	Bovidae	1	LongidoEnduimet WMA
		<i>Tragelaphus strepsiceros</i>	Greater Kudu	Bovidae	5	LongidoEnduimet WMA
		<i>Equus quagga burchellii</i>	Zebra	Equidae	4	LongidoEnduimet WMA
Total					46	

Appendix 15: Origin of wildlife housed in WCF within Western zone

Region	Name of WCF	Scientific name	Common name	Family name	Total	Origin
Tabora	Tabora game park	<i>Aepyceros melampus</i>	Impala	Bovidae	1	LongidoEnduimet WMA
		<i>Cephalophinae</i>	Common duiker	Bovidae	1	LongidoEnduimet WMA
		<i>Connochaetes taurinus</i>	Wildest	Bovidae	4	LongidoEnduimet WMA
		<i>Equus quagga burchellii</i>	Burchell's zebra	Equidae	2	Savannah plain Zoo
		<i>Kobus ellipsiprymnus</i>	Waterbuck	Bovidae	2	Maswa Game reserve
		<i>Pavo cristatus</i>	Peacock	Phasianidae	2	Wami-Mbiki WMA
		<i>Phacochoerus africanus</i>	Warthog	Suidae	2	Moyowosi Game reserve
		<i>Redunca redunca</i>	Redbuck	Bovidae	2	Uyumbu WMA
		<i>Struthio camelus</i>	Ostrich	Struthionidae	1	LongidoEnduimet WMA
	Savanna plains zoo	<i>Aepyceros melampus</i>	Impala	Bovidae	2	LongidoEnduimet WMA
		<i>Equus quagga burchellii</i>	Burchell's zebra	Equidae	1	LongidoEnduimet WMA
		<i>Nangergranti</i>	Grand gazelle	Bovidae	4	LongidoEnduimet WMA
		<i>Kobus ellipsiprymnus</i>	Waterbuck	Bovidae	6	LongidoEnduimet WMA
		<i>Pavo cristatus</i>	Peacock	Phasia	2	LongidoEndui

	Kigoma hill top wildlife breeding	<i>Connochaetes taurinus</i>	Wildebeest	<i>Bovidae</i>	6	met WMA LongidoEndui met WMA
		<i>Equus quagga burchellii</i>	Burchell's zebra	<i>Equidae</i>	8	Moyowosi-Kigosi GR
		<i>Aepyceros melampus</i>	Impala	<i>Bovidae</i>	20	LongidoEndui met WMA
		<i>Nangergranti</i>	Grand gazelle	<i>Bovidae</i>	7	LongidoEndui met WMA
Total					82	

Appendix 16: Costs involved in the management of WCF found in Coastal zone

Region	Name of WCF	Establishment cost	Feeding cost	Operational cost	Annual Total costs	Total cost for 5yrs
Dar es salaam	Bahari zoo	600000000		36000000	636000000	780000000
	Dar es salaam Zoo	900000000	36000000	124000000	1384000000	3320000000
	Mbale traders	50000000	0	0	50000000	50000000
	Light in Africa	54000000		0	54000000	54000000
	Lake holdings	260000000	8000000	19200000	287200000	396000000
	Nyati corporation	120000000	8000000	15600000	143600000	238000000
Morogoro	Mikumi snake park	12000000	4000000	3400000	19400000	49000000
	Abood zoo	15000000	4800000	25500000	45300000	166500000
	Mtomawe zoo	120000000	0	0	120000000	120000000
Pwani	Kaole mamba ranch	56000000	24000000	6600000	86600000	209000000
	Bui bui zoo	130000000	2000000	11520000	143520000	197600000
	KJM animal farm	130000000	0	2520000	132520000	142600000
	Kaole snake park	35000000	500000	17000000	52500000	122500000
Tanga	Macarious Hotel & Co Ltd	45000000	8000000	7200000	60200000	121000000
Total		2530000000	415300000	269540000	3214840000	5954200000

Appendix 17: Costs involved in the management of WCF found in the Northern zone

Region	Name of WCF	Establishment cost	Feeding cost	Operational cost	Annual Total costs	Total cost for 5yrs
Arusha	Meserani snake park	45000000 0	3500000	2210000 0	4757000 00	57750000 0
	Mountain birds and trophies	25000000	0	0	2500000 0	50000000
	Papio farm	40000000	0	0	4000000 0	80000000
	Kill golf/DOLLY ESTATE	25000000 0	0	7200000	2572000 00	28600000 0
Kilimanjaro	Machame zoological garden	24000000 0	5840000 0	1627848 000	1926248 000	86712400 00
	TPC ranch	87000000	2000000	9400000	9840000 0	14400000 0
	Kafoi estates ltd	60000000	0	0	6000000 0	66000000
Manyara	Ilaloi	15000000 0	0	1300000 0	1630000 00	21500000 0
Total		130200000 000	6400000 0	1679548 000	3045548 000	10019740 000

Appendix 18: Costs involved in the management of WCF found in the Southern zone

Region	Name of WCF	Establishment cost	Feeding cost	Operational cost	Total costs	Total cost for 5yrs
Iringa	Mkwawa magic site	94000000	360000 00	282000 00	15820000 0	41500000 0
Lindi	Rondo wildlife breeding site	30000000	0	0	30000000	60000000
Mbeya	Ifisi zoo	800000000	200000 00	236000 00	84360000 0	10180000 00
Ruvuma	Ruhila zoo	0	600000 0	187400 00	24740000	12370000 0
	Lugali minizooological garden	60000000	144000 00	192000 00	93600000	22800000 0
Total		984000000 0	764000 000	897400 00	1150140 000	1814700 000

Appendix 19: Costs involved in the management of WCF found in the Western zone

Region	Name of WCF	Establishment cost	Feeding cost	Operational cost	Annual Total costs	Total cost for 5yrs
Kigoma	Kigoma Hill Top Wildlife Breeding	12300000 0	800000 0	210000 00	15200000 0	26800000 0
Shinyanga	Savanna plains international schools	82000000	300000 0	116000 00	96600000	15500000 0
Tabora	Tabora zoo	0	240000 00	156000 00	39600000	19800000 0
	Merzak Wildlife Zoo	10800000 0	600000	240000 0	11100000 0	12300000 0
	Tabora Wildlife Zoo	26000000	0	0	26000000	52000000
Total		33900000 00	356000 00	50600 000	4252000 00	7700000 00

Appendix 20: Costs involved in the management of WCF found in Lake zone

Region	Name of WCF	Establishment cost	Feeding cost	Operational cost	Annual Total costs	Total cost for 5yrs
Kagera	Kanyigo Wildlife Farm	96000000	2500000	2100000	10060000 0	11900000 0
Mwanza	Kassa zoo	850000000	1200000 0	31000000	89300000 0	10650000 00
	Wag hill lodge	170000000	1000000	159000000	33000000 0	97000000 0
Total		111600000 0	155000 00	19210000 0	13236000 00	21540000 00

Appendix 21: Revenues generated from different wildlife captive facilities

Zone	Region	WCF Name	Income generated in captivity per local visitors annually (Tzs)	Income generated in captivity per foreign visitors for 5yrs (USD)	Income generated for 5 yrs (Tzs)

Coastal	Pwani	Kaole mamba ranch	0	0	0
		Kaole snake park	960000	13400	4800000
		Buibui zoo	0	0	0
		KJM farm	0	0	0
	Dar es salaam	Bahari zoo	0	0	0
		Dar es salaam zoo	386735000	108000	1933675000
		Lake holdings	0	0	0
		Light in Africa	0	0	0
		Mbale traders ltd	0	0	0
		Nyati corporation	0	0	0
	Morogoro	Abood farm	0	0	0
		Mikumi snake park	0	0	0
		Mtomawe	0	0	0
	Tanga	Macarious hotel & co ltd	0	0	0
Lake	Mwanza	Kassa zoo	360048000	0	1800780000
		Waghill	11530000	120	57650600
North-ern	Arusha	Kili golf	0	0	
		Meserani snake park	95000000	750000	475000000
		Mountain birds and trophies	0	0	0
		Papio farm	0	0	0
	Kiliman-jaro	Kafoi estates ltd	0	0	0
		Machame zoological garden	0	0	0
	Manyara	Ilaloi ranching limited	0	0	0
		Ontour (T) ltd	0	0	0
South-ern	Iringa	Mkwawa magic site	790000	0	3950000
	Lindi	Rondo wildlife breeding facility	6000	0	30000
	Mbeya	Ifisi zoo	600000	0	3000000
	Ruvuma	Lugali zoo	24185000	935000	125600000
		Ruhila zoo	66000	0	330000
West-ern	Tabora	Tabora game park	240000	0	1200000

Appendix 22: Checklist of questions to key Informants

I am..... from Sokoine University of Agriculture, Morogoro, and I am part of a research team conducting a study titled “*The Assessment of the current status of wildlife captive facilities in Tanzania*”. I would like to assure you that the information that you will reveal in this interview will be used solely for purposes of research, and that your identity as well as your answers will be treated with confidentiality.

Contacts: +255 755 748 421 (Miss. Zena Mng’ong’o)

A. IDENTIFICATION VARIABLES

- 1. Enumerator’s name
- 2. Date Region District
- 3. Ward Village name
- 4. Respondent’s Name:
- 5. Designation of the respondent:
- 6. Phone number:
- 7. Email address:

B. INFORMATION ON CAPTIVE FACILITIES

- 1. What types of wildlife captive facilities are under Tanzania Wildlife Management (TAWA)?
.....
.....
- 2. What are the purpose of establishing wildlife captive facilities?
 - i.
 - ii.
 - iii.
 - iv.
 - v.

Birth and Mortality rates

Animal Species	Birth rate	Mortality rate

5. Who are common visitors and users of your facility?

1. Locals

2. Foreigners

6. How many local and how many are foreign? (Annual statistics)

Locals:

Foreigners:

7. Which season(s) of the year are most visitations and why?

.....

ENTRANCE FEE FOR VISITORS

Type of visitor	Cost per unit	Number of visitors per Year

8. Which cost items are necessary in running your facility?

.....

9. How much do you spend to run this facility per year?

2. Maintenance Cost:

3. Management Cost:

4. Feeding Cost:

5. Other Cost:

10. Do you get any benefit(s) in keeping this facility?

6. Yes

2. No

11. What is your annual income in this facility?

.....

12. What are the challenges you encountered during establishment and running the facility?

i.

ii.

iii.

iv.

v.

vi.