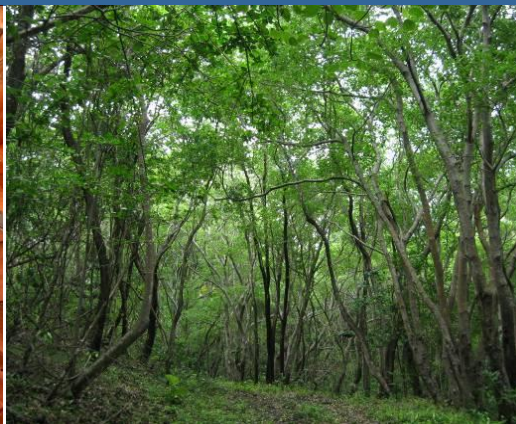


Presented to the European Commission and  
Banana Industry Trust



**NATIONAL FOREST DEMARCATION AND BIO-PHYSICAL  
RESOURCE INVENTORY PROJECT  
CARIBBEAN – SAINT LUCIA  
SFA 2003/SLU/BIT-04/0711/EMF/LC**

**A SURVEY OF WILDLIFE USE ON SAINT  
LUCIA**

By

MATTHEW MORTON

Eastern Caribbean Manager, Durrell Wildlife Conservation Trust

2009



This project is funded by the  
European Union



Finnish Consulting Group  
International

Cover illustrations: Cloud Montane Forest on Mount Gimie Range (Roger Graveson, FCG); Boa constrictor (Matthew Morton, FCG-Durrell Wildlife Conservation Trust); Deciduous Seasonal Forest at Grande Anse (Jenny Daltry, FCG-FFI).

THE OPINION OF THE AUTHOR DOES NOT NECESSARILY REFLECT THE OPINION OF FCG INTERNATIONAL LTD,  
THE BANANA INDUSTRY TRUST (BIT), OR THE EU.

THE AUTHOR AND FCG INTERNATIONAL LTD TAKE NO RESPONSIBILITY FOR ANY MISREPRESENTATION OF  
MATERIAL THAT MAY RESULT FROM THE TRANSLATION OF THIS DOCUMENT INTO ANY OTHER LANGUAGE,  
NOR FOR ANY ATTEMPT TO USE THE MAPS OR GEOREFERENCES IN THIS DOCUMENT FOR NAVIGATIONAL  
PURPOSES.

PUBLISHED BY  
FCG International Ltd  
Helsinki, Finland

COPYRIGHT  
© 2009 Banana Industry Trust (Contracting Authority)

REPRODUCTION FOR RESALE OR OTHER COMMERCIAL PURPOSES IS PROHIBITED WITHOUT PRIOR WRITTEN  
PERMISSION FROM THE COPYRIGHT HOLDER.

PHOTOGRAPHS REMAIN THE COPYRIGHT OF INDIVIDUAL PHOTOGRAPHERS, AS CREDITED IN THE REPORT, WHO  
MUST BE CONTACTED IN ADVANCE FOR PERMISSION TO USE ANY OF THESE PHOTOGRAPHS OUTSIDE OF THIS  
REPORT.

#### RECOMMENDED CITATION

Morton, M. (2009) *A survey of wildlife use on Saint Lucia*. Technical Report No. 7 to the National Forest  
Demarcation and Bio-Physical Resource Inventory Project, FCG International Ltd, Helsinki, Finland.

The National Forest Demarcation and Bio-Physical Resource Inventory Project was funded by the  
European Union under the auspices of the Banana Industry Trust, and implemented by the

Finnish Consulting Group (FCG) International Ltd in collaboration with  
the Saint Lucia Forestry Department.

## Table of Contents

Executive Summary .....	1
1. Introduction .....	3
1.1. Purpose and scope of this report .....	3
1.2. Saint Lucia .....	4
1.3. History of wildlife use and relevant legislation .....	5
2. Methods.....	6
2.1. Questionnaire survey of the public of Saint Lucia.....	6
2.2. Questionnaire survey of expert respondents .....	12
3. Results.....	13
3.1. Respondent demography.....	13
3.2. Perception of trends in target species' populations .....	13
3.3. Respondents' own use of wildlife species.....	14
3.4. Respondents' perceptions of other people's use of wildlife .....	16
3.5. The relationship between respondents' use of wildlife and their perceptions of population trends.....	16
3.6. Reported reasons for not using wildlife species .....	18
3.7. Forest Range differences in questionnaire responses .....	18
3.8. Expert respondent opinions on use of target wildlife species .....	21
4. Discussion .....	26
4.1. Scope, limitations and biases .....	26
4.2. Public awareness of the target species and their status.....	26
4.3. Reasons for not using wildlife .....	27
4.4. Harvesting pressure on different wildlife species .....	28
5. Management priorities for the use of target wildlife species on Saint Lucia .....	37
5.1. Scope .....	37
5.2. Sustainable livelihoods.....	37
5.3. Conservation of endangered game species .....	40
5.4. Reduction of alien invasive game species impacts .....	41
5.5. Research into game species impacts .....	44
6. References .....	45
Acknowledgements .....	47
Annex I: Questionnaires to general public .....	48
Annex II: Guidance for surveyors in administering the general public questionnaire .....	61
Annex III: Questionnaire to expert respondents within the Ministry of Agriculture, Lands, Fisheries & Forestry.....	68
Annex IV: Respondents' Age and Sex by Community and Forestry Range .....	72

## Executive Summary

The purpose of this survey was to assess current levels of exploitation of 14 wild plants and animals, identified by the Saint Lucia Forestry Department (SLFD) as the most important of the many species currently in use on Saint Lucia. The selected plants were gonmyé (*Dacryodes excelsa*), lansan (*Protium attenuatum*), latannyé (*Coccothrinax barbadensis*), and four species of lyenn: awali (*Clusia major* and *C. plukenetii*), ti kannou (*Asplundia rigida*) and ponm dilyenn (*Passiflora laurifolia*); and the animals were bak or forest crab (*Guinotia dentata*), kwab or coastal crab (*Cardisoma guanhumi*), léza or iguana (*Iguana cf iguana*), tet chyenn or boa (*Boa constrictor*), mannikou or opossum (*Didelphis marsupialis*), kochon mawon or feral pig (*Sus scrofa*) and agouti (*Dasyprocta leporina*).

The study entailed an island-wide questionnaire survey of the general public on Saint Lucia, supplemented by a more detailed questionnaire to expert respondents within SLFD. A randomly selected sample of communities, stratified by SLFD administrative ranges and community population size, was selected and 213 persons interviewed.

In general, more respondents reported using the target plant species and invertebrates (crabs) than vertebrate animal species (mammals and reptiles). However, the same respondents reported knowing a larger number of “other people” who use vertebrates. Because the target mammals and reptiles have statutory protection under the 1980 Wildlife Protection Act, this may be indicative of some respondents under-reporting their own use of these animals.

Public confidence in their knowledge of trends in target species populations appeared to be low, with most expressing ignorance of whether populations were increasing, decreasing or stable. In other words, knowledge of the impact of wildlife use on that resource appeared to be a gap in the public’s awareness. It would appear that most people do not consider the sustainability of the wild populations when deciding whether or not to collect or purchase a species or its products.

A large number of respondents did not use most of the target species. The most frequent reasons given were the availability of better alternatives (cited as a reason primarily for the target plants), lack of availability of wildlife species (both plants and animals), and disgust at the idea of using it or dislike of the taste (cited as a reason primarily for non-use of animal species).

There was slightly higher reported usage of some target mammals and reptiles in the eastern ranges of Dennery and Quillesse ranges, compared with the other three administrative ranges. There was also slightly higher usage reported for the target plants and invertebrates in the more populous Northern Range. The sample sizes are small when the data is examined range by range, however, so these observations need to be treated with caution.

Expert respondents were asked to rate the abundance of target species as “abundant”, “common” or “rare”. Their responses indicated that most target species were common. Two were notably considered very abundant - kochon mawon and mannikou - whilst léza and ponm dilyenn were mostly considered rare. This report presents the expert respondents opinions and information on levels of take, frequency of take, numbers of harvesters per range and extraction methods used.

This report covers a gamut of wildlife species used in Saint Lucia from those needing urgent conservation (the Saint Lucia iguana, léza) to non-native species that are considered pests (kochon mawon), with others in between these extremes that seem to show the promise of being possible to sustainably manage. Currently, no extractive uses of léza appear to be sustainable, nor are any likely to be for the foreseeable future; and there clearly should be concerns about the sustainability of using tet chyenn, wild stocks of latannyé and agouti, and possibly ponm dilyenn (though usage of tet chyenn and ponm dilyenn seems low already). There seem to be excellent prospects for sustainably harvesting most other plants and animals in this study at present levels of take, and hunting of kochon mawon and mannikou could be significantly increased. However, with the exception of mannikou and kochon mawon, it would be prudent to assess the sustainability of removing these species at higher than current levels before allowing such a change. Additionally, the collateral damage from hunting these species, particularly impacts from dogs on iguanas, does need to be adequately mitigated before an increase in any hunting pressure can be advised. Other collateral impacts should be assessed too.

Some management priorities for wildlife species used in Saint Lucia are suggested by this work and described in more detail in this and associated reports:

- Establish community-based sustainable harvesting of lansan resin for incense.
- Establish small-scale sustainable farming of agouti.
- Reduce the impact of hunting and hunting dogs on the Saint Lucia iguana.
- Control the numbers of kochon mawon within and outside the Forest Reserve.
- Assess the impacts of mannikou on native wildlife species.

# 1. Introduction

## 1.1. Purpose and scope of this report

This survey was conducted as a part of the National Forest Demarcation and Bio-Physical Resource Inventory Project, funded by the European Community under the Saint Lucia SFA2003 Programme of Economic and Agriculture Diversification and Poverty Reduction through Integrated National Resources Management. The purpose of this inventory project was “to survey and demarcate the physical parameters of the public forest reserve and conduct a comprehensive biophysical inventory/assessment and management system of forest resources”. This report forms a part of Result 5, namely an “assessment report on wildlife use”.

The scope of this work was limited to a brief (one month), island-wide questionnaire survey of the public of Saint Lucia, seeking responses on their use, and their knowledge of others’ use of selected forest wildlife species on the island. Whilst an effort was made to speak to a representative range of all Saint Lucia’s citizens, it was not possible to draw a truly random sample of respondents and some possible biases are discussed below. To provide context, a small number of ‘expert respondents’ working within the Ministry of Agriculture, Lands, Fisheries & Forestry were also questioned in some more detail about exploitation of these species of interest.

The sample size attained in this survey, though reaching over 200 citizens of Saint Lucia, is still only a small proportion (about 0.001%) of the country’s total population. This, combined with possible biases, led to the decision use only descriptive statistics to examine and interpret the data. A more statistically rigorous study was beyond the scope of this survey.

The purpose of this report is to assess current levels of exploitation of selected forest wildlife. ‘Wildlife’ in the context of this report refers to free-living (not domesticated) species of both plants and animals, and includes both native and introduced species. One of the survey’s target animal species (the pig, *Sus scrofa*) is domesticated in Saint Lucia, but this survey restricted itself to only feral populations of this species (i.e. not under the control of humans). Likewise, one target plant species (the broom palm, *Coccothrinax barbadensis*) is also cultivated, but this survey restricted itself to only uncultivated plants of this species. This survey did not include trees used for timber, which are covered under separate reports.

Eleven native and non-native target animals and plants were selected in consultation with the Saint Lucia Forestry Department (SLFD, Ministry of Agriculture, Lands, Fisheries & Forestry) so that questionnaire respondents were not saturated with questions. As with other biological assessments in this inventory project, species of interest were selected only from terrestrial forest wildlife and so some rather notable examples of exploited marine species, including the marine alga sea moss and a number of globally threatened marine turtles, were excluded. However, two commonly used species of crab – the coastal kwab *Cardisoma guanhumi* (species identity to be confirmed) and the forest bak *Guinotia dentata* (species identity not confirmed) – were included because their life history is predominantly terrestrial. Exclusively freshwater aquatic species that are exploited on Saint Lucia (such as crayfish and eels), on the other hand, were not included in this survey.

This survey was not designed to directly assess the impact or sustainability of this exploitation, although respondents were questioned about their perception of trends in individual species. In

addition, some more detailed information on the perception of impacts was sought from interviews with expert respondents. To accurately assess the impacts of exploitation on wild populations would require a longer-term field study, which is beyond the scope of this project.

Kwéyòl spellings follow Frank (2001) where possible. Additional plant names follow Graveson (in prep.).

## **1.2. Saint Lucia**

Saint Lucia is located within the Windward Islands of the Lesser Antilles in the West Indies. Its closest neighbouring islands are Martinique, 32km to the north, and Saint Vincent, 40km to the south. Saint Lucia is the second largest island of the Lesser Antilles, with an area of 616km<sup>2</sup>, and with a maximum length and width of 43km and 21km, respectively. The human population is close to 166,838 residents, giving a mean density of approximately 1,036/km<sup>2</sup>, but much of the island's interior is uninhabited.

Volcanic in origin, Saint Lucia has a mountainous topography dominated by a central ridge running almost the full length of the island from north to south. Numerous steep offshoot ridges extend to both sides of the coasts. Some valleys are broad and occupied by large banana plantations, including Cul-de-sac, Roseau and Mabouya. These valleys, together with the area around the town of Vieux-Fort in the South, account for most of the flat lands of the country. The central southern part of the country has high mountains (Mount Gimie being the highest at 958m). The coastlines, particularly the east coast, are deeply indented by near-vertical cliffs and have a number of narrow sandy beaches.

The island's tropical marine climate is characterized by relatively uniform high temperature throughout the year. The dry season is roughly from January to April and the rainy season from May to August, with usually sunny, warm weather from September to October. (This pattern is variable, however, and the present study regularly experienced torrential storms). Tropical storms and hurricanes are infrequent, with the majority of West Indian tropical cyclones passing to the north of Saint Lucia. The hottest period is May to October, and the coolest, December to March, giving a mean annual temperature of approximately 26°C at sea level. Annual rainfall varies from 1,524-1,778mm in the north to 2,540-3,683mm in the mountainous interior of the south.

There are 21,692 hectares of natural vegetation types in Saint Lucia, of which 9,196 hectares are within the Government Forest Reserve (protected forests). Graveson (2009) described the different types of forest cover, which range from a very xeric littoral shrubland and mangroves on the coast to a lush rainforest and elfin shrubland in the high peaks.

Approximately 30% of Saint Lucia's land area is pastoral and arable land. Originally the mainstay of the economy, agriculture has been in decline in recent years, contributing only 3.4% of Gross Domestic Product (GDP) in 2005, with bananas the principal export crop. The economy of Saint Lucia has shifted to a service economy, with tourism the largest economic sector, accounting for 13.6% of GDP in 2005.

### 1.3. History of wildlife use and relevant legislation

Exploitation of forest wildlife on Saint Lucia dates back to the island's first Amerindian settlers, around 200AD. The collection of wild plants and hunting of animals continued through the colonial period. Breen (1844) provided a long list of useful plants and observed "the woods are inhabited by the wild ox, musk rat, wild hog, iguana, and agouti, which afford excellent sport to the native *chasseurs*". The Biodiversity Country Study Report by the Government of Saint Lucia (GOSL, 1998) briefly outlined some uses of timber and non-timber (including animal) species.

Hunting of wild birds was first restricted by the Wild Bird Protection Ordinance of 1885, which established open and close hunting seasons for migratory species and protected several birds that were perceived to be in danger of over-hunting. This was rarely enforced, however, and indiscriminate hunting was said to continue through the 1960s (Towle & Towle, 1991). The Wild Bird Protection Ordinance was subsequently updated and expanded to include other animals in the Wildlife Protection Act (1980), which greatly restricted the hunting of a number of animals. Prior to this moratorium, John (2001a) reported "hunting of indigenous wildlife for food was a common practice". He considered some non-native species such as agouti (*Dasyprocta leporina fulvus*), and opossum or mannikou (*Didelphis marsupialis marsupialis*) as indigenous species because they are considered 'naturalized' on Saint Lucia (but see Clarke, 2009). John (2001a) also made special mention of the severe exploitation of the endemic Saint Lucia amazon (*Amazona versicolor*), which had devastating impacts, as documented by various authors (Porter, 1929; Danforth, 1935; Wingate, 1969; Diamond 1973; Butler, 1977).

A small hunting association has lobbied for the moratorium to be lifted, but John (2001a) documented a large majority of the Saint Lucia population registering disapproval of hunting. These results were collected by the GOSL's Department of Statistics from a sample of 505 respondents that was "statistically representative of the population by age, gender, religion, occupation and distribution". Nonetheless, illegal hunting of wild animals clearly does continue on Saint Lucia, as documented by this report.

The Wildlife Protection Act (1980) offers different levels of protection to named species of animals, with four of the seven target animal species in this survey protected under Schedule 1: the iguana or léza (*Iguana cf iguana*), the boa constrictor or tet chyenn (*Boa constrictor orophias*), the agouti (*Dasyprocta leporina fulvus*), and the mannikou (*Didelphis marsupialis marsupialis*).

There is no specific legislation protecting individual species of plants, but Article 33a of the Forest, Soil and Water Conservation Act (1945, revised 2001) prohibits the felling, cutting, girdling, marking, lopping, tapping, or bleeding of any tree on Crown land without permission from a forestry officer (the Act includes palms, bamboos, stumps, brushwood and canes in its definition of 'tree'). As with all animal species, plants within the Government's Forest Reserve and Saint Lucia's Nature Reserves are also afforded protection under the Wildlife Protection Act (1980).



## 2. Methods

### 2.1. Questionnaire survey of the public of Saint Lucia

Eleven target wildlife species of interest were chosen, based on their known importance to local livelihoods, their conservation significance and ease of recognition. To avoid saturating and boring respondents with too many questions, these eleven species were divided into two sets: Common Game (Fig 1), and Plants and Less Common Game (Fig 2). Each respondent was questioned on only one set.

The target species were defined, in consultation with SLFD, as the following:

Plants:	Gonmyé or Gom (gum, resin)	<i>Dacryodes excelsa</i>
	Lansan (incense)	<i>Protium attenuatum</i>
	Latannyé (palm for brooms)	<i>Coccothrinax barbadensis</i>
	Lyenn (lianas)	(see below)
Animals:	Agouti	<i>Dasyprocta leporina fulvus</i>
	Bak (forest or stream crab)	<i>Guinotia dentata</i>
	Kochon mawon (wild pig)	<i>Sus scrofa</i>
	Kwab (coastal crab)	<i>Cardisoma guanhumi</i>
	Léza, gwo zandoli (iguana)	<i>Iguana cf iguana</i>
	Mannikou (opossum)	<i>Didelphis marsupialis marsupialis</i>
	Tet chyenn (boa constrictor)	<i>Boa constrictor orophias</i>

The species identities of kwab (tentatively, *Cardisoma guanhumi*; see Bright & Hogue, 1972; Abele & Kim, 1986) and bak (tentatively, *Guinotia dentata*; see Rodriguez & Lopez, 2003) need to be confirmed.

Gom refers to the product (resin) used from the Gonmyé tree; it is sometimes used as an abbreviation in this report (for example on labels on graphs). Lansan refers to both the tree and its product (a resin burned as incense).

Four separate plant species are commonly called lyenn, though two share the same Kwéyòl name (R. Graveson, pers. comm.). However, most respondents did not make a distinction between these four species. When they did, the species were recorded separately; otherwise they were treated collectively as lyenn. Because of this technicality, plant targets of this survey are referred to collectively as “plant groups” or just “plants”, rather than plant species. The four lyenn species are:

Awali	<i>Clusia major</i> and <i>Clusia plukenetii</i>	moist forest
Ti kannou	<i>Asplundia rigida</i>	
Ponm dilyenn	<i>Passiflora laurifolia</i>	dry forest

Ti kannou (Ti kanot in some figures in this report) is also known as sidjinn, but the former name was the one used in the delivery of questionnaires. Technically, only ponm dilyenn is a true liana (a climbing vine); the others are the aerial roots of their respective tree species.

Fig. 1. Wildlife species in questionnaire set 1: Common Game and agalo (harvested in Saint Lucia but not covered in this report)

Photos (a)-(c), (e) © M. Morton / Durrell; photo (d, f), © E. Corry / Durrell.



(a) Agouti



(b) Mannikou (opossum)



(c) Kochon mawon (wild pig)



(d) Bak (forest or stream crab)



(e) Kwab (coastal crab)



(f) Agalo (leatherback turtle)



Fig. 2. Wildlife in questionnaire set 1: Plants and Less Common Game

The lyenn shown in (d) is awali. Photos: (a), (e), (f) © M. Morton / Durrell; (b) © A. Toussaint; (c), (d), © R. Graveson.



(a) Latannyé (broom palm)



(b) Lansan (incense)



(c) Gonmyé (gum, resin)



(d) Lyenn ('lianas')



(e) Tet chyenn (boa constrictor)



(f) Leza, gwo zandoli (iguana)



Surveys were conducted by two teams of two surveyors each, made up of SLFD staff and Durrell Wildlife Conservation Trust (Durrell) volunteers. This allowed questions to be asked or answered in English, Kwéyòl or both. Every respondent was asked about one set of species. Questionnaires consisted of some core questions that all respondents were asked, plus additional optional questions the responses to which were recorded if they were volunteered by respondents. Questionnaire forms were not filled out by the respondents themselves, but by the survey teams, and were subsequently filed in a spreadsheet (Microsoft Excel 2002). The questionnaire forms are provided in Annex I.



Fig. 3. SLFD administering questionnaires in Saint Lucia (© M Morton/ Durrell). This photo was taken during a 2005 wildlife questionnaire using protocols from which the 2009 questionnaire was developed.

Questionnaire delivery was conversational and intended create a relaxed opportunity for respondents to speak without feeling that it was a formal exercise in collecting data. However, the questionnaires followed a detailed protocol, described in Annex II. No details of the personal identity of the respondents were sought, to encourage them to speak more openly about illegal exploitation practices.

It should be noted that while the selection of interview locations was systematic/random (see below), it was not possible to randomize the interviewees within every location. To an extent, interviewees were self-selecting (i.e. based on whether or not they agreed to be interviewed) and there was

also a bias towards time of day because interviews were conducted during normal daytime working hours. Most people approached did agree to be interviewed, but a minority did not, citing either that they were busy or that they did not want to give a reason. Some attempt was made to counter the bias against respondents who were out at work by seeking some respondents working in agricultural areas around human settlements (although this introduced a bias towards agricultural workers).

The surveyors aimed to distribute respondents equally between four broad demographic classes:

- adult male < approx 40 years old
- adult male > approx 40 years old
- adult female < approx 40 years old
- adult female > approx 40 years old

Twelve children (< approx 16 years old) were also questioned to gauge their knowledge and attitudes towards wildlife use. The majority of the interviewees were adults, however: these being more likely to have collected or purchased wildlife

Sample strata were allocated in Arc View GIS, using Forest Ranges (SLFD administrative units) and census data per “settlement” (a settlement being an area including  $\geq 1$  communities) from the 2001 census of Saint Lucia (GOSL, 2002). Individually identifiable demographic data from this census

were not available for this survey. Settlement areas were classified using Arc View 3.2 into four quantile classes of human population density (people per hectare, 2001 census: GOSL, 2002):

- 0 [not used]
- 1 - 102
- 104 - 341
- 342 - 1,055
- 1,056 - 20,357

This classification was selected because most settlement areas have a population density <1,000 people/ha (Fig. 4) and these quantiles emphasized smaller communities in Saint Lucia. A four class quantile classification ensured some samples (1 settlement per Range) in the most densely populated areas and divided the rest amongst the less densely populated areas of Saint Lucia in the 1-1,055 people/ha interval. Most other classifications of these census data either result in almost no weight being given to centres of high human population density (equal interval; natural breaks [Jenks optimization]), or they lump all high density areas in a single class with most low density areas (e.g. a 4 class classification on equal polygon area gives the following classes: 0-10; 11-56; 59-258; 259-20,307).

This produced 20 strata, within which one point was allocated at random using the Animal Movement extension (Hooge & Eichenlaub, 2000). Random points within each area were then visually inspected against the D.O.S. 1:25,000 map of Saint Lucia, plus a map of all houses on Saint Lucia, and moved to the nearest mapped settlement within that area and stratum. If there was no mapped settlement within a “settlement” area that a random point fell in, a second point was randomly allocated within the same Range-plus-settlement stratum.

Fig. 4. Human population density within settlements (*sensu* GOSL, 2002) on Saint Lucia.

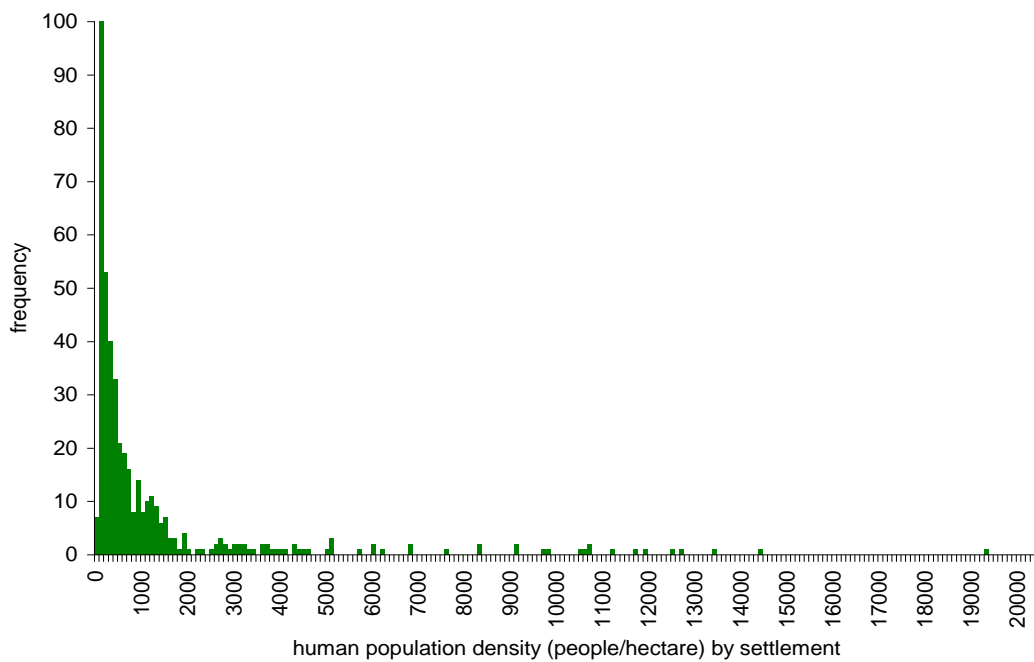


Fig. 5. The location of areas where interviews were conducted, selected using stratified random sampling.

The central uncoloured area of the map is the unsettled Forest Reserve, although some “settlements” (*sensu* GOSL, 2002) do overlap with the boundary of this reserve.

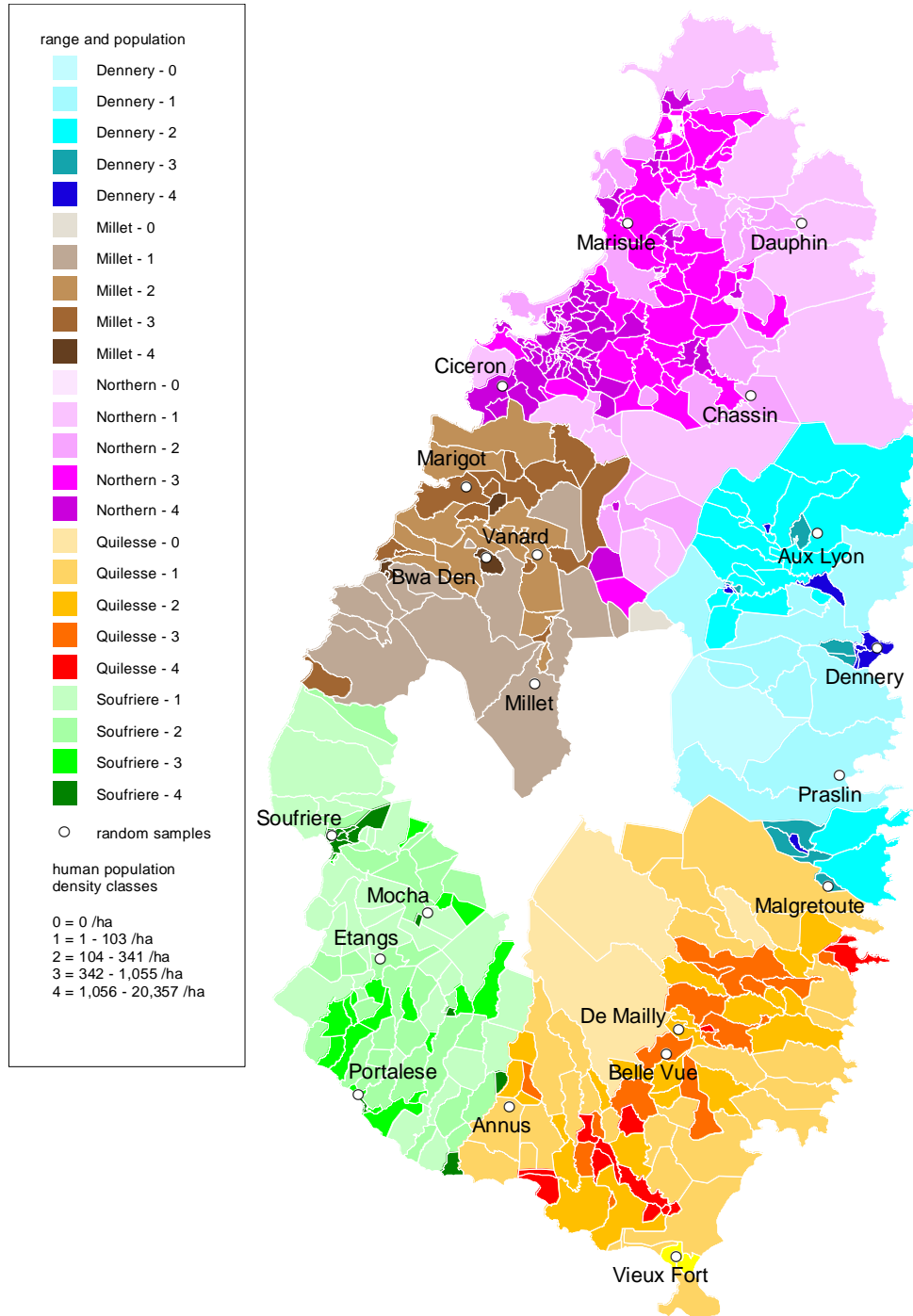


Fig.5 shows the scheme for sampling communities in the survey and the 21 communities that were visited to interview respondents.

## **2.2. Questionnaire survey of expert respondents**

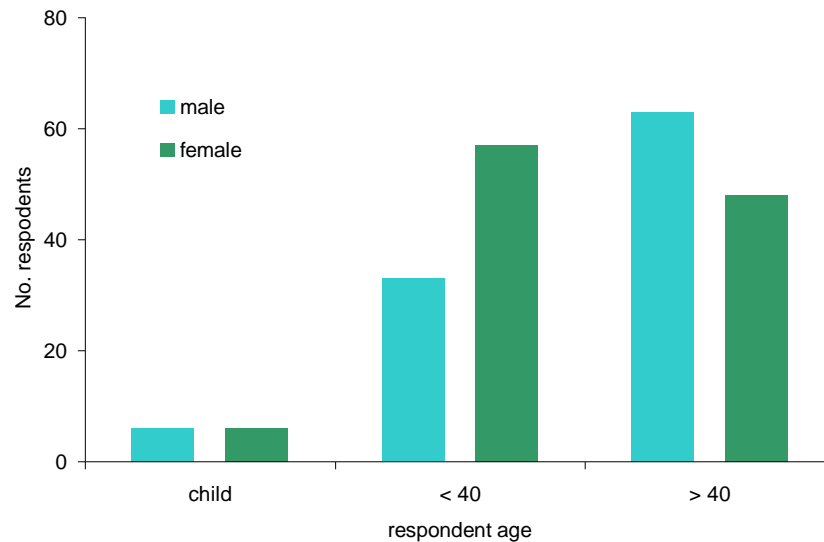
Given the relatively large number of species on which detailed responses were sought, the number of questions per species put to members of the public had to be limited (see Annex I). To gather some more detailed responses, four individuals within the Ministry of Agriculture, Lands, Fisheries & Forestry were questioned in more detail (see Annex III for questionnaire form) about wildlife use within four of Saint Lucia's five Forest Ranges: Dennery, Millet, Quilesse and Soufrière. Interviews were conducted on a one-to-one basis by a single interviewer from Durrell.

### 3. Results

#### 3.1. Respondent demography

A total of 213 members of the general public of Saint Lucia were interviewed. 109 respondents were interviewed using the Common Game questionnaire; 103 were interviewed using the Plants and Less Common Game questionnaire. One interviewee answered both questionnaires. Men and women were interviewed in roughly equal proportions, but only a small minority of respondents were children of school age (see Fig. 6). A more detailed breakdown of the general respondents' demography, by Forest Range and by community, is given in Annex IV.

Fig. 6. Age and sex of respondents interviewed for the general public questionnaire.

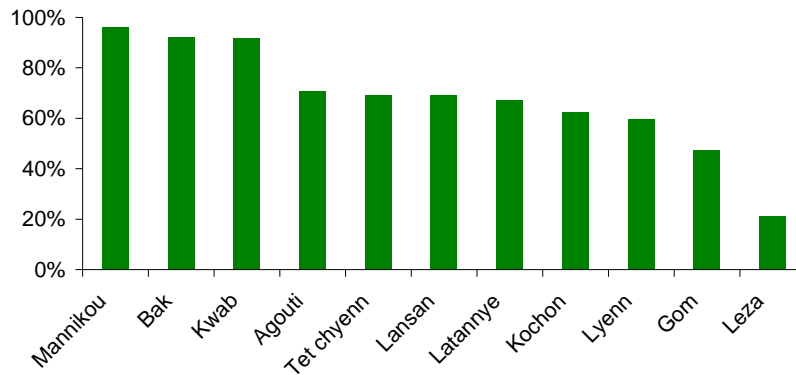


#### 3.2. Perception of trends in target species' populations

Respondents were first asked if they knew of each species and the surveyor rated whether those respondents answering yes were credible based on their answers to subsequent questions. Most respondents were deemed to know what most of the target species were (see Fig. 7).



Fig. 7. Percentage of respondents deemed by the surveyors to know each species.



Those respondents deemed to be familiar with each species were asked, for each species, “Do you think the numbers of this species *in your area* have changed in your lifetime?” The responses are shown in Fig. 8. Most respondents could not offer an opinion on whether the population of each given species had increased, decreased or stayed stable during their lifetime. Amongst those respondents who did offer an opinion, few indicated that populations had remained stable, while roughly equal proportions indicated decreases as indicated increases in wildlife populations.

The graphs in Fig. 8 are sorted by species with most to least reported declines. All four plant groups were reported most frequently as having decreased. However, three of the four plants were also the three plants most reported as increasing, which suggests that the predominance of “Don’t Knows” in the responses was probably the most reliable indication amongst this data. Fewer than 20% of respondents reported any of the target animal species as having declined during their lifetimes. The two animal species most often perceived to be increasing, though still by fewer than 20% of respondents, were the mannikou and kochon mawon.

### 3.3. Respondents’ own use of wildlife species

Respondents indicating they knew of a species were asked whether they themselves used, or had in the past used, that species. Some respondents declined (giving no reason) to answer this question for all species on their questionnaire. High levels of use were reported, with the five species reported as being most commonly used being two plants, two invertebrates (crabs) and mannikou: see Fig. 9.

Among the least used target species, four (gonmyé, agouti, tet chyenn and léza) were reported as having been used by fewer than 20% of respondents.

Fig. 8. Respondents' perceptions of trends in wildlife species' populations.

Species are sorted in order of frequency of respondents reporting a decline. Note that the vertical axes of the top three graphs have a different scale to that of the bottom graph. The horizontal axis is the same for all four graphs.

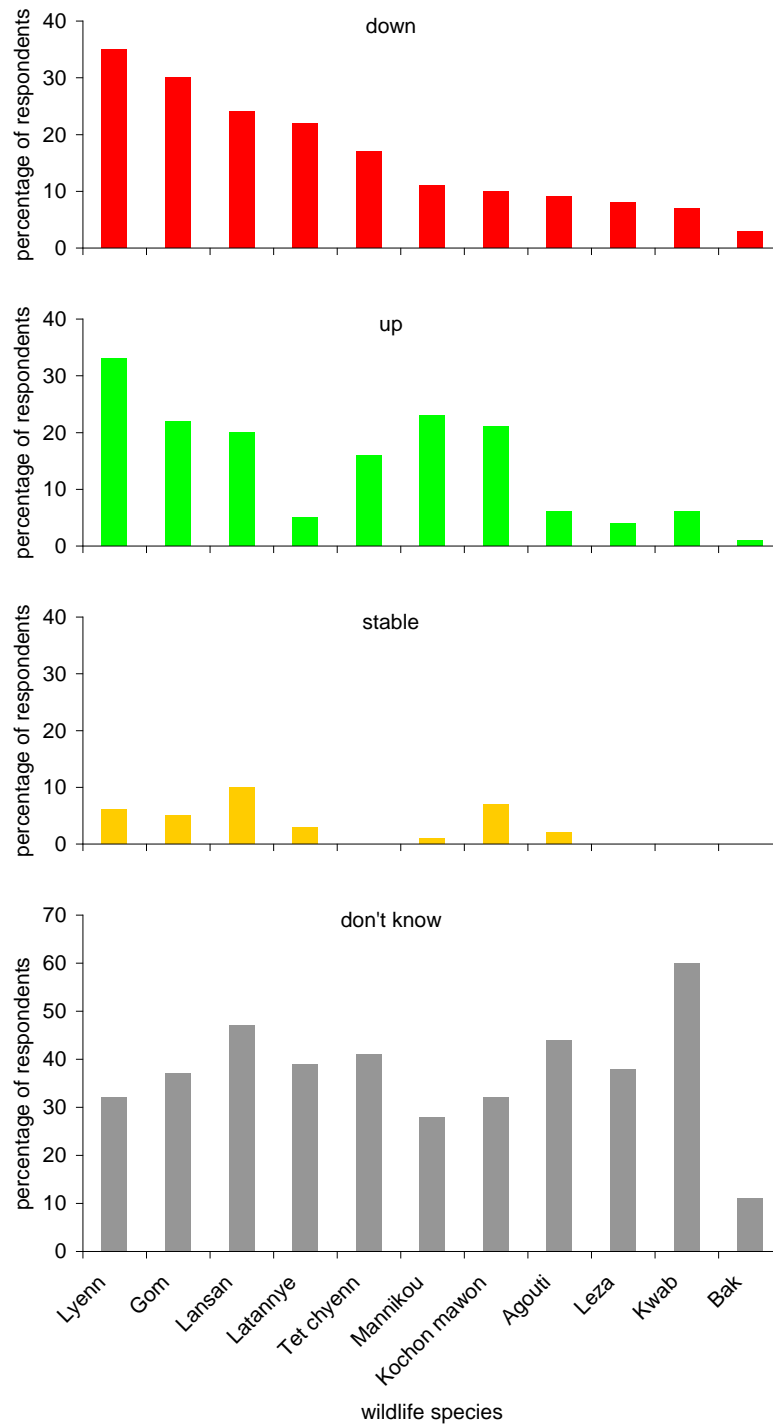
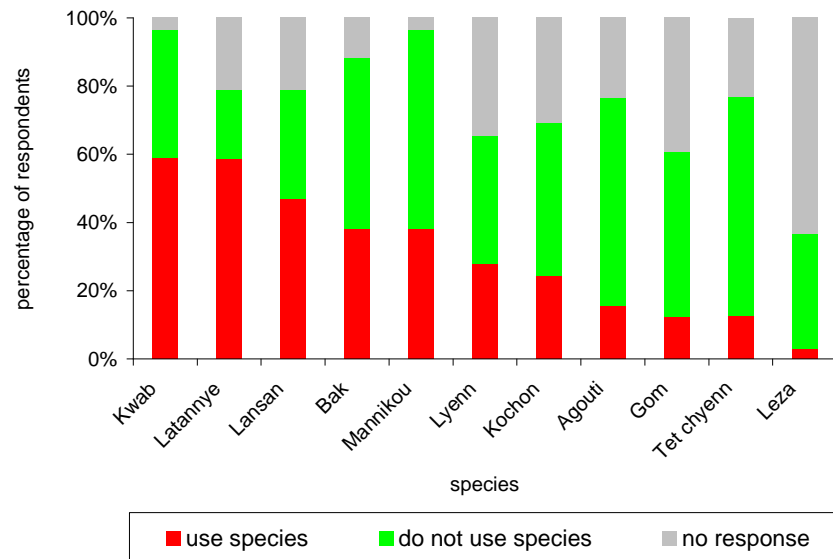


Fig. 9. Respondents reporting that they have used the target wildlife species.

Target species are sorted along the horizontal axis according to the number of interviewees reporting to use them.



### 3.4. Respondents' perceptions of other people's use of wildlife

Respondents indicating they knew of a species were asked whether they knew of other people in Saint Lucia using that species. The results from respondents who gave a “yes” or “no” answer to this question are shown in Fig. 10.

With the exception of a single species (latannyé), a higher proportion of other people were reported as using each species than the respondent themselves. This pattern appears particularly pronounced for most of the target animal species, with the exception of the two crab species. It is these animal species that have some protection under the 1980 Wildlife Protection Act. It may be that a smaller proportion of respondents were prepared to admit to the use of these species, whilst having fewer qualms about reporting their use by others. However, this pattern may also in part be explained by the fact that “other people” could potentially refer to a great many others, whereas the respondent themselves is just a single person. Thus the chances of a respondent knowing of at least one other person using a given species could be high even if most people (including themselves) do not use it.

### 3.5. The relationship between respondents' use of wildlife and their perceptions of population trends

Plotting the percentage of respondents reporting use of each wildlife species against the percentage reporting a perceived decline in those species during their lifetimes revealed only a very weak relationship (Fig. 11).

There are several possible reasons for this. For example, if the harvesting of most target species is not severe enough to affect the wild population size; if the wild population is declining due to factors other than very recent hunting (such as habitat loss, alien invasive species); if use of some species is being under-reported; or if some species are now too scarce to harvest. The weak relationship between

the use of wildlife and the perceived changes in their populations may also be a reflection of the poor knowledge most respondents have of recent population trends (see section 3.2).

Fig. 10. Reported use of wildlife species by the respondents and by people other than themselves in Saint Lucia.

Species on the horizontal axis are sorted from those most often reported used (by the respondents themselves) on the left to least often on the right.

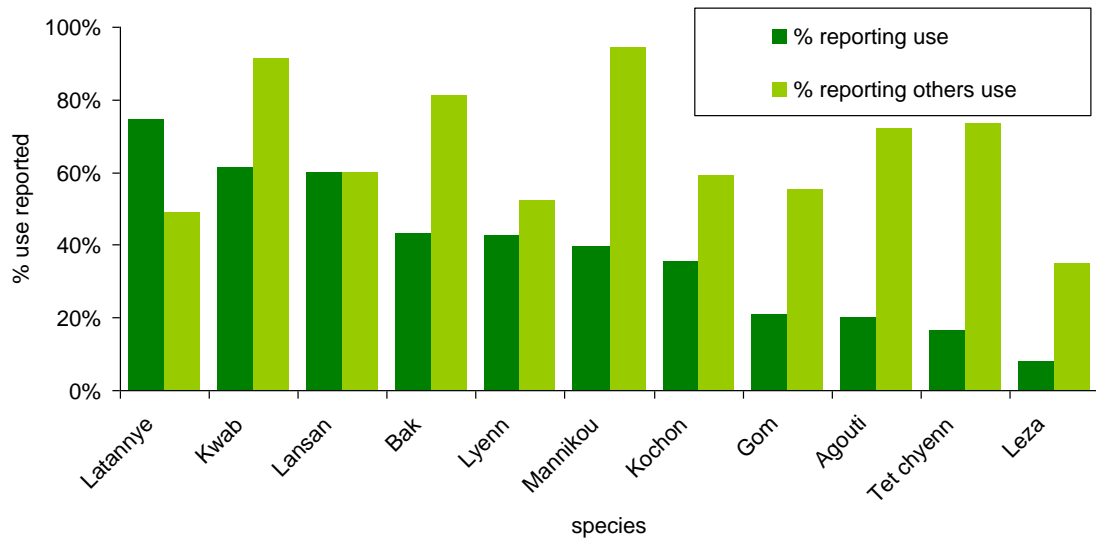
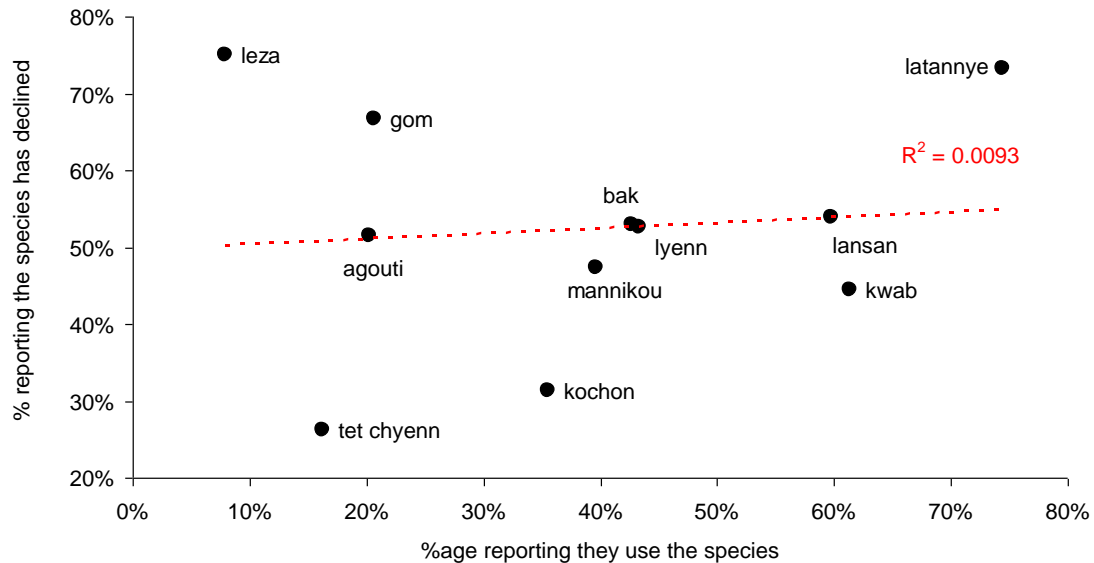


Fig. 11. The relationship between the percentage of respondents reporting use of each wildlife species and the percentage reporting a perceived decline of those species during their lifetime.



### **3.6. Reported reasons for not using wildlife species**

Respondents reporting they did not use any given target species were asked why not, and their answers classified into seven possible categories (see Fig. 12). Note that not all these categories apply to every species, and respondents were allowed to give one or more reasons for not using any given species.

The most commonly cited reasons were that better alternatives were available (this applied predominantly to all four target plants, on the left hand side of the graphs in Fig. 12); the poor availability of the species, and that the idea of using the species was disgusting to the respondent. The latter two reasons were given most frequently as reasons for not using certain target animal species: tet chyenn, mannikou, agouti, kochon mawon and léza. A general disgust with using (in most cases eating) a species was recorded separately from a reported dislike of the taste (for those species that are eaten), which was less commonly reported.

Other reasons for non-use were only rarely reported. In addition to cost and a failure to produce the desired results (which was reported by one respondent referring to snake oil derived from the tet chyenn), it is notable that the illegality of using some species (see section 1.3) was only rarely cited as a reason for non-use.

### **3.7. Forest Range differences in questionnaire responses**

The number of respondents answering “yes” or “no” to the question of whether they themselves used, or had in the past used, that species is shown in Fig. 13, plotted by Forest Range (Dennery, Millet, Northern, Quillesse and Soufrière Ranges, indicated by different coloured bars). As expected, the pattern for each Range was broadly similar to that shown in Fig. 9 (being the data in Fig 13 pooled across all ranges), with higher use of plants and invertebrates (crabs) reported than for the target mammals and reptiles.

There was slightly higher reported use of some target animal species in the eastern ranges of Dennery and Quillesse compared with the other three Ranges. There was also slightly higher use of the target plant and invertebrate species (which are not protected outside of the Government Forest Reserve) in the more populous Northern Range.

However, it should be remembered that when the data are divided into subsets like this, the sample sizes are very small per subset, with typically fewer than 30 respondents per species per range for more familiar species and fewer than 10 respondents per species per range for less familiar species. This may result in important gaps and errors. For example, no use of léza was reported by the Dennery Range interviewees, even though it is known from independent studies (Morton, 2007) that this species is hunted and consumed within this Range.

Fig. 12. Reasons given by respondents for not using different wildlife species.

The four plants are to the left of the horizontal axis, the seven animal species are to the right. Respondents could cite more than one reason for each species. The vertical axis shows the frequency of respondents as a percentage of all respondents who reported not using this species.

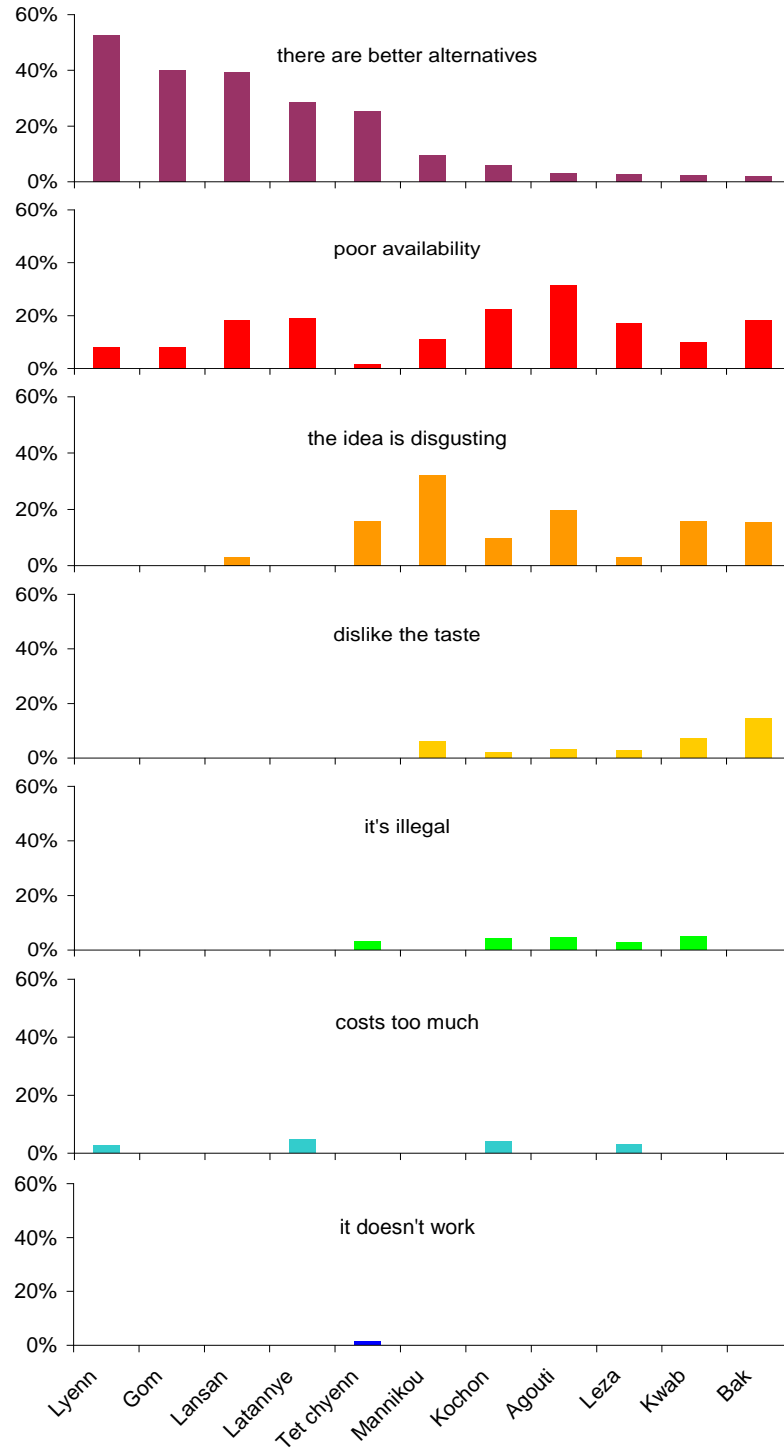
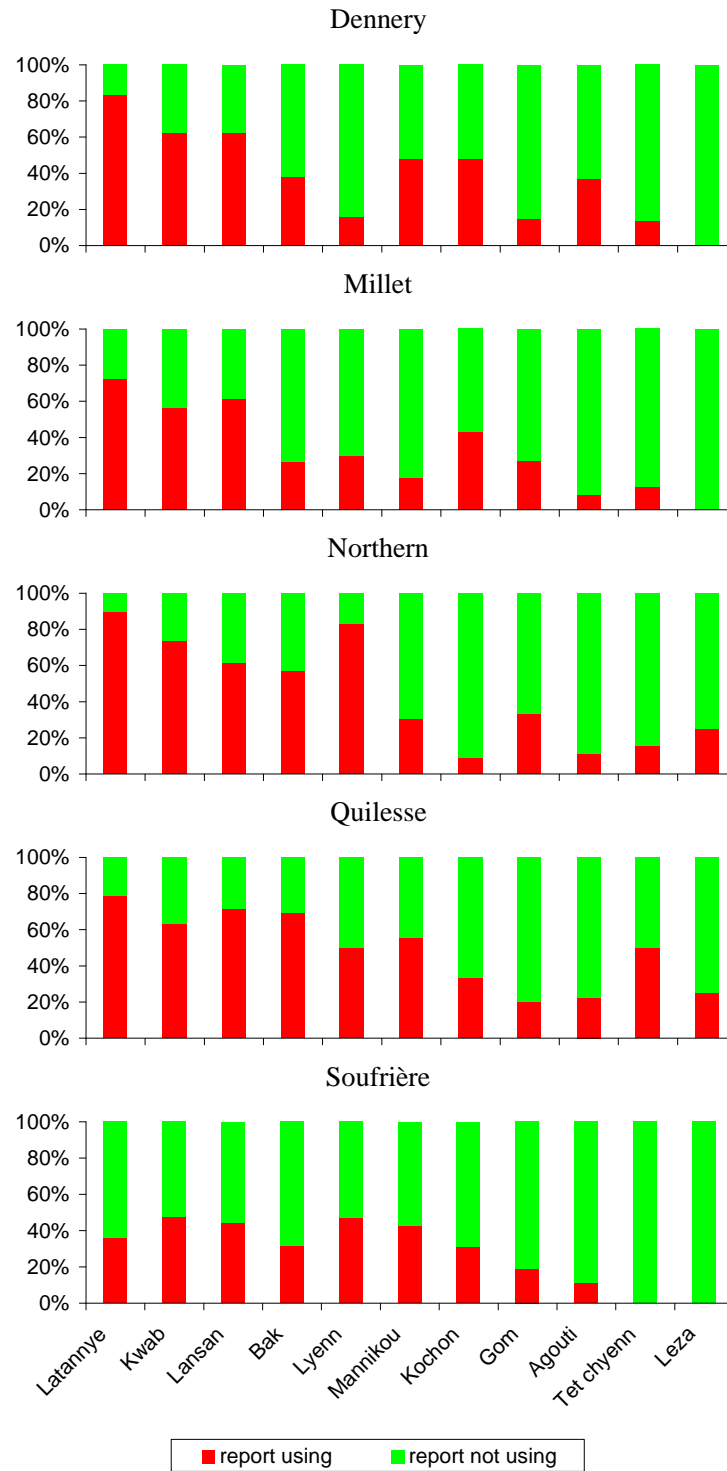


Fig. 13. Reported use of target species per Forest Range.

Data are sorted along the species axis from highest reported use for all ranges pooled (on the left; latannyé) to the lowest (on the right; léza).



### 3.8. Expert respondent opinions on use of target wildlife species

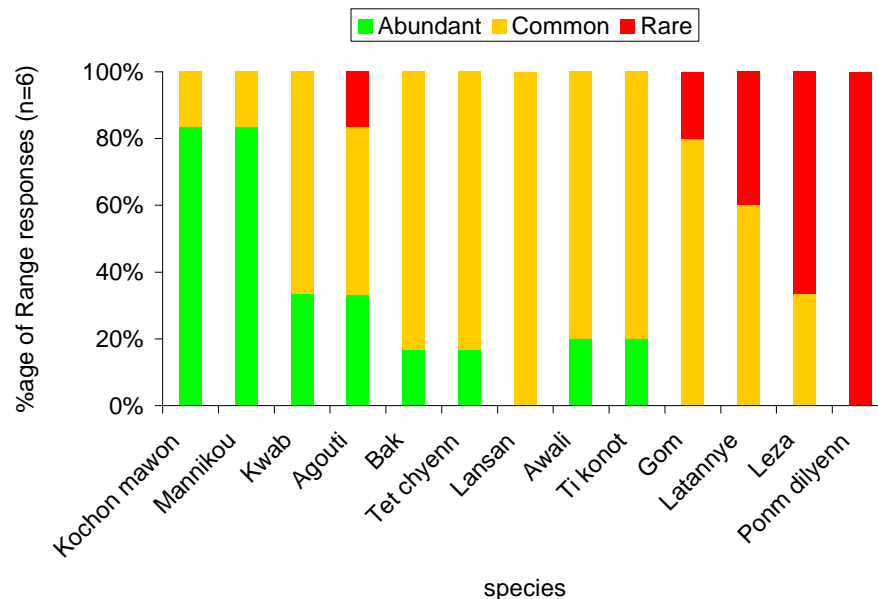
Limited time to conduct this survey meant that only four expert respondents were interviewed, three sharing their knowledge and opinions on wildlife use in Dennery Range and one each on Millet, Quillesse and Soufrière Ranges. In response to most questions, respondents indicated they were unable to base their responses on empirical data, but they were nonetheless encouraged to respond if they felt they could offer an informed opinion.

The descriptive statistics in this section refer to Range per respondent as the sample of interest; i.e. there is a sample size of six (because three respondents offered information on Dennery Range). Although this sample is small, these interviewees were able to offer more detailed insights into the context of the responses from the general public. These respondents, unlike the general public, typically were able to discriminate amongst the three target species of lyenn: awali, ti kannou and ponm dilyenn.

Respondents were asked to rate the abundance of target species as “abundant”, “common” or “rare”. Most responses indicated that most target species were common (orange bars, Fig. 14). Two were notably considered very abundant: kochon mawon and mannikou, whilst léza and ponm dilyenn were mostly considered rare.

Fig. 14. Expert opinions of the relative abundance of the target species.

The data are sorted along the horizontal axis with the species most often report rare to the right, those most often reported abundant to the left.



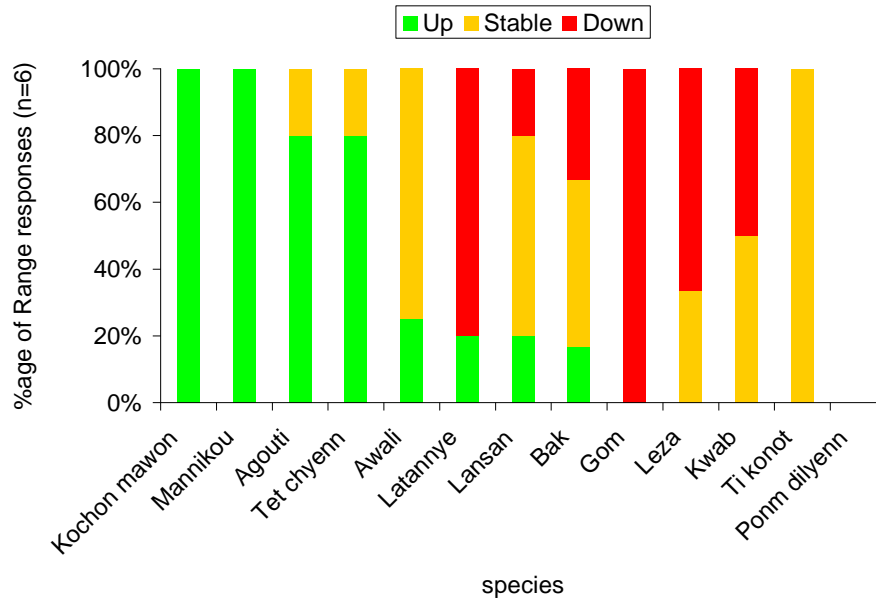
These responses were largely consistent with respondents’ perceptions of population trends in the target species (Fig. 15), with kochon mawon and mannikou reported as increasing, although interestingly so were agouti and tet chyenn (but respondents generally admitted a lack of knowledge on the latter). Latannyé, léza and gonmyé were most often reported as declining, while none of the



respondents felt able to offer an opinion on the trend in ponm dilyenn (one of the three species of lyenn).

Fig. 15. Expert opinions of population trends in the target species.

The data are sorted along the horizontal axis with the species most often report to be decreasing to the right, those most often reported increasing to the left.



Use of all species was reported for all four ranges with the following exceptions: use of léza was reported only from Dennery Range; ponm dilyenn only from Soufrière Range (which was also the only Range where use of gonmyé was not reported); and latannyé was reported to be used in Dennery, Quillesse and Soufrière, but not Millet.

Respondents generally felt less confident commenting on the frequency of extraction or harvest of target species, and stated that their opinions largely followed those on abundance: more common species (kochon mawon, kwab, mannikou) were believed harvested more frequently (at least once a week per Range) whilst those believed more rare (léza, ponm dilyenn) were generally believed to be harvested less frequently (Fig. 16). Interestingly, the tet chyenn, while mostly considered a common species (see Fig. 14), was considered to be only rarely harvested.

Respondents believed that personal consumption accounted for most of the target animal species (Fig. 17), although over half believed there was a local market in agouti. Among the target plant species, most products were sold in local markets, but for lansan and latannyé, overseas markets were believed more significant (Fig. 17).

As with frequency of extraction, respondents generally felt less confident commenting on the believed number of harvesters of each species per Range per year. Kwab, kochon mawon and mannikou were exceptions: most respondents believed that large numbers of people harvested these species. For most species, however, respondents indicated that fewer than ten people per Range were actively harvesting them, with the caveat that they had little direct data to base this belief on.

Fig. 16. Reported frequency of harvest of target wildlife species.

The data are sorted along the horizontal axis with the species most often reported to be frequently harvested (at least once per week within the Range in question) to the left, those most often reported infrequently harvested to the left.

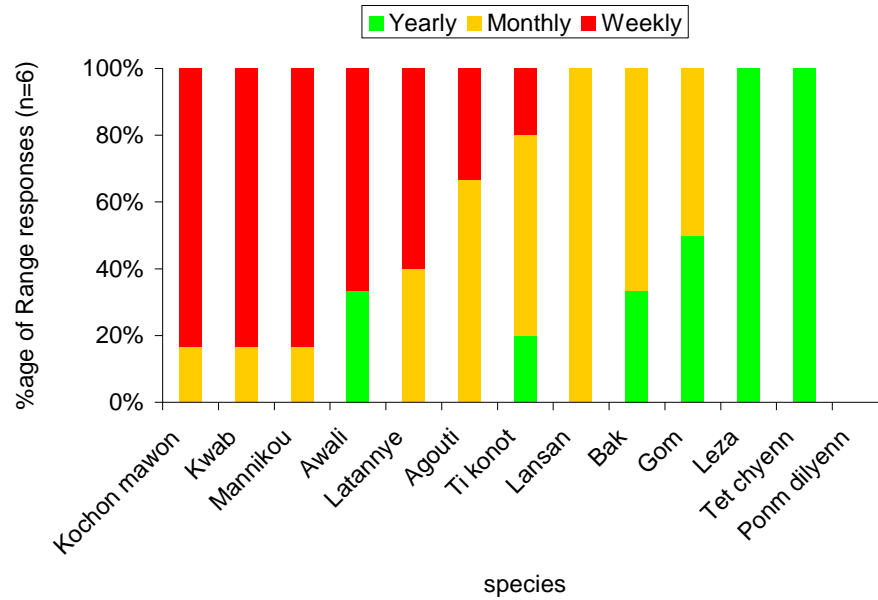


Fig. 17. Reported consumption of target wildlife species in Saint Lucia and overseas.

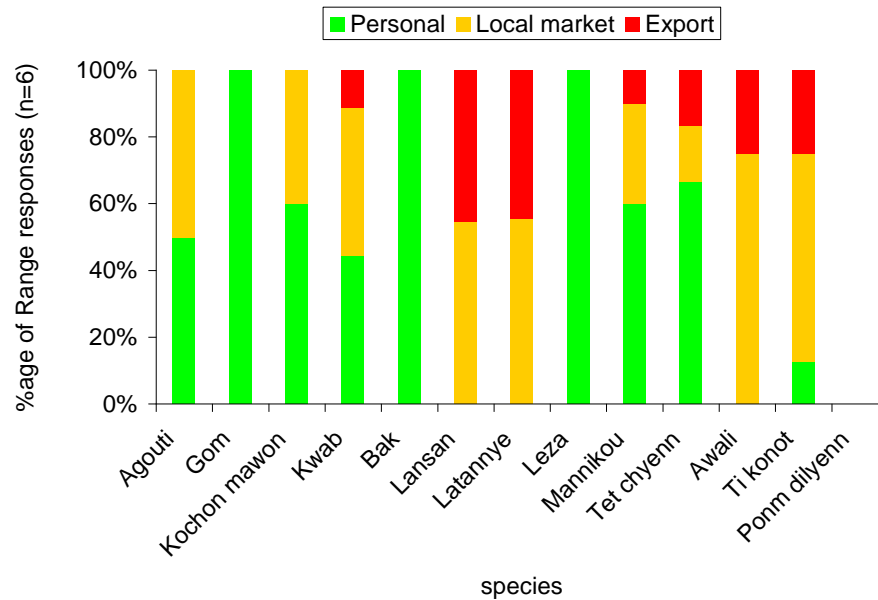
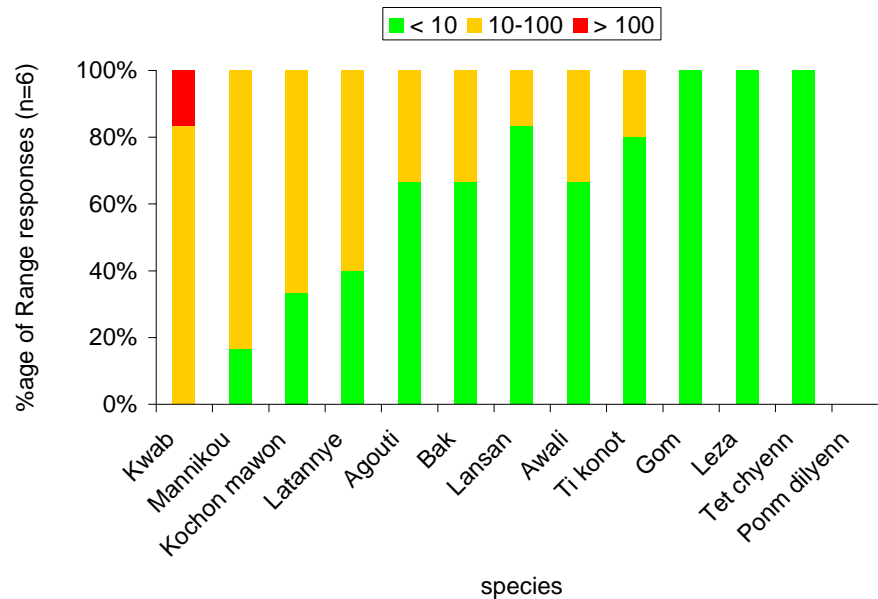


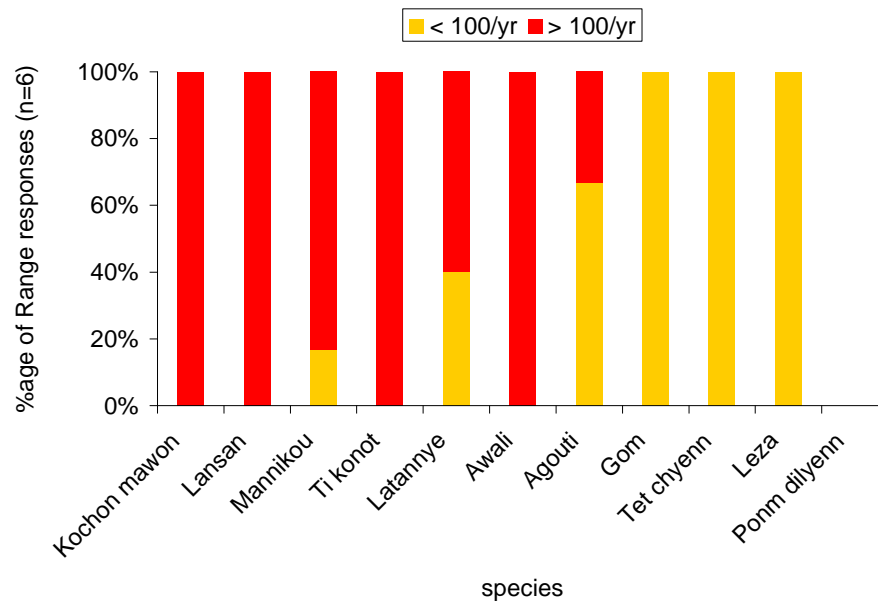
Fig. 18. Reported number of harvesters of target wildlife species per Forest Range.



Similarly, respondents felt that take (number of individuals harvested) was high for kochon mawon, mannikou, lansan and ti kannou (Fig 19). One respondent noted that some pig hunters treat the kochon mawon as a sustainable resource and “spare suckling mothers so the young will flourish”. Take of both species of crab was believed to be very high, in the hundreds or thousands per year.

Fig. 19. Reported number of individuals of target wildlife species harvested per Forest Range per year.

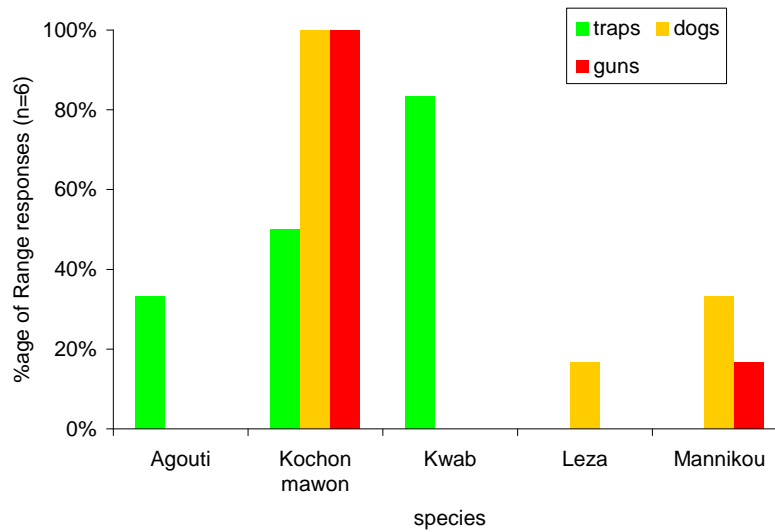
This graph does not show kwab or bak – see text.



Respondents reported various methods used to hunt target animal species (Fig. 20); most respondents reported the use of guns and dogs to hunt kochon mawon, but also traps. Fewer respondents reported the use of guns and traps to hunt mannikou, while traps were commonly reported as being used to harvest kwab (though not bak). Most respondents also reported that simple hand capture was a common technique to harvest crabs (of both species) and mannikou (the latter sometimes as road kills). In the case of kwab, this was often accompanied by digging out the kwab hole first.

Fig. 20. Reported methods used to hunt certain target wildlife species.

Traps, Guns and dogs are treated as separate methods though they may be used in combination by hunters.



Finally, two thirds of respondents reported some latannyé harvesters destroyed whole plants, but 83% reported others selectively harvested individual leaves. Opinion was divided on the number of cuts made to lansan trees, with 50% reporting lots of indiscriminate cuts, the other 50% reporting fewer more selective cuts.

## 4. Discussion

### 4.1. Scope, limitations and biases

John (2001a) reported that the 1999 questionnaire survey of attitudes towards hunting on Saint Lucia interviewed 505 persons and that this sample was judged by the GOSL Statistics Department to be “statistically representative of the population by age, gender, and socio-economic status”. In this study, it was not possible to define the sampling frame ahead of sampling by these demographic factors, though some attempt at representative sampling of age and gender was made, and the stratification by geography (Forest Ranges) and community sizes could be expected to provide some surrogate for representing socio-economic differences. However, it is clear from Fig. 5 that our stratification resulted in some bias towards smaller, and hence more rural, communities likely to have lower socio-economic indicators. It might be expected that persons in these strata are more likely to use wildlife species, both because of their closer geographical proximity to the habitats that support them and the appeal of ‘free’ products to persons in lower income brackets. Thus it seems at least plausible that this survey exaggerates the use of wildlife on Saint Lucia and this should be borne in mind when interpreting its findings. This potential bias was, of course, apparent during the design of this study but it was felt that capturing the responses of more people familiar with the target species would reveal additional insights.

In addition, the small sample size reached in the present survey (213 persons) is inevitably likely to lead to some inaccuracies through outlying or inadequately captured variation. For example, in Range by Range comparisons where sample sizes are even smaller, use of léza was reported from Northern and Quillesse Ranges, but not from Dennery Range where it is known independently to be consumed (Morton, 2007). Likewise, use of tet chyenn in Soufrière was not recorded though it is known to occur (D. Anthony, pers. comm.).

These limitations of the data result from the modest scope of this survey, and mean that it is probably best to view the results and the following discussion not as offering definitive answers but rather in the nature of a pilot study that prompts questions for future work.

### 4.2. Public awareness of the target species and their status

Most respondents from the general public were familiar with all the target species of this survey inasmuch as they recognized them (Fig. 7). With the exception of kwab and latannyé, however, only a minority reported using them (Fig. 9).

The apparent disparity in Fig. 10 between the reported personal use of the target species by the respondents versus the wider use by ‘other people’ is more prominent for vertebrate species than for the plant and invertebrate (crab) species. It may not be a coincidence that the latter species have no protection under Saint Lucia law (at least outside of the Government Reserve) while the former are protected as individual species under the 1980 Wildlife Protection Act. This may reflect another bias in the data with respondents less likely to admit to using species protected by law. However, illegality was cited by very few respondents as a reason for not using these species (Fig. 12).

The largest gap in public awareness appeared to be over what is happening to the populations of the target species in the wild: whether they are increasing, decreasing or staying stable. Most respondents

could not pick any of these options (Fig. 8) and even among the expert respondents interviewed, most admitted considerable uncertainty on this point for most species. Most expert respondents did feel confident, however, that populations of three non-native mammals – mannikou, agouti and kochon mawon – were increasing, a perception they attributed to increasing reports of crop damage. The general public were less clear about increases in these non-native species and, as a group, showed considerable confusion over population trends even when they chose one of the three options (increasing, decreasing or stable). For example, the two target species most often identified by the public as increasing (lyenn and gonmyé) were also most often identified as decreasing (Fig. 8). Ignorance of the status of the wild population is perhaps understandable among respondents who do not use these species or who buy wildlife produce instead of collecting it themselves from the forests.

The responses from the respondents from the general public indicated there is no relationship between perceived population trends and reported use (Fig. 10). This could be a true – that there is no correlation between the level of exploitation and the status of the wild populations of the target species – but equally it could simply be a reflection of low public awareness of impacts on those populations.

### **4.3. Reasons for not using wildlife**

For most target species, more respondents reported not using them than reported using them. The exceptions to this were kwab, latannyé and lansan, where reported use was higher than reported non-use (Fig. 9). There is some variation in this overall pattern when data are compared among the Ranges (Fig. 13). Usage reported for Dennery and Millet Ranges seems, by visual inspection, closest to the overall national picture, with slightly more people exploiting more species in Northern and Quillesse Ranges and slightly fewer in Soufrière Range. However, the small sample sizes from each range suggest caution in interpreting this data. For example, latannyé broom use is probably higher in Soufrière than Fig. 13 suggests (A. Toussaint, pers. comm.).

Among the target plant species, the availability of better alternatives was cited as the main reason for non use amongst the general public (Fig 12), presumably suggesting some decline in satisfaction with traditional plant products. However, two of these species – lansan and latannyé – are also among the most frequently used species (Fig. 9) and expert respondents indicated that the products of these species are the most exported overseas (Fig. 17).

Interestingly, availability of better alternatives was also the main reason given for not using tet chyenn products – i.e. snake oil derived from the animal's body fat – and this species was the only one for which another reason for non-use was that the product “did not work”. While the apparent low harvesting of the tet chyenn (Figs. 9 and 19) suggest that impacts on this species may be low (Fig. 14), it is worth noting that snake oil extraction involves extensive surgery on the tet chyenn, without anaesthetic, with the animal then being released alive to suffer or die slowly. Given this, coupled with the endemic subspecies status of the tet chyenn and indications that it may now qualify as globally threatened (Daltry, 2009), it is difficult to justify the granting by SLFD of further licences to collect snake oil in this inhumane manner. The collection of snake oil is not currently a significant livelihood activity, with reportedly very few people involved.

Among target animal species, disgust at the idea of using (usually eating) certain species, followed by specifically a dislike of the taste, were the reasons most often cited for not using them. For example, this was noted for the agouti, although slightly more respondents noted poor availability as accounting

for their non-use of this species (Fig. 12). Given that this species is reported as relatively rarely used (20% of respondents), this may indicate that some market research into consumer preferences would benefit any plans to farm and sell this species. That said, a similar proportion of non-users reported disgust as their reason for not using mannikou, even though this was reported as one of the more commonly used animal species on Saint Lucia (Figs 9, 16).

The small proportion of people who gave the law as a reason for not using certain wildlife is notable (Fig. 12). It might imply either a lack of awareness of the Schedules under the 1980 Wildlife Protection Act or a belief that it is not effectively enforced. However, the possibility that some respondents were under-reporting the use of protected wildlife (see section 3.4) does suggest some public concern over being identified as carrying out illegal activities which appears to belie this conclusion. It might be fruitful to investigate this area of public perception further.

#### **4.4. Harvesting pressure on different wildlife species**

Very little of the extraction of wildlife covered by this surveys appears to be by organized groups; at most a few individuals may hunt together, but the activity seems very largely to be ad hoc and not to operate within any structured framework, whether official or unofficial. The exception to this may be the reportedly small group of harvesters engaged in the relatively specialized activity of lyenn harvesting although, even here, no formal group seems to exist.

##### **4.4.1. Kwab and bak**

Kwab and bak were widely reported as being used across Saint Lucia (Fig. 9). Usage may be slightly lower for the western ranges of Millet and Soufrière (Fig. 13) though the small sample sizes from each range make it difficult to be confident in this interpretation. Expert respondents suggest harvest levels are very high, with hundreds or thousands of crabs collected from every Range every year. For kwab, harvesting is frequent (at least every week; Fig. 16) and involves up to 100 or possibly more catchers per Range (Fig. 18). Expert respondents reported equally high personal consumption and sale in local markets for kwab. Bak is believed less frequently harvested and by fewer people, presumably because it is found in the less accessible forest, compared with the lower, more easily accessible areas kwab where is found.

Although traps (Fig. 21) were cited as a harvest method for kwab by most expert respondents, most also noted that hand capture (Fig. 22), including digging out kwab holes was very common.

Bak seems to be less commonly harvested than kwab. One expert respondent suggested this simply reflected the fact that fewer people spent time in the forest than in coastal regions and that harvesting of bak was largely opportunistic. Another suggested that memories of schistosomiasis (bilharzia, carried by aquatic snails) in Saint Lucia in the 1970s and 1980s still made many people reluctant to eat freshwater invertebrates in general.

Only part of the kwab's lifecycle is completed on land (Bliss 1968). Specifically, reproduction (spawning and growth of larval stages) occurs in the sea, where larvae may mix with the young from other Caribbean islands. This may help ensure a steady supply of young crabs to Saint Lucia's forests and provide some buffer against over-hunting. That said, while it may be difficult to wipe out these species by harvesting alone, other factors, such as the loss of suitable terrestrial habitat, could impact their availability to Saint Lucians, as noted by two expert respondents.



In contrast, reproduction in bak occurs in freshwater (Bliss, 1968). Thus, unlike kwab, impacts of harvesting on this species will not be buffered by a pool of future generations deriving in part from outside Saint Lucia. Although kwab appears to be subject to the most hunting pressure on Saint Lucia, further information on the current status of bak would be helpful in assessing the likely impacts of hunting on this species.

Fig. 21. Kwab trapping



(a) Kwab trap, set in mangrove at Trou Sallée, 2004. Photo: © M Morton / Durrell.



(b) Kwab trapper, Grand Anse, 2009. Photo: © M Morton / Durrell.

Although the Fisheries Act of 1985 prohibits the removal of “fresh water shrimp or crayfish” from “the rivers of Saint Lucia” (Section 37), freshwater crabs are not explicitly mentioned, nor elsewhere in this act. This Act’s interpretation (Section 2) of the word fish to “mean any aquatic animal [including]... crustacean” should afford some protection to kwab in Marine Reserves (Section 22).

Neither kwab nor bak are Scheduled for protection in the Wildlife Protection Act of 1980, though the interpretation (Section 2) of “wildlife” to include “(d) crustaceans” may offer some protection. Under Section 16, “a person commits an offence who... (f) deposits or permits the deposit of any deleterious substance of any type in water frequented by fish, shrimps or crabs or in any place where such deleterious substance may enter such water”. This illegal method (of



Fig. 22. Coconut sack filled with hand-collected kwab at Grand Anse; a small group of harvesters filled six such sacks to capacity in a few hours on this occasion. Photo: © M Morton / Durrell.



poisoning rivers) is used to harvest freshwater crayfish, at least outside of the Forest Reserve (pers. obs.) though none of the respondents during this survey mentioned its use for harvesting bak. However, at the very least, the possibility of collateral damage to this (and other) species must exist.

#### 4.4.2. *Lansan, latannyé, gonmyé and lyenn*

Amongst the target plant species, lansan and latannyé (Fig. 23) stand out as the species most commonly reported as being used (Figs. 9, 19). A large minority of the general public and the majority of expert respondents believe both species are in decline or at best stable (Figs. 8, 15), especially for declines in latannyé, though several respondents noted that this perception of declining latannyé referred specifically to wild-growing plants (as stipulated by the surveyors), not the cultivated stocks distributed by SLFD.

Reported usage of other target plant species – gonmyé and the lyenns – was lower. Almost none of the general public respondents differentiated between the three target species of lyenns, though it seems clear most were referring to the two *Clusia* species (awali) and ti kannou. Expert respondents were familiar with the different lyenns, though reported ponm dilyenn to be rare and a species that they had no information for regarding extraction. It appears that gonmyé is little used now, and that lyenn products are primarily targeting the tourist market. The low reported usage of gonmyé seems to have more to do with the availability of better alternative glues for boat repairs, although J. Daltry (pers. comm.) reports seeing a lot of gonmyé trees slashed in the forest reserve, though it is not clear if this represents would-be harvesters mistaking these trees for lansan.

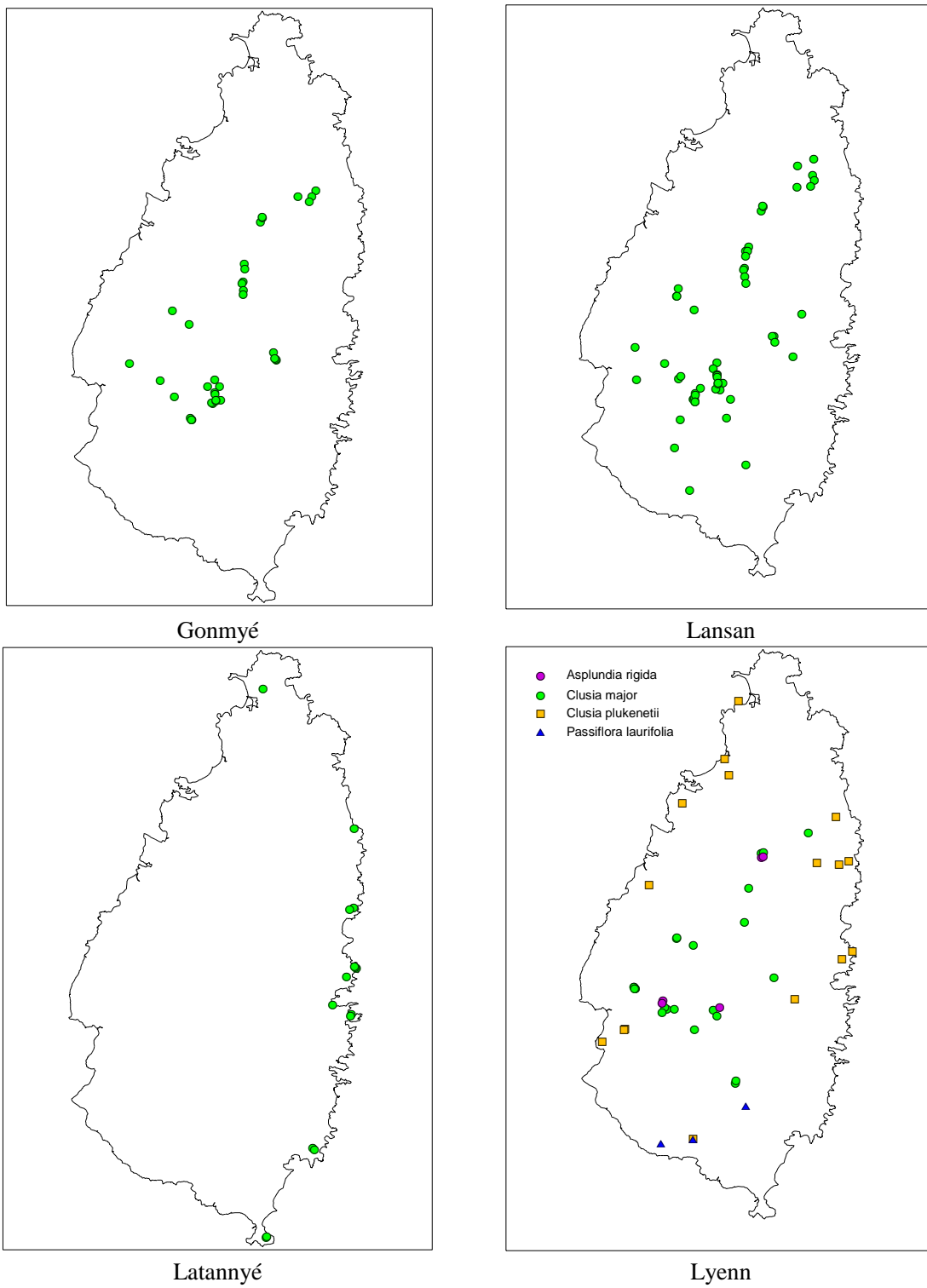
Public and expert perceptions of the relative rarity of target plant species are largely not entirely consistent with the findings of Graveson (2009; see Fig. 24), who found lansan in particular to be a dominant tree species in lower montane forest. However, both lansan and gonmyé are restricted largely to this habitat type which is largely covered by the Forest Reserve, which may mean most people are not accustomed to seeing them.

In the case of lyenn, these are also largely found in lower montane forest of the Forest Reserve, but appear less common (Graveson, 2009). But both ponm dilyenn and latannyé are species of deciduous seasonal forest, and respondents' perception of their relative rarity is largely reflected in Graveson's 2009 findings (Fig. 24).



Fig. 23. Latannyé brooms on sale to local residents and tourists in Soufrière town. Photo: © M Morton / Durrell.

Fig. 24. Distribution of target wildlife plant species on Saint Lucia; data from Graveson 2009.



From discussions with expert respondents, it appears the lyenns are collected largely by a small number of specialist users who have special techniques for both harvesting and preparing the aerial roots. Aerial roots (of awali and ti kannou) are harvested by hand, predominantly in the Forest Reserve, where they are boiled, on site, in preparation for basket making. None of the expert witnesses spoken to knew any details of the harvesting or use of ponm dilyenn, though some had heard of it occurring. It is difficult to assess whether extractive uses of this species are sustainable without further information.



Fig. 25. Lansan tree killed by over-harvesting of resin; photo © A. Toussaint.

Latannyé is extracted by both traditional harvesters and broom makers – who were believed by expert respondents to harvest leaves sustainably – but also a number of ‘zombies’ and other non-traditional users seeking to sell leaves to make quick profits from a ‘free’ natural resource, who indiscriminately and destructively harvest entire plants. John (2001b) and Gustave *et al.* (2006) describe the over-harvesting of this species, with Gustave *et al.* (2006) observing that the occurrence of latannyé on private lands with absentee expatriate owners results in it being regarded as a de facto free resource. The latter authors also report the total value of latannyé brooms exported from Saint Lucia in 2004 to be

US\$24,377.

Gustave *et al.* (2006) document a decline in broom quality resulting from the use of smaller leaves which they attribute to over-harvesting of this species. These authors documented SLFD’s response to this over-harvest with the establishment of latannyé plantations from cultivated stock. Currently, there are approximately 45 plantations on Saint Lucia, all of which are intact and productive, that are on average 2 to 3 years old. All of these plantations were supplied with SLFD stock (D. Gustave, pers. comm.). Whilst these impressive efforts have helped recover this declining species on Saint Lucia, they will not in themselves address declines in the species in its natural ecosystem if indiscriminate casual use continues.

As with latannyé, respondents knew of both sustainable and unsustainable modes of harvest, with some trees being tapped so heavily that they die (Fig. 25). The occurrence of unmolested lansan trees within the immediate vicinity of others from which resin has been over-harvested (A. Toussaint, pers. comm.) suggests opportunistic harvesting by persons only able to recognize the species once somebody else has already tapped it.

Lansan is now restricted to the southern part of the Lesser Antilles in Guadeloupe, Dominica, Martinique, Saint Lucia, and St. Vincent. It is a common tree in Saint Lucia’s lower montane rain forests (Howard, 1988; Graveson, 2009). It is less common in Dominica and rare in St. Vincent, with

no reports of the tree in Grenada (Howard, 1988). Thus its global status is of concern (it appears as Data Deficient on IUCN's red list; World Conservation Monitoring Centre, 1998) and although common in Saint Lucia, it is a slow-growing species (A. Toussaint, pers. comm.) and the use of unsustainable harvesting practices must also raise concerns here. It is reportedly widely used on Saint Lucia, with some specialized users such as the Catholic Church who use it in religious ceremonies (A. Toussaint, pers. comm.).

A precedent for successful, community-based sustainable use of non-timber forest products exists on Saint Lucia, with the Au Picon Charcoal and Agricultural Producers Group (APCAPG). Samuel & Smith (2000) and Anon. (no date) describe the successes of this work in more detail. It is an example of successful sustainable use of mangroves through restricting access to the resource to local community members; but also an example of how such initiatives can falter without sufficient institutional support being sustained (A. Toussaint, pers. comm.). Nevertheless, lessons learned from this work may be portable to the sustainable, *in situ* use of other species such as lansan.

#### **4.4.3. Mannikou and agouti**

Amongst the vertebrate animal target species, mannikou was the most commonly reported as being used (Fig. 9) and expert respondents believed that harvesting of it was frequent (at least one collected every week in every Range; Fig. 16), involving significant numbers of harvesters per Range (Fig. 18) and that the take was high (hundreds per Range per year; Fig. 19). Some expert respondents believed guns and/or dogs were used to hunt mannikou, though most agree hand capture was the commonest method, including collection of road kills. Clarke (2009) reported mannikou occurring in all forest types on Saint Lucia, but being twice as common in the dry forest, i.e. outside of the protected Government Reserves. This appears in contrast to the agouti which was less commonly reported being used (Fig. 9), and which appears to have a more restricted distribution, being primarily restricted to wet forest types (pers. obs.). However, the agouti is reported by expert respondents to forage outside of these forests, causing damage to crops - the expert respondents suggested its use may be higher than responses from the general public indicated (Figs. 16, 19).

Both mannikou and agouti are alien species on Saint Lucia (Clarke 2009), though are treated as 'naturalized' by SLFD and protected under Schedule One of the 1980 Wildlife Protection Act, prohibiting all except licensed (Section 10) hunting of these species. Of those members of the public reporting a trend, most reported the mannikou population was increasing, as did most expert respondents. The latter also believed the agouti population was on the increase, although only a minority of the general public who reported a trend reported an increase (Figs 15, 8). Clarke (2009) also reported this species as rare, although it is a shy and elusive species (A. Dornelly, pers. comm.) which may exaggerate impressions of its rarity.

Hunting of mannikou, though reportedly widespread and common, appears often to be opportunistic and not generally a specialized activity. Hunting of agouti is often reported to use traps and in reference to controlling individuals causing crop damage, though this may represent under-reporting of hunting with food as the motive.

There is no evidence to believe that hunting of mannikou is unsustainable at current levels. It is a widespread, common species (Clarke, 2009) that is fecund (Nowak, 1991) and should probably be considered an invasive species on Saint Lucia, whose negative impacts on native fauna can be

predicted (Daltry, 2009) though are yet to be established. However, concerns remain that lifting the current moratorium on hunting wildlife may result in collateral impacts on other species that cannot sustain hunting. A revision of the mannikou's current protected status on Saint Lucia would need to be accompanied by raised awareness in the public of Saint Lucia about those wildlife species that need to remain protected, and monitoring and enforcement to address collateral impacts.

The status of the agouti on Saint Lucia is less clear, but small scale farming of this species may provide a sustainable means of exploitation (see Clarke, 2009, for further details and recommendations). This may also require a revision of the agouti's protected status, but again the concerns about collateral impacts of such a course of action need to be carefully addressed. Maillard (2008) reports that the agouti has disappeared from Martinique and is rarely seen on Guadeloupe. This may be due to habitat loss, or hunting, or both; although this species is protected by law in the French Antilles. Maillard (2008) suggests the decline of this species could negatively affect the regeneration of certain trees, such as koubawi (*Hymenaea courbaril*), although agouti is not a natural (native) component of the ecosystems referred to in this context.

#### **4.4.4. Kochon mawon**

Kochon mawon consumption by the general public was reported to be relatively low (Fig. 9), though higher in the Dennery and Northern Ranges than in the other ranges (Fig. 13).

However, expert respondents believed that take was very high, with hundreds of kochon mawon hunted every year in every Range (Fig. 19), and frequent (with at least one kochon mawon hunted every week in every Range Fig. 16). These expert respondents also reported kochon mawon abundance to be high (Fig. 14) and increasing (Fig. 15), but this perception was not shared by most of the general public interviewees (Fig. 8). The expert opinion in this regard appears to be corroborated by a recent workshop of SLFD staff and private pig hunters (Dornelly & Jn Baptiste, in prep.), which reported an expanding range for kochon mawon in Saint Lucia, including almost the entirety of the Government Reserves and extending into seasonal deciduous forest areas especially to the north east of the island.

At this workshop, hunters reported that kochon mawon are hunted for recreation, for food and, increasingly, as pest control at the request of farmers, with these three motives not being mutually exclusive (Dornelly & Jn Baptiste, in prep.). Hunters reported hunting in small groups which are known to SLFD although there is at present no formal framework for regulating, monitoring or coordinating their efforts. Traps (primarily snares), guns and dogs were all reported to be used (as they were in this survey) and hunters report that they would normally butcher the take in the forest before removing the meat. Workshop participants reported that whilst sustainable practices, such as sparing suckling mothers, had been used in the past, this was no longer the case because the kochon mawon population was now so large that it had become a serious pest. However, the activity was clearly one that hunters were motivated to do in the absence of being paid to do so.

Hunters also reported that kochon mawon were not the same as free-ranging domestic pigs but that there was interbreeding between these two populations particularly in certain areas such as around La Sorcière in the seasonal deciduous forest of the North East Corridor.

Although the 1980 Wildlife Protection Act defined "wildlife" to mean "any species of the following groups living beyond the control of man" including " (a) mammals", kochon mawon are not on any



Protected Schedule and are considered by SLFD to be wildlife under this Act (L. John, pers. comm.). However, under Section 14, this Act does prohibit “except by authority of a licence or permit issued under section 10” the entry of dogs or persons carrying a gun or any hunting weapon into Wildlife Reserves, a Protected Area designation that includes approximately four square kilometres of the Forest Reserve.

From the standpoint of conserving biodiversity, it is unfortunate that the kochon mawon population may be able to sustain the impacts; certainly to date it has done so and appears to have flourished. It would be prudent to attempt to change this situation, to control negative impacts on both biodiversity and human livelihoods. Clarke (2009) and Dornelly & Jn. Baptiste (in prep.) discuss this further, and there seems agreement that a broad suite of techniques will need to be deployed rather than relying on any single mechanism. In addition to the trapping and hunting currently practiced – which may need to increase in efficiency and be regulated – other options that can be considered include poisoning, contraception and physical exclusion (for example using solar-powered electric fencing).

#### **4.4.5. Léza and tet chyenn**

Use of léza and tet chyenn was reported to be low during this survey. The work of Durrell and SLFD corroborate this for the léza, but nonetheless document that it is ongoing in Saint Lucia (Morton 2007). It is predicted that even a low take of this species will have severe impacts the small and restricted population that remains, estimated to number less than a thousand mature adults and confined to Saint Lucia’s North East Corridor (Morton, 2007). One expert respondent reported that dogs were used to hunt léza, a finding borne out by Morton (2007) who also noted the danger of collateral kills: dogs used to hunt other game species in seasonal deciduous forest, such as mannikou, will also take léza opportunistically (Fig. 26). These collateral impacts of hunting with dogs may well extend beyond léza and beyond its seasonal deciduous forest habitat and should be a cause for concern for any native wildlife species on Saint Lucia that may be killed by dogs. Adult female iguanas migrating to nesting sites (and, by extension the next generation that these females carry) seem especially vulnerable to attacks by dogs as they spend more time on the ground at this time of year (February to May: Morton, 2007).

Hunting of iguanas seems largely opportunistic, although a few individual hunters in the North East Corridor are known to target both nesting areas and the nesting season (pers. obs.). With an adult population estimated to number less than 1,000 iguanas, even the loss of a few individuals to hunting each year is predicted to have a severe impact. Additional, collateral kills worsen the situation.

Daltry (2009) notes the tet chyenn is “locally common in some areas ... but interview reports indicate it has declined in many parts of the



Fig. 26. Remains of nesting female Saint Lucia iguana killed by dogs at Louvet Beach. Photo © M Morton / Durrell.

island”. However, this may be due to simple persecution of the snakes or other threats (e.g. alien species, fires) because this species is reportedly rarely taken (Figs. 9, 16). Tet chyenn are reportedly collected by hand with little opportunity for collateral damage to other species, though K. Breach (pers. comm.) reports an interview with a tet chyenn hunter hospitalized – on repeated occasions! – with sépan (fer de lance) bites after mistakenly grabbing venomous *Bothrops caribbaeus* (see Breach 2009 for more details of this survey). As discussed above (see section 4.3), the present level of take seems unlikely to have much impact on the wild population (and indeed, most of the expert respondents interviewed for this survey felt the tet chyenn population was increasing; Fig. 15). However, as also discussed in section 4.3, animal welfare concerns should arguably guide SLFD’s future policy on issuing licences to extract snake oil from tet chyenn and suggest this practice should stop. Developing guidelines for good practice in the other reported use of tet chyenn – as an attraction, for tourists and Saint Lucians – would also be a positive step.

## 5. Management priorities for the use of target wildlife species on Saint Lucia

### 5.1. Scope

In keeping with the scope of this survey, the following recommendations are restricted to the survey's target animals and plants. However, it must, of course, be remembered that other wildlife species are subject to extractive uses on Saint Lucia and the future development of recommendations for these species should also be given consideration by SLFD. These include crayfish (reportedly in decline; GOSL 1998); eels and other native freshwater fish; certain bird species and their eggs (such as the ramiér, *Columba squamosa*); and the three species of globally threatened (IUCN, 2009) marine turtle known to nest on Saint Lucia (*Dermochelys coriacea*, *Eretmochelys imbricata*, and *Chelonia mydas*), at least during the period they spend on land.

The information in this report suggests a wealth of opportunities for the management of wildlife species that are used by people in Saint Lucia. In the interests of providing a more feasible shortlist of recommendations, actions for five priority species are presented (in alphabetical order):

- agouti – an opportunity for sustainable livelihoods;
- kochon mawon – an alien invasive species causing severe impacts;
- lansan – an opportunity for sustainable livelihoods;
- léza – at extremely high risk of extinction in the wild;
- mannikou – a need for more research on alien invasive impacts.

### 5.2. Sustainable livelihoods

#### Establish community-based sustainable harvesting of lansan

Lansan on Saint Lucia represents a globally important species. SLFD's previous successes with the Au Picon Charcoal and Agricultural Producers Group (APCAPG; Samuel & Smith, 2000; Anon., no date) managing the Mankoté mangroves suggests both a mechanism for ensuring the sustainable use of non timber forest products and some of the pitfalls to be avoided in implementing such mechanisms. The activities under this recommendation have been adapted from a proposal in development by J. Daltry and A. Toussaint (pers. comm.).

#### 5.2.1. Research the impacts of lansan harvesting regimes

1. Conduct a comparative study of differing harvesting regimes on and resin quality and volume. Involve local resin tappers in both the tapping and monitoring the effects on:
  - (a) the growth and crown health of lansan trees.
  - (b) resin quality and volume.
2. Involve local resin tappers in both the tapping and monitoring the trees.



3. Document the effects of differing regimes

#### **5.2.2. *Research the market for lansen products***

1. Determine supply chains, demand and trade economics of lansen resin (to ensure the new management model does not exceed demand, and to set appropriate harvesting license fees).

#### **5.2.3. *Develop a co-management plan with community-based harvesters***

1. Meet regularly with local resin tappers in at least two key communities to build up a working relationship:
  - (a) determine their needs, attitudes and current management practices;
  - (b) identify areas of forest used for harvesting;
2. Develop a co-management plan
  - (a) Include provision for resin tappers cooperating with SLFD enforcement officers to help protect the rainforests from unlicensed tappers.
  - (b) Develop rules on fair and sustainable usage of trees.
3. Raise national awareness of the concerns over lansen harvesting and of the new management plan.

#### **5.2.4. *Pilot the local harvesting of resin, licensed by SLFD.***

1. Develop a licensing framework with financing within SLFD's annual budget and operational plans. Resin tappers can be licensed either as individuals or as a communal group.
2. Tappers implement the management plan developed under 5.2.3.1:
  - (a) Tappers trained in the approved methods.
  - (b) SLFD monitors the performance of tappers in adhering to the approved methods;
  - (c) SLFD and the tappers monitor the impacts of the harvesting regime on lansen trees, and adjust it if necessary;
  - (d) SLFD monitor the productivity of the resin tappers and traders and their opinions of the new co-management system;
3. SLFD monitors the pressures on the lansen population (i.e. not only from licensed tappers).
4. SLFD and the tappers review and adjust the management regime.

#### **5.2.5. *Establish institutional support for community groups.***

1. SLFD establishes a mechanism for ongoing support (e.g. in enforcement, or in providing advice and training; rather than financial support) for community groups involved in implementing the lansen management plan.

- (a) SLFD identifies current funding to support this action.
- (b) SLFD liaison officers operate at the Range level.
- (c) Regular meetings between SLFD and tappers groups, including site visits by SLFD.

<b>Establish small-scale sustainable farming of agouti</b>
--

The prospect of ‘minilivestock farming’ this species is discussed in some detail by Clarke (2009; and references therein), to which the reader is also referred.

#### **5.2.6. *Research the market for agouti products***

1. Demand for agouti appears to be low (or at least under-reported) at present. Conduct market research into potential demand and economics. Specialist markets (e.g. tourists) could also be investigated.
2. Determine the set-up and operational costs of agouti farming to local farmers. This could be done with a pilot study involving a few interested farmers.
3. Estimate the predicted supply of agouti products.

#### **5.2.7. *Develop agouti husbandry practices for Saint Lucia***

1. Pilot husbandry by a small number of interested farmers:
  - (a) Provide guidelines on husbandry practices.
  - (b) Inspect and monitor premises and practices;
  - (c) Ensure the maintenance of breeding and health records;
  - (d) Provide a regulated framework for disposal of live breeding stock.
2. Concurrently, implement the husbandry experiments suggested by Clarke (2009) at SLFD’s Union minizoo and/or as a part of the pilot itself.
3. Review and if necessary adjust protocols in the light of the pilot findings

#### **5.2.8. *Establish a regulatory framework***

1. Establish a framework, and sufficient recurrent funding, to licence agouti farmers. Funding may come from within SLFD’s annual budget and/or from sale of the licences themselves. Establish regulations for:
  - (a) obtaining stock;
  - (b) conditions under which stock are maintained and bred;
  - (c) maintaining records of production;
  - (d) disposal of live breeding stock (without this it may be difficult to regulate removal of stock from the wild).

#### **5.2.9. *Establish a monitoring framework for wild stocks of agouti***

1. Establish a monitoring mechanism for wild stocks. This may prove challenging for this rather elusive species, although a simple index may suffice.
  - (a) Forest trail workers in the Forest Reserves trained to record encounters with agouti (seen or heard, or detected by sign).
  - (b) Monitoring reports coordinated at the Range level and compiled by SLFD's Wildlife Unit.

### **5.3. Conservation of endangered game species**

<b>Reduce the impact of hunting and hunting dogs on the Saint Lucia iguana</b>
--

Of all Saint Lucia's terrestrial game species, the Saint Lucia iguana seems most under threat of extinction in the wild. This is due to a number of threats, most notably habitat loss to development in the North East Corridor (Morton, 2007) and hybridization with alien green iguanas (Morton, 2008). Wildlife use – direct hunting of iguanas and collateral losses from the hunting of other game species – appears to be at a low level but is nonetheless predicted to be having severe impacts on the very small remaining iguana population. As such, management of these wildlife use activities should be a priority for SLFD. Saint Lucia iguanas seem most vulnerable to direct hunting and collateral hunting impacts during their nesting season, February to May each year, and primarily at two sites, the estates of Grand Anse and Louvet.

#### **5.3.1. *Establish a framework for monitoring hunting pressure on the Saint Lucia iguana***

1. Conduct monitoring patrols at iguana nesting sites (Grand Anse and Louvet) during the period first week of February to first week of May:
  - (a) Patrols conducted by Northern and Dennery Ranges, coordinated by SLFD's wildlife Unit.
  - (b) Multiple patrols per nesting season.
  - (c) Patrol routes include the iguana nesting beaches in each estate.
2. SLFD Wildlife Unit coordinate data recording to monitor hunting pressures and impacts.
  - (a) Patrols record and store the location of (using a GPS receiver or map) all sightings of people and of dogs (with or without people) inside each estate. Record whether dogs are tied (leashed).
  - (b) Patrols record and GPS all iguana carcasses or remains.
  - (c) Patrols conduct questionnaires on known iguana kills in any given season.
  - (d) The simple presence of SLFD in these areas, without any additional enforcement actions, appears to lead to a reduction in iguana hunting and marine turtle poaching (Morton, 2007).

### **5.3.2. *Maintain public sensitization of this issue and monitor its effects***

1. Continue raising awareness of the Wildlife Protection Act and of the value of the Saint Lucia iguana and the negative impacts of hunting, including collateral impacts from hunting dogs:
  - (a) Use mass media to sensitize the national population to these concerns.
  - (b) Use face to face contacts and informal discussions during patrols (5.3.1).
  - (c) Negotiate repair of signage at Louvet and installation of signage at Grand Anse.
  - (d) Sensitize the Royal Saint Lucia Police Force to the application of the 1980 Wildlife Protection Act to the hunting of iguanas.
  - (e) Enforce the Wildlife Protection Act when people are caught deliberately killing iguanas.

### **5.3.3. *Monitor the effects of public sensitization***

1. Use the monitoring framework (5.3.1) to measure changes in:
  - (a) the number of iguana carcasses or remains recovered each year;
  - (b) the number of reported iguana kills;
  - (c) the number of untied dogs at nesting sites.

## **5.4. Reduction of alien invasive game species impacts**

<b>Reduce the impacts of kochon mawon within and outside the Forest Reserve</b>
---

Although kochon mawon is clearly used for meat within Saint Lucia, increasingly it is being perceived primarily as a pest. Use of this resource and control of the negative impacts it causes are not necessarily mutually exclusive aims. However, sustainable use – or at least usage that sustains the population at a higher than desirable level – *is* incompatible with control efforts. The actions below focus on control and whilst they do not preclude consumption of this species – which may provide an incentive – that is not the primary objective.

### **5.4.1. *Establish a framework to regulate control efforts***

1. Establish a regulatory framework for pig hunters with sufficient recurrent funding, to administer it. Funding may come from within SLFD's annual budget and/or from sale of the licences themselves. Establish regulations for:
  - (a) Hunting methods used; this may include:
    - licensing of firearms;
    - licensing of hunting dogs within the Forest Reserve.
  - (b) Coordination of different hunting groups, SLFD and other forest users.
  - (c) Health and Safety procedures.

- (d) Registering and recording take; this should include:
  - number of kills,
  - sex and size and/or weight of each kill,
  - date and location of each kill (give consideration to the loan, and training in the use, of GPS receivers to hunters).
- (e) Disposal of take.
- 2. Establish administration of these regulations at the Range level, with coordination by the Wildlife Unit.

#### **5.4.2. *Establish a framework to collate reports of kochon mawon and its impacts***

- 1. Establish a framework for reporting (by pig hunters, farmers, tourists, the general public) sightings of kochon mawon and their impacts
  - (a) Establish reporting and public liaison mechanisms at the Range level.
- 2. Establish collation of reports by the Wildlife Unit, with support from the Mapping Unit.

#### **5.4.3. *Establish a framework to monitor control efforts***

- 1. Establish a regular timetable for reporting from the Ranges to the Wildlife Unit data on:
  - (a) issuing of licences;
  - (b) hunting effort:
    - number of hunting parties per period;
    - extent of hunting forays;
  - (c) any accidents;
  - (d) take by hunters;
  - (e) details of take (5.4.1.1(d), above).

#### **5.4.4. *Train SLFD staff and private hunters to deploy and monitor multiple control techniques***

- 1. Use a workshop comprising SLFD Range staff, private Saint Lucian pig hunters and one or more overseas consultants to:
  - (a) Evaluate multiple techniques. Mitchell & Balogh (2007) detail a range of available methodologies – additional to the hunting methods presently in use in Saint Lucia – that could be selected from. These include:
    - Trapping
    - Catch per unit effort

- Removal-index
  - Bait-take
  - Dung counts
  - Spotlight counts
  - DNA sampling
- (b) Identify training needs for SLFD Range staff and private pig hunters in the deployment *and* use for monitoring of selected techniques. Monitoring is of:
- the control effort deployed;
  - the kochon mawon population (some of the same methods – catch per unit effort and removal-index can be used to both control and monitor the kochon mawon population).
2. Train SLFD staff at the Range level to monitor changes in the impacts of kochon mawon abundance on native biodiversity. Mitchell & Balogh (2007) detail a range of available methodologies that could be selected from, which include:
- (a) Identify target native species to monitor. Candidates that might be expected to suffer from the presence of kochon mawon include:
- ground-nesting birds (e.g. bridled quail dove);
  - terrestrial reptiles (e.g. Saint Lucia pygmy gecko, Saint Lucia worm lizard);
  - plants favoured as food by kochon mawon.
- (b) Develop measures of the state (abundance, occupancy) or population processes (survival) of these targets that can be deployed by Range staff. In the interests of feasibility, these measures may have to be indices of the above variables that can be collected during other routine Range activities.
- (c) Establish a reporting framework, operating at the Range level and reporting to the Wildlife Unit.
- (d) Monitoring of kochon mawon impacts on crops is covered under 5.4.2.

#### **5.4.5. *Deploy and adapt selected techniques based on monitoring of their effects***

1. SLFD and private pig hunters develop a 5-year kochon mawon control plan.
2. Deploy selected control techniques (5.4.4.1).
3. Monitor control effort (5.4.3).
4. Monitor the impact of control on kochon mawon (5.4.4).
5. Monitor the impact of control on native biodiversity (5.4.4).
6. Monitor the impact of control on crop damage (5.4.2).



7. Each year, SLFD and private pig hunters review the results of monitoring and adapt the control plan as necessary.

#### **5.4.6. *Regulate the control of domestic pigs***

1. Review existing legislation regulating the husbandry and control of domestic pigs.
2. Using existing legislation where possible, require domestic pigs be marked and owners penalized if the animals escape.

### **5.5. Research into game species impacts**

<b>Assess the impacts of mannikou on native wildlife species</b>
--

Although mannikou is widely hunted for meat, it is an alien invasive species likely to have impacts on Saint Lucia's native fauna (Daltry, 2009, M. Morton, pers. obs.). More research is needed on this, which may, secondarily, provide data on the predicted sustainability of hunting this species.

#### **5.5.1. *Measure the impacts of mannikou on native herpetofauna, avifauna and invertebrates***

1. Remove mannikou at high sensitivity sites (e.g. for ground nesting birds or iguanas):
  - (a) Use live trapping and euthanasia.
  - (b) Record demographics of the mannikou population (age, sex).
  - (c) Identify and record stomach contents.
  - (d) Estimate mannikou population density using the removal method (see Morton, 2005, for an example of this method using mongoose trapping in Saint Lucia).
  - (e) Re-estimate mannikou population at the same sites a year later, to determine local population recovery.

## 6. References

- Abele, L.G. & Kim, W. (1986) *An Illustrated Guide to the Marine Decapod Crustaceans of Florida*. State of Florida Department of Environmental Regulation. Technical series, Volume 8. Florida State University.
- Anon (undated) *Case Study on Benefit Sharing Arrangements – Mankote Mangrove* [online] [http://www.slubiodiv.org/pdfs/Benefit\\_Sharing\\_Mankote\\_Mangrove.pdf](http://www.slubiodiv.org/pdfs/Benefit_Sharing_Mankote_Mangrove.pdf) [Downloaded on 2 November 2009].
- Bliss, D.E. (1968) Transition from water to land in decapod crustaceans. *American Zoologist*, 8, 355-392.
- Breach, K. (2009) *Quantifying the Interactions Between Humans and Endemic Pit vipers (Bothrops caribbaeus) in Saint Lucia*. MSc thesis, Imperial College, University of London, London.
- Breen, H.H. (1844) *Saint Lucia: Historical, Statistical and Descriptive*. Longman, Brown, Green and Longmans, London.
- Bright, D.B. & Hogue, C.L. (1972) A synopsis of the burrowing land crabs of the world and list of their symbionts and burrow associates. *Contributions in Science (Los Angeles County Natural History Museum)*, 220, 1-58.
- Butler, P.J. (1978) *Saint Lucia Research Report*. Unpublished Report. North East London Polytechnic, London.
- Clarke, F.M (2009) *The Mammals of Saint Lucia: Species Accounts, Distribution, Abundance, Ecology, Conservation and Management of Saint Lucia's Native and Introduced Wild Mammals*. Technical Report to the National Forest Demarcation and Bio-Physical Resource Inventory Project, FCG International Ltd, Helsinki, Finland.
- Daltry, J.C. (2009) *The Status and Management of Saint Lucia's Forest Reptiles and Amphibians*. Technical Report to the National Forest Demarcation and Bio-Physical Resource Inventory Project, FCG International Ltd, Helsinki, Finland.
- Danforth, S.T. (1935) The Birds of Saint Lucia. *Monographs of the University of Puerto Rico; Series B*, 3, 1-129.
- Diamond, A.W. (1973) Habitats and feeding stations of Saint Lucia's forest birds. *Ibis*, 115, 317-329.
- Dornelly, A. & Jn Baptiste, T. *Report on workshop on pig hunting in Saint Lucia*. Saint Lucia Forestry Department. In preparation.
- Frank, D. (ed.) (2001) *Kwéyòl Dictionary*. Ministry of Education, Government of Saint Lucia. Castries, Saint Lucia.
- Hooge, P.N. & Eichenlaub, B. (2000) *Animal Movement Extension to Arc View. ver. 2.0*. Alaska Science Center, Biological Science Office, U.S. Geological Survey, Anchorage, USA.
- Government of Saint Lucia (1998) *Biodiversity Country Study Report*. Ministry of Agriculture, Lands, Fisheries & Forestry, Forestry and Fisheries. Saint Lucia.
- Government of Saint Lucia (2002) *2001 Population and Housing Census Report*. Statistics Department. [Available at [http://www.stats.gov.lc/cenpub\\_f.pdf](http://www.stats.gov.lc/cenpub_f.pdf) ].
- Graveson, R. *Checklist of the Flora of Saint Lucia*. In preparation.
- Graveson, R. (2009) *The Classification of the Vegetation of Saint Lucia*. Technical Report to the National Forest Demarcation and Bio-Physical Resource Inventory Project, FCG International Ltd, Helsinki, Finland.

- Gustave, D., John, L., Andrew, M., Charles, B., Severin, M., Hyacinth, M., Fevrier, L., James, J., James, A., Issac, C. & Rock, R. (2006) *Development of the Latanye Broom Industry in Saint Lucia (West Indies)*. Unpublished Report, Saint Lucia Ministry of Agriculture, Saint Lucia.
- Howard, A.R. (1988) *Flora of the Lesser Antilles*. Arnold Arboretum, Harvard University, Massachusetts.
- IUCN (2009) *IUCN Red List of Threatened Species. Version 2009.2*. [online] <[www.iucnredlist.org](http://www.iucnredlist.org)>. [Downloaded on 3 November 2009].
- John, L.C. (2001a) *Attitudes Towards Hunting and the Development of a National Wildlife Policy in Saint Lucia*. Unpublished Report. Saint Lucia Forestry Department, Ministry of Agriculture, Lands, Fisheries & Forestry, Saint Lucia.
- John, L.C. (2001b) *The Latanye (Coccoloba barbadensis) Craft Industry in Saint Lucia*. Unpublished Report. Forestry Department. Ministry of Agriculture, Forestry & Fisheries, Saint Lucia.
- Maillard, J.-F. (2008) *Faune des Antilles: Guide des Principales Espèces Soumises à Réglementation: Martinique, Guadeloupe, Saint-Barthélemy*. Editions Roger Le Guen, Garies, France.
- Mitchell, B. & Balogh, S. (2007) *Monitoring Techniques for Vertebrate Pests: Feral Pigs*. Bureau of Rural Sciences, Canberra, Australia. [Available online at [http://www.dpi.nsw.gov.au/\\_\\_data/assets/pdf\\_file/0005/218534/Monitoring-techniques-for-vertebrate-pests---pigs.pdf](http://www.dpi.nsw.gov.au/__data/assets/pdf_file/0005/218534/Monitoring-techniques-for-vertebrate-pests---pigs.pdf)]
- Morton, M.N. (2005) *Mongoose Trapping: Louvet 2005*. Unpublished Report. Durrell Wildlife Conservation Trust, Jersey.
- Morton, M.N. (2007) *Saint Lucia Iguana Report 2002-06*. Unpublished Report. Durrell Wildlife Conservation Trust, Jersey.
- Morton, M.N. (2008) *The Urgent Problem of Alien Green Iguanas Around Soufriere*. Unpublished Report to Saint Lucia Ministry of Agriculture, Lands, Fisheries & Forestry. Durrell Wildlife Conservation Trust, Jersey.
- Nowack, R.M. (1991) *Walker's Mammals of the World: Volume 1* (Fifth Edition). Johns Hopkins University Press, Baltimore.
- Porter, S. (1929) In search of the imperial parrot. *Avicultural Magazine* 7, 240-246, 267-275. [Published in two parts, in volume 7, issues 10 and 11].
- Rodríguez, G. & López, B. (2003) Insular species of Neotropical freshwater crabs (Crustacea: *Brachyura*). *Journal of Natural History*, 37, 2599-2614.
- Samuel, N. & Smith, A. (2000) Popular knowledge and science: using the information that counts in managing use of a mangrove in Saint Lucia, West-Indies. *Paper presented at: Quebec 2000 Millennium Wetland Event, Quebec, 6-12 August, 2000*. CANARI Communication No 27X: 5 p.
- Towle, J.A. & Towle E.L. (ed.) (1991) *Saint Lucia Environmental Profile*. Caribbean Conservation Association, Barbados, and Island Resources Foundation, US Virgin Islands.
- Wingate, D. (1969) *A Summary of the Status of the Saint Lucia Parrot, Amazona versicolor, and Other Rare Birds of Saint Lucia*. Unpublished Report. International Council for Bird Preservation, Washington, D.C.
- World Conservation Monitoring Centre (1998) *Protium attenuatum*. In (IUCN, 2009) *IUCN Red List of Threatened Species. Version 2009.1*. <[www.iucnredlist.org](http://www.iucnredlist.org)> [Downloaded on 02 November 2009].

## Acknowledgements

This survey was a part of the National Forest Demarcation and Bio-Physical Resource Inventory Project, funded by the European Union, and implemented by the Finnish Consulting Group in collaboration with the Saint Lucia Forestry Department under the auspices of the Banana Industry Trust. I am grateful to Jorma Peltonen, FCG, for engaging myself, via the Durrell Wildlife Conservation Trust (Durrell); and to Project Leader Dr Bob Tennent, for his support and advice.

Dr Jenny Daltry and Adams Toussaint both provided many useful comments on earlier drafts of this report which have improved it greatly. Any errors that remain are my own.

My thoughts on the subject of wildlife use in Saint Lucia have been greatly influenced by the many useful discussions I have had with members of the Saint Lucia Forestry Department over the eight years I have worked in Saint Lucia. In particular, Michael Andrew, Donald Anthony, Michael Bobb, Alwin Dornelly, Donatien Gustave, Tim Jn Baptiste, Lyndon John, Alfred Prospere, Adams Toussaint and Anias Verneuil have given me many invaluable insights which I hope have made their way into this report. I would also like to extend my thanks to the Saint Lucia Ministry of Agriculture, Lands, Fisheries & Forestry, Lands, Fisheries & Forestry for their support of Durrell's various collaborations with SLFD over the years, many of which have also fed into this report. Roger Graveson has been consistently generous with his expansive knowledge of Saint Lucia's flora throughout my stay here, and a great help.

Dr Jenny Daltry, my colleague in the conservation biology team of this project has been tireless in her support and has contributed much expert advice and guidance throughout this project, for which I am very grateful.

My colleagues at Durrell in Jersey (Great Britain) have been an ongoing source of support to me whilst working in Saint Lucia, with especial thanks to Drs John Fa, Stephan Funk, Andrew Terry Glyn Young and Richard Young, and Sarah Seymour.

Finally, I would like to thank the many volunteers who have worked in Saint Lucia for Durrell and SLFD's collaborations during the time I have been here. In particular, Elli Holt and Erica Spayne – very ably assisted by SLFD's George Antoine, Mary James, Stephen Lesmond and Tim Jn Baptiste – were responsible for collecting much of the questionnaire data on which this report is based.

# Annex I: Questionnaires to general public

## 1.1 Questions set 1

<b>Common game animals</b>	<div>Date</div>	<div>Respondent Code</div>
----------------------------	-----------------	----------------------------

**These questions cover:**

*Agouti*

*Kochon mawon (wild pig)*

*Mannikou (opposum)*

*Bak (forest [stream] crab)*

*Kwab (coastal crab)*

Surveyors \_\_\_\_\_
Location \_\_\_\_\_
Waypoint \_\_\_\_\_
GPS \_\_\_\_\_

Respondent's sex  
circle one

**M**    **F**

Respondent's age:  
circle one

**child**    **under 40**    **over 40**

How often do they go into the *bush* or to their *garden*? circle one

**at least once/week**

**at least once/month**

**less than once/month**

How often do they go into the *forest*? circle one

**at least once/week**

**at least once/month**

**less than once/month**

**Extra information – snakes** (serpan = fer de lance)

Did they mention any encounters with snakes? circle one

**Yes**    **No**

Were the specifically *fer de lance* encounters? circle one

**Yes**    **No**

How many *fer de lance* encounters did the talk about? circle one

**One**    **More than 1**

If more than 1, how many?  
could be a number or "few", "many", etc

Did they say where they encountered it/them? any information

How did the encounter go? circle one or more

**just saw it**

**tried to kill it**

**did kill it**

**got bitten**

Any other information?

*St Lucia Wildlife Use Questionnaire 2009*

Page 1 of 6

Common game animals

Date

Respondent Code

**AGOUTI**

Have they seen agouti before? **Yes No**  
circle one

Were you convinced they knew what an agouti was? **Yes No**  
circle one

When was the last time they saw one? **This year**  
**Last year**  
**In the last 5 years**  
**Over 5 years ago**

Do they think the numbers of agouti in their area have changed in their lifetime? **Gone Up** **Gone Down**  
**Stayed same** **Don't know**

Do they eat agouti? **Yes No**  
circle one

If no, why not? **Costs too much**  
**Can't get it**  
**It's illegal**  
**Don't like the taste**  
**Just the idea is disgusting**

Do they know if other people in their area eat agouti? **Yes No**  
circle one

Do they hunt agouti? **Yes No**  
circle one

Do they know if other people in their area hunt agouti? **Yes No**  
circle one

**Extra information**

Did they mention any locations?

Did they mention hunting methods? one or more

**Dogs** **Guns** **Traps**

**Other:**

Did they mention how often they hunt it? one  
**once week** **once month** **less**

Did they mention how often others hunt it? one  
**once week** **once month** **less**

Did they mention the legality of hunting it? one  
**Yes** **No**

Did they mention if it was a pest? circle one  
**Yes** **No**

Any details?:

Did they mention Kweyol Day or any other special occasions it's eaten on? circle one  
**Yes** **No**

Any details?:

Any other notes?



## Common game animals

Date

Respondent Code

## MANNIKOU

Have they seen mannikou before? **Yes No**  
circle one

Were you convinced they knew what a mannikou was? **Yes No**  
circle one

When was the last time they saw one? **This year**  
circle one **Last year**  
**In the last 5 years**  
**Over 5 years ago**

Do they think the numbers of mannikou in their area have changed in their lifetime? **Gone Up** **Gone Down**  
circle one **Stayed same** **Don't know**

Do they eat mannikou? **Yes No**  
circle one

If no, why not? **Costs too much**  
circle one or more **Can't get it**  
**It's illegal**  
**Don't like the taste**  
**Just the idea is disgusting**

Do they know if other people in their area eat mannikou? **Yes No**  
circle one

Do they hunt mannikou? **Yes No**  
circle one

☐ Do they know if other people in their area hunt mannikou? **Yes No**  
circle one

## Extra information

Did they mention any locations?

\_\_\_\_\_

\_\_\_\_\_

Did they mention hunting methods? one or more

**Dogs** **Guns** **Traps**

Other: \_\_\_\_\_

Did they mention how often they hunt it? one

**once week** **once month** **less**

Did they mention how often others hunt it? one

**once week** **once month** **less**

Did they mention the legality of hunting it? one

**Yes** **No**

Did they mention if it was a pest? circle one

**Yes** **No**

Any details?: \_\_\_\_\_

\_\_\_\_\_

Did they mention Kweyol Day or any other special occasions it's eaten on? circle one

**Yes** **No**

Any details?: \_\_\_\_\_

\_\_\_\_\_

Any other notes?

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

## Common game animals

Date

Respondent Code

## KOCHON MAWON

Have they seen kochon mawon before? **Yes No**  
 circle one

Were you convinced they knew what it was? **Yes No**  
 circle one

When was the last time they saw one? **This year**  
 circle one **Last year**  
**In the last 5 years**  
**Over 5 years ago**

Do they think the numbers of kochon mawon in their area have changed in their lifetime? **Gone Up Gone Down**  
 circle one **Stayed same Don't know**

Do they eat kochon mawon? **Yes No**  
 circle one

If no, why not? **Costs too much**  
 circle one or more **Can't get it**  
**It's illegal**  
**Don't like the taste**  
**Just the idea is disgusting**

Do they know if other people in their area eat it? **Yes No**  
 circle one

Do they hunt kochon mawon? **Yes No**  
 circle one

Do they know if other people in their area hunt it? **Yes No**  
 circle one

## Extra information

Did they mention any locations?

Did they mention hunting methods? one or more

**Dogs Guns Traps**

Other: \_\_\_\_\_

Did they mention how often they hunt it? one

**once week once month less**

Did they mention how often others hunt it? one

**once week once month less**

Did they mention the legality of hunting it? one

**Yes No**

Did they mention if it was a pest? circle one

**Yes No**

Any details? \_\_\_\_\_

Did they mention Kweyol Day or any other special occasions it's eaten on? circle one

**Yes No**

Any details? \_\_\_\_\_

Any other notes?

## Common game animals

Date

Respondent Code

## BAK

Have they seen bak before? **Yes** **No**  
circle one

Were you convinced they knew what bak was? **Yes** **No**  
circle one



When was the last time they saw one? **This year**  
circle one **Last year**  
**In the last 5 years**  
**Over 5 years ago**

Do they think the numbers of bak in their area have changed in their lifetime? **Gone Up** **Gone Down**  
circle one **Stayed same** **Don't know**

Do they eat bak? **Yes** **No**  
circle one

If no, why not? **Costs too much**  
circle one or more **Can't get it**  
**It's illegal**  
**Don't like the taste**  
**Just the idea is disgusting**

Do they know if other people in their area eat bak? **Yes** **No**  
circle one

Do they collect bak? **Yes** **No**  
circle one

Do they know if other people in their area collect bak? **Yes** **No**  
circle one

## Extra information

Did they mention any locations?

\_\_\_\_\_

Did they mention hunting methods? one or more

**Dogs** **Guns** **Traps**

**Other:** \_\_\_\_\_

Did they mention how often they hunt it? one

**once week** **once month** **less**

Did they mention how often others hunt it? one

**once week** **once month** **less**

Did they mention the legality of hunting it? one

**Yes** **No**

Did they mention if it was a pest? circle one

**Yes** **No**

Any details?: \_\_\_\_\_

Did they mention Kweyol Day or any other special occasions it's eaten on? circle one

**Yes** **No**

Any details?: \_\_\_\_\_

Any other notes?

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Common game animals**

Date

Respondent Code

**KWAB**

Have they seen kwab before? **Yes** **No**  
circle one

Were you convinced they knew what kwab was? **Yes** **No**  
circle one

When was the last time they saw one? **This year**  
**Last year**  
**In the last 5 years**  
**Over 5 years ago**

Do they think the numbers of kwab *in their area* have changed in their lifetime? **Gone Up** **Gone Down**  
circle one  
**Stayed same** **Don't know**

Do they eat agouti? **Yes** **No**  
circle one

If no, why not? **Costs too much**  
circle one or more  
**Can't get it**  
**It's illegal**  
**Don't like the taste**  
**Just the idea is disgusting**

Do they know if other people *in their area* eat agouti? **Yes** **No**  
circle one

Do they hunt agouti? **Yes** **No**  
circle one

Do they know if other people *in their area* hunt agouti? **Yes** **No**  
circle one

**Extra information**

Did they mention any locations?

Did they mention hunting methods? *one or more*  
**Dogs** **Guns** **Traps**  
**Other:**

Did they mention how often *they* hunt it? *one*  
**once week** **once month** **less**

Did they mention how often *others* hunt it? *one*  
**once week** **once month** **less**

Did they mention the legality of hunting it? *one*  
**Yes** **No**

Did they mention if it was a pest? *circle one*  
**Yes** **No**  
Any details?:

Did they mention Kweyol Day or any other special occasions it's eaten on? *circle one*  
**Yes** **No**

Any details?:

Any other notes?

## 1.2 Questions set 2

Plants and less common game

Date

Respondent Code

These questions cover:

*Latannyé (palm for brooms)*

*Lansan (incense)*

*Gom (gum, resin)*

*Lyenn ('liannas')*

*Tet chyenn (boa constrictor)*

*Leza, gwo zandoli (iguana)*

Surveyors \_\_\_\_\_ Location \_\_\_\_\_ Waypoint \_\_\_\_\_ GPS \_\_\_\_\_

Respondent's sex  
circle one

M

F

Respondent's age:  
circle one

child

under 40

over 40

How often do they go into the bush or to  
their garden? circle one

at least  
once/week

at least  
once/month

less than  
once/month

How often do they go into the forest?  
circle one

at least  
once/week

at least  
once/month

less than  
once/month

Extra information – snakes

(serpan = fer de lance)

Did they mention any encounters with  
snakes? circle one

Yes No

Were the specifically *fer de lance*  
encounters? circle one

Yes No

How many *fer de lance* encounters did the  
talk about? circle one

One More  
than 1

If more than  
1, how many?  
could be a number  
or "few", "many",  
etc

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Did they say where they encountered  
it/them? any information

\_\_\_\_\_  
\_\_\_\_\_

How did the encounter  
go? circle one or more

just saw it

tried to kill it

did kill it

got bitten

Any other  
information?

\_\_\_\_\_  
\_\_\_\_\_

St Lucia Wildlife Use Questionnaire 2009

Page 1 of 7

**Plants and less common game**

Date

Respondent Code

**LATANNYÉ**

Do they know where latannyé grows in the wild? **Yes No**  
circle one

Were you convinced they knew what latannyé was? **Yes No**  
circle one

When was the last time they saw latannyé in the wild? **This year Last year In the last 5 years Over 5 years ago**  
circle one

Do they think the numbers of wild-growing latannyé plants in their area have changed in their lifetime? **Gone Up Gone Down Stayed same Don't know**  
circle one

Do they use latannyé brooms? **Yes No**  
circle one

If no, why not? **Costs too much Can't get them There are better alternatives**  
circle one or more

Do they know if other people in their area use latannyé brooms? **Yes No**  
circle one

Do they harvest wild latannyé? **Yes No**  
circle one

Do they know if other people in their area harvest wild latannyé? **Yes No**  
circle one

**Extra information**

Did they mention any locations?

\_\_\_\_\_

Did they mention harvesting methods? **one or more**

**Take some leaves Take whole plants**

**Other:** \_\_\_\_\_

Did they mention how often they harvest it? **one once week once month less**

Did they mention how often others harvest it? **one once week once month less**

Did they mention the legality of harvesting it? **Yes No**

Did they mention if it was also cultivated? **one Yes No**

Did they mention if harvesters (themselves or others) were also...? **one growers producers of brooms vendors of brooms**

Any other notes?

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



Plants and less common game

Date

Respondent Code

**LANSAN**

Do they know where lansan trees grow? **Yes No**  
circle one

Were you convinced they knew what lansan was? **Yes No**  
circle one

☐ When was the last time they saw lansan trees in the wild? **This year Last year In the last 5 years Over 5 years ago**  
circle one

Do they think the numbers of lansan trees in their area have changed in their lifetime? **Gone Up Gone Down Stayed same Don't know**  
circle one

Do they use lansan? **Yes No**  
circle one  
If no, why not? **Costs too much Can't get it There are better alternatives Don't like it**  
circle one or more

Do they know if other people in their area use lansan? **Yes No**  
circle one

Do they harvest lansan? **Yes No**  
circle one

Do they know if other people in their area harvest lansan? **Yes No**  
circle one

**Extra information**

Did they mention any locations?

\_\_\_\_\_

Did they mention harvesting methods? **one or more**

**tap tree in few places tap in lots places**

Other info: \_\_\_\_\_

Did they mention how often they harvest it? **one once week once month less**

Did they mention how often others harvest it? **one once week once month less**

Did they mention the legality of harvesting it? **Yes No**

Did they mention if it was also cultivated? **one Yes No**

Other info: \_\_\_\_\_

Did they mention if harvesters (themselves or others) were also vendors? **circle one Yes No**

Any other notes?

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Plants and less common game

Date

Respondent Code

GOM

Do they know where gom trees grow? **Yes No**  
circle one

Were you convinced they knew what gom was? **Yes No**  
circle one

When was the last time they saw gom trees in the wild? **This year**  
circle one **Last year**  
**In the last 5 years**  
**Over 5 years ago**

Do they think the numbers of gom trees in their area have changed in their lifetime? **Gone Up Gone Down**  
circle one **Stayed same Don't know**

Do they use gom? **Yes No**  
circle one

If no, why not? **Costs too much**  
circle one or more **Can't get it**  
**There are better alternatives**  
**Don't like it**

Do they know if other people in their area use gom? **Yes No**  
circle one

Do they harvest gom? **Yes No**  
circle one

Do they know if other people in their area harvest gom? **Yes No**  
circle one

Extra information

Did they mention any locations?

\_\_\_\_\_

Did they mention harvesting methods? one or more

**tap tree in few places tap in lots places**

Other info: \_\_\_\_\_

\_\_\_\_\_

Did they mention how often they harvest it? one

**once week once month less**

Did they mention how often others harvest it?

**once week once month less**

Did they mention the legality of harvesting it?

**Yes No**

Did they mention if it was also cultivated? one

**Yes No**

Other info: \_\_\_\_\_

Did the mention if harvesters (themselves or others) were also vendors? circle one

**Yes No**

Any other notes?

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Plants and less common game

Date

Respondent Code

LYENN

Do they know where lyenn for basket grows in the wild? **Yes No**  
circle one

Were you convinced they knew what lyenn for basket was? **Yes No**  
circle one

When was the last time they saw lyenn for basket in the wild? **This year Last year In the last 5 years Over 5 years ago**  
circle one

Do they think the numbers of lyenn for basket trees in their area have changed in their lifetime? **Gone Up Gone Down Stayed same Don't know**  
circle one

Do they use baskets made from lyenn? **Yes No**  
circle one

If no, why not? **Costs too much Can't get them There are better alternatives**  
circle one or more

Do they know if other people in their area use baskets made from lyenn? **Yes No**  
circle one

Do they harvest lyenn? **Yes No**  
circle one

Do they know if other people in their area harvest lyenn? **Yes No**  
circle one

Extra information

Did they mention any locations?

Did they specify which lyenn? **circle one or more**  
**awali ti konot ponm dilyenn**

Did they mention harvesting methods? **one or more**  
**Take a few vines Take lots of vines**  
**Other:**

Did they mention how often they harvest it? **one once week once month less**

Did they mention how often others harvest it? **one once week once month less**

Did they mention the legality of harvesting it? **Yes No**

Did they mention if it was also cultivated? **one Yes No**

Did they mention if harvesters (themselves or others) were also...? **one**  
**growers producers vendors**  
**of baskets of baskets**

Any other notes?

Plants and less common game

Date

Respondent Code

TET CHYENN

Have they seen tet chyenn before? **Yes No**  
circle one

Were you convinced they knew what tet chyenn was? **Yes No**  
circle one

When was the last time they saw a tet chyenn? **This year**  
circle one **Last year**  
**In the last 5 years**  
**Over 5 years ago**

Do they think the numbers of tet chyenn in their area have changed in their lifetime? **Gone Up** **Gone Down**  
circle one **Stayed same** **Don't know**

Do they use tet chyenn or any products from it? **Yes No**  
circle one

If no, why not? **Costs too much**  
circle one or more **Can't get it**  
**It's illegal**  
**Snake oil doesn't work**  
**Just the idea is disgusting**

Do they know if other people in their area use tet chyenn or tet chyenn products? **Yes No**  
circle one

Do they take tet chyenn? **Yes No**  
circle one

Do they know if other people in their area take tet chyenn? **Yes No**  
circle one

Extra information

Did they mention any locations?

\_\_\_\_\_

Did they mention tet chyenn products or uses? **one or more**

**Pet** **Tourist attraction** **Snake oil**

Other: \_\_\_\_\_

Did they mention how often they take it? **one**  
**once/month** **once/year** **less**

Did they mention how often others hunt it? **one**  
**once/month** **once/year** **less**

Did they mention the legality of hunting it? **one**  
**Yes** **No**

Did they mention if it was a pest? **circle one**  
**Yes** **No**

Any details?: \_\_\_\_\_

Any other notes?

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Plants and less common game

Date

Respondent Code

LEZA

Have they seen leza before? **Yes** **No**  
circle one

Were you convinced they knew what an leza was? **Yes** **No**  
circle one

When was the last time they saw one? **This year**  
circle one **Last year**  
**In the last 5 years**  
**Over 5 years ago**

Do they think the numbers of leza in their area have changed in their lifetime? **Gone Up** **Gone Down**  
circle one **Stayed same** **Don't know**

Do they eat leza? **Yes** **No**  
circle one

If no, why not? **Costs too much**  
circle one or more **Can't get it**  
**It's illegal**  
**Don't like the taste**  
**Just the idea is disgusting**

Do they know if other people in their area eat leza? **Yes** **No**  
circle one

Do they hunt leza? **Yes** **No**  
circle one

Do they know if other people in their area hunt leza? **Yes** **No**  
circle one

Extra information

Did they mention any locations?

Did they mention hunting methods? one or more

**Dogs** **Guns** **Traps**

**Other:**

Did they mention how often they hunt it? one  
**once week** **once month** **less**

Did they mention how often others hunt it? one  
**once week** **once month** **less**

Did they mention the legality of hunting it? one  
**Yes** **No**

Did they mention if it was a pest? circle one  
**Yes** **No**

Any details?:

Did they mention Kweyol Day or any other special occasions it's eaten on? circle one  
**Yes** **No**

Any details?:

Any other notes?

## Annex II: Guidance for surveyors in administering the general public questionnaire

### Saint Lucia Wildlife Use Questionnaire 2009 – instructions for surveyors

#### 1. Sets of forms

There are 2 sets of forms: both have the same cover sheet; the first set then deals with common game (animal) species; and the second set then deals with plants plus 2 less commonly taken game (animal) species. The sets and the Kwéyòl and English names of the species in them are:

Set 1: common game (6 pages)		Set 2: plants + less common game (7 pages)	
Agouti	Mannikou (opossum)	Latannyé (palm for brooms)	Lansan (incense)
Kochon mawon (wild pig)	Bak (forest [stream] crab)	Gonmyé (gum, resin)	Lyenn ('liannas')
	Kwab (coastal crab)	Tet chyenn (boa constrictor)	Leza, gwo zandoli (iguana)

Try to do equal numbers of each set, but only one set per respondent.

#### 2. Filling out sets of forms

- Don't fill out sets of forms in front of respondents; do it afterwards (as soon as possible afterwards; i.e. a few minutes later) from memory.
- Give each respondent a unique code (number): 001, 002, 003, etc. Fill this in, with the date of the interview, on every sheet – that way, if sheets get separated, we can put them responses back together with the correct respondent information again.
- On the cover sheet (page 1), put the initials of all the surveyors present at that interview, plus the name of the place the interview was done at, if you know it.
- Mark a GPS waypoint near to where the interview took place and on the cover sheet (page 1) write down the waypoint and which GPS it was saved on.
- Fill in as many of the non-optional questions as possible: optional questions are in greyed boxes (see below); the non-optional questions are on the top half of the cover sheet, plus the left-hand side of all the remaining sheets.

- A lot of questions (optional and non-optional) just ask you to circle a choice. The choices are in bold type. Usually you just circle one choice per question; for a few you can circle one or more (it says where).
- All interviewers present at an interview should check the filled out forms straight after they been filled in to make sure the information is correct by their memory too.

### 3. Extra information – optional questions

- All forms have some questions to fill out that are in greyed boxes, titled ‘Extra information’ (bottom of cover sheet, plus right-hand side of all the remaining sheets) – these questions are optional; you don’t need to ask these questions (though you can if you want) but if any of this information does come out of an interview (the respondent may volunteer it without being asked), record as much of it as you can here.
- The extra information on the cover sheet (page 1) is about fer de lance. All the remaining extra information boxes refer to the species on that page.

### 4. Conducting interviews

- Don’t ask for people’s names or any other identifying information (such as occupation).
- Assure the respondent that you are not collecting any personal information on them or anyone they tell you about. We just want to get an idea of what wildlife – plants and/or wild animals – is useful to Saint Lucians.
- Don’t ask their age, but try to choose one of the 3 options for this (‘child’, ‘under 40’ or ‘over 40’) on the cover sheet when you fill it out afterwards. Hopefully you don’t need to ask their sex either; just fill it out on the form.
- But for all other non-optional questions after ‘Respondent’s age’ on the cover sheet, do attempt to get information on.
- Memorize all the non-optional questions before starting the interviews. They are very similar for every species. A few things specific to some species and not others are noted below.
- You don’t have to ask the questions using the wording on the form; in fact it’s probably best if you don’t – just try to gather the informational you’ll need when you answer these questions on the form after the interview is over.
- You don’t need to ask these questions in any order. Keep the interview as conversational as possible.
- Don’t be pushy or confrontational. If they are clearly very uncomfortable about answering questions, move on to another topic. If they are clearly very uncomfortable about answering any questions, move on to another respondent.



- Some questions are likely to be much more touchy than others, in particular ones about hunting game, and in particular agouti and iguanas (léza). Try to lead up to these carefully, maybe towards the end of the interview and maybe in a roundabout way (for example, there seems to be an ‘unofficial acceptance’ that game is eaten on Kwéyòl Day; asking about that day might be a roundabout lead-in).
- Don’t contradict what the person is telling you, even if you know it’s wrong. We want to find out what they know or will tell us, not what you know.
- Wherever possible, don’t ask leading questions: e.g. asking “do you avoid eating mannikou because it tastes horrible?” is a leading question. A better way of asking it might be: “is there any reason why you don’t eat mannikou?”
- Keep the interview fairly short: 15-20 minutes per respondent.
- Forest and bush or garden
- For the questions about these on the cover sheet, try to draw a distinction between:
  - Bush or garden: non-urban, vegetated areas but not forest
  - Forest: People may think of this as ‘rain forest’ – not scrub, not cultivated

#### 5. Species-specific points to bear in mind

- For all species, plants or animals, we’re interested in extraction:
- Terms like ‘hunt’ or ‘take’ could include trapping (snare, pits, cage traps etc) as well as active hunting.
- Taking animals as pets and looking after them is still extraction
- Taking only parts of plants (latannyé leaves or gonmyé resin) is still extraction
- The following is just some background on individual species that might help you ask questions on them:

#### Agouti

- Agouti has the same name in Kwéyòl and English.
- Some people confuse agouti and mannikou (ask if it had a tail or climbs trees – agouti don’t).
- People are probably more likely to be wary of admitting to eating or hunting this species than many of the others.

- Some people report agouti destroy their gardens (crops) – asking about this first might make you seem more ‘sympathetic’ to the idea of controlling the, which might make people less reluctant to discuss hunting.

#### Mannikou

- Some people confuse agouti and mannikou (ask if it had a tail or climbs trees – agouti don’t).
- Probably widely hunted in many areas, so you could use that fact as a lead-in to questions on extracting this species.

#### Kochon mawon

- Mawon in Kwéyòl means ‘wild’ or ‘escaped’ (i.e. feral). We’re asking about pigs that don’t belong to anyone.
- Some people are legally licensed to use firearms to hunt pigs.
- Some people regard wild pork as better quality (more lean than) domestic pork – you could ask about that as a lead-in.
- Some people report wild pigs destroy their gardens (crops) – asking about this first might make you seem more ‘sympathetic’ to the idea of controlling the, which might make people less reluctant to discuss hunting.

#### Bak

- These are specifically the orange and black crabs that live in streams, predominantly in the forest. Check you and the respondent are both talking about the same thing here (maybe feigning ignorance of what bak is might be a way of doing this without asking a leading question like “are these the orange and black crabs that live in streams, in the forest?”).
- Apparently some people stopped eating pretty much any freshwater invertebrates after a bilharzia scare in the 70’s and 80’s.

#### Kwab

- We are interested in the coastal crabs (much more widely harvested than bak, it seems); but as for bak – check you and the respondent are both talking about the same thing.
- These are fairly commonly, and openly sold, so you could maybe ask where you could buy some or for how much.

### Latannyé

- The Forestry Department have been supplementing wild stocks with cultivated plants for people to grow and harvest. This is a wildlife questionnaire, so check that the respondent is talking about wild growing plants (e.g. if they say that numbers have increased, it might be because they are including cultivated plants).
- Brooms are openly sold, so this might be a lead-in.
- Some people regard latannyé brooms as superior in performance to imported mass-produced brooms.
- Brooms involve: harvesting, production (broom-making) and selling (which could be on the Saint Lucian market or exported overseas). The same person may be involved in just one of these steps, some, or all of them. (This is apparently in contrast to basket makers where the same person is usually the harvester and the producer, though not necessarily a vendor too).

### Lansan and Gonmyé

- Lansan and gonmyé are two different resins from two different tree species. Lansan is a white crumbly resin. Try to check you and the respondent are talking about the same thing
- You could also ask if lansan (l'encens in French; incense in English) is superior to gonmyé (gum)
- Gonmyé used to be used as a glue to repair leaks in boats, though not so much these days
- Lansan is sold, but I'm not sure if gonmyé is – you could ask.

### Lyenn

- Lyenns are used in basket making
- At least 3 different lyenns are used in basket making; you don't necessarily need to know these, but this background might help you to show more interest in what a basket-maker is telling you if they know you do. They are:
  - awali
  - ti kannou
  - ponm dilyenn
- Only ponm dilyenn is actually a liana (lyenn is liane in French); awali and ti kannou are aerial roots of trees.
- Ponm dilyenn produces a wild (edible) passion fruit
- Ponm dilyenn may not be so widely used for basket-making(?)

- Awali is apparently harder to harvest than ti kannou (it beaks low down when you yank it, not high up giving you a long lyenn – so you have to use more effort [climb up] or more skill [ball it and yank it by a special technique, apparently] to harvest it.

#### Tet chyenn

- I know of at least two uses for boas here: as a tourist attraction (or sometimes to attract Saint Lucians) and to produce snake oil.
- Snake oil is apparently especially valued, and valuable, in the French territories (Martinique, Guadeloupe) and may be exported to them.
- Local producers may also produce snake oil for friends/relatives (e.g. on request) rather than for sale.
- The Forestry Department do issue a small number of licences to collect boas.

#### Leza

- Leza ('lizard' – lézard in French) seems to be a more common name than gwo zandoli ('big lizard'); the latter may show indicate some confusion with other lizard species (zandoli, in Kwéyòl, is a generic term for lizards; léza is specific to iguanas)
- Most people in Saint Lucia have never seen an iguana in the wild and, on a previous questionnaire survey, many confused it with other lizards (e.g. the whiptails on Maria Island). Asking about colour and size should indicate whether a respondent is talking about iguanas.
- When you indicate size, some Saint Lucians indicate girth (diameter across belly) which some herpetologically-minded non-Saint Lucians may misinterpret as referring to snout-to-vent length. So check.
- There has been a lot of awareness-raising about the Saint Lucia iguana, including about the undesirability and illegality of hunting them. Most Saint Lucians will probably have had no contact with iguanas; but if you interview anyone who does hunt them, questions about hunting this particular species are probably going to be the hardest to get straight answers to.
- A surprising (to me) number of Saint Lucians seem interested in keeping iguanas as pets, and a number take them from the wild for this. There seems to be less awareness about the illegality of this (it's just as illegal as hunting them for food, but you don't need to tell respondents that on this survey – you're trying to gather information, not raise awareness). So this might be a slightly less threatening lead-in.
- If you speak to people about hunting, or even just seeing, iguanas, try to find out where. We are just as interested in iguanas outside the North East Coast – i.e. Saint Lucia iguanas that may have been moved by people or alien iguanas originating from the Soufrière area (and currently occupying an as-yet undetermined range). Responses about alien iguanas should also be included on the questionnaire forms.

#### Fer de lance

- Any information on this species is optional; it's not one of the harvested species covered by this survey. But:
  1. any such information could help augment a second, fer de lance, questionnaire running in parallel to this one; and
  2. people often seem quite happy to talk about fer de lance, so it may be a way of keeping a conversation flowing; it's a topic that often seems to arise naturally when you're discussing bush- or forest-based activities, as this questionnaire does.
- This species is on Schedule 3 ('Unprotected Wildlife') of the 1980 Wildlife Protection Act, along with vermin species. It's not illegal to kill it.
- This questionnaire explicitly does not seek any personally identifying information from respondent's, about themselves or other people. But in fact, for the fer de lance questionnaire being run in parallel to this questionnaire, it would be useful to have contacts that could be followed up for people who know a lot about fer de lance from personal experience, or know someone who does. Even so, don't even think about asking for contact details until the whole interview is finished and even then ask only if you feel very confident from the conversation you've just had that the respondent would not be upset by you asking this.

## Annex III: Questionnaire to expert respondents within the Ministry of Agriculture, Lands, Fisheries & Forestry

### QUESTIONNAIRE: USE OF WILDLIFE IN ST LUCIA QUESTIONS FOR ST LUCIA FORESTRY DEPARTMENT STAFF

All of these questions seek responses that *refer to the respondents own Forest Range*, not to the whole of St Lucia.

#### NOTES ON QUESTIONS AND RESPONSES

At the top of the form, enter the respondent's name, the Forest Range they are telling you about, your name (as the Recorder) and the date the questionnaire was delivered.

<b>Species</b>	Name of wildlife species of interest. For Lyenn, ask if they can distinguish different species, and if they can, record them on separate rows
<b>In Range</b>	Q: Does this species occur in the respondent's Range? A: Yes or No or N/K (Not Known) - circle one
<b>Locations</b>	Write down any named locations where the respondents knows this species occurs within his/her range. Continue on the back of the sheet if necessary
<b>Abundance</b>	Q: How abundant is this species in the respondent's Range? A: Abundant or Common or Rare or N/K (Not Known) - circle one
<b>Trend</b>	Q: Do the numbers of this species seem to be going up or down in the respondent's Range? A: Up or Down or Stable (neither up nor down) or N/K (Not Known) - circle one
<b>Harvested</b>	Q: Is this species known to be harvested in your range? A: Yes or No or N/K (Not Known) - circle one
<b>Harvested at least every</b>	Q: How often is this species harvested within the respondent's Range? A: At least once every Week or Month or Year or N/K (Not Known) - circle one
<b>Sale and/or personal use</b>	Q: Do people in the respondent's harvest this species for personal consumption or for sale or both? A: Personal use (not sold) or Local mkt (sold in St Lucia) or Exported (sold outside of St Lucia) or N/K (Not Known) - circle one <u>or more</u>
<b>Number harvesters</b>	Q: How many people does the respondent estimate are currently harvesting this species within their Range? A: 0 (zero) people or 1-9 people or 10-100 people or > (over) 100 people or N/K (Not Known) - circle one
<b>Take</b>	Q: Can the respondent estimate for his/her Range how many individuals (agouti, mannikou, wild pigs), individual plants (latannyé, lyenn) are removed each year; or how many lansan trees are tapped each year? A: < (less than) 100/yr or > (over)100/yr or N/K (Not Known) - circle one
<b>Harvest Methods</b>	Q: How is this species harvested in the respondent's Range? A: Depending on the species in question: <ul style="list-style-type: none"> <li>For agouti, mannikou, wild pigs: Traps and/or Dogs and/or Guns and/or Other (describe in 'Notes' column) or N/K (Not Known) - circle one <u>or more</u></li> <li>For latannyé: Whole plant removed or only some leaves are harvested (leaving the plant alive) or N/K (Not Known) - circle one <u>or more</u></li> <li>For lansan: a tree is tapped in one or a few places at a time or in lots of places or N/K (Not Known) - circle one <u>or more</u></li> <li>For lyenn: Whole plant removed or only part of the plant is harvested (leaving the plant alive) or N/K (Not Known) - circle one <u>or more</u></li> </ul>
<b>Notes</b>	Add any more information of interest from the respondent here

RESPONDENT			RANGE				RECORDER				DATE	
Species	In Range circle one	Locations	Abundance circle one	Trend circle one	Harvested?	Harvested at least every circle one	Sale and/or personal use circle one or more	Number harvesters circle one	Take see notes on cover page circle one	Harvest Methods circle one or more Notes	Notes	
Agouti	Yes No N/K		Abundant Common Rare N/K	Up Down Stable N/K	Yes No N/K	Week Month Year N/K	Personal use Local mkt Exported N/K	0 1-9 10-100 > 100 N/K	< 100/yr > 100/yr N/K	Traps Dogs Guns Other* N/K		
Mannikou	Yes No N/K		Abundant Common Rare N/K	Up Down Stable N/K	Yes No N/K	Week Month Year N/K	Personal use Local mkt Exported N/K	0 1-9 10-100 > 100 N/K	< 100/yr > 100/yr N/K	Traps Dogs Guns Other* N/K		
Kochon mawon	Yes No N/K		Abundant Common Rare N/K	Up Down Stable N/K	Yes No N/K	Week Month Year N/K	Personal use Local mkt Exported N/K	0 1-9 10-100 > 100 N/K	< 100/yr > 100/yr N/K	Traps Dogs Guns Other* N/K		
Leza	Yes No N/K		Abundant Common Rare N/K	Up Down Stable N/K	Yes No N/K	Week Month Year N/K	Personal use Local mkt Exported N/K	0 1-9 10-100 > 100 N/K	< 100/yr > 100/yr N/K	Traps Dogs Guns Other* N/K		
Tet chyeim	Yes No N/K		Abundant Common Rare N/K	Up Down Stable N/K	Yes No N/K	Week Month Year N/K	Personal use Local mkt Exported N/K	0 1-9 10-100 > 100 N/K	< 100/yr > 100/yr N/K	Traps Dogs Guns Other* N/K		



RESPONDENT			RANGE				RECORDER			DATE		
Species	In Range circle one	Locations	Abund- ance circle one	Trend circle one	Harves- ted?	Harvested at least every circle one	Sale and/or personal use circle one or more	Number harvest- ers circle one	Take see notes on cover page circle one	Harvest Methods circle one or more Notes	Notes	
Kwab (forest)	Yes No N/K		Abundant Common Rare N/K	Up Down Stable N/K	Yes No N/K	Week Month Year N/K	Personal use Local mkt Exported N/K	1-9 10-100 > 100 N/K	< 500/yr > 500/yr N/K	Traps Dogs Guns Other* N/K		
Kwab (land, coastal)	Yes No N/K		Abundant Common Rare N/K	Up Down Stable N/K	Yes No N/K	Week Month Year N/K	Personal use Local mkt Exported N/K	1-9 10-100 > 100 N/K	< 500/yr > 500/yr N/K	Traps Dogs Guns Other* N/K		
Latanye	Yes No N/K		Abundant Common Rare N/K	Up Down Stable N/K	Yes No N/K	Week Month Year N/K	Personal use Local mkt Exported N/K	1-9 10-100 > 100 N/K	< 100/yr > 100/yr N/K	Whole plant Some leaves only N/K		
Lansan	Yes No N/K		Abundant Common Rare N/K	Up Down Stable N/K	Yes No N/K	Week Month Year N/K	Personal use Local mkt Exported N/K	1-9 10-100 > 100 N/K	< 100/yr > 100/yr N/K	1 or a few taps/tree Many taps/tree N/K		
Gom	Yes No N/K		Abundant Common Rare N/K	Up Down Stable N/K	Yes No N/K	Week Month Year N/K	Personal use Local mkt Exported N/K	1-9 10-100 > 100 N/K	< 100/yr > 100/yr N/K	1 or a few taps/tree Many taps/tree N/K		

RESPONDENT			RANGE				RECORDER			DATE	
Species	In Range circle one	Locations	Abundance circle one	Trend circle one	Harvested? circle one	Harvested at least every circle one	Sale and/or personal use circle one or more	Number harvesters circle one	Take see notes on cover page circle one	Harvest Methods circle one or more Notes	Notes
Lyenn 1 name:	Yes No N/K		Abundant Common Rare N/K	Up Down Stable N/K	Yes No N/K	Week Month Year N/K	Personal use Local mkt Exported N/K	1-9 10-100 > 100 N/K	< 100/yr > 100/yr N/K	Cut part of plant Pull down whole plant N/K	
Lyenn 2 name:	Yes No N/K		Abundant Common Rare N/K	Up Down Stable N/K	Yes No N/K	Week Month Year N/K	Personal use Local mkt Exported N/K	1-9 10-100 > 100 N/K	< 100/yr > 100/yr N/K	Cut part of plant Pull down whole plant N/K	
Lyenn 3 name:	Yes No N/K		Abundant Common Rare N/K	Up Down Stable N/K	Yes No N/K	Week Month Year N/K	Personal use Local mkt Exported N/K	1-9 10-100 > 100 N/K	< 100/yr > 100/yr N/K	Cut part of plant Pull down whole plant N/K	

Any other notes:

## Annex IV: Respondents' Age and Sex by Community and Forestry Range

Range	Community	Age: child			Age < 40			Age > 40			Total Respds
		F	M	Total	F	M	Total	F	M	Total	
Dennerly	Aux Lyon	0	0	0	2	0	2	1	3	4	6
	Dennerly	1	0	1	3	4	7	3	6	9	17
	Malgretoute	0	0	0	7	1	8	2	4	6	14
	Praslin	0	0	0	4	6	10	5	3	8	18
<b>Dennerly Range Total</b>		<b>1</b>	<b>0</b>	<b>1</b>	<b>16</b>	<b>11</b>	<b>27</b>	<b>11</b>	<b>16</b>	<b>27</b>	<b>55</b>
Millet	Bois D'Inde	0	0	0	4	3	7	2	2	4	11
	Marigot	0	0	0	0	4	4	3	3	6	10
	Millet	1	0	1	3	0	3	2	2	4	8
	Vanard	0	0	0	1	1	2	3	2	5	7
<b>Millet Range Total</b>		<b>1</b>	<b>0</b>	<b>1</b>	<b>8</b>	<b>8</b>	<b>16</b>	<b>10</b>	<b>9</b>	<b>19</b>	<b>36</b>
Northern	Chassin	0	0	0	3	0	3	3	3	6	9
	Ciceron	0	3	3	6	4	10	3	2	5	18
	Dauphin	0	0	0	0	0	0	2	2	4	4
	La Borne	0	0	0	0	0	0	1	0	1	1
	Marisule	1	1	2	2	3	5	4	4	8	15
<b>Northern Range Total</b>		<b>1</b>	<b>4</b>	<b>5</b>	<b>11</b>	<b>7</b>	<b>18</b>	<b>13</b>	<b>11</b>	<b>24</b>	<b>47</b>
Quillesse	Annus	1	1	2	2	1	3	0	0	0	5
	Belle Vue	1	0	1	5	2	7	0	1	1	9
	De Mailly	0	0	0	1	1	2	3	1	4	6
	Vieux Fort	0	0	0	5	0	5	5	5	10	15
<b>Quillesse Range Total</b>		<b>2</b>	<b>1</b>	<b>3</b>	<b>13</b>	<b>4</b>	<b>17</b>	<b>8</b>	<b>7</b>	<b>15</b>	<b>35</b>
Soufrière	Etangs	1	0	1	4	0	4	1	4	5	10
	Mocha	0	0	0	3	1	4	2	4	6	10
	Portalese	0	1	1	0	0	0	0	1	1	2
	Soufrière	0	0	0	2	2	4	3	11	14	18
<b>Soufrière Range Total</b>		<b>1</b>	<b>1</b>	<b>2</b>	<b>9</b>	<b>3</b>	<b>12</b>	<b>6</b>	<b>20</b>	<b>26</b>	<b>40</b>
<b>Total Respondents</b>		<b>6</b>	<b>6</b>	<b>12</b>	<b>57</b>	<b>33</b>	<b>90</b>	<b>48</b>	<b>63</b>	<b>111</b>	<b>213</b>