THE NATIONAL SUKUMA EXPANSION
And
SUKUMA-LION CONFLICT

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Summary

Considerable concern has been expressed about the environmental impact of expanding agro-pastoralist populations, particularly the Sukuma, across Tanzania. Mapping arrival dates of agro-pastoralists into each district across Tanzania show their steady advancement across the country. The environmental implications of this wave of agro-pastoralist migration has resulted in conflict over natural resources between the migrating agro-pastoralists and local communities, illustrated by the number of newspaper reports pertaining to the issue (2006-2008). Hotspots of human-lion conflict (defined as incidents of livestock depredation, man-eating and lion kills) tend to coincide with key lion populations. Reported incidents of lion kills are particularly high in western Tanzania, an area that has also received large numbers of agro-pastoralists, primarily Sukuma. A pilot study designed to explore the prevalence of lion killing by the Sukuma suggests that the numbers of lions being killed is substantially higher than that recorded by government game officials. A worrying shift away from retaliatory lion killing kills to active hunting by the young men for personal economic gains appears to be occurring. With implications for management and human lion conflict mitigation this issue should be the focus of future lion conservation studies in western Tanzania, a zone that up until now has to a large degree been overlooked by current lion conservation action.

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Project Details

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Project Duration

January – July 2009

Project Budget:

$21,000 (27,825,000 Tsh)

TOTAL EXPENSES/SAL	Shillings	US $$
Jacobo salary	3,402,000.00	
Jacobo equipment	5,160,000.00	
Emily salary	13,515,000.00	
Emily equipment	4,240,813.00	
Jairos salary	900,000.00	
TOTAL in shillings	**27,217,813.00**	**20542**

Background

The 2006 Eastern and Southern African lion conservation workshop concluded that lion populations were at an all time low with estimates for the African continent ranging from 16,500 – 47,000 (Packer et al 2006). Tanzania supports 4 of the 6 remaining populations of >1000 individuals (Packer et al. Submitted), consequently the success of lion conservation strategies within Tanzania is pivotal to the survival of this species. Lion population declines are driven by habitat loss (Loveridge & Canney 2009), prey declines (Loveridge & Canney 2009), disease (Munson et al. 2008)and direct kills (Frank et al. 2006, Hazzah et al. 2009, Packer et al. *Submitted*, Whitman et al. 2007).

Direct kills is perhaps the least well understood dimension of these dynamics. Three principle motives exist for killing lions. (1) Retaliation for attacks on livestock (Dickman 2008, Frank et al. 2006, Holmern et al. 2007, Kissui 2008, Patternson 2004 or humans (Frank et al. 2006, Frank et al. 2006b, Packer et al. 2005, 2006) is thought be the most critical threat. (2) Tourist hunting, long thought to be of negligible significance, is drawing renewed attention as a significant threat in some areas (Packer et al submitted, Whitman et al. 2007). (3) Traditional hunts, often linked to rites of passage (Spear and Waller 1993, Wilson 1953), have also long been viewed as of trivial demographic import, a position for which there is now some empirical support (Kissui and Packer 2008). Thus livestock-keeping groups, be they pastoralists such as the Masaai who rely primarily on livestock husbandry or agro-pastoralists such as the Sukuma who mix agriculture with livestock raising, who are vulnerable to livestock depredation are potentially the most likely people to kill or harass lions.

The movement of the Sukuma out of Shinyanga that began in the late 1960s is presenting a major challenge to the Tanzanian government. While the Sukuma have strong traditional institutions for policing social behavior (Paciotti et al. 2005), they are not known for tight regulation of codes of environmental management practice, with the exception of *ngitili* grazing and fodder reserves (Barrow et al. 1992). In their culture they celebrate and honor lion-killers. Nevertheless the full extent of the relationship between the Sukuma and lions is currently unknown.

Project structure

This project had three phases:

Phase 1 involved a nationwide survey. Each district in which Sukuma agro-pastoralists are known to exist was visited and an expert interview conducted with senior district officials to collect data on spatial and temporal Sukuma migration patterns, activities and human-lion conflict. Sukuma migration into new regions has frequently brought them into conflict over resources and land with resident (indigenous) populations.

Phase 2 tracked national media coverage of conflicts between agro-pastoralists and resident (indigenous) populations between 2006 to 2008, quantifying the number of conflicts that occurred over four key resources –pasture, agricultural land, water, and forests, as well as documenting conflicts with wild animals.

The results of Phase 1 and 2 both indicate western Tanzania as being a hotspot for both Sukuma migration and conflict over natural resources, including human-lion conflict. In Phase 3 we therefore expanded our research beyond the original aims of our proposal and conducted a focused pilot study on Sukuma lion killing in Western Tanzania (Rukwa region). Therefore the overall project objectives were:

Principle Aims:

1. To map the extent of the agro-pastoral expansion across Tanzania, and the implications for human-wildlife conflict, primarily with lions
2. To examine newspaper coverage of the agro-pastoralist expansion (pilot survey)
3. To conduct a pilot investigation into the prevalence and motivations behind lion-killing in three Sukuma communities in Katavi-Rukwa (Western Tanzania)

The Sukuma

The Sukuma are energetic agro-pastoralists originating from Shinyanga and Tabora Regions of northern Tanzania. In the 1960s and 1970s they began to expand their population, both in numbers and geographical extent. While exact numbers are not available newspapers report that they constitute between 13-20% of Tanzania's native population. The Sukuma resisted the village consolidation programmes that occurred under the presidency of Julius Nyerere during the 1970s and tend to live instead in scattered extended family homesteads with their livestock, and surrounded by their agricultural lands (Figure 1). Combining both productive agriculture (primarily cotton, rice

and maize) with extensive cattle grazing they primarily count their wealth in heads of cattle and agricultural production. Their gradual spread across Tanzania has pushed back the margins of undeveloped land, attracting considerable concern over their environmental impact.

Figure 1. A traditional Sukuma homestead.

Lion killing and Lion Dancers

The Sukuma are renowned for their cultural dances (www.sukumamuseum.org). Dancing is ordinarily engaged in by young men and often associated with the use of traditional medicines which enhance the dancer's strength, agility and ability. These dances fulfil a number of different roles ranging from a celebration of a good day's farming, advertisement of feats of bravery, and the famous annual competitive dances. Dancing is often associated with the payment of a reward, often cattle, and it is in this sense it becomes linked to lions. Living often in marginal habitats across Tanzania, and commonly adjacent to protected areas, Sukuma livestock are highly vulnerable to predation by lions. To kill a lion ("m*wizi wa ng'ombe*" of thief of a cow) in defence of one's (or one's neighbours') cattle is viewed as the ultimate act of bravery. Such killings gave rise to one of the most famous of the Sukuma dancing rituals, the Lion Dance (Figure 2). Following a lion kill, the perpetrator (usually a young man) is required to travel around his extended family

and clansmen recounting the tale of the kill through a highly stylized dancing ritual. Dancing by the lion killer serves multiple purposes. First it acts as a means by which the killer can advertise his bravery. It is also thought to stave off the impending madness that would otherwise occur as the spirit of the lion possessed that of its killer. In reward for both his bravery and his contribution to a common good – the removal of a threat to cattle – a lion killer's relatives are be obliged to bestow gifts of cattle as reward. This travelling and dancing continues sometimes for several years over which time the lion-dancer may gather many hundred head of cattle. Therefore killing a lion almost guarantees the accumulation of great wealth with which brides can be bought, fortunes made and fame assured.

Figure 2. Sukuma Lion Dancer in Rukwa Region in 2002

PHASE 1
Tanzania-Wide Patterns of Sukuma Migration and Human-Lion Conflict

Researchers: Jacob Mwalyoyo & Emily Fitzherbert

The expansion and movement of agro-pastoralist tribes across Tanzania has caused considerable environmental concern. Although a number of different ethnic groups that keep cattle, for example the Datoga and Barabaig (Mang'ati), the Maasai, the Parakuyu and the Gogo, have to some degree been involved in the agro-pastoralist expansion across Tanzania, the process has been by dominated by Sukuma. The movement of Sukuma and Nyamwezi agro-pastoralists out of Shinyanga began in the late 1960s when they were forced out of their homelands by the rapid environmental degradation, provoked by the rapid growth of cotton production occurring at this time (Charnley 1997). As agro-pastoralists, engaging in both cultivation and livestock-raising, they tend to settle in marginal previously uninhabited lands, often accumulating along the edges of national parks, thus presenting a growing environmental problem for the Tanzanian conservation and administrative bodies. Forced evictions from lands settled by the agro-pastoralists are routinely implemented (Brockington 2002), sometimes with a Presidential Order as in the case of Usangu in 2006 (Walsh 2007). Whilst this policy may ease pressure on resources *locally* it only exacerbates the problem at a national level by in effect passing the problem on to the next region or district (leakage effects).

To better understand the impact Sukuma have at the national level we mapped the extent of the Sukuma "diaspora", exploring the relationship between the patterns of Sukuma migration and incidents of wildlife human conflict, focusing on lions. Although many people are aware of the expansion of agro-pastoralist peoples across rural Tanzania this is to our knowledge the first systematic record of its extent, given that national census data do not record ethnicity.

Methods

Following discussion with officials in various ministries (Natural Resources and Tourism; Regional Administration and Local Government) and with conservation/development workers well-travelled in Tanzania, all districts across Tanzania in which Sukuma are present were identified. Within each district we conducted expert interviews with either the district game officer (DGO) or the district forest officer (DFO), or both, the senior environmental officials at this administrative district level. The following data were collected during interviews. Where possible we tried to ensure information supplied orally

by the respondent was supported by official records. This was not always possible as a result of poor data management systems.

A. General Questions regarding agro-pastoralist environmental impacts
   1. General information about the respondent, his position, interview date and how long they had held the current position.
   2. Which agro-pastoralist tribes are found in the district (Sukuma, Mang'ati, Maasai, Other).
   3. In which year did these agro-pastoralists arrive in the district?
   4. In which divisions within the district are they most numerous, and how have their populations changed over time (up, down or stable)?
   5. Have there been any incidences of forced removals since that time?
   6. How do agro-pastoralists currently affect the environment?
   7. Which environments do they affect, mbuga (seasonally flooded grasslands), forest, savanna, riverine habitats?
   8. Which activities are the main causes of habitat conversion: Livestock husbandry, rice, maize cultivation other?
   9. Is tree clearance extensive, moderate, minimal, stable?
   10. Are agro-pastoralists employing burning extensively, moderately, a little, not at all?
   11. Are agro-pastoralists hunting extensively, moderately, a little or not at all?
   12. Which species do agro-pastoralists hunt? Buffalo, elephant, swala, lions.
   13. List the environmental conservation initiatives operating in the district and the implementing organization.
   14. List the forest reserves, game reserves, game control areas and national parks in the district.

B. Questions on human-lion conflict.
   1. How many people have been killed by lions in your district between 2004-2008?
   2. " injured " ?
   3. Can you list the people killed/ injured in the last five years giving the village, date, ethnicity of person and the circumstances under which the attack occurred.
   4. How many livestock have been killed by lions in your district between 2004-2008?
   5. " injured " ?
   6. How many agro-pastoralist livestock have been lost to lions in your district (2004-2008)?
   7. Can you make a list of livestock killed by lions between 2004-2008, listing the village in which it occurred, date, species killed (cow, sheep, goat etc.), ethnicity of the owner, circumstances under which it occurred?
   8. Can you list the number of lions killed by people between 2004 and 2008?
   9. How many lions where killed by agro-pastoralists?

10. Can you list the village in which it occurred, the date, the ethnicity of the person who killed the lion, and their motivation?
11. What factors do you think might mitigate human-lion conflict?
12. What challenges do you face in your job as an environmental officer in this district?

Data from 48 districts were used to generate maps which illustrate the movement of agro-pastoralists across Tanzania and identify hotspots of human-lion conflict. More detailed analyses of the descriptive data presented are in progress.

Key Results

The agro-pastoralist expansion across Tanzania.

Sukuma have dominated the agro-pastoralist expansion across Tanzania, with other ethnic groups, such as the Mang'ati or Gogo, accompanying them in some but not all Districts. A map showing the temporal shift in agro-pastoralist populations (primarily the Sukuma) is shown in Figure 3, based on arrival dates provided by the district officials.

The Sukuma originated in the northern Shinyanga region, an area known as Sukumaland. The 1960s saw their first movement out of their homeland south into the districts of Urambo and Nzega. This movement continued through the 1970's primarily south into Rukwa (Mpanda, Nkansi and Sumbawanga districts) with some expansion around the edge of Maasailand (but not into Maasailand – these two ethnic groups preferring to avoid cattle raiding through distance). The 1980s saw the Sukuma spreading into the central regions around Dodoma, Iringa and south towards Mbeya. Policies of forced evictions at the end of the 1990s by districts already settled by the Sukuma precipitated expansion into the coastal and southern zones (Figure 3). The pattern of agro-pastoralist movements and eviction events does seem to support the suggestion that migration patterns and continued expansion has indeed at least been in part driven by forced evictions. Currently (August 2009) evictions are under discussion in Bagamoyo, conflicts are occurring in Mbarali, and Sukuma are reportedly returning to Morogoro from Nachingwea because of "problems with snakes".

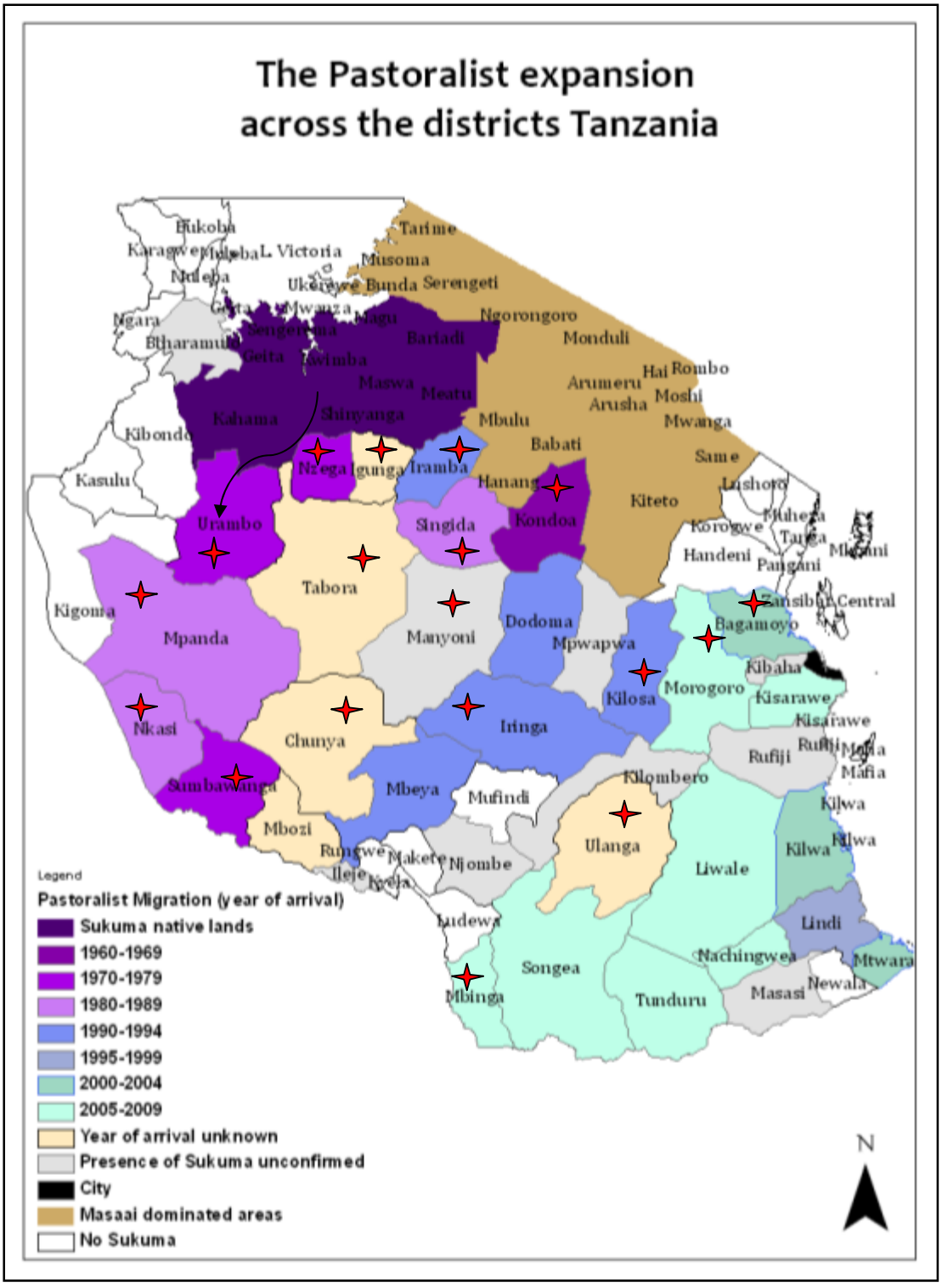

Figure 3. Agro-pastoralist expansion through Tanzania. Districts which have implemented a policy of forced evictions are denoted by the red star. (This map was created using 2002 district boundaries and will be updated to include newly created districts when the data become available; cases with missing data will also be updated.)

Human-lion conflict – district level records

Numbers of livestock killed by lions, numbers of humans attacked and numbers of lions killed within the last 5 years are three key indicators of human-lion conflict. Figure 4 plots the incidences of these three indicators, and helps to reveal hotspots of conflict. Incidences of livestock predation ranged from 0-137, with a mean of 21 across the 48 districts for which data was available. Lion attacks on humans ranged from 0-77 with a mean of 5 across 48 districts. [1]

The number of reported lion kills within each district ranged from 0-12 with a mean of 2.6. Given the illegality of lion killing this is most likely an underestimate, as noted in many instances by the district officials interviewed (see below). The pattern of lion killing closely mirrors that of lion attacks on livestock and humans, suggesting (but not of course proving) that killings of lions are retaliatory. It is also likely that retaliatory killings, provoked by livestock or human loss, are most likely to be reported. It is perhaps also unremarkable that the livestock predation and human-lion interactions occur primarily where lion populations are highest (Figure 7.3, zones A,B,C and D; note zones A&B are not studied here because they are not heavily impacted by agro-pastoral migration).

Human-lion conflict mitigation

Environmental education was identified by natural resource officers as a key activity for effective conflict mitigation, alongside forced evictions of agro-pastoralists, especially from protected areas and their buffer zones as well as settling agro-pastoralists in areas away from wildlife. Interestingly improved livestock husbandry – the focus of many mitigation programmes – was identified as important in only one case. Linking communities with conservation and producing tangible benefits for local people was also a popular approach. Improving wildlife enforcement and patrols was also considered to be important but many districts reported lack of support at the district and national level as a major obstacle in this. In fact lack of support at the district and higher levels was a major theme in response to an open question appended to the questionnaire – what are the greatest challenges of your job?

[1] The district of Lindi stands as an outlier within 77 people being attacked by lions in the last 5 years. The northern part of this district falls within the Selous Game Reserve, an area renowned for having the highest rates of man-eating lions on the African continent (Packer et al. 2005). Incidents of man-eating are influenced by the availability of mid-sized prey and bush-pig density. Where there are bushpigs, farmers sleep in their fields to try to reduce dry season crop losses, so increasing the likelihood of lion attack (Packer et al. 2005).

The fact that forced evictions are seen as a key management approach to the environmental problems created by agro-pastoralists, and specifically to mitigating human-lion conflict, has potentially far-reaching consequences. While possibly effective at the local level, at the national scale it may serve to only displace the problem elsewhere. This serves to highlight the wider problem in Tanzania of the lack of an effective national-scale environmental planning strategy.

The data presented in this section are most likely an underestimate of human-lion conflict. Poor recording systems will be partially responsible for this bias; for some districts there were no district level records of lion kills, although lions were reported as being one of the species targeted by agro-pastoralists. However a lack of reporting of livestock losses and lion kills is of greater concern. There are several factors which hinder accurate reporting. Distance to government offices often prevents reporting, and without effective follow-up action or compensation for losses the incentive to report is minimal. Killing lions is illegal. Although leniency is given to the killing of "problem lions" the rules around who can kill such animals are ambiguous. Many district officials said that lion kills were underreported (especially when killings occur in protected areas where any sort of incursion is illegal), and thus the number of lions being killed is probably considerably higher that these results suggest.

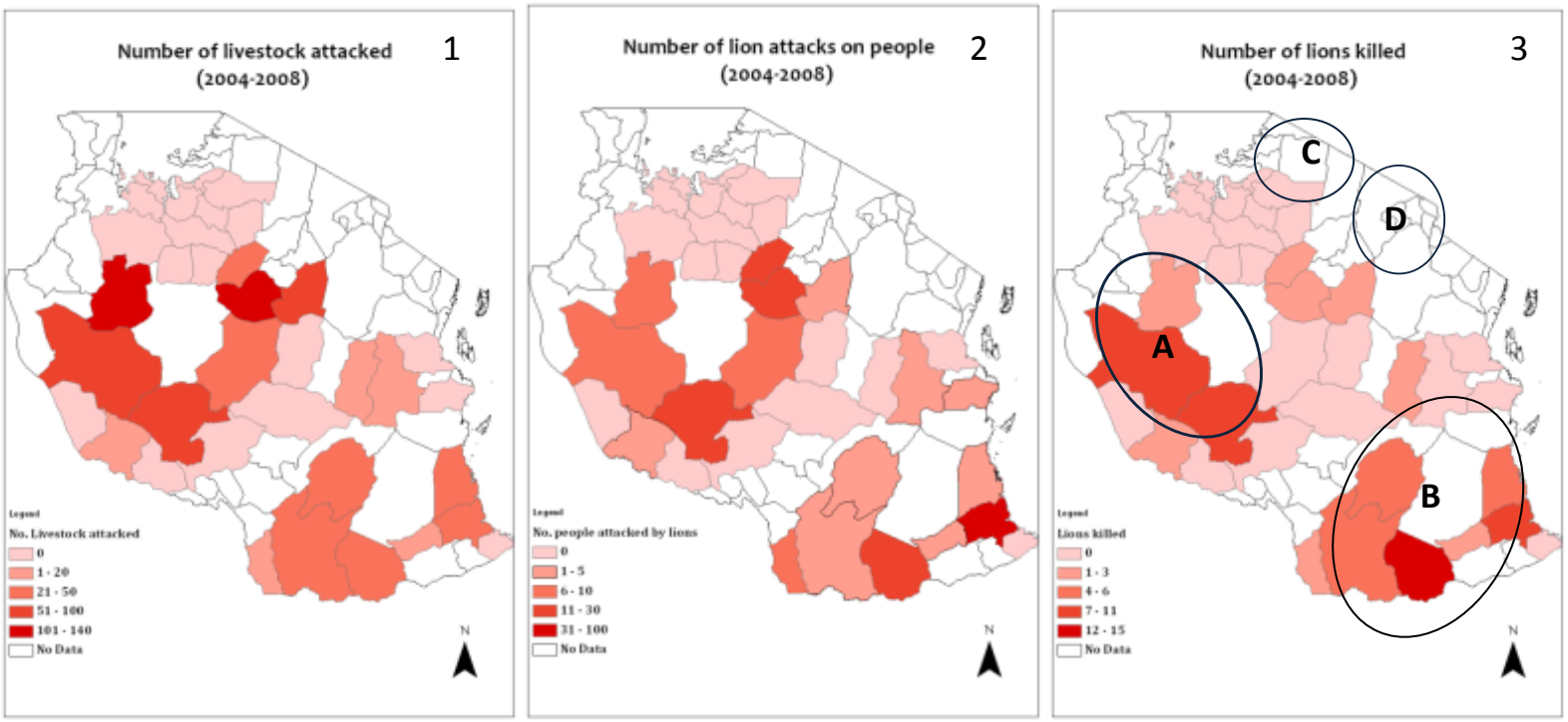

Figure 4. Number of human lion conflict incidents within agro-pastoralist-occupied districts as recorded by district game officers for the years 2004-2008. (**1**) number of livestock killed or injured by lions. (**2**) number of people killed or injured by lions (3) number of lions killed. Tanzania's four key remaining lion populations are demarked on map (**3**): **A** = The Ruaha/Rukwa/Rungwa/Katavi/Ugalla/Moyowosi ecosystem. **B** = Selous Game Reserve, Mikumi National Park and the Nyasa Corridor. **C** = The Serengeti/Mara **D**= The Maasai Steppe. Areas C & D are largely occupied by Maasai pastoralists, and are not covered in this study. (Once new district level maps are available rates of livestock depredation, man-eating and lion killing will be calculated to control for district area and human population sizes).

Phase 2.
Newspaper Reports of Agro-Pastoralist Conflict

Researcher: Jairos Mahenge & Emily Fitzherbert

The expansion of herders across Tanzania has become a topic of much public concern, prompting disputes and occasionally physical violence between indigenous and immigrant populations. These conflicts arise primarily from contests over resource use and access, although additional cultural, economic, and political issues emerge. To supplement and validate the measures obtained in Phase 1 we catalogued reports in Tanzanian newspapers pertaining to realized and potential conflict over natural resources involving agro-pastoralists over a 3 year period (2006 to 2008). The goals was to determine those regions in which the conflicts are the most acute, and to identify the principle causes of these disputes.

Methods

Articles pertaining to conflicts occasioned by the agro-pastoralist expansion were identified from three national newspapers identified by the Journalists Environmental Association of Tanzania as being papers most atuned to environmental issues, with additional expert guidance from Professor Kim Howell at the University of Dar es Salaam: The Guardian, Majira and Nipashe. Newspapers from January 2006-December 2008 were consulted. The issues were held at the University of Dar es Salaam library but where issues were missing they were located from the respective newspaper offices. For each article the following data were extracted:

1. The location of the conflict (Region, District, Division, Ward, Village)
2. The ethnicity of the protagonists
3. Whether it was reporting a potential or realized conflict.
4. The nature of the conflict: was it over land /grazing, agricultural land, water, forested land or dangerous animals
5. Did the conflict involve a protected area
6. Were there livestock involved and if so the numbers.
7. Were there any human casualties or injuries.
8. Was there damage to livestock or crops, and if so how much?
9. What organizations where involved: government / NGOs etc.
10. What solutions to the problem where suggested or found, if any?

The number of conflict records was mapped at the regional level in order to identify hotspots of recorded conflicts.

Key Results

A total of 228 articles pertaining to conflicts occasioned by the agro-pastoralist expansion were found for the period 2006-2008. The number of articles relating to each region is shown in Figure 5. All bar two regions reported at least one conflict incident over this time period. There was an average of 7 reports per region although Arusha, Mbeya and Morogoro had substantially more with 24, 42 and 39 respectively.

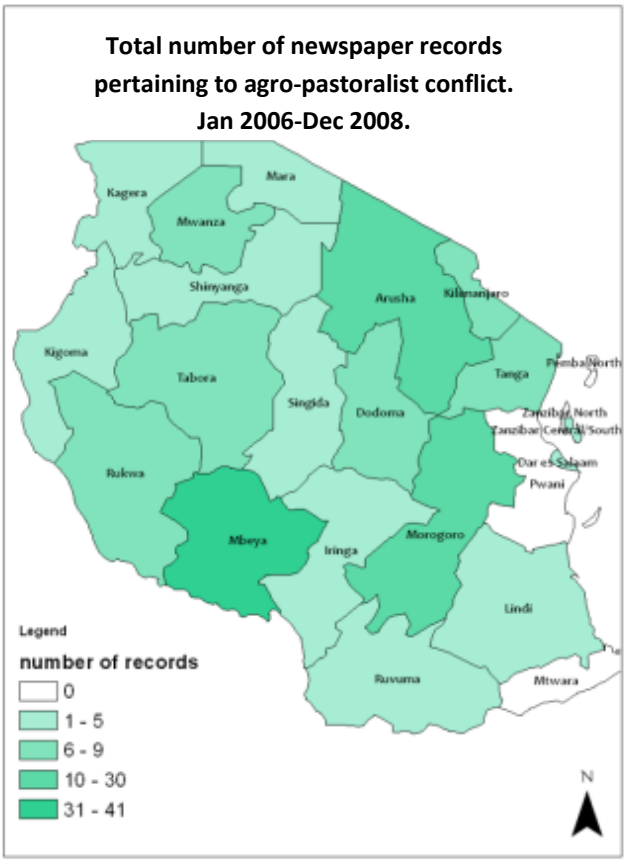

Figure 5. Total number of newspaper records pertaining to agro-pastoralist conflict across the regions of Tanzania

Disputes centred on pasture land (n=182), agricultural land (n=107), forests (57) and water (n=80). Cases that included a mention of conflicts with dangerous animals (n=25) were comparatively few. The hotspots of conflict were found in Mbeya, Arusha and

Morogoro/Pwani, regions that support protected areas with three of the four primary Tanzanian lion populations (Figure 6).

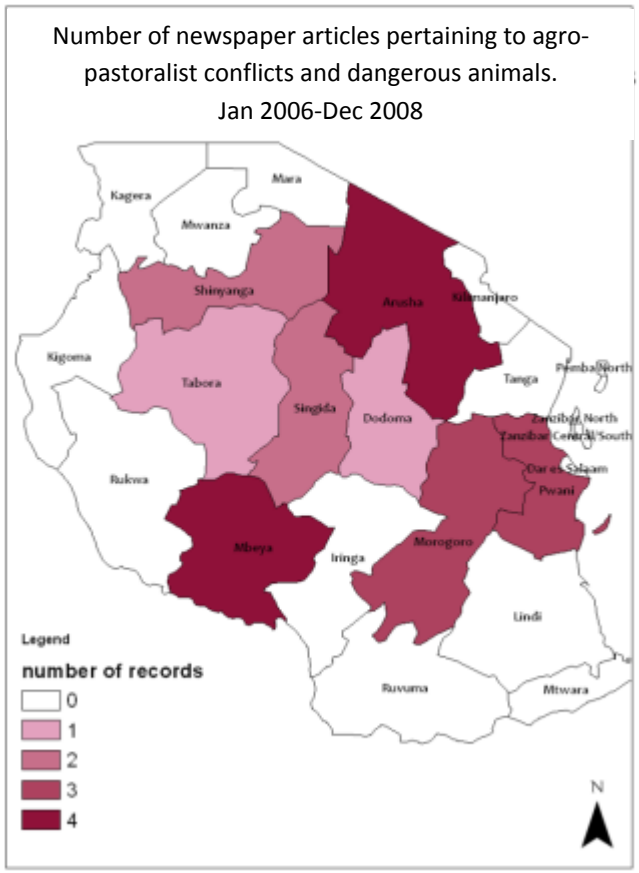

Figure 6.The number of reports of conflicts occasioned by the expansion of agro-pastoralists across Tanzania that included mention of conflicts with dangerous animals as reported by 3 Tanzanian national newspapers between 2006 – 2008.

Generally this systematic survey of the press points to the robusticity of the results obtained in Phase 1 of the project. Further analyses of the data are in progress.

PHASE 3.
The Culture of Sukuma Lion Killing in Western Tanzania

Researcher: Emily Fitzherbert

The results presented in Sections 1 and 2 of this report highlight western Tanzania as a hotspot of lion killing and human-lion conflict, an area that has for the most part been overlooked by lion conservation initiatives and scientific researchers. This area is home to one of the last four remaining large lion populations in Tanzania (Katavi-Rukwa), and also has a large and well-established cattle-keeping Sukuma population (Coppolillo 2000, 2001); the indigenous ethnic groups do not keep livestock in large numbers. We therefore decided to conduct a small pilot study of a Sukuma community in Katavi-Rukwa, with the goal of exploring the prevalence and motivations behind lion-killing. In this section we report the findings from a pilot investigation conducted in three villages in Mpimbwe, Mpanda District, that has been a destination for Sukuma for over 25 years (see see Figure 3).

Study area

Mpimbwe Division (population approx 75,834 (2002 Census)) lies adjacent to Katavi National Park, forming a hard boundary with the park. It has been the subject of longterm ecological and social research (Borgerhoff Mulder et al. 2007), and contains the largest concentration of Sukuma in Rukwa region. Longitudinal data show that predator and prey numbers are declining dramatically in the park and adjacent protected areas (Caro 2008), a reduction attributed in part to activities of adjacent local communities (Caro 2008). Mpimbwe Division is divided into a number of sub-divisions (wards). For the purpose of this initial study we focused on Sukuma households in the three villages that comprise Kibaoni ward – Kibaoni, Manga and Mirumba (Figure 7).

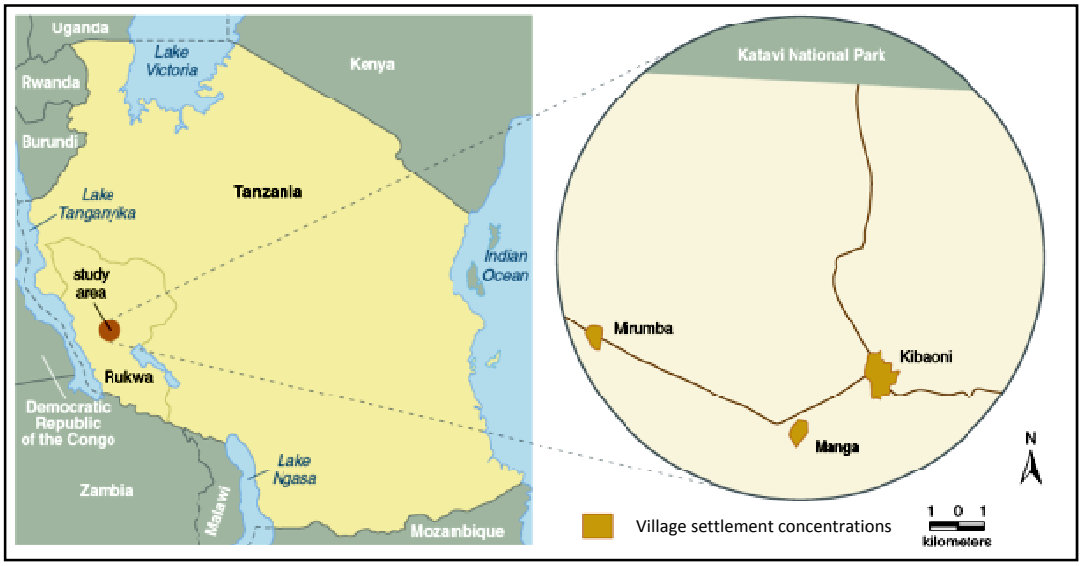

Figure 7. Research was conducted in Rukwa Region, western Tanzania (a). Within this region Sukuma households were visited in three villages, Kibaoni, Manga and Mirumba (b) all situated just south Katavi National Park. Note village lands extend up to the national park boundary.

Pilot study

As a pilot study of the dynamics of Sukuma-lion relationships in Mpimbwe we conducted semi-structured interviews within Sukuma households. We selected 30 households randomly from within each village, stratifying the number of households visited within each sub-village according to the proportion of Sukuma households present. Interviews almost invariably were conducted with multiple household members who were drawn into the conversation due to its inherent interest to men and women of all ages. Preliminary attempts to quantify lion-killing (as part of a broader suite of natural resource utilization questions) suggested a far more effective but indirect strategy that focused on the cultural dances (the "Lion Dance") that follow lion-killings. From a series of open questions and free-ranging discussion (typical of the methods of an ethnographer), combined with the strategic insertion of questions requiring quantitative responses, we were able to produce several preliminary findings that merit much further investigation (see accompanying proposal).

A key finding of the pilot study is the feasibility of using traditional dancing as a reliable surrogate measure of lion kills. After killing a lion a Sukuma has the right to visit the houses of relatives and clansmen, perform his dance, and receive rewards primarily of

livestock that are used to acquire brides, similar to customs reported for other ethnic groups in Tanzania (e.g., Borgerhoff Mulder 1991). For the lion dance to be a reliable indicator of the extent of lion-killing, records of lion dances must fulfill two criteria.

Firstly all lion kills by Sukuma must result in a lion dance. All interviewees agreed that a Sukuma who has killed a lion *must* undertake a period of dancing, with the general consensus being that should they fail to dance they, the perpetrator, would go mad. The validity of this first criterion is further in evidence in the story of a local respondent (Box 1)

Box 1

*"I remember when I was young there was once a boy who lived up on the Ufipa plateau who killed a lion defending his cattle. However because his father had lots of cows already he decided not to dance. He went mad. So his family brought him to see my father (*a traditional doctor*). But it was too late and to this day he remains mad and wanders around with no clothes on. If you kill a lion you must go straight to the mganga* to get medicine. Then you can rest for one year before you start to dance but you must get dawa first and you must dance."*

Respondent 11030905

*a traditional doctor

Secondly, visits from a lion dancer must be independently identifiable to avoid the double counting that could result from a single dancer visiting multiple households within a single village, and thus being reported multiple times. This was also relatively straightforward.

Using the home origin of the dancer and year of the dance visit we were able to establish 36 independent records of lion kills between the years 2004 – 2009 (Table 3), a figure obviously dependent on the accuracy of recall. Note the massive discrepancy for the report (for the same period) for the entire district of Mpanda, which was 7 (see Figure 4), supporting our suspicions of considerable under-reporting in the district survey.

Since only 26 of the total 57 households reported lion-dancer visits this suggests that dancers target specific households for their visits. Perhaps richer households are targeted, because such households are at greater risk of losing livestock to predation and might therefore donate more generously (Ruttan & Borgerhoff Mulder 1999); many of the poorer Sukuma households in Mpimbwe own no cattle. Quantitative analysis of the pilot data reveals no association between household wealth and number of dance visits, and informal discussion suggested that lion dancers primarily target their relatives for visits. This suggests that some lineages (or clans) are more predisposed to lion-killing than others, attested to by anecdotal comments in the ethnographic discussions (Box 2).

'Box 2

'To kill a lion you have to be from a lion killing family. If you are then you will not be frightened if you meet a lion and will be able to kill it but if you are not then you will be afraid and likely to run away and then be killed yourself rather than killing the lion.'

Respondent 17030907

Table 3. The origin of each dancer for reports in which the lion was said to have been killed in Mpimbwe giving the number of independent (households) reports.

Year of dancing visit	Origin of dancer	Number dancing incidence
2004	Kasekela	1
	Ufipa	1
2005	Unknown	1
	Kasekela	1
	Manela	1
	Mpimbwe	1
	Mwaniapulu	1
	Singida	1
	Usaveya	1
2006	Kashishi	2
	Luchima	1
	Manela	3
	Mirumba	1
	Mitimbila	1
2007	Kashishi	2
	Luchima	1
	Manela	2
	Mirumba	1
	Mpanda	1
	Mpimbwe	1
	Mwaniapulu	2
	Ufipa	2
	Usevya	1
2008	Mamba	1
	Mfinga	1
	Mirumba	1
	Mwadini	1
	Singida	1
	Ufipa	2
	Usaveya	1
	Wkingwa	1
2009	Luchima	1
	Majimoto	1
	Malendi	1
	Mirumba	1
	Sakalio	1

Our preliminary results also shed light on the motivation for lion-killing and the lion dance. Respondents were asked the open question 'why do Sukuma kill lions'. Perhaps unsurprisingly most said that lions were killed because they "kill cattle", but "personal gain" was added a key motivation behind lion killing by 25% of households. Furthermore when asked about why killers perform the lion dance "personal gain" was mentioned by almost 70% of households, as indeed one would expect from tradition (see Box 3). Interestingly at this stage of the interview references to madness were less prevalent than the importance of personal rewards.

Box 3

'Lions are brought to us by the forefathers so that we can gather mali' respondent 17030901

Mali is the traditional price paid to the bride's father, usually a negotiated number of cattle

The most intriguing findings with respect to future research and conflict-mitigation strategies emerged from our finding, from both open ended and quantified measures, that the motivation for lion killing has been changing over recent years. The quantitative data suggests that there has been a reduction in the value of the rewards given (Figure 8). In addition, 31% of respondents reported that rather than killing lions in response to livestock depredation or harassment, young men are now actively hunting lions in the national park for their own "business" purposes (see Figure 9).

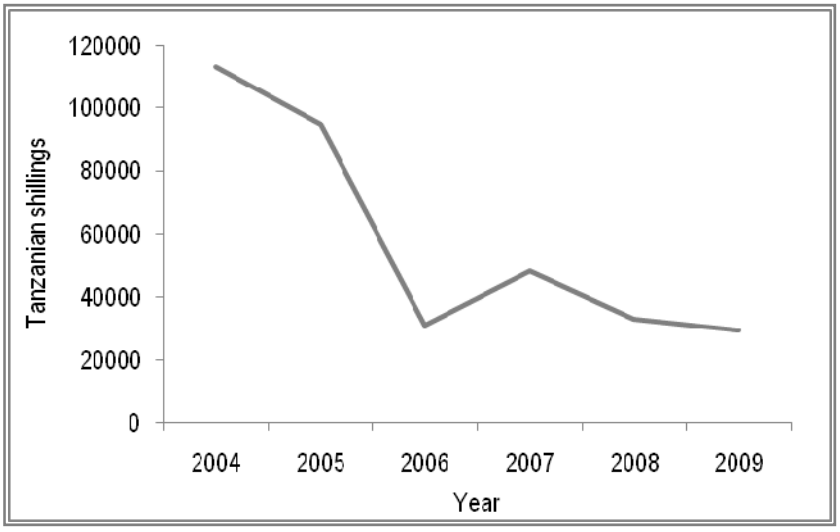

Figure 8. The mean monetary value of gifts given to a lion dancer between the years 2004-2009. The value of a cow was set at 100,000 Tsh, the value of a goat at 40,000Tsh, cash gifts were kept as stated.

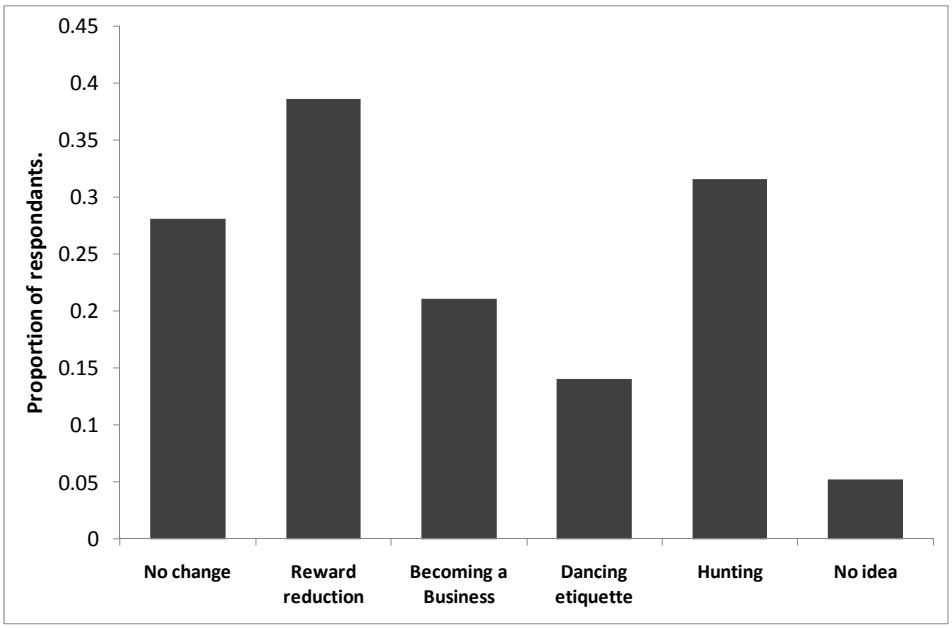

Figure 9 . The proportion of respondents incorporating one or more of these descriptions as to how the Sukuma tradition of killing lions has changed in recent times. Note that a single respondent may contribute to more than one category.

These data suggest that a potentially worrying shift in the motivation behind lion killing is occurring. Rather than killing lions in response to livestock depredation, there are a growing number of Sukuma youth engaged in the active hunting of lions so that, if successful, they can undertake a period of dancing and reap the associated rewards. Furthermore although only reported anecdotally, a market demand exists for lion parts. Lion fat is considered a powerful ingredient in traditional Sukuma medicine, and demand from further afield may be growing as lion parts become substitutes for increasingly scarce tiger body parts. Whether the shift towards hunting lions is simply to obtain the traditional benefits from the lion dance (traditional benefits that appear to be eroding in value), or to supply a market in lion body parts is still unclear.

On the brighter side this new development is also provoking a change in the behavior of householders visited by lion-dancers. Householders reported giving smaller rewards than they used to do in past, in part because they feel cheated by the lion dancer (Box 4), in part because they believe killings are no longer prompted by depredation of livestock, and in part because there are simply too many visits of lion dancers! (The increase in visits could be a product not of an increase in the number of lions being killed, but rather of the geographical area a dancer can now visit with improved transport). This acute awareness of Sukuma to the changes in their traditions suggests potential mitigation strategies for future work.

Box 4

"It [killing lions] *has become more like a business. Now some people pay someone with a gun to kill a lion and then pretend that they killed a lion so that they can then dance and get rewards. Even people without any cows go and kill a lion but this isn't tradition. You traditionally could only kill a lion if it killed your cows, if you have no cows you should not be killing lions – there is no excuse...It isn't necessary for the Sukuma to kill lions if they are not loosing cattle. There are now fewer lions and they do not bother our cows as much. "*

Respondent 10030902

"People from Ufipa come to Mpimbwe to hunt [lions]. They put snares in the bush and hunt lions."

Respondent 13030902

Conservation Consequences & Future directions

The first two phases of this research illuminate the truly widespread influence of Sukuma expansion across Tanzania. Conflict over natural resources involving agro-pastoralists occurs nationwide with western regions seeing the highest numbers of reported conflict incidents.

The western region of Tanzania also appears to be a hotspot of conflicts between agro-pastoralist and lions. These preliminary results from our pilot study in Mpimbwe represent the first research into human-lion conflict in this region. This work needs expansion if Katavi-Rukwa is to be incorporated into a nationwide strategy to secure the Tanzanian lion population. If it is no longer true that livestock predation underpins lion killing, and if the quest for economic gain (gathering gifts of livestock) rather than the prevention of economic loss (livestock depredation) is becoming the primary motivation behind Sukuma lion killing, mitigation strategies that focus on improved animal husbandry will prove ineffectual. Furthermore if there is a new market in lion parts (hinted at but never clearly established for Mpimbwe) this should be uncovered quickly. In short, there is a real need to explore further the prevalence and extent to which the motivations behind Sukuma lion killing are changing, what the attitudes of the Sukuma are to this shift, and to

use this improved understanding to develop effective culturally-sensitive mitigation strategies (see, for example, Hazzah 2009).

Despite the worrying issues brought to light by this pilot study the results also suggest that there are real prospects for conflict mitigation – especially though well established cultural institutions of self regulation (a local militia called *Sungusungu*, (Paciotti & Borgerhoff Mulder 2004; Paciotti et al. 2005). Amongst those respondents who talked about the shift from retaliatory killing of lions in response to livestock depredation to the active hunting of lions, there was frequently a feeling that they were being cheated. The area is no longer being cleared of problem lions; rather lion dancers are engaging in personal business, either through the seeking of traditional benefits associated with the lion dance or through other undisclosed markets in lion parts, or both. If households no long give as generously as they once did there may be reduced incentive to hunt lions as a method of accumulating wealth, and the financial benefits of supplying lion parts to a commercial market become even more attractive. Fortuitously the rise in mobile phone use may allow households visited by a so called 'fraud' to inform friends and relatives not to reward lion dancers who have not rightfully killed a lion. If this practice of self monitoring 'real' from 'fake' lion dancers persists, it may serve to provide a strong disincentive for the active hunting of lions in Mpimbwe and Sukuma areas more widely, and possibly to control an illegal body parts market. Institutions such as the *Sungusungu* need to be effectively engaged in order to ensure the longevity and appropriateness of mitigation programs, and thus conservation success.

Finally, with some of the lowest literacy rates in the country education amongst the Sukuma youth should also be a keystone to future lion-killing mitigation programs. Such programs should be directly informed by the results of attitudinal investigations into the cultural practice of lion killing, and the attitudes of the Sukuma, to ensure that they are appropriately targeted and designed.

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