

Report to the African Elephant Fund

1.1 Country: Tanzania

1.2 Project Title: Human-Elephant Conflicts Mitigation around Kilimanjaro National Park in Tanzania

1.3 Project Location: Rombo - Kilimanjaro National Park in Tanzania

1.4 Overall Project Cost: 48,733 US\$

AMOUNT Requested from African Elephant Fund: 26,865 US\$

1.5 Project Duration: 1 year

1.6 Project Proponent: Tanzania Wildlife Research Institute (TAWIRI)

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1.12 Date report submitted: 28-11-2014

2.0 Project Report Summary

Recent elephant surveys have shown a decline of African elephant (*Loxodonta africana*) in Selous and Ruaha- Rungwa Ecosystems, which were strong, holds of elephants in Tanzania (TAWIRI 2013) but good news in the Serengeti Ecosystem where increased by 78% (TAWIRI 2014). Again reported decline of elephant in Tsavo a shared ecosystem with the Rombo district in Tanzania where the projected is located (KWS 2014). In 2014 season the Lake challa areas did not experience any movement of elephants from Tsavo Kenya. Therefore in this report no record of crop raiding in relation to the installed bee fence. In the three villages that interviewed (Challa, Ngoyoni and Ngareni) all elephant damage their crops come from Tsavo then Challa forest before entering their farms. Originally elephants used to move between Kilimanjaro and Tsavo toward the dry season for search water and food. According the villagers elephants were passing by in small groups and move toward Kilimanjaro in one or two days. This has changed after the owner of challa hotel in Tanzanian side put water hole at challa forest. As such elephants are spending much time at the forest during the day and invades the farm at night. Farmers experienced peak of raid at night from 19:00hours to 20:00hrs even though some elephant groups might continues until midnight. The peak months of crop raiding are from May to July and intermittently April, August to December.

Currently a two kilometres of BEEFENCE has been installed that have 163 active colonies at the border of Challa forest. In January 2015 will be the first honey-harvesting season for the farmers. The August season were not harvested to pave way of building up of strong bee colonies.

For the sustainability of the project a total of 30 farmers received beekeeping training both practical and theory. All farmers involved in the project also participated fully in hive siting and they are continuously monitoring the hive and bee colonies. Also the farmers formed an association named "UKI GROUP" that will deal with bee fence at the end of the project. UKI stand for honey in chagga tribe the dominant ethnic group at the study areas.

3.0 Objectives of the Project

The main objective of the proposed project is to enhance elephant conservation by reduction of crop raiding by elephants through institution of none-lethal mitigation method in villages around Kilimanjaro National Park (KINAPA). The specific objectives of the project are: -

- i. To assess the magnitude and distribution of elephant crop damage in villages around KINAPA in Rombo district.
- ii. To determine spatial and temporal movement patterns of elephants in villages around KINAPA in Rombo district.
- iii. To institute bee fence as a mitigation measure to reduce elephant crop damage.
- iv. To increase community awareness on elephant conservation and welfare in villages around KINAPA in Rombo district.

4.0 Project Rationale

The success of conservation of African elephants i.e., increasing elephant populations have resulted into a major challenge particularly with regard to the increase in crop raiding in various places adjacent to protected areas (Hoare 2000, Sitati and Walpole 2006, Graham et al. 2010, Malugu 2011).

The human-elephant conflict particularly crop raiding in different ecosystems of Tanzania reduces the indirect protection of elephants from rural areas where they inflict rural livelihoods. Elephants crop raiding in Tanzania have been frequently reported in local TV channels, newspapers and parliament sessions (Bakari 2010, Gamain 2011) as such might tarnish the positive effort of elephant conservation to the public and might loosening the political support (e.g., from the members of parliament) (Chiza 2011). Recently poaching has been gaining front page/main news in local media that shows a challenge to elephant conservation.

The 2012 census of people and settlement indicates a 30% of population increase in Tanzania since 2002 (URT 2013). Rombo district is among the highly populated districts with a population density of 471 per sq. km of the available land. Land carrying capacity has been exceeded 7 people per hector instead of approved 5 people per hector (Rombo 2013). Encroachments to corridor of elephant movement in this area are exacerbating human-elephant conflicts

(Graham et al. 2010). Lethal retaliation against elephants is very common in Tanzania amongst the human population because elephants are being viewed as a nuisance (Malugu 2011, Ntalwila et al. 2011). In surrounding areas of Serengeti National Park elephants were reported to be poisoned in pumpkins farms and use of nails in areas around Mikumi national Parks (Malugu per. communication). Killing of elephants in retaliation to crop raiding has a significant impact on elephant welfare, population size and conservation at large. Bee fence for elephants provides a double impact, first protection of crops and second provides extra income and food at the household level.

Therefore, the overall objective of this project is to improve elephant conservation by reducing crop raiding by elephants through institution of non-lethal mitigation measures in areas between Kilimanjaro National Park in Tanzania and Tsavo Kenya. The project aimed to enhance elephant conservation and welfare and the communities in Rombo District benefiting through increased crop yield and therefore improving household income and food safety.

5. Methods

Bee fence as natural enemy of elephant were used as a mitigation measure to improve elephant conservation by reducing crop raiding at Ngoyoni and Chala villages bordering international boundary with Kenya. To address the crop raiding issue we conducted questionnaire survey from the district, focus group discussion with village leaders (Challa (6), Ngoyoni (6) and Ngareni (6)) and questionnaires survey in the three villages (Challa (65), Ngoyoni (62) and Ngareni (46)). In each village we interviewed two sub-villages selected purposely in the focus group discussion with the village leaders. We ranked all sub-villages in relation to crop raiding incidences. The interviewed sub-villages are: Challa (Witini-Makana & Kidondoni); Ngareni (Mwekiwo and Ngareni) and Ngoyoni (Mlambai & Ngoyoni). The number of people interviewed based on the proportional of the number of households of the sub-village. The outcome of focus group discussion and questionnaire survey with village led to change our original plan of having bee fences into two separate villages. All the results pointed at Challa forest as the source of elephants that raiding crops. Therefore we created one line of live fence "BEE FENCE" bordering Challa forest. The Challa forest border Challa and Ngoyoni village a length of approximately 5km long.

Bee Fence

A total of 200 top bar hives systematically sited at the border of Challa forest at a distance of 2 km. The distance between hive was set to be 10m. All hives were suspended in a way that can easily swing to aggravate the bees.



With the collaboration of villagers, hives were aligned in straight line. On the right is the beginning of Challa forest and on the left is the abandoned farmland due to high incidence of crop damages.

Data analysis

Descriptive statistics were used and results summarised in table and graph for better understanding.

6. Results and Discussion

6.1 Distribution of Crop damage Incidences

The report from the interviewed villagers indicates that the elephant crop damages were not uniform within the villages (i.e., Challa, Ngoyoni and Ngareni) and at the level of wards only certain villages were affected similarly not all wards were affected. At a district level Lake Challa village (Mamsera ward), Ngoyoni and Ngareni villages (Ngoyoni ward) were the most affected villages (Table 1). At village level certain sub-villages were highly vulnerable than others particularly

those border challa forest or have a direct connection to lake challa corridor to Tsavo National Park Kenya.

Table 1 indicates ranking of highly vulnerable villages and wards to crop raiding in Rombo Districts

SN	Name of villages	Ward	Ranking
1	Chala	Mamsera	1
3	Ngoyoni	Ngoyoni	2
4	Ngareni	Ngoyoni	3
5	Mahorosha	Kisale Msarange	4
6	Msaranga	Kisale Msarange	5
2	Mamsera Chini	Mamsera	6
7	Menzeni Chini	Mengwe	7

Crop damage incidences were highly occurred in Challa (Witini-Makana and Kidondoni sub villages were ranked high among the five sub village), and Ngoyoni village (Mlambai and Ngoyoni sub villages were ranked high among the five sub villages of Ngoyoni). Ngareni was the third mostly affected villages (Mwekiwo and Ngareni sub villages were ranked highly). Ngareni village has a connection with Ngoyoni village particularly Mlambai sub village border Mwekio Sub village that are at the edge of restored forest by the Challa Hotel (well known as challa forest).

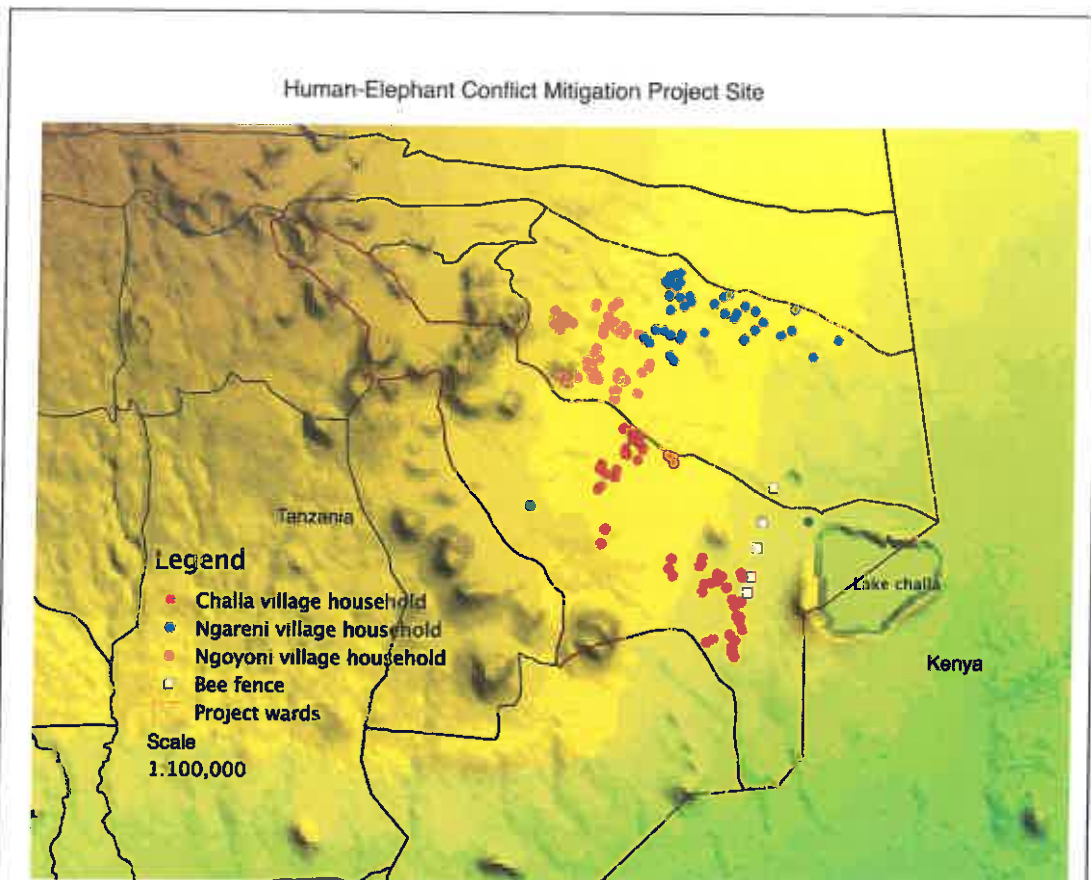


Figure 1 Map indicating study site in Challa and Ngoyoni ward

6.2 Movement of Crop raiding Elephant

The results from all three villages that are highly ranked for crop damages shows that elephant comes from Tsavo Kenya move around lake chala and settle at lake challa forest (Figure 2) where they graze and drink at the water hole made by the lake Challa hotel. Villagers were speaking with emotion toward the lake Challa hotel that the restored forest around their hotel and the provisional of water has been the major source of crop raiding elephant.

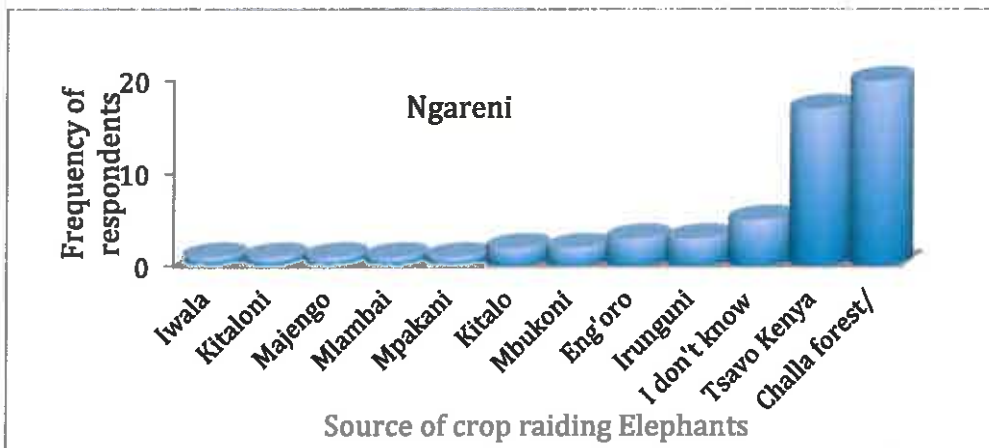
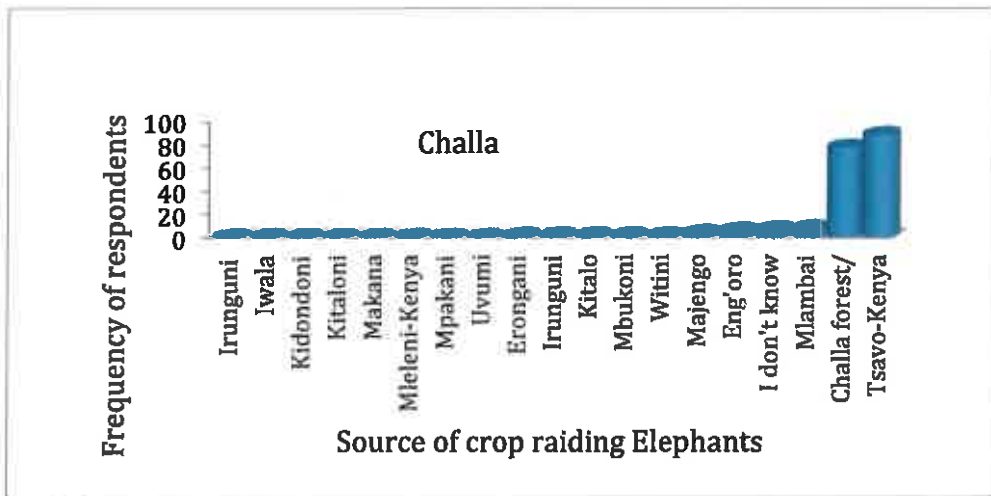
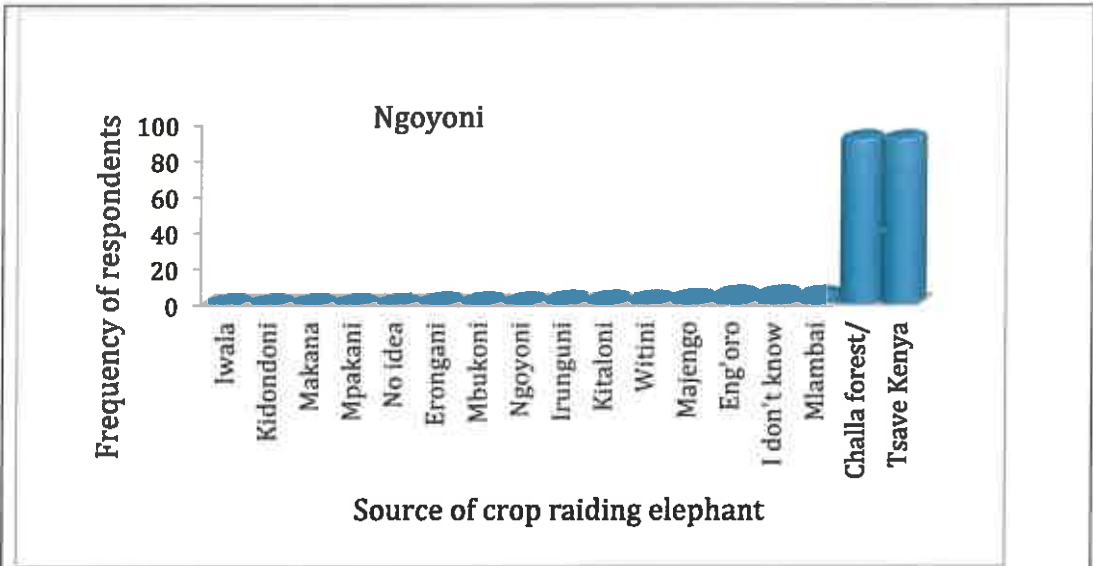


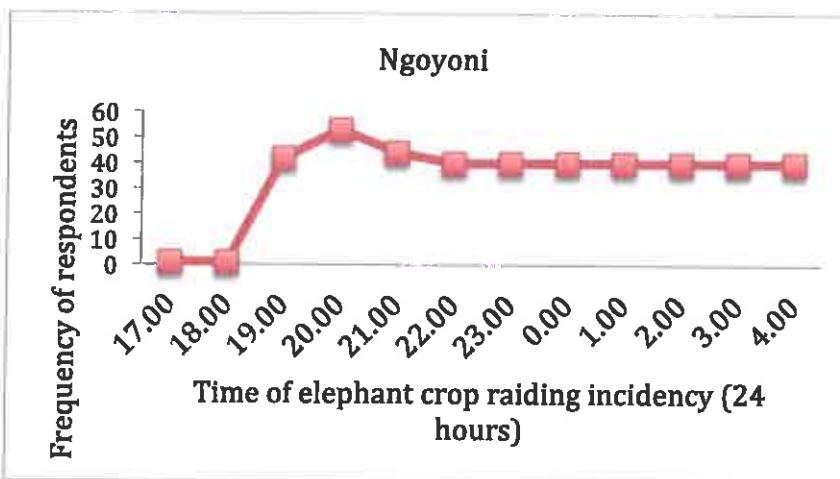
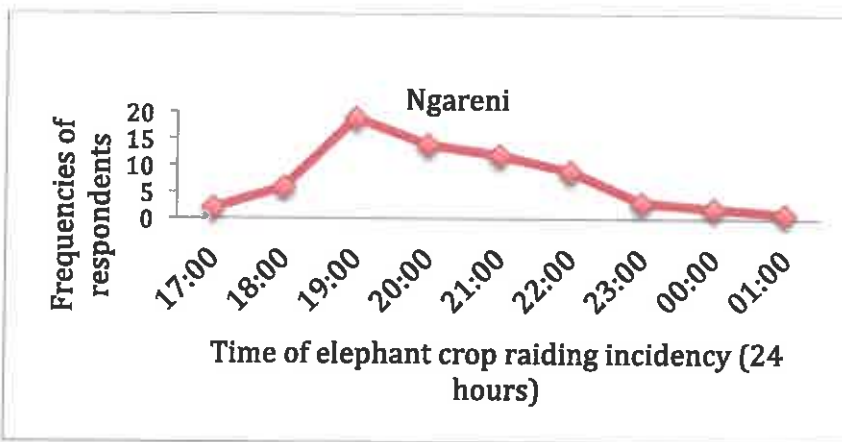
Figure 2 Source of crop raiding Elephants in Challa, Ngoyoni and Ngareni villages

Elephants known to settle at challa forest while target their next move to Mlambai (Ngoyoni) then Mwekio (Ngareni) and disperse in other places in these

villages. In case of challa Witin-Makana first followed by Kidondoni areas then move toward Mlambai and Ngoyoni for Ngoyoni area.

6.3 Temporal movement of elephant crop raiding

Elephant crop raiding time were high around 19:00 – 20:00 hours and decreasing toward the morning hours (Figure 3). Elephants might be moving away due to heavy resistance of early hours of raiding from the people using all sorts of means to chase them away.



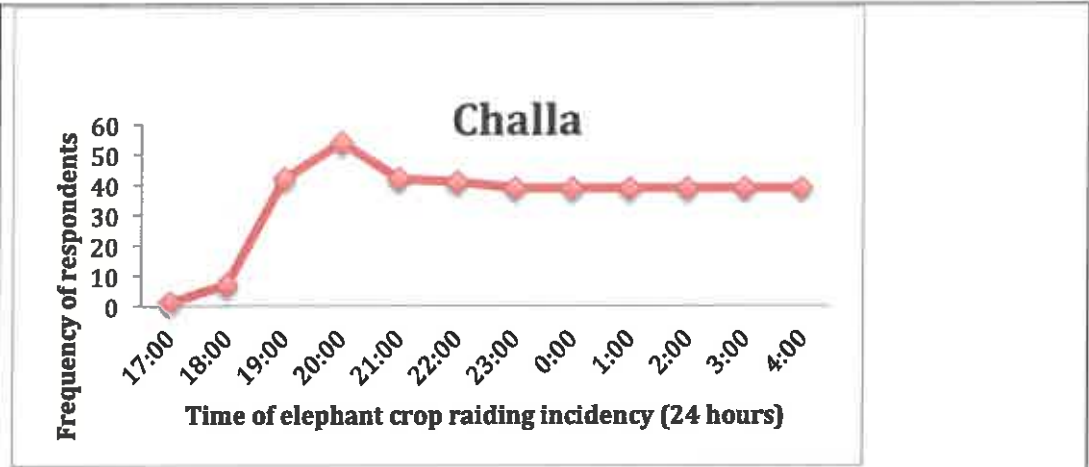
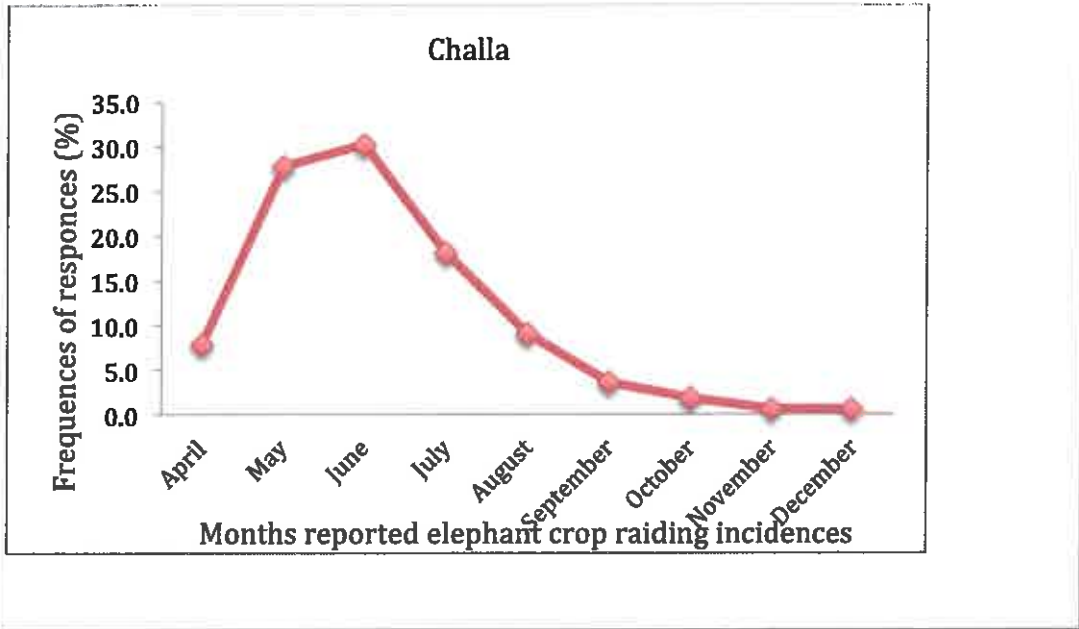


Figure 3 indicates time of elephants crop raiding in Challa, Ngareni and Ngoyoni villages

6.4 Seasonal Movement of crop raiding

The peak months of elephant crop raiding incidences were occurring mainly from May – July, with intermittently occurring in April, August to December (Figure 4).



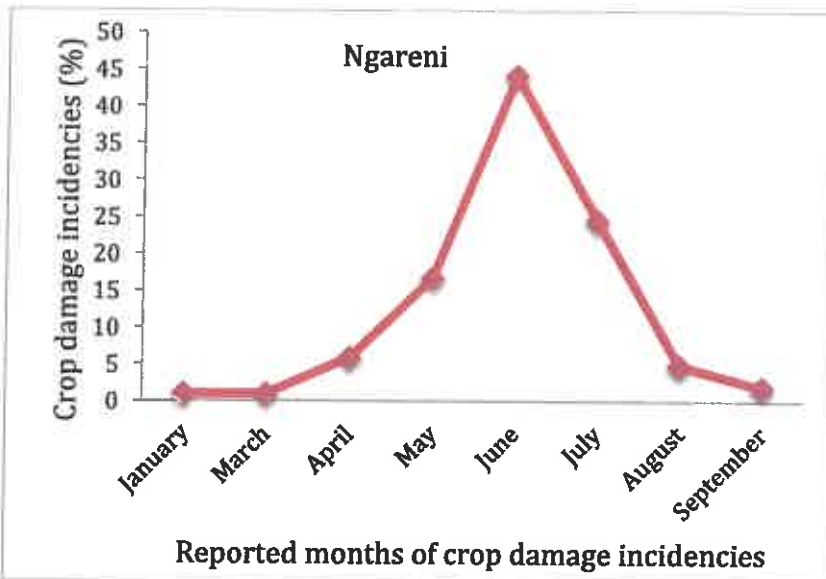
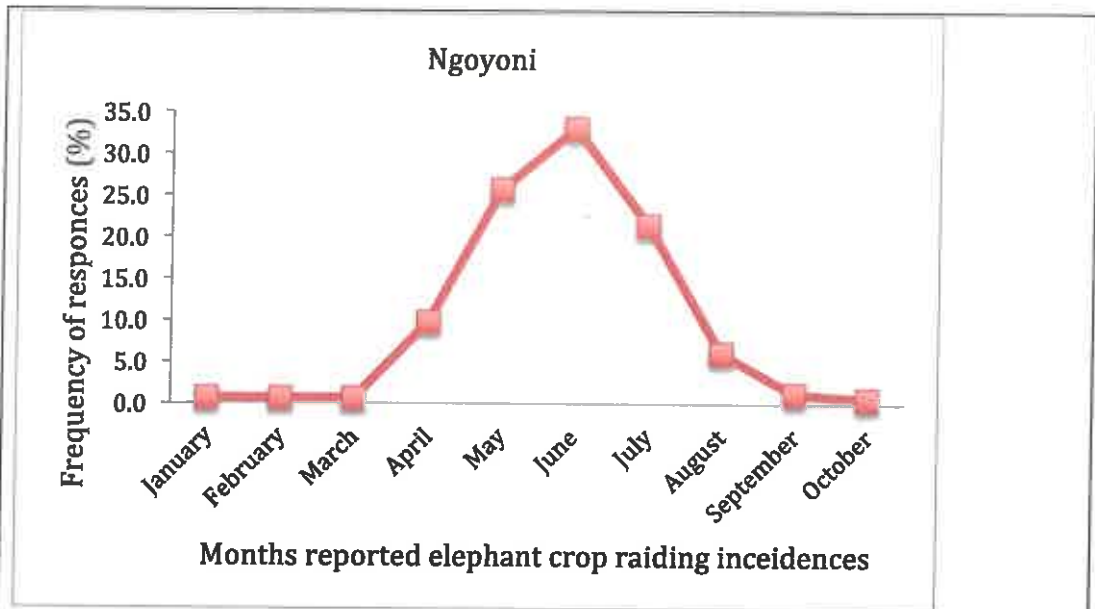


Figure 4 indicates months of elephants crop raiding in Challa, Ngareni and Ngoyoni villages

The biggest cry occurs when crops are at the maturity stages before harvest time. In the study areas maize, beans, peanuts, finger millets and sunflowers are harvested in June-July while peas are harvested in August. This means the presence of elephants in their farm destroy all their seasonal crops including banana and cassava, which are not seasonal crops.

6.5 Farming system in crop raiding areas

The farming system is predominantly mixed-cropping system. The system is adopted mainly due to soil conservation and lack of sufficient farming land in the Kilimanjaro areas. The major cropping crops are maize, peas, beans, sunflower and finger millets. Other includes banana plants, fruit trees (papaya, avocado and mango), and coffee (few in the challa areas).

6.6 Training of Beekeeping Skills

The training of beekeeping practices and skills were conducted for villagers of Challa and Ngoyoni who are participating to the BEE FENCE FOR ELEPHANT project. A total of 35 individuals have been registered at Challa village Mamsera ward are actively involved in the monitoring of beehives and report any coming elephant group. The training involved theory and practical. The course was for four days that based on hand on approach and a total of 30 participants were trained on beehive management (hive siting skills, inspections of hives and hive fence, baiting of hives) and honey harvesting and processing skills.



Plate 1, group photo of beekeeping training course in Challa village.

6.7 Response of elephants to the hive fence

The 2014 harvesting i.e., July to August experienced no elephant crop raiding simply because no elephant come from Tsavo National Park Kenya to Tanzania (lake challa areas). Therefore no records of elephant crop raiding were recorded

for the year 2014. However, the bee fence is in place now and bee colonies are become more strong and aggressive. One instant recorded where cattle disturbed the fence and bees responded positively. The cattle herder and cattle were stung. No cattle are herded toward the fence currently. Also one member was inspecting the hives and accidentally moved the wire hooked on the hives he was stung bitterly by bees. This shows that bees can react to disturbance and can defend their colony.

6.8 Bee colonisation

Currently there are good numbers of bee colonies in a stretch of two kilometres. In total there are one hundred and sixty three (163) bee colonies out of 199 hives. One hive was stolen just two days after sitting them.



Plate 2: Bee fence adjacent Challa forest

Honey harvest: The first honey harvest will be done in January 2015 following late sitting in April 2014 (due to delay of funding in steady of December 2013 we received the fund February 2014) therefore the allowed building up of bee colonies that will be large and strong. Harvesting of honey in a building up colonies toward dry season will cause less food in the hives as a result the queen will stop laying new eggs.

7.0 Wayward

7.1 Reporting: The project will further follow up the bee fence even after the end of the project and report back to African Elephant fund.

7.2 Project sustainability: The Rombo district council and local councillors support the initiative. The Rombo District Executive Director has currently appointed the beekeeping officer to be part of the monitoring team and advise the beekeepers. In case of bee fence maintenance, the villagers (beekeepers) who work together in the project have formed a beekeeping group named “UKI GROUP” which means honey group in chagga language. The group have already contributed seed money around 6US\$ for each member to open a bank account of the group and repairing of the fence if the need arise. Also the group have formed a working constitution, which will guide toward the beekeeping project for elephant. Tanzania wildlife research will continue to advise them and gather data on hive performances, fence maintenance frequencies, elephant response the bee fence. The data will be crucial for replicating the same practice somewhere else particularly in Serengeti where the 2014 census shows an increase by 78%. Such increase is a joy to conservationists but might be a cry to farmers.

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