Final Evaluation Report

We ask all grant recipients to complete a project evaluation that helps us to gauge the success of your project. This must be sent in **MS Word and not PDF format**. We understand that projects often do not follow the predicted course but knowledge of your experiences is valuable to us and others who may be undertaking similar work – remember that negative experiences are just as valuable as positive ones if they help others to learn from them.

Please DO NOT fill in and submit this form until the project has been completed.

Complete the form in English. Note that the information may be edited before posting on our website.

Please email this report to jane@rufford.org.

Your Details	
Full Name	John Aboje Onah
Project Title	Conservation of the Vulnerable Population of the Northern Ground-hornbill: A Community-Based Survey and Conservation Education Program in Bauchi State, Nigeria.
Application ID	41864-1
Date of this Report	2nd June, 2025

1. Indicate the level of achievement of the project's original objectives and include any relevant comments on factors affecting this.

Objective	Not achieved	Partially achieved	Fully achieved	Comments
To understand the Perception of the local community's perception of hunting Northern Ground-hornbill				We were able to interview 236 individuals across Eight communities. These individuals cut across every socio-economic way of Life of the people in these communities. From these interviews, we were able to understand the effect of socio-economic structure and perception of the people on the Northern Ground-Hornbill. We interviewed 236 individuals before and 243 after the conservation education programme to evaluate changes in their perceptions. Notable differences were observed across various age groups and communities, as illustrated in Figures 1–8.
Comprehensive conservation education to educate the people on the importance of conserving the Northern Ground-Hornbill				We implemented an extensive conservation education and community engagement program aimed at raising awareness about the importance of protecting the Northern Ground-Hornbill and biodiversity in general. Through this initiative, we were able to reach a wide range of stakeholders, including traditional medicine men, farmers, traders, hunters, and students in the communities surrounding the Yankari Game Reserve.

				Our activities included interactive sessions, educational talks, poster and banner displays, and the distribution of learning materials such as conservation-themed exercise books. Through this programme activities we were able to foster better understanding of the species' ecological role and the long-term benefits of biodiversity conservation. This approach helped build community support for the conservation of this species and biodiversity in general. We were able to reach out to over 100 individuals per community and more than 100 students per community throughout the conservation education program. We distributed a total of 20 posters and 500 pamphlets as part of the conservation education program, along with 150 books given to students during the campaign. We printed and distributed 200 T-shirts.
Identify Nesting areas of the Northern Ground-Hornbill				We carried out nest search inside the reserve and some of the communities surrounding the reserve. During our nest search, we encountered two adult Northern Ground-Hornbills and one juvenile near an abandoned nest site within the Yankari Game Reserve. In total, we had 6 sightings of the Northern Ground-hornbill. We recorded 2 sightings in Mainamaji and 4 sightings within the Reserve.

				We didn't locate any other nest apart from the abandoned nest. We recorded multiple sightings of the Northern Ground-Hornbills in some parts of the reserve, as well as in the nearby Mainamaji community. These repeated sightings suggest the continued presence of the species in the area and indicate that the reserve and surrounding habitats may serve as important breeding and foraging grounds. This highlights the need for further monitoring to identify active nest sites, understand habitat use, and assess the overall population status of the species in and around the reserve. We deployed 40 song meters during the preliminary survey, which captured only one call, which was from a far distance. This approach was not effective in locating Northern Ground-Hornbill and their nests. And we switched to direct field searches, relying on the rangers' knowledge of areas where the species is frequently sighted.

2. Describe the three most important outcomes of your project.

a). One of the key outcomes of our project was gaining a clear understanding of how local people perceive the hunting and trade of the Abyssinian Ground-Hornbill. Through interviews and field surveys, we engaged with individuals from various groups—hunters, traders, elders, and youth and uncovered the cultural beliefs, motivations, and socio-economic factors driving their actions. These insights were essential for designing a targeted and culturally sensitive conservation education program.

Influence of respondents' perception on hunting and trade of the Northern Ground-hornbill before conservation education

We interviewed 236 individuals across the communities before implementing conservation education to assess their perceptions of the Northern Ground-hornbill. The level of education among respondents significantly influenced their views on whether it is acceptable to hunt and sell the Northern Ground Hornbill (χ^2 (16) = 53.05, $p < 0.001$, n = 236; figure 1). Respondents with higher education (secondary, Islamic and tertiary) were much more likely to reject hunting and trade of the species, while those with little or no formal education were more likely to view such practices as acceptable. Notably, 64% of respondents with tertiary education and 59% of those with Islamic education strongly disagreed with hunting and selling the species, compared with less than half of those with only primary education (45%) and 21% of respondents with no education. conversely, 35% of respondents with no formal education and 38% of respondents with only primary education showed high agreement that hunting and selling the bird is acceptable, whereas this view was held by only 14% and 11% of those with Islamic and tertiary education respectively.

Respondents' age group also significantly influenced their perceptions of hunting and selling the Northern Ground Hornbill (χ^2 (12) = 25.62, p = 0.01, n = 236; figure 2). Older respondents (41-49 and >50 years) showed the strongest opposition, with over half (59% and 52% respectively) strongly disagreeing and 29% disagreeing that it is acceptable to hunt and sell the bird, compared with lower proportions in younger age groups. Furthermore, respondents between 20–30 years and 31–40 years were more likely to support hunting and trade: 32% and 35% of these groups, respectively, agreed that hunting and selling the species is acceptable. Mixed views were more common among the younger groups. Respondents aged 41–49 years displayed the strongest rejection overall, with nearly 60% strongly disagreeing with hunting and selling the bird. However, this group also showed notable divergence in opinion, as 14% still expressed agreement with the practice. In contrast, younger respondents (20–40 years) were less divided in their views and more supportive of hunting, suggesting that generational factors may shape attitudes across age categories.

Perceptions also varied significantly across communities ($\chi^2 = 87.36$, $p < 0.001$; Figure 3). Strong opposition to hunting and selling the species was recorded in Kwala (71%), Kuka (63%), Mainamaji (60%), and Yelwan-Duguri (53%). In contrast, communities such as Yalo (54% agree) and Mai Ari (34% agree, 14% strongly agree) showed the highest levels of support for hunting and trade, while other communities expressed mixed views. Neutral responses were not common, ranging from 3% to 12% across all communities. Regarding local knowledge of the species' diet, most respondents were unaware of what the Northern Ground-hornbill feeds on in their farmlands. However, respondents in Yelwan-Duguri (57%) and Kwala (42%) reported that the species feeds mainly on snakes, lizards, and other small reptiles (Figure 4).

Influence of respondents' perception on hunting and trade of the AGHB after Conservation education

We interviewed a total of 243 individuals across all communities following the conservation education. The Survey revealed a significant relationship between

respondents' education level and their perception of hunting and selling the Northern Ground Hornbill (χ^2 = 54.49, p <0.001, n=243; figure 5). Respondents across all levels of education demonstrated stronger opposition to the hunting and trade of this species. Specifically, 90% of individuals with tertiary education and 65% of those with secondary education strongly disagreed that it is acceptable to hunt and sell the bird, as did a high proportion of those with Islamic (88%) and primary (74%) education. Only respondents without formal education exhibited more diverse opinions, with 39% strongly disagreeing, 27% disagreeing, and 33% remaining neutral.

The relationship between age and attitude toward hunting and selling the bird was not statistically significant (χ^2 = 6.37, p = 0.70; figure 6). Across all age groups, there was a consistently high level of disapproval of hunting and trade following conservation education. Although minor differences were observed—such as slightly higher neutrality (14%) and disagreement (16%) among older respondents. The uniformity of responses across age groups suggests that conservation education effectively influenced participants' attitudes regardless of their age ensuring a collective perspective.

Respondents perception on hunting and sell of the Northern Ground-Hornbill differs significantly (χ^2 = 46.86, p<0.001; figure 7) across all communities, majority of respondents strongly disagreed with the perception that it is acceptable to hunt and sell the Northern Ground Hornbill. With communities like Gaji-gamu (93%), Shafan-duguri (86%), Mainamaji (79%), Kuka (78) and Yalo (73%). The remaining respondents across the community largely expressed disagreement (ranging from 3% to 25%) or neutrality (3% to 35%), while only a small fraction (ranging from 3% to 11%) agreed that it is acceptable to hunt and sell the Northern Ground-hornbill. And finally most of the respondents across all the communities showed high willingness to participate in conserving the Northern Ground-Hornbill after the conservation education (Figure 8).

b). Through our survey, we were able to identify key areas where the Northern Ground-Hornbill is regularly observed in and around the reserve. These areas are known feeding and nesting sites that are important to the species. We also identified major threats impacting its presence, such as habitat loss from agricultural expansion, disturbance from human activities, and targeted hunting for disguise and traditional uses. These findings are important for developing targeted future conservation strategies to protect the species and its habitat.

c). The conservation education and awareness program has successfully increased public understanding of the importance of protecting the Northern Ground-Hornbill. This has helped shift local perceptions toward valuing the species and has created a strong sense of stewardship for the people across all levels, as each community chief gave their full commitment to protecting this species and gave out a law prohibiting their people from hunting the Northern Ground Hornbill

3. Explain any unforeseen difficulties that arose during the project and how these were tackled.

During our research activities in and around the Yankari Reserve there were some security challenges, such as poaching, reports of kidnapping and growing tensions in local communities due to longstanding government neglect. To address these issues, we took several precautionary measures. We restricted all fieldwork to daylight hours, carefully selected travel routes, and adjusted our visits to survey sites based on the current security situation. We worked closely with local security agencies and adopted a flexible field schedule to respond to any unforeseen developments. We also maintained regular communications with traditional leaders, including village chiefs and community elders, to build trust and ensure local support. These proactive steps helped reduce security risks and allowed us to continue the project safely and effectively despite challenging circumstances.

4. Describe the involvement of local communities and how they have benefitted from the project.

Throughout this project, we actively involved local communities at every stage. School teachers served as interpreters and coordinators during interviews and conservation education activities in schools and communities. We also engaged community members, including youths, women, and farmers, in both school outreach and local awareness programs. In addition, they participated in field surveys, helping to foster a sense of ownership and support for the conservation efforts.

5. Are there any plans to continue this work?

We plan to continue our RSG project. One major conservation issue we identified is the lack of biodiversity awareness among local communities. Many community members are unaware that the Northern Ground-Hornbill plays an important role in pest control on their farmlands. Most farmers mistakenly believe the bird feeds on their crops, when in fact it feeds on insects found around farms. This misunderstanding has led to the unnecessary killing of the species. To further address this issues, we plan to expand our conservation education program to more communities around the reserve and introduce repeated awareness initiatives over time to refresh the knowledge of the importance of these species to the people. We also plan to conduct further surveys to better understand the species' breeding habitat preferences.

6. How do you plan to share the results of your work with others?

Currently we have prepared a manuscript focused on understanding human perceptions of the threatened Northern Ground-Hornbill population. The manuscript will be submitted to an internationally peer-reviewed journal, making it accessible to researchers, conservationists, NGOs, government agencies, and the management of Yankari Game Reserve. We shall be presenting the findings of this research to conferences. Additionally, we plan to share key findings through social media and online platforms to engage the general public and broader conservation networks.

Currently the manuscript is being reviewed by APLORI's scientific committee before submission will be carried out, but we plan to submit our work to Journal of wildlife management. And this will be shared with RSG immediately after publication.
We have shared some of our activities on X. We have also presented our findings at the A. P. Leventis Ornithological Research Institute, Jos (APLORI) and Yankari Game Reserve. We intend to share more of our findings when the work has been published. Our findings have not yet been presented to a radio station, we are still aiming to communicate this results to the local radio station at Bauchi State.

7. Looking ahead, what do you feel are the important next steps?

To promote lasting conservation efforts, we recommend that more conservation education activities be conducted on repeated basis and expanded to reach more communities around the Reserve. Repeated awareness efforts will help improve understanding of the ecological importance of the Northern Ground-Hornbill and biodiversity as a whole. We believe that continuous and repeated education and community engagement will foster long-lasting change in attitudes towards hunting and habitat destruction.

A complete habitat and population assessment of the Northern Ground-Hornbill should be carried out to better understand the population trend of the species and its habitat preference. Furthermore, research on the breeding ecology and feeding behaviour of the Northern Ground-Hornbill should be carried out to provide a comprehensive understanding of the species' biology. This will help provide critical information for further conservation action to protect this threatened species.

8. Did you use The Rufford Foundation logo in any materials produced in relation to this project? Did the Foundation receive any publicity during the course of your work?

- On pamphlets, books, and posters used during our community-based conservation education programmes in schools and among the community members.
- On t-shirts worn by team members and some community members during field surveys and conservation education activities.

9. Provide a full list of all the members of your team and their role in the project.

John Aboje Onah – Project Lead, data analysis, field and social surveys and conservation awareness activities.
Conscience Ogunleye – Field and social survey and conservation education activities
Rose Adejo – Field and social survey and conservation education activities
Josiah Ibrahim – Support nesting and conservation awareness activities
Iniunam Iniunam – Support conservation awareness activities
Isreal Adedeji Bolade – Support conservation awareness activities

Nasiru Mohammed – Community liaison, social and field survey and conservation education programme.

10. Any other comments?

This project gave me the opportunity to strengthen my skills in community engagement, conservation and leadership. It has also been an important step in understanding people's perceptions and helping to conserve the Northern Ground-Hornbill. One of the major successes was the strong collaboration built with local communities during this project and we hope to build on this momentum in future conservation efforts.

ANNEX – Financial Report

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Appendix 1: Figures showing respondents' perceptions before the conservation education program.

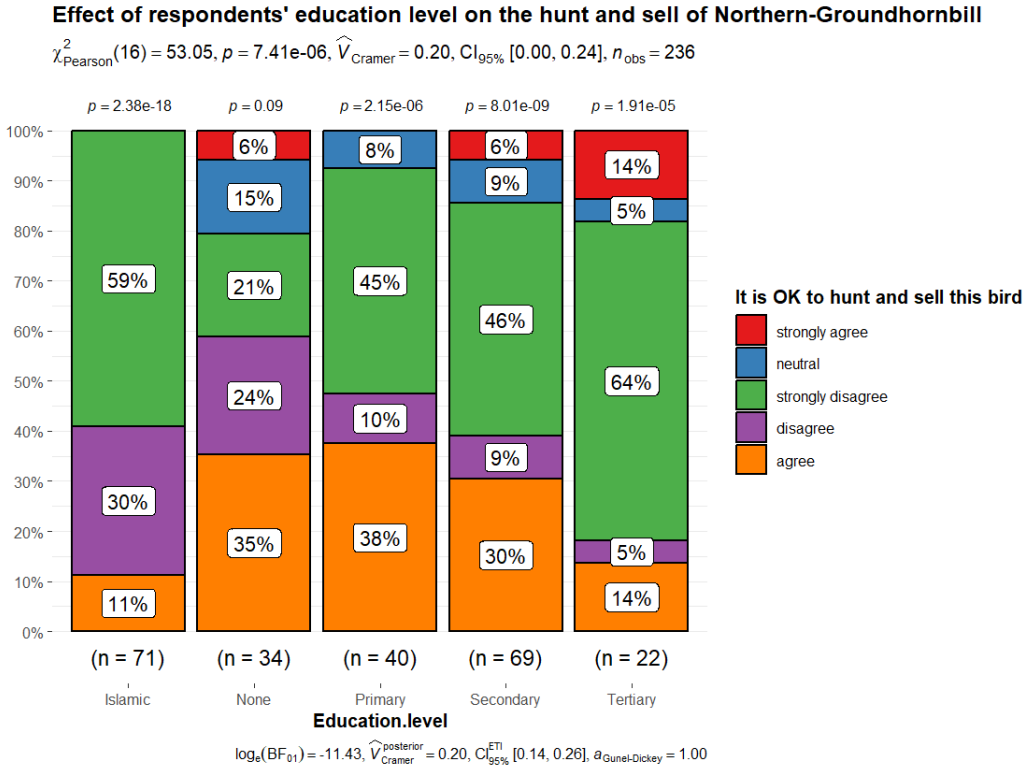

Figure 1.

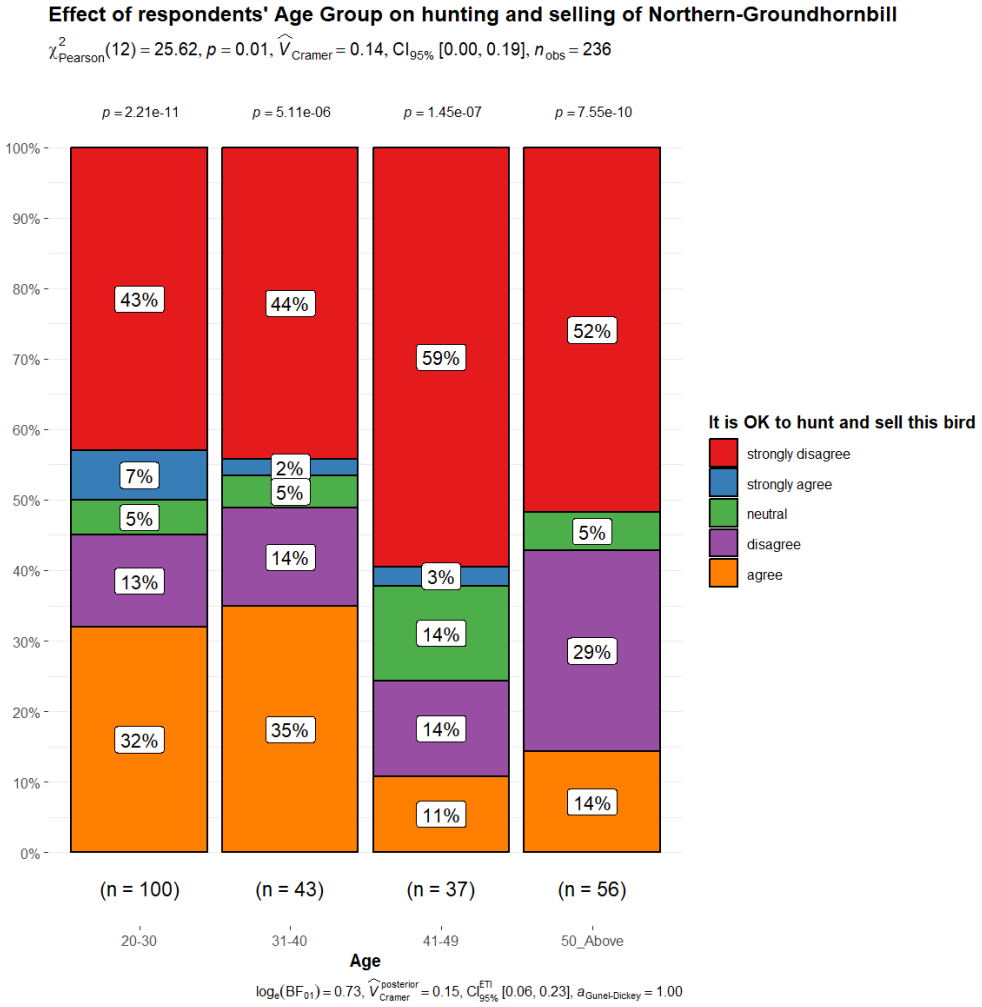
Effect of respondents' Age Group on hunting and selling of Northern-Groundhornbill
$\chi^2_{Pearson}(12) = 25.62, p = 0.01, \widehat{V}_{Cramer} = 0.14, CI_{95\%}$ [0.00, 0.19], $n_{obs} = 236$
p = 2.21e-11
p = 5.11e-06
p = 1.45e-07
p = 7.55e-10
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
43%
7%
5%
13%
32%
44%
2%
5%
14%
35%
59%
3%
14%
14%
11%
52%
5%
29%
14%
(n = 100)
(n = 43)
(n = 37)
(n = 56)
20-30
31-40
41-49
50_Above
Age
It is OK to hunt and sell this bird
strongly disagree
strongly agree
neutral
disagree
agree
$\log_e(BF_{01}) = 0.73, \widehat{V}^{posterior}_{Cramer} = 0.15, CI^{ETI}_{95\%}$ [0.06, 0.23], $a_{Gunel\text{-}Dickey} = 1.00$

Figure 2.

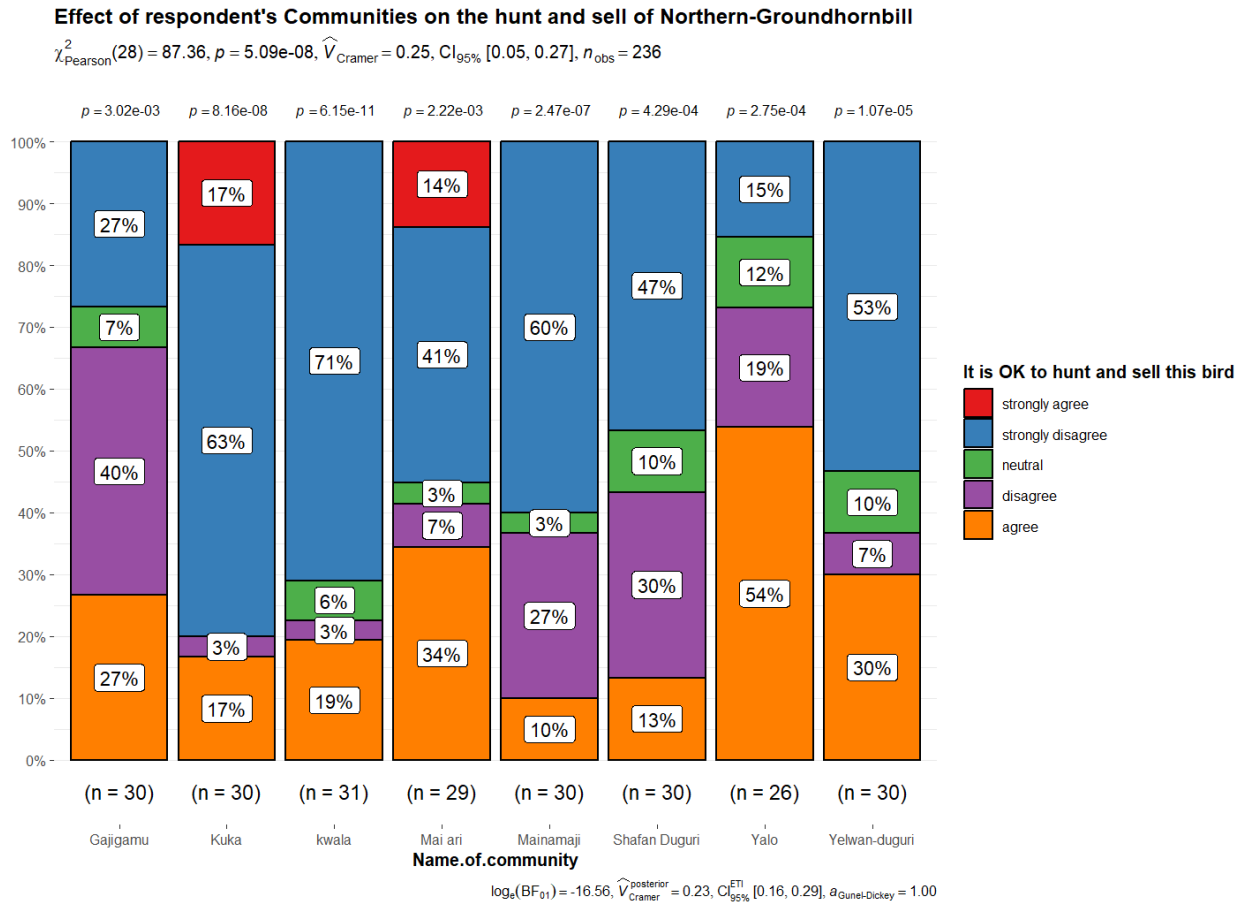
Effect of respondent's Communities on the hunt and sell of Northern-Groundhornbill
$\chi^2_{Pearson}(28) = 87.36$, $p = 5.09e-08$, $\widehat{V}_{Cramer} = 0.25$, $CI_{95\%}$ [0.05, 0.27], $n_{obs} = 236$
p = 3.02e-03
p = 8.16e-08
p = 6.15e-11
p = 2.22e-03
p = 2.47e-07
p = 4.29e-04
p = 2.75e-04
p = 1.07e-05
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
27%
7%
40%
27%
17%
63%
3%
17%
71%
6%
3%
19%
14%
41%
3%
7%
34%
60%
3%
27%
10%
47%
10%
30%
13%
15%
12%
19%
54%
53%
10%
7%
30%
(n = 30)
(n = 30)
(n = 31)
(n = 29)
(n = 30)
(n = 30)
(n = 26)
(n = 30)
Gajigamu
Kuka
kwala
Mai ari
Mainamaji
Shafan Duguri
Yalo
Yelwan-duguri
Name.of.community
It is OK to hunt and sell this bird
strongly agree
strongly disagree
neutral
disagree
agree
$\log_e(BF_{01}) = -16.56$, $\widehat{V}^{posterior}_{Cramer} = 0.23$, $CI^{ETI}_{95\%}$ [0.16, 0.29], $a_{Gunel-Dickey} = 1.00$

Figure 3.

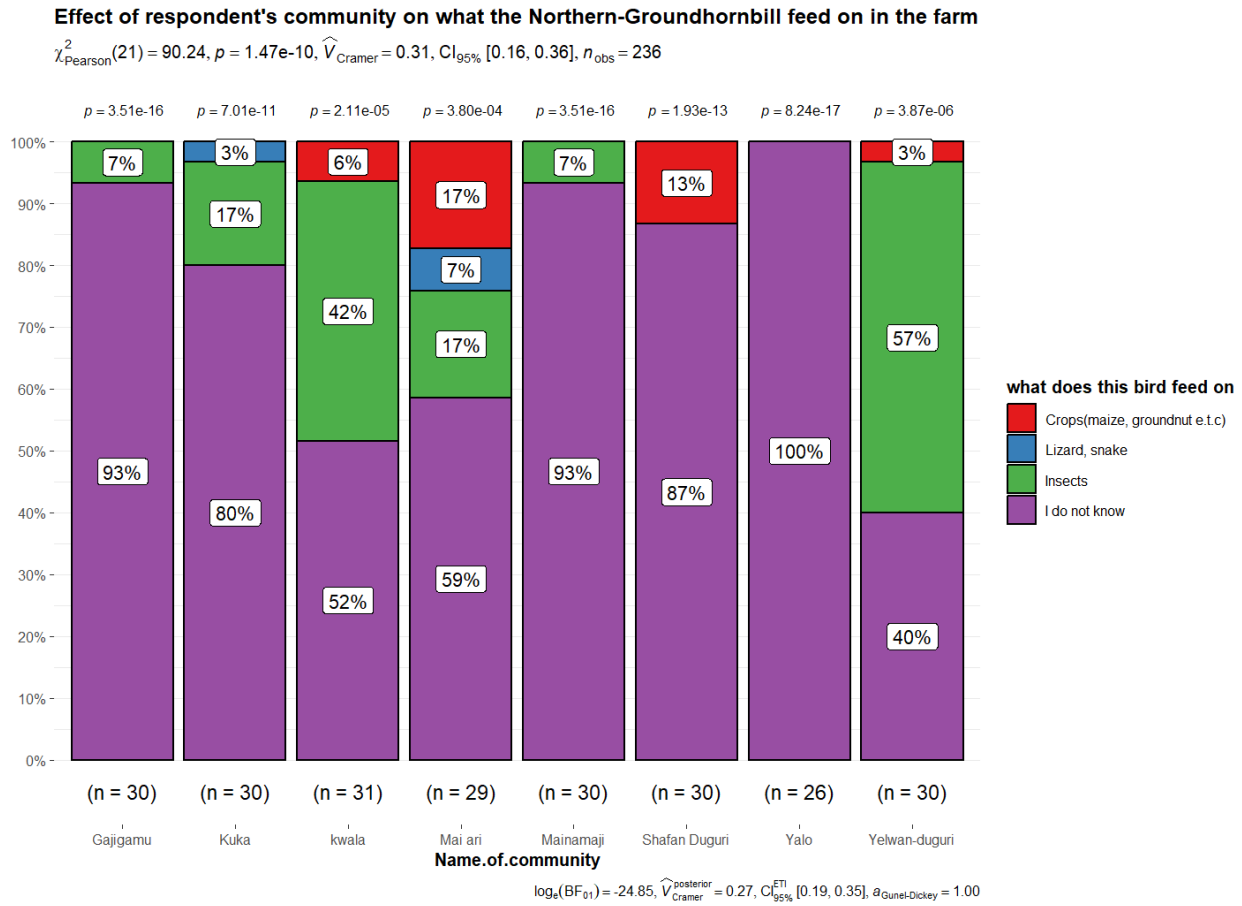
Effect of respondent's community on what the Northern-Groundhornbill feed on in the farm
$\chi^2_{Pearson}(21) = 90.24$, $p = 1.47e\text{-}10$, $\widehat{V}_{Cramer} = 0.31$, $CI_{95\%}$ [0.16, 0.36], $n_{obs} = 236$
p = 3.51e-16
p = 7.01e-11
p = 2.11e-05
p = 3.80e-04
p = 3.51e-16
p = 1.93e-13
p = 8.24e-17
p = 3.87e-06
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
7%
93%
3%
17%
80%
6%
42%
52%
17%
7%
17%
59%
7%
93%
13%
87%
100%
3%
57%
40%
(n = 30)
(n = 30)
(n = 31)
(n = 29)
(n = 30)
(n = 30)
(n = 26)
(n = 30)
Gajigamu
Kuka
kwala
Mai ari
Mainamaji
Shafan Duguri
Yalo
Yelwan-duguri
Name.of.community
what does this bird feed on
Crops(maize, groundnut e.t.c)
Lizard, snake
Insects
I do not know
$\log_e(BF_{01}) = -24.85$, $\widehat{V}^{posterior}_{Cramer} = 0.27$, $CI^{ETI}_{95\%}$ [0.19, 0.35], $a_{Gunel\text{-}Dickey} = 1.00$

Figure 4.

Appendix 2: Figures repondents perception after Conservation education

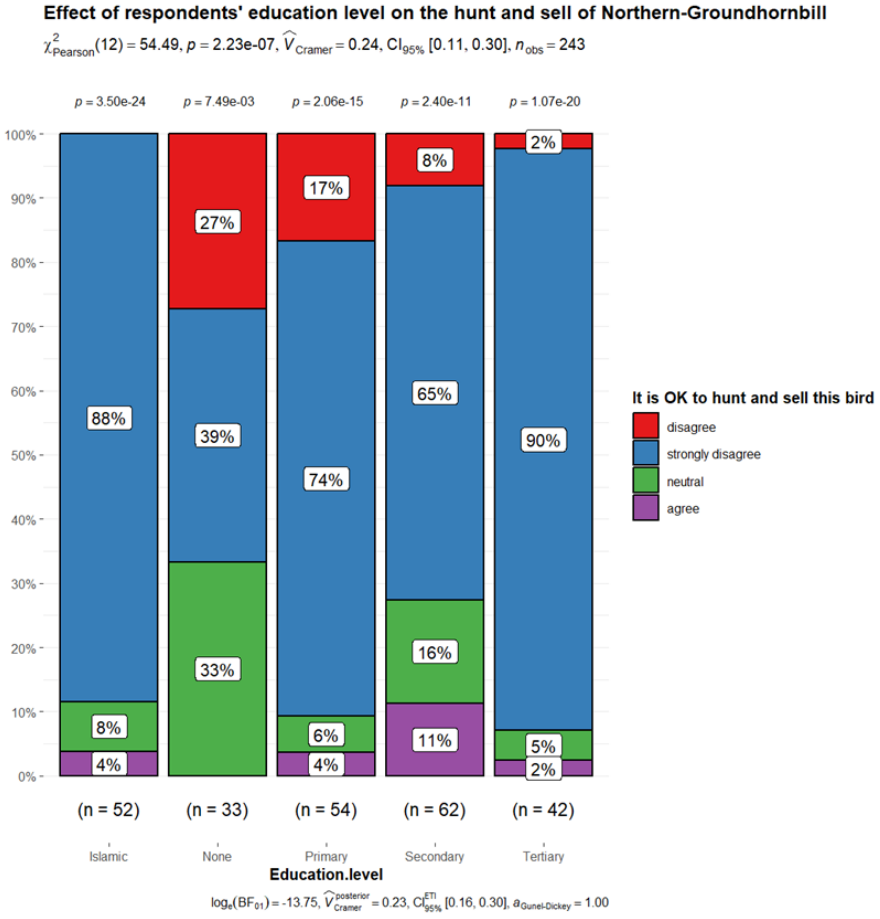

Figure 5.

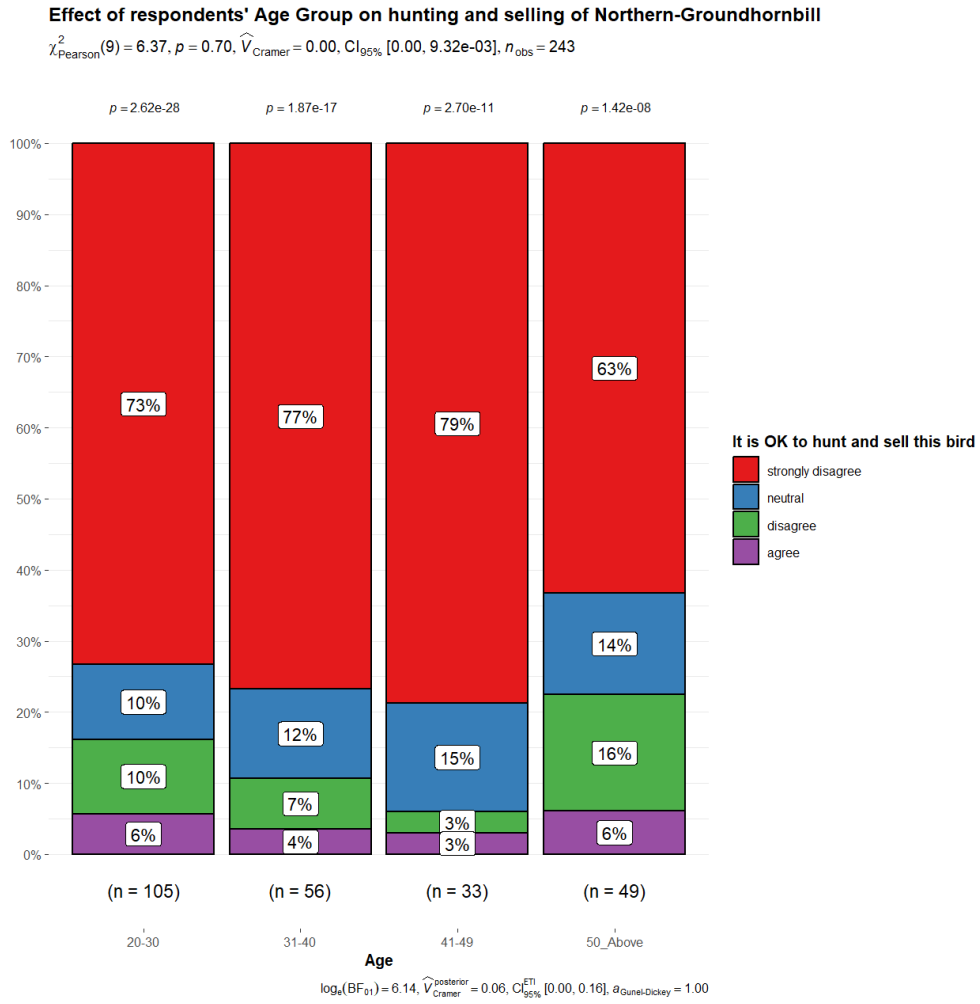
Effect of respondents' Age Group on hunting and selling of Northern-Groundhornbill
$\chi^2_{Pearson}(9) = 6.37, p = 0.70, \widehat{V}_{Cramer} = 0.00, CI_{95\%}$ [0.00, 9.32e-03], $n_{obs} = 243$
p = 2.62e-28
p = 1.87e-17
p = 2.70e-11
p = 1.42e-08
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
73%
10%
10%
6%
77%
12%
7%
4%
79%
15%
3%
3%
63%
14%
16%
6%
(n = 105)
(n = 56)
(n = 33)
(n = 49)
20-30
31-40
41-49
50_Above
Age
It is OK to hunt and sell this bird
strongly disagree
neutral
disagree
agree
$\log_e(BF_{01}) = 6.14, \widehat{V}^{posterior}_{Cramer} = 0.06, CI^{ETI}_{95\%}$ [0.00, 0.16], $a_{Gunel\text{-}Dickey} = 1.00$

Figure 6.

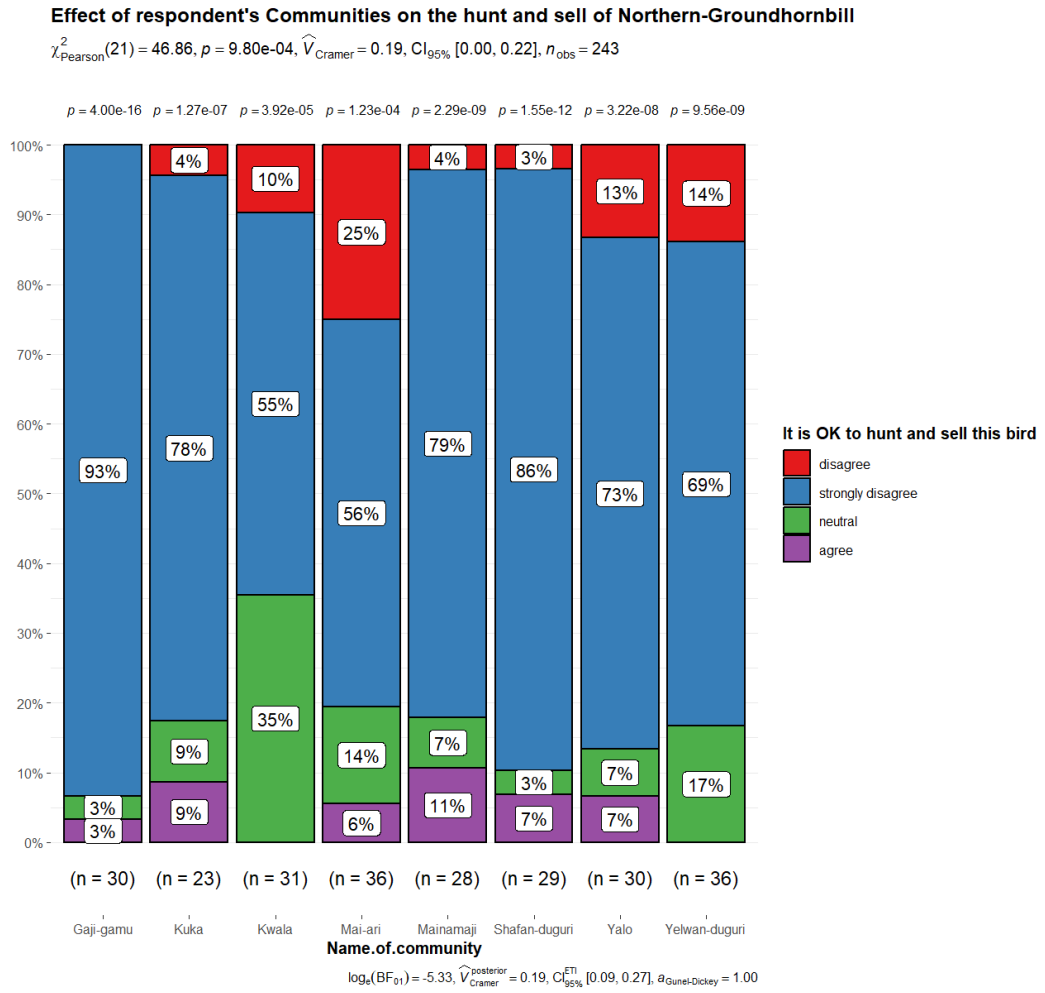
Effect of respondent's Communities on the hunt and sell of Northern-Groundhornbill
$\chi^2_{Pearson}(21) = 46.86$, $p = 9.80e-04$, $\widehat{V}_{Cramer} = 0.19$, $CI_{95\%}$ [0.00, 0.22], $n_{obs} = 243$
p = 4.00e-16
p = 1.27e-07
p = 3.92e-05
p = 1.23e-04
p = 2.29e-09
p = 1.55e-12
p = 3.22e-08
p = 9.56e-09
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
93%
3%
3%
4%
78%
9%
9%
10%
55%
35%
25%
56%
14%
6%
4%
79%
7%
11%
3%
86%
3%
7%
13%
73%
7%
7%
14%
69%
17%
(n = 30)
(n = 23)
(n = 31)
(n = 36)
(n = 28)
(n = 29)
(n = 30)
(n = 36)
Gaji-gamu
Kuka
Kwala
Mai-ari
Mainamaji
Shafan-duguri
Yalo
Yelwan-duguri
Name.of.community
It is OK to hunt and sell this bird
disagree
strongly disagree
neutral
agree
$\log_e(BF_{01}) = -5.33$, $\widehat{V}^{posterior}_{Cramer} = 0.19$, $CI^{ETI}_{95\%}$ [0.09, 0.27], $a_{Gunel-Dickey} = 1.00$

Figure 7.

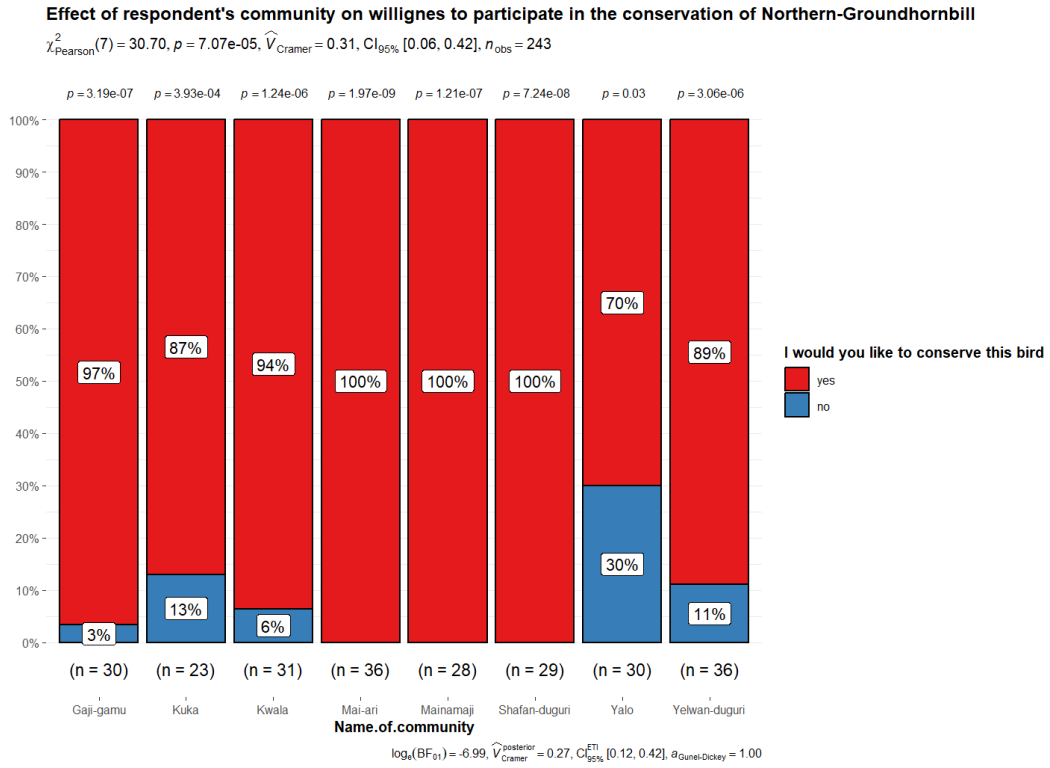
Effect of respondent's community on willignes to participate in the conservation of Northern-Groundhornbill
$\chi^2_{Pearson}(7) = 30.70, p = 7.07e\text{-}05, \widehat{V}_{Cramer} = 0.31, CI_{95\%}\ [0.06, 0.42], n_{obs} = 243$
p = 3.19e-07
p = 3.93e-04
p = 1.24e-06
p = 1.97e-09
p = 1.21e-07
p = 7.24e-08
p = 0.03
p = 3.06e-06
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
97%
3%
87%
13%
94%
6%
100%
100%
100%
70%
30%
89%
11%
(n = 30)
(n = 23)
(n = 31)
(n = 36)
(n = 28)
(n = 29)
(n = 30)
(n = 36)
Gaji-gamu
Kuka
Kwala
Mai-ari
Mainamaji
Shafan-duguri
Yalo
Yelwan-duguri
Name.of.community
I would you like to conserve this bird
yes
no
$\log_e(BF_{01}) = -6.99, \widehat{V}^{posterior}_{Cramer} = 0.27, CI^{ETI}_{95\%}\ [0.12, 0.42], a_{Gunel\text{-}Dickey} = 1.00$

Figure 8