RADIO AS A TOOL FOR CONSERVATION EDUCATION

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Introduction - Why Radio?

The Gorilla Rehabilitation and Conservation Education (GRACE) Center is the world's only sanctuary for rescued Grauer's gorillas *(Gorilla beringei graueri)* orphaned as a result of poaching. GRACE is located in a remote area of Democratic Republic of Congo (DR Congo) adjacent to the Tayna Nature Reserve (TNR). TNR, an important habitat for the critically endangered Grauer's gorilla (Plumptre et al., 2019), is a community-managed reserve comprised of land donated by 21 community neighbourhoods called Barazas. An estimated 6,800 Grauer's gorillas remain in the wild (Plumptre et al., 2021) where they are threatened by habitat loss, poaching, mining, and disease (Maldonado et al., 2012). As the only conservation organisation in this region, GRACE plays a vital role in protecting the area around the sanctuary through a collaborative approach to community-led conservation in the Tayna region.

GRACE has three strategic priorities: providing sanctuary, rehabilitation, and rewilding of Grauer's gorillas; educating and inspiring people to take conservation action; and conserving the forests of Tayna Nature Reserve alongside local communities. GRACE employs a team of highly trained Congolese Educators, who teach a variety of conservation education programs. In addition to engaging with primary schools, conservation clubs, and community associations, GRACE Educators deliver programming on the local radio station, *Radio Tayna* (an estimated potential listening area of 60,000 people) (Figure 1). Their program, *Echoes of GRACE*, includes 2-minute spots and 30-minute programs on conservation topics, threats, and actions. These radio broadcasts typically complement in-person outreach and conservation education efforts.

Figure 1: the GRACE Education Team poses outside of the local radio station, Radio Tayna, eastern DR Congo (left to right: Honoré Kambale Masumbuko, GRACE Education Manager, Gracianne Basyanirya, GRACE Educator, and Guy Sims Mumbere, GRACE Educator). (Photo credit: GRACE Gorillas).

When an 18-month Ebola outbreak, followed by the ongoing COVID-19 pandemic, halted in-person programming, GRACE Educators faced a dilemma: how to safely continue conservation education with communities. The radio became a silver-lining and GRACE Educators utilised radio as the primary form of outreach. For the first time, GRACE could formally evaluate radio as a tool for expanding conservation education across Tayna Nature Reserve.

Methods - Connecting With Communities Through Radio

People in Tayna share the forest with wildlife, including chimpanzees and gorillas. The risk of disease transmission, including Ebola and COVID-19, poses a threat to primate conservation. Therefore, GRACE Educators chose to highlight the connection between human and gorilla health. The learning objectives were for community members to know that gorillas and people can share the same diseases, and that practicing good hygiene benefits people, gorillas, and the forest. The behaviour change target was to "Tell friends and family to listen to *Echoes of GRACE* on *Radio Tayna*." In this remote region, spreading awareness is an important conservation action.

To begin, GRACE held meetings with community members from all 21 Barazas in adherence to COVID-19 protocols. Community consent, including intent to conduct pre- and post-evaluations, was obtained during these meetings following *Free, Prior*, and *Informed Consent* guidelines.

GRACE Educators trained local community members to conduct the evaluations. The evaluators deployed as small groups into Tayna Nature Reserve to survey members of the 21 Barazas. Each participant verbally agreed to the survey before beginning. The evaluators also confirmed that *Radio Tayna* had a strong signal in each Baraza.

Pre-evaluation data informed our methods. Responses showed that group listening was important, with 94% of people listening at home with other Baraza members (Figure 2). However, 80% of people did not have access to a working radio. Therefore, GRACE purchased and distributed one solar-powered radio to each Baraza prior to beginning the new campaign. GRACE Educators trained each Baraza leader on how to use and care for their radio (Figure 3).

Figure 2: Family members from the same Baraza gather together to listen to GRACE's new radio campaign (Photo credit: GRACE Gorillas).

Figure 3: Guy Sims Mumbere (GRACE Educator) teaches Baraza leaders how to operate and maintain the solar powered radios (Photo credit: GRACE Gorillas).

GRACE Educators partnered virtually with Advisors from Disney's Animal Kingdom to create content for a 4-week radio program (20 individual broadcasts, 10 total hours of airtime). GRACE Educators broadcast in Kiswahili and Kinande local languages. Information was delivered via lectures, radio dramas, interviews with local leaders, and a theme song written specifically for the campaign (Figures 4 and 5). A new "jingle" advertised specific programming times.

Figure 4: GRACE Education Team broadcasting their program, *Echoes of GRACE*, on Radio Tayna (Photo credit: GRACE Gorillas).

Figure 5: Gracianne Basyanirya, GRACE Educator, interviews a local leader for the new radio campaign as part of a segment featuring voices from the community (Photo credit: GRACE Gorillas).

The new radio campaign launched in January 2021 and aired for two months (one month repeated) to maximize listenership. Immediately following, evaluators collected post-evaluations from the same 21 Barazas (n=213). Pre- and post-evaluation response rates for questions were compared descriptively and using a two-proportions z-test ("prop.test" function in R Version 4.0.5).

Results - Radio Works!

The goals were to assess the effectiveness of radio as a tool to expand the scope of GRACE's conservation education programs and amplify existing conservation initiatives. Our results suggest the following:

1) Providing each Baraza with a solar-powered radio increased listenership. Compared to only 33% of respondents in the pre-evaluation noting listening once per day, the post-evaluation found 100% of respondents listened at least once per day, and 66% listened twice per day. In the post-evaluation, 96% of respondents listened to programs on the solar-powered radio (the remaining 4% said they already had their own radio at home).

2) People are listening to Echoes of GRACE. Providing working radios was not a guarantee that listeners would tune in to *Echoes of GRACE*. Post-evaluation data showed that listening increased across all types of programs (World News, Local News, Agricultural Programs). In the post-evaluation, 97% said they listened to *Echoes of GRACE* compared to 13% in the pre-evaluation. This suggests an interest in radio programming from GRACE.

3) A "jingle" effectively advertises programming times. In the post-evaluation, 58% said they listened for the jingle to know it was time for *Echoes of GRACE*.

4) Song is effective for increasing conservation knowledge. This was the first time GRACE evaluated song as a tool for conservation education. Listeners were asked to identify the "secret" to being a gorilla protector, as relayed only through the song. 88% of respondents correctly identified the secret in the post-evaluation, as well as citing hygiene in 88% of responses on how to protect gorillas, a significant increase from the pre-evaluation ($\chi^2 = 184.49$, df = 1, $P < 0.001$).

5) Radio is an effective tool for conservation education in DR Congo. The project was designed during an 18-month Ebola outbreak and the ongoing COVID global pandemic. The campaign primarily addressed human-wildlife disease transmission as a threat to gorillas, with a focus on human hygiene.

   a. In the post-evaluation, 100% of respondents reported that gorillas can get sick, a significant increase from the pre-evaluation response rate of 72% ($\chi^2 = 66.99$, df = 1, $P < 0.001$).

   b. In the post-evaluation, 99% of respondents reported that gorillas and humans can get the same diseases, a significant increase from the pre-evaluation response rate of 64% ($\chi^2 = 92.28$, df = 1, $P < 0.001$).

   c. In the post-evaluation, 89% of respondents said practicing good hygiene can protect gorillas from getting sick, which was a significant increase in knowledge from the pre-evaluation response rate of 21% ($\chi^2 = 183.43$, df = 1, $P < 0.001$).

6) Radio can encourage conservation action. As a behaviour change target, we asked listeners to spread awareness of gorilla conservation. In the post-evaluation, 100% of respondents said they told friends and family to listen to *Echoes of GRACE*.

Discussion - Informing Future Programming

To our knowledge, this is the first time radio was evaluated as a tool for conservation education in DR Congo. It is also the first time GRACE Educators trained an external team to administer evaluations across a rural geographic area. Both of these milestones show that even with a small team, evaluation of radio in a remote region is possible when the local community is included.

This was the first time GRACE evaluated a theme song for effectiveness. Knowing that music can increase knowledge has inspired GRACE Educators to include songs in future programming. The jingle proved to be effective for letting listeners know when to tune in, reinforcing the importance of music in connecting with the community.

GRACE has actively engaged with communities near the sanctuary since its inception. However, this is the first time GRACE has expanded its scope to include a larger audience in remote areas throughout Tayna Nature Reserve. Additionally, radio provided GRACE with a mechanism to increase our audience size during a time when in-person visits were not possible. As in-person programming returns, radio will remain an important and valuable tool for reaching communities across this remote region.

GRACE plans to implement our learnings to enhance and continue conservation-focused radio programming in the future. The insights from this project will help GRACE to better create content that fits the audience and addresses threats throughout Tayna Nature Reserve.

Conclusion

Evaluation data and personal testimonies from Baraza members reinforced the importance of engaging with local communities. Evaluation requires resources, but it is critical for understanding program impact. Because of pre- and post-evaluations, we confirmed that our messages 1) reached the intended audience, and 2) encouraged conservation action.

Based on the success of this project, we can say with confidence that radio, including the use of a culturally relevant song, is an important and effective tool for conservation education in DR Congo. Finding creative ways to connect with remote audiences, including the use of radio, can inspire conservation action.

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