A REPORT SUBMITTED TO RUFFORD SMALL GRANT FOUNDATION 2024

DELIVERING BETTER ECOLOGICAL AND SOCIAL OUTCOMES IN A NIGERIA'S FOREMOST GAME RESERVE AT THE BRINK OF LOSING ITS CONSERVATION VALUE.

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Summary of Activities

- Communities adjoining the Yankari Game Reserve were visited in an effort to enhance conservation, and to deliver better ecological and social outcomes in the savanna ecosystem of Yankari Game Reserve, Nigeria, where biodiversity currently faces severe human threat.

- Stakeholder workshops were organized for conservation education to harnessed efforts at protecting biodiversity from anthropogenic effects by establishing Conservation Site Support Group (CSSG).

- Positive and negative social impacts of the Yankari Game Reserve were identified with the view to providing community-based solution in reducing the negative and increasing the positive impacts as described in the Social Assessment for Protected and Conserved Areas (SAPA) tool.

- Evaluation workshop was carried out where stakeholders in conservation and the environment including management and staff of the Yankari Game Reserve, community members, relevant governmental ministries, agencies, government officials, politicians, NGOs and critical individuals were in a workshop.

Summary of key Findings

- 480 community members participated in the first and second community workshops, and 566 questionnaires were administered to households across communities bordering the Yankari Game Reserve.

- Lack of provision of social amenities, empowerment and incentives, crop raiding by wild animals, loss of livelihood due to community relocation outside of the reserve, and bias and lack of employment of local community members are the most important negative social impact of the Yankari Game Reserve on the adjoining communities. These social impacts are also rated high from the household surveys.

- Top on the most important positive social outcomes are provision of some social amenities and incentives, intrinsic value of the reserve, tourism and international linkage, employment opportunities to few local people though inadequate, provision of

fuel efficient stove by the GEF project 20 years ago, and collection of non-timber products.

- On the solutions to the negative social impacts, employment including adhoc jobs to local community members adjoining the reserve, empowerment and provision of alternative source of livelihood, compensation for damaged crops and dead of livestock caused by wildlife mainly the Hyena, and establishment of a dispute resolution committee. These solutions to the negative social impacts were rated high from the household surveys.

- Participants or stakeholders of the evaluation workshop acknowledged and appreciated findings from this study. They however suggests another survey to draw perspective of the negative and positive social impacts, as well as the solution to the negative social impacts by staff and management of the Yankari Game Reserve and other stakeholders in relevant government ministries and institutions. This way, a more robust policy and implementation outcomes could be reached. Participants at the evaluation workshop unanimously expressed willingness to implement key aspects of the results from the study provided the perspectives of other stakeholders are incorporated.

1.0 Background

Any conservation efforts in Africa that does not integrate adjoining community participation in aspects of their operations will be inimical to conservation success (Angwenyi *et al.*, 2021). Scientific findings and the benefits of conservation must be communicated in a manner that is understood and appreciated by local community people that lives on borders to protected areas. Failure to incorporate local communities in conservation effort and some critical decisions will not only yield minimal success, it could aggravate human-wildlife conflict as well as breed mutual distrust between PA/CA managers and local people. Consequently, to succeed in conservation of African protected or conserved areas is to invest massively in community conservation education awareness, build capacity for livelihood and instill a sense of belonging to community members by so established mutual trust, respect and cooperation. Bringing together community members in series of workshop engagements should provide avenues to change behaviour for a positive effect on the environment, improve public support for conservation, advance conservation initiatives, influence conservation policy, improve people's knowledge and share scientific advances (Wright *et al.,* 2007; Fada, 2014; Abukari & Mwayyosi, 2020).

Social Assessment for Protected and Conserved Areas (SAPA) methodology is a relatively simple and low-cost method for assessing the positive and negative social impacts of a Protected Area or Conserved Area (PA/CA) and related conservation and development activities on the wellbeing of communities living within and around the Protected Area or Conserve Area (PA/CA). It is a multi-stakeholder assessment for use by PA/CA managers, communities and other local level actors to help increase and more equitably share positive social impacts, and reduce negative social impacts.

During our recent visit for an on-the-spot review of the reserve as a key biodiversity area (also an important bird area) in Nigeria, observations showed that the reserve is under serious negative human influence, prime of which is poaching, human-wildlife conflict, and trade in wildlife and illegal grazing by herders. This recent development is worrisome and has raised so

many concerns that motivated the conduct of this project. The project is an extension of our previous research supported by Rufford Foundation at the Yankari Game Reserve where we investigated fire and its effects on nesting birds, elephants and other large herbivore's impact on trees and woody plants, and established a model for fire return intervals.

1.0.1 Aim

Specifically, this project adopted the SAPA tool which identified the negative and positive social impacts of the reserve on sixteen communities adjoining the reserve and proffer a community driven solution to the impacts by mitigating the negative human activities.

This approach has the potential to strengthened conservation practice across many sites, and using standardized assessment template from multiple sites to build a broader, more balanced picture of the social impacts of the reserve, and the opportunities social assessment provides for improving the effectiveness and equity of a protected area conservation. The study conducted workshops to create conservation education among community members in locations around the reserve.

1.0.2 Objectives

Specifically, this project was set out to achieve the following objectives;

 i. to assess the positive and negative social impacts of the Yankari Game Reserve on the surrounding communities,

 ii. provides a community-based solution to reduce the negative social impacts and engage community stakeholders to agree on common grounds for effective and sustainable conservation efforts at the Yankari Game Reserve,

 iii. create conservation education awareness among the community members around the reserve, and solicit support in protecting the biological diversity of the reserve from anthropogenic effects by establishing a Conservation Site Support Group (CSSG). This workshop was carried out at the levels of CSSG and policy makers.

1.1 Conservation Evidence

Projects involving workshops that introduces the rigorous process of Social Assessment of Protected and Conserved Area (SAPA) manual to evaluate the positive and negative social impacts in adjoining communities to protected or conserved areas has shown great success. There is also much external evidence of successful conservation activities in different protected areas where communities and stakeholders are involved in the management of reserves within and around their communities (IUCN, 2006; Fada, 2014 & Habu & Naziru, 2017). Studies have also shown that forest cover increased more in community-managed forests than in forests not managed by local communities. Again, legal protection of forest increased tree species richness and diversity or the density of young trees (Sutherland, *et al.* 2019).

2.0 METHODS

2.1 Description of Study Site

This study was carried out in rural communities adjoining the Yankari Game Reserve for Yankari National Park (9°45'N 10°30'E; Figure 1), 100 km South east of Bauchi town in Bauchi state. The reserve covers a total area of 2,244 km², in the east-central part of Nigeria. The reserve records an average rainfall of about 1000 mm per year, which occurs between April and October (Crick and Marshall, 1981). Yankari Game Reserve lies within the Sudan Savanna Zone (Geerling, 1973) of Nigeria with a vegetation made up of swampy flood plain bordered by patches of forest, gallery forest and riparian forest, woodland Savanna (Crick and Marshall, 1981). The Game Reserve was designated and opened as Nigeria's biggest National Park in 1991 (but is now a game reserve). It is the most popular destination for tourists in Nigeria and, as such, plays a crucial role in the development and promotion of ecotourism in Nigeria (Odunlami, 2000). The Reserve is bisected by the River Gaji.

Yankari Game Reserve is one of Nigeria's foremost reserves located in the Sudan savanna rich in biodiversity. It is a choice destination of national and international value for tourists. The reserve is an important refuge for over 50 mammalian species including African Bush Elephant *Loxodonta africana*, Olive Baboon *Papio onobis*, Patas Monkey *Cercopithecus patas*, Tantalus Monkey *Cercopithecus tantalus*, Roan Antelope *Hippotragus equinus*, Western Hartebeest *Alcelaphus buselaphus*, West African Lion *Panthera leo*, Leopard *Panthera pardus,* Spotted Hyena *Crocuta crocuta,* African Buffalo *Syncerus caffer*, Waterbuck *Kobus ellipsiprymnus*, Bushbuck *Tragelaphus scriptus*, Hippopotamus *Hippopotamus amphibious* etc. The Leopard is long presumed to be extinct in the game reserve, but in April 2017, one adult male was captured on Wildlife Conservation Society's camera-trap with another in 2020 (Nacha Geoffrey Per. Comm. 2020; WSC 2020). Yankari is recognized as having one of the largest populations of elephants in West Africa, estimated at more than 300 in 2005. Since 2005, the protected area is considered a Lion Conservation Unit together with Kainji National Park (IUCN Cat Specialist Group 2006). Unfortunately, in recent times, the population of these species is on an accelerated decline (WCS, 2020) due to poaching activities, illegal grazing, trade in wildlife, and human-wildlife conflict.

There are also over 337 species of birds in the reserve. Of these, 130 are resident, 50 are Palearctic migrants and the rest are intra-African migrants that move locally within Nigeria (Ezealor 2002). Some threatened birds in this reserve include the Saddle-billed Stork *Ephippiorhynchus senegalensis*, Martial Eagle *Polemaetus bellicosus*, Abyssinian Ground Hornbill *Bucorvus abyssinicus*, Narina's Trogon *Apaloderma narina*, and Secretary Bird *Sagittarius serpentarius* among others (Ezealor 2002; Olokesusi 1990). In recent years there was no sightings of Critically Endangered White-backed Vultures in Yankari and species is thought to be extirpated from the reserve. Further information on the conservation significance of the Yankari Game Reserve and its flora and fauna are presented in Idowu & Morenikeji (2015). There are many other taxa including fishes, amphibians and reptiles.

Threatened plants in Nigeria from the IUCN red list include Critically Endangered (17 species), Endangered (36 species), Vulnerable (157 species) and Data Deficient (16 species) to sum up to 226 plant species in total. Among these plants are some found at the Yankari Game Reserve requiring protection considering their status. Specifically, some plants recorded for the reserve include *Afzelia africana, Burkea africana, Pterocarpus erinaceus, Isoberlina doka, Monotes kestingii, Combretum glutinosum, Detarium microcarpum* and *Anogeissus leiocarpus. Gardenia aqualla* and *Dischrostachis glomerata, Hyparrhenia involucrate* and *H. bagirmica, Khaya senegalensis, Vitex doniana, Acacia sieberiana, Tamarindus indica, Borassus aethiopium Daniella oliveri*, *Pteleopsis habeensi, Terminalis habeensis* etc. The reserve recently assumed the status of a Biosphere Reserve (Naziru Mohammad Per. Comm).

Members of the communities adjoining the reserve are predominantly farmers, Fishermen, hunters, traders with few civil servants. There are different tribes and ethnic group in these rural communities including Dugumawa, Dunsunawa, Dugurawa, Gobirawa, Bolawa, Fulani, Barebari, Jarawa etc. (Umar *et al.,* 2015). There are many communities in close proximity to the Yankari Game Reserve. For the purpose of this study, 16 communities (Yalwan Duguri, Dagudi, Gaji, Gaji Gamu, Duguri, Dogon Dutse, Gale, Sarkin Yaki Malla, Yalo, Garin Kweri, Jada, Mai-Ari,

Kwala, Pali, Kuka, and kafi were randomly selected for this study (Oldekop *et al.,* 2016; Figure 1).
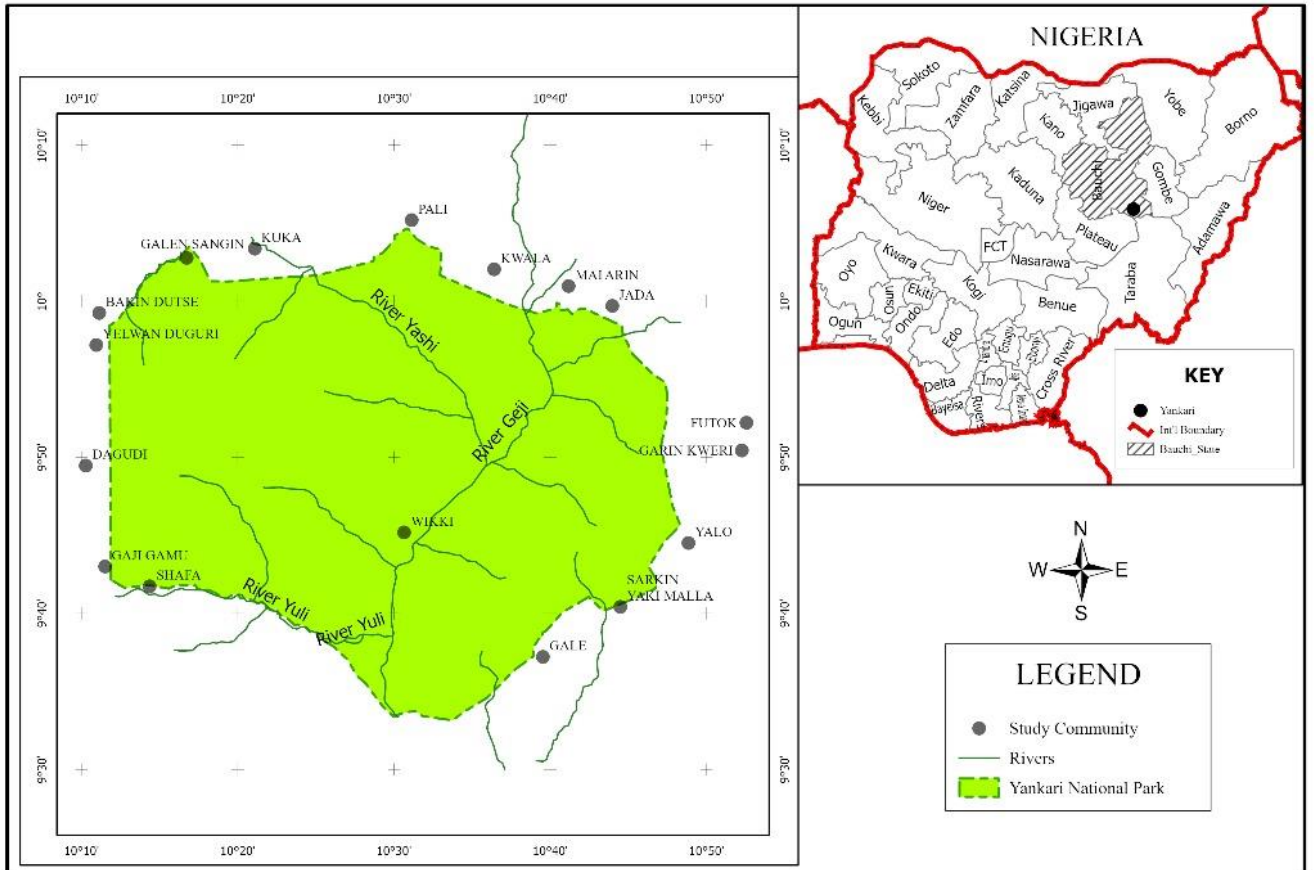

Figure 1. Map of Yankari Game Reserve indicating the adjoining communities visited.

2.2 Conservation Education Outreach and Identification of Stakeholders

Community rapport building, identification and conservation advocacy outreach was conducted in the sixteen communities adjoining the Game Reserve. Conservation education outreaches and awareness campaign to the adjoining communities about the importance of conservation of biological diversity in the Yankari Game Reserve were conducted. Specifically, visits were made to the palace of each community's village head in addition to preparing community stakeholders and actors that formed the Conservation Site Support Group (CSSG) towards the workshops. The role of the CSSG included conservation vanguards for the reserve, support management efforts for the protection of biodiversity and solicit cooperation of community members towards conservation activities in the reserve. The communities adjoining the reserve include; Mainamaji, Yalwan Duguri, Dagudi, Gaji, Duguri, Dogon ruwa, Rimi, Mansur, Gale, Sarkin Yaki Malla, Yalo, Garin Kweri, Jada, Mai-Ari, Kwala, Pali, Kuka, and kafi. Each community is at least 2 to 10 Km away from the boundary of the reserve (Oldekop *et al.,* 2016), including the communities without Ranger outpost. Unfortunately due to community clashes situation at the time of visit to Rimi and Mansur communities, workshops were not conducted. Conservation education outreaches to identify contact persons and stakeholders were conducted. This was essentially scooping which involve planning the assessment process, community mapping, reviewing existing information, stakeholder analysis and training the facilitators who assisted in the analyses process and data collection.

2.3 First Community and Stakeholders Workshop

The first community workshops were held in the 16 communities to generate information on the negative and positive social impacts of the reserve on their communities including providing solution to the negative social impacts. Due to cultural norms in these communities, men and women sessions were held in separate venues but simultaneously. Men sessions were conducted by men facilitators, while female sessions were facilitated by female facilitators. The first community and stakeholders' workshop involve priority impacts identification and site specific assessment.

2.4 Planning Information Gathering and Sampling

Following the outcomes of the first workshops, a plan for gathering information was developed to summarize the social impacts generated for further investigation and address in the questionnaire. Household survey questionnaires were developed; enumerators training were carried out, as well as collection of household survey data and analysis. Thirty five (35) questionnaires were administered randomly to households in each of the 16 communities visited.

2.5 Second Community and Stakeholder Workshop/Formation of the Yankari Conservation Site Support Group (CSSG)

The second community stakeholder's workshops were aimed to validate the outcome of the first workshop and the findings of the questionnaires administered to communities. At least 30 members from each of the sixteen communities were selected for this workshop among which are the individuals selected as CSSG. Social impacts and related governance challenges were clarified and validated by stakeholders who provided practical ideas for action. The formation of stakeholders included community leaders namely village heads, women leaders, religious leaders, youth leaders and association leaders.

2.6 Staff and Management of PA/CA Workshop

The Staff and management of PA/CA workshop was geared towards collective decisions on effective management and conservation of biodiversity at the Yankari Game Reserve. The staff and management workshop in other words brought together management and staff of the Yankari Game Reserve, relevant governmental ministries, agencies, government officials, politicians, NGO/CSO and critical individuals. These stakeholders are chosen for their position in influencing policy decisions selected member of the CSSG were also included in this workshop. The stakeholders were expected to advocate for conservation activities, recommend improved conservation policy and legislations, and implement outcome from the first and second workshops.

2.7 Evaluation of Workshops and Final Report

During the staff and management of PA/CA workshop, evaluation was carried out to appraise lessons learnt, conservation action nuggets and assessment of implementation of workshop outcomes. All data were imputed in excel spread sheet and analyse in R. During the analyses of the questionnaire data to determine how important the social outcomes were, bias from respondents were addressed to either limit or to ensure no bias at all.

3.0 RESULTS

3.1 Demographics

The first and second workshops were conducted in 16 communities adjoining the Yankari Game Reserve namely; Yelwan Duguri, Gaji, Gaji Gamu, Kuka, Gale, Pali, Dagudi, Pali, Mai-Ari, Kwala, Jada, Garin Kweri, Yalo, Sarkin malla, Galen Sengin, and Bakin Dutse. These communities comprised three districts namely Pali, Duguri and Dagudi.

There were 480 participants in the first and second workshops, 240 males and females each participated. Of the 16 communities, there were 30 participants, 15 males and females each.

Surveys of 566 semi-structured questionnaires were administered to households across the 16 rural communities bordering the Yankari Game Reserve.

3.2 Negative Socio-Ecological Impact of 16 Communities adjoining the Yankari Game Reserve.

Kafi, Kuka, Gaji, Kwala, Galen Sangin, and Yelwan Duguri communities recorded the highest negative social impact, while Yalo, Mai-Ari and Bakin Dutse recorded the lowest (Figure 2).

Lack of provision of social amenities (22%) such as portable water, electricity and medical supplies, crop raiding by wild animals (18%), loss of livelihood due to community relocation outside of the reserve (12%), bias and lack of employment of local community members (12%) adjoining the reserve, and an increased crime and poor policing (10%) were considered as the most important negative social impact of the Yankari Game Reserve to the 16 communities where workshops were conducted (Table 1).

On the other hand, least most important negative social impacts were; Erosion and flood on farms near reserve due to grazing (0%), Snake and Tse-Tse Fly bite and effects of disease on livestock (1%), Human wildlife conflict (1%), bias to women for community support (2%) and Restriction on collection of non-timber products (2%), Unwholesome behavior and immoral acts in the wikki spring (2%), and Wild animals (majorly Spotted Hyenas; *Crucuta crucuta*) killing livestock & humans (2%) Table 1.
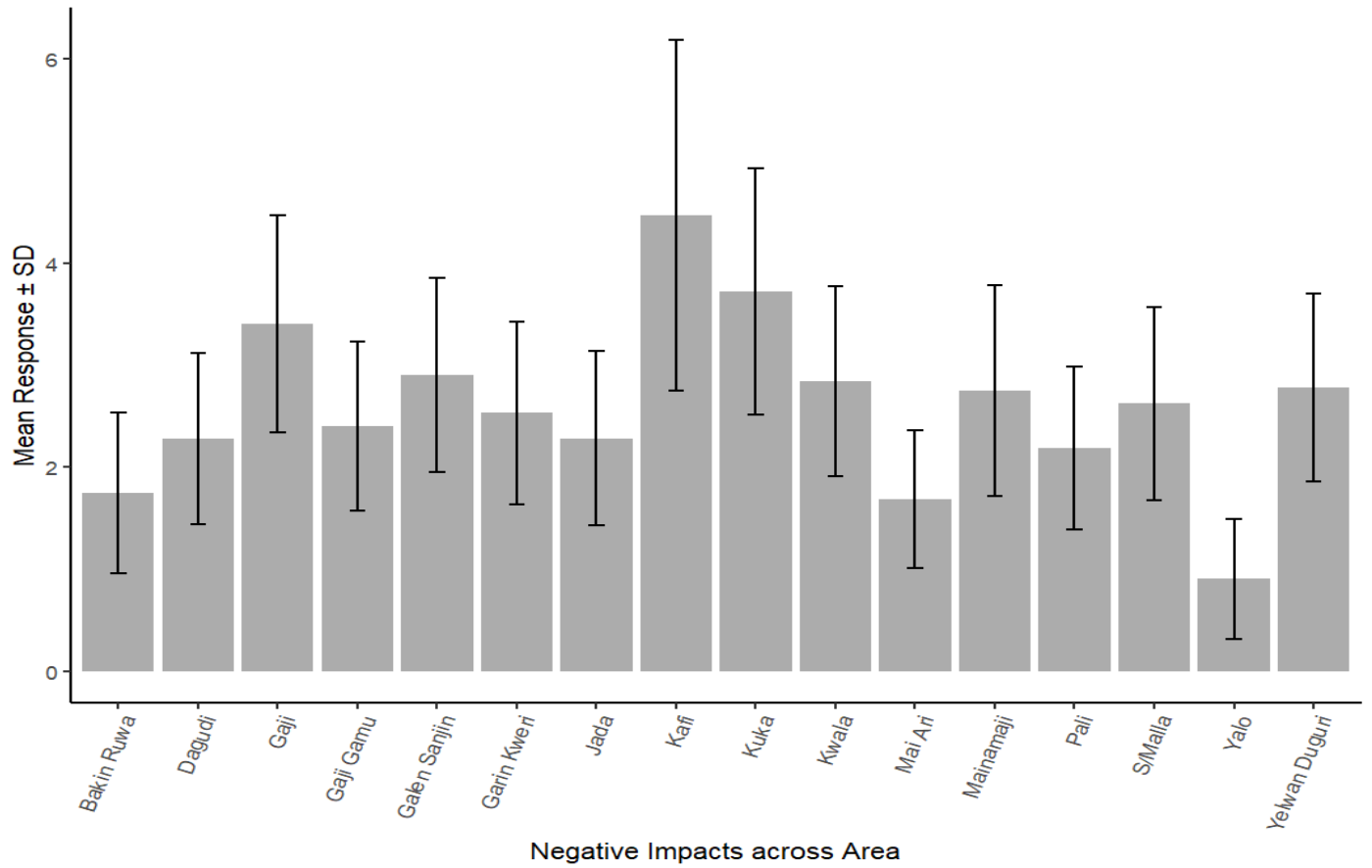
Figure 2. Negative Socio-ecological impacts of Yankari Game Reserve as expressed by sixteen communities surrounding the Reserve.

Table 1. Negative Socio-ecological Impact of the Yankari Game Reserve as expressed by sixteen communities surrounding the Reserve

s/n	Negative Impacts	n	Mean (%)	sd	se	Ci
1	"Biase and Lack of employment"	32	4.94 (12)	7.2	1.27	2.6
2	"Biase to women for community support "	32	0.688(2)	2.89	0.511	1.04
3	"Crop raiding"	32	7.66(18)	4.94	0.873	1.78
4	"Erosion and flood on farms near reserve due to grazing"	32	0(0)	0	0	0
5	"False accusation, illegal arrest and harassment of communities"	32	0.969(2)	3.24	0.572	1.17
6	"Hide out for criminals"	32	2.56(6)	4.62	0.817	1.67
7	"Human wildlife conflict"	32	0.281(1)	1.42	0.251	0.512
8	"Increased crime and poor policing"	32	4.22(10)	6.05	1.07	2.18
9	"Lack of provision of social amenities"	32	9.06(22)	9.68	1.71	3.49
10	"Loss of livelihood since relocation "	32	5.06(12)	7.72	1.36	2.78
11	"Poor relationship and communication between communities and managers"	32	1.84(4)	4.7	0.832	1.7
12	"Restriction on collection of non-timber products "	32	0.688(2)	2.51	0.443	0.904
13	"Snake and Tse-Tse Fly bite and effects of disease on livestock"	32	0.562(1)	2.23	0.394	0.803
14	"Stoppage of community involvement in adhoc jobs"	32	1.34(3)	3.72	0.658	1.34
15	"Unwholesome behavior and immoral acts in the wikki spring"	32	0.688(2)	2.72	0.48	0.98
16	"Wild animals killing livestock & humans"	32	0.969(2)	3.39	0.6	1.22

3.3 Positive Socio-Ecological Impact of 16 Communities adjoining the Yankari Game Reserve.

Pali, Mai-Ari, Gaji, Gaji Gamu, and Yelwa Duguri communities showed the highest positive social impact. However, Bakin Ruwa, Sarkin malla, Jada and Kuka opined the lowest (Figure 3).

When asked about the most important positive social outcomes for the 16 rural communities adjoining the Yankari Game reserve, provision of some social amenities and incentives (18%), intrinsic value, tourism, international linkage (16%), provision of employment opportunities to few local people though inadequate (14%), provision of fuel efficient stove by the GEF project (13%) and collection of non-timber product adjudged as the most important positive social outcomes of the Yankari Game Reserve in the last 20 years (Table 2).

3.4 Community-Based Solution to the Negative Socio-Ecological Impact of 16 Communities adjoining the Yankari Game Reserve.

Kafi, Dagudi, Gaji gamu offered more solution to reduce the negative social impact. However, Maina maji, Yelwan Duguri, Jada, Sarkin Malla, Gaji, and Garin Kweri provided the least solutions (Figure 4).

When asked about the most important solution to the negative social outcomes from the 16 rural communities adjoining the Yankari Game Reserve, an increased provision of employment to local community members adjoining the reserve (24%), empowerment and provision of alternative to source of livelihood (22%), compensation for damaged crops and dead of livestock (such as sheep, goats, chicken, etc) caused by wildlife mainly the Hyena (7%) be made by the Yankari game Reserve, and establishment of a dispute resolution committee (7%) comprising the management of Yankari Game Reserve and selected community members resolve any disputes as relates to the reserve and community members, and to foster mutual working relationship (Table 3).
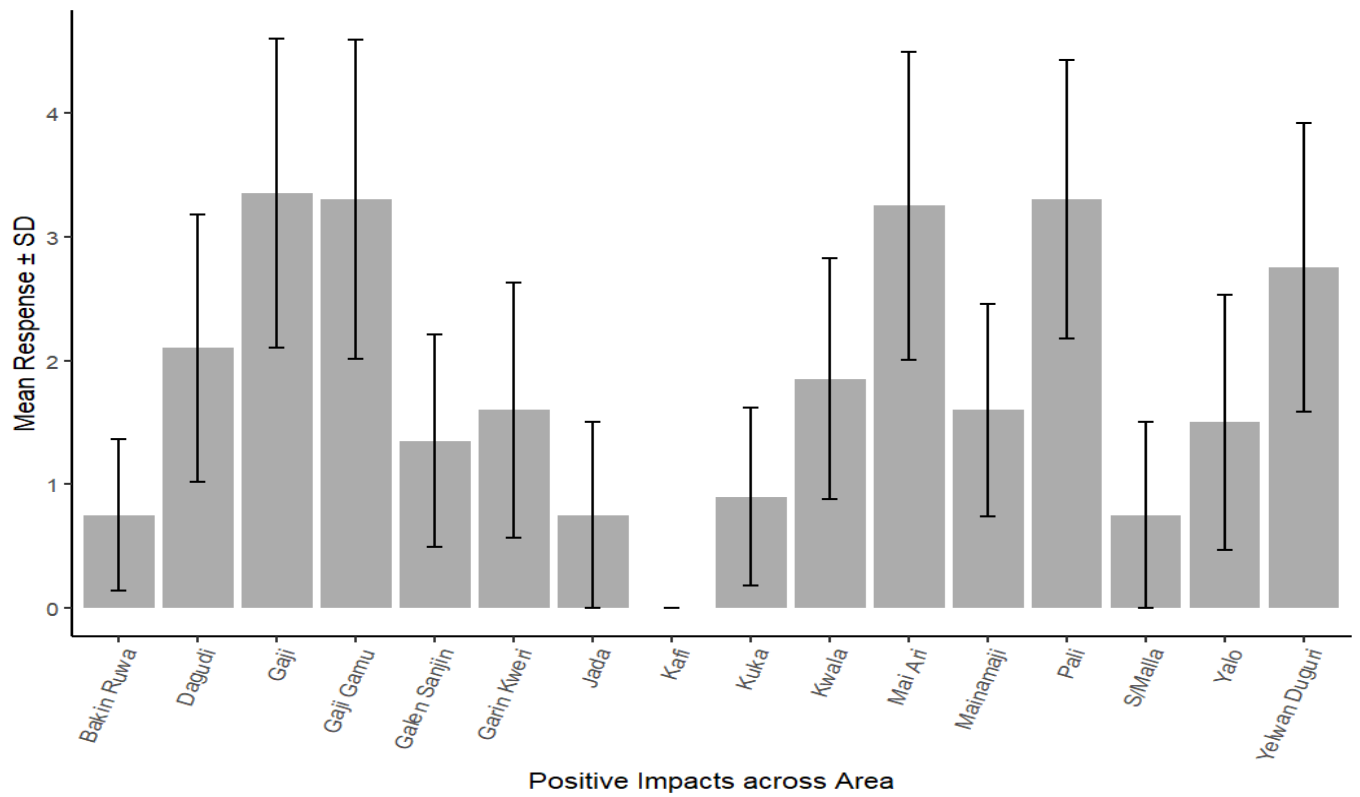
Figure 3. Positive Socio-ecological Impacts of the Yankari Game Reserve as expressed by sixteen communities surrounding the Reserve.

Table 2. Positive Socio-ecological Impact of the Yankari Game Reserve as expressed by 16 communities surrounding the Reserve

|	Positive Impacts	n	mean	sd	se	Ci
1	"Collection of non-timber products "	32	2.16 (12)	4.7	0.831	1.69
2	"Conservation Education, gift and scholarship	32	1.28 (7)	3.3	0.584	1.19
3	"Ecosystem services; Erosion and flood control	32	0.91(5)	3.19	0.563	1.15
4	"Empowerment and provision of alternative source of livelihood	32	1.41(8)	4.24	0.75	1.53
5	"Gift from Tourists and staff of the PA"	32	0.72(4)	2.83	0.5	1.02
6	"Intrinsic value, Tourism, International linkage	32	2.91(16)	5.31	0.939	1.92
7	"Provision of Employment but inadequate"	32	2.53(14)	5.19	0.918	1.87
8	"Provision of Fuel-Efficient Stove "	32	2.31(13)	4.58	0.81	1.65
9	"Provision of Borehole"	32	0.75(4)	3.05	0.539	1.1
10	"Provision of some social amenities in the past 20 years	32	3.22(18)	5.86	1.04	2.11
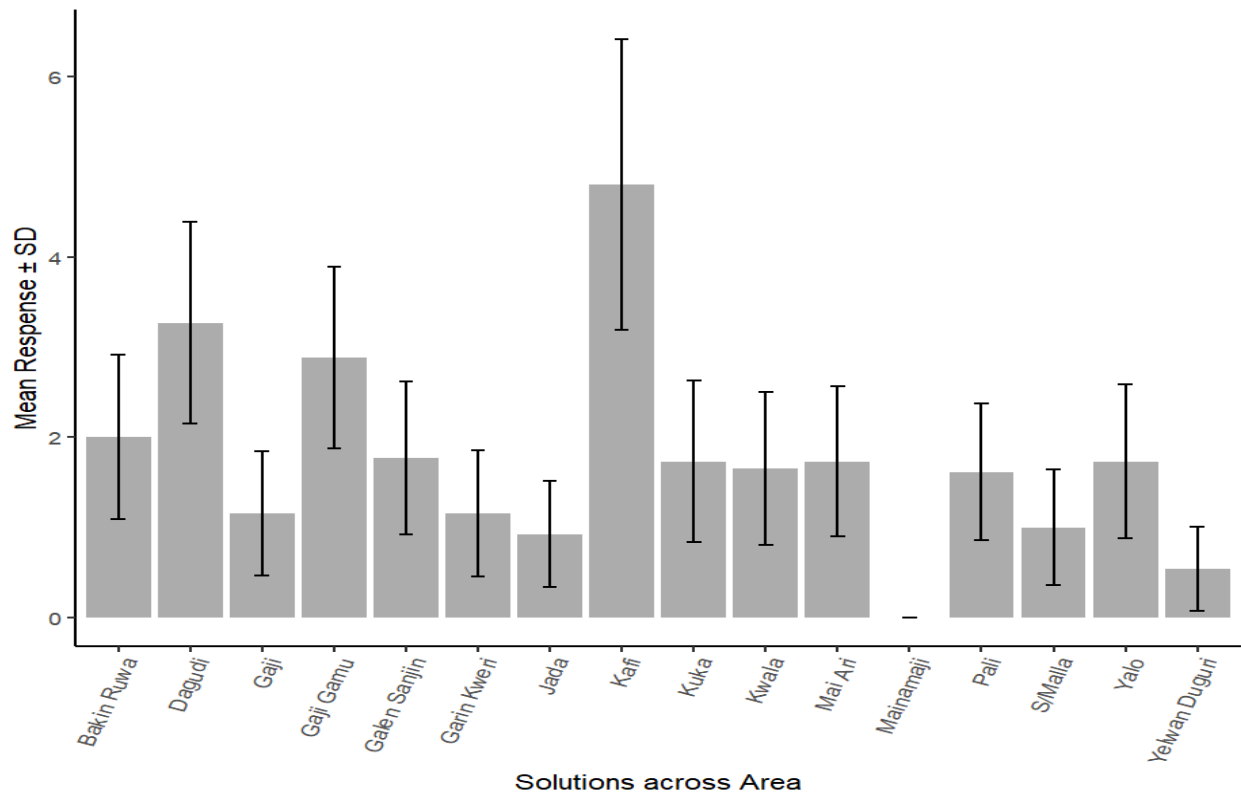
Figure 4. Solution to the negative socio-ecological impacts of Yankari game Reserve as expressed by sixteen communities surounding the Reserve.

Table 3. Solution to the negative socio-ecological impacts as expressed by 16 communities surrounding the Reserve.

s/n	Solution to the negative Impacts	n	mean	sd	se	Ci
1	"Allow for collection of non-timber products"	32	0.75(3)	2.83	0.5	1.02
2	"Compensation for damage crops and death of livestock "	32	1.56(7)	4.33	0.765	1.56
3	"Deploy modern technology to keep wildlife from straying inside the reserve	32	1.12(5)	3	0.531	1.08
4	"Effective communication forum between community and management	32	0.93(4)	3.13	0.553	1.13
5	"Employ of indigenous people "	32	5.53(24)	7.37	1.3	2.66
6	"Empowerment and provision of alternative livelihood"	32	2.22(10)	5.51	0.973	1.98
7	"Establish Ranger station to ward-off criminals"	32	0.50(2)	2.21	0.391	0.798
8	"Establish dispute resolving committee "	32	1.50(7)	3.57	0.63	1.29
9	"Increase rangers to secure reserve"	32	0.50(2)	1.68	0.298	0.607
10	"Make concession to increase farmlands"	32	0.56(2)	2.5	0.442	0.902
11	"Prevent grazing and access of herders into the reserve"	32	1.53(7)	4.15	0.734	1.5
12	"Provision of social amenities"	32	4.91(22)	6.84	1.21	2.47
13	"Sustained conservation education"	32	1.09(5)	3.48	0.615	1.25

3.5 Outcome of Questionnaire survey conducted in households on the importance of negative and positive social outcomes as well as the solution to the negative social outcome at the Yankari Game Reserve.

Specific Yankari Game Reserve-related negative social impact which may have affected the wellbeing of households during the last 20 years as obtained from workshops with various communities adjoining the reserve were described as either high, medium, low or zero. Zero indicates that the social impact is not important in terms of their priority need.

Lack of social amenities, bias and lack of employment of local people, stoppage of adhoc jobs to local people, poor relationships with managers of reserve, restriction on collection of non-timber products, and raiding of crops by wild animals adjudge high in terms of priority importance.

Hide out for criminals, snake bite, tse-tse fly and disease, accusation and harassment of community members, wildlife killing livestock and in rare cases humans, increase in crime and poor policing are of medium importance, while immoral activities at the Wikki Camp spring and loss of livelihood are the least important social impact described as low and zero (Figure 5).

Specific Yankari Game Reserve-related positive social impact which had enhanced the wellbeing of households during the last 20 years as obtained from workshops with various communities adjoining the reserve showed that conservation education, gifts and scholarships, empowerment and alternative to livelihood, intrinsic value and tourism, provision of social amenities, provision of borehole, provision of employment opportunities to local people and collection of non-timber products are of high importance. Provision of fuel efficient stove was the positive social outcome that is of low importance as expressed by the communities (Figure. 6).

As solution to the negative social impact of the Yankari Game Reserve towards the problems of the adjoining communities in the last 20 years include deployment of technology to keep away wildlife damage to crops, provision of social amenities, empowerment and incentives, employment of indigenes, establishment of dispute resolving committee, sustained conservation education, compensation for damaged crops by wildlife, empowerment and alternative to livelihood of the reserve, effective communication between communities and management, permission to allow for collection of non-timber products and making concession for farming are of high importance.

While increase in number of rangers and ranger station to ward-off criminals and prevention of herders into the reserve and medium and low respectively (Figure 7).
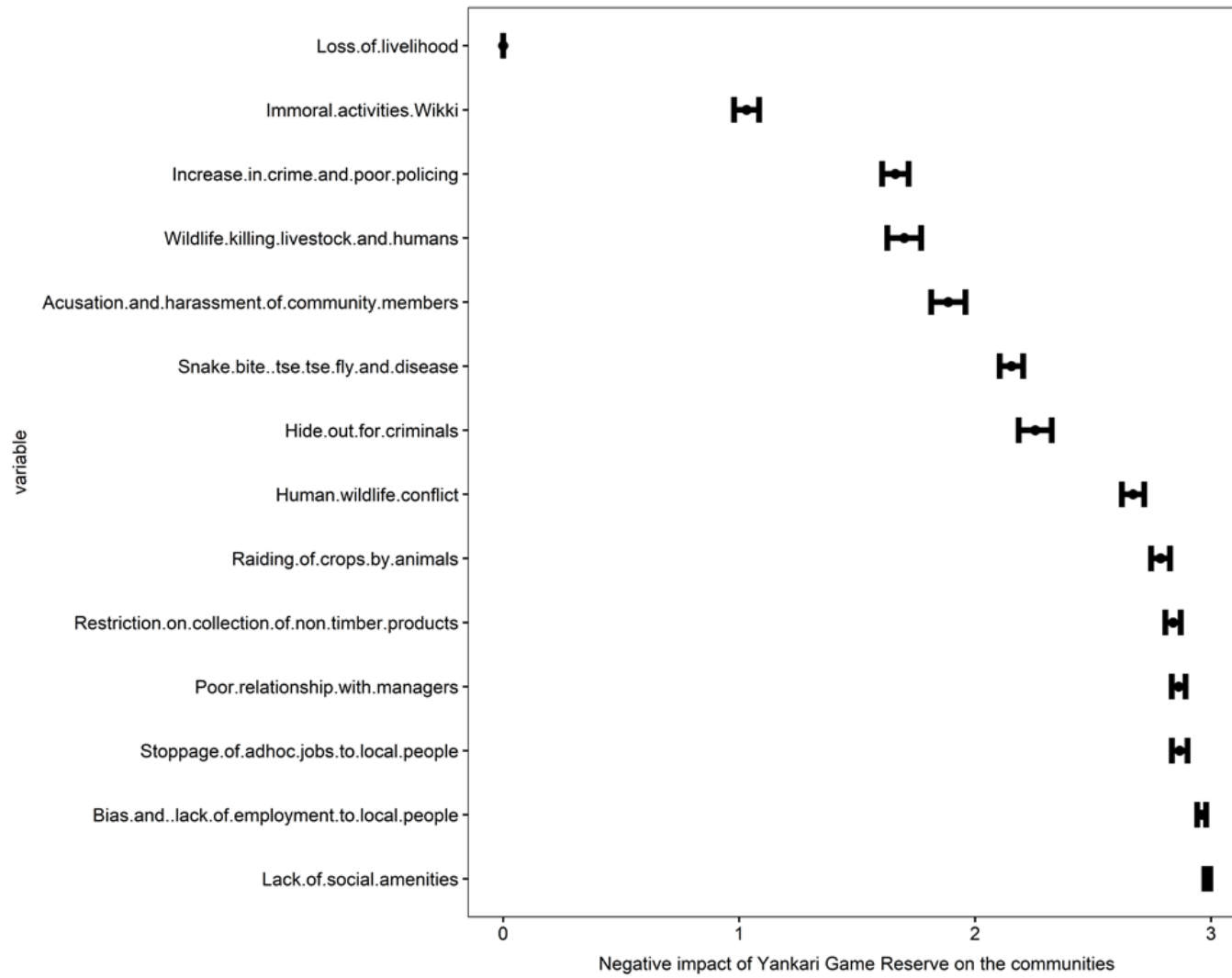
Figure 5. The negative social impacts of the Yankari Game Reserve on adjoining communities (3= High, 2=Medium, 1=Low, 0=Zero)
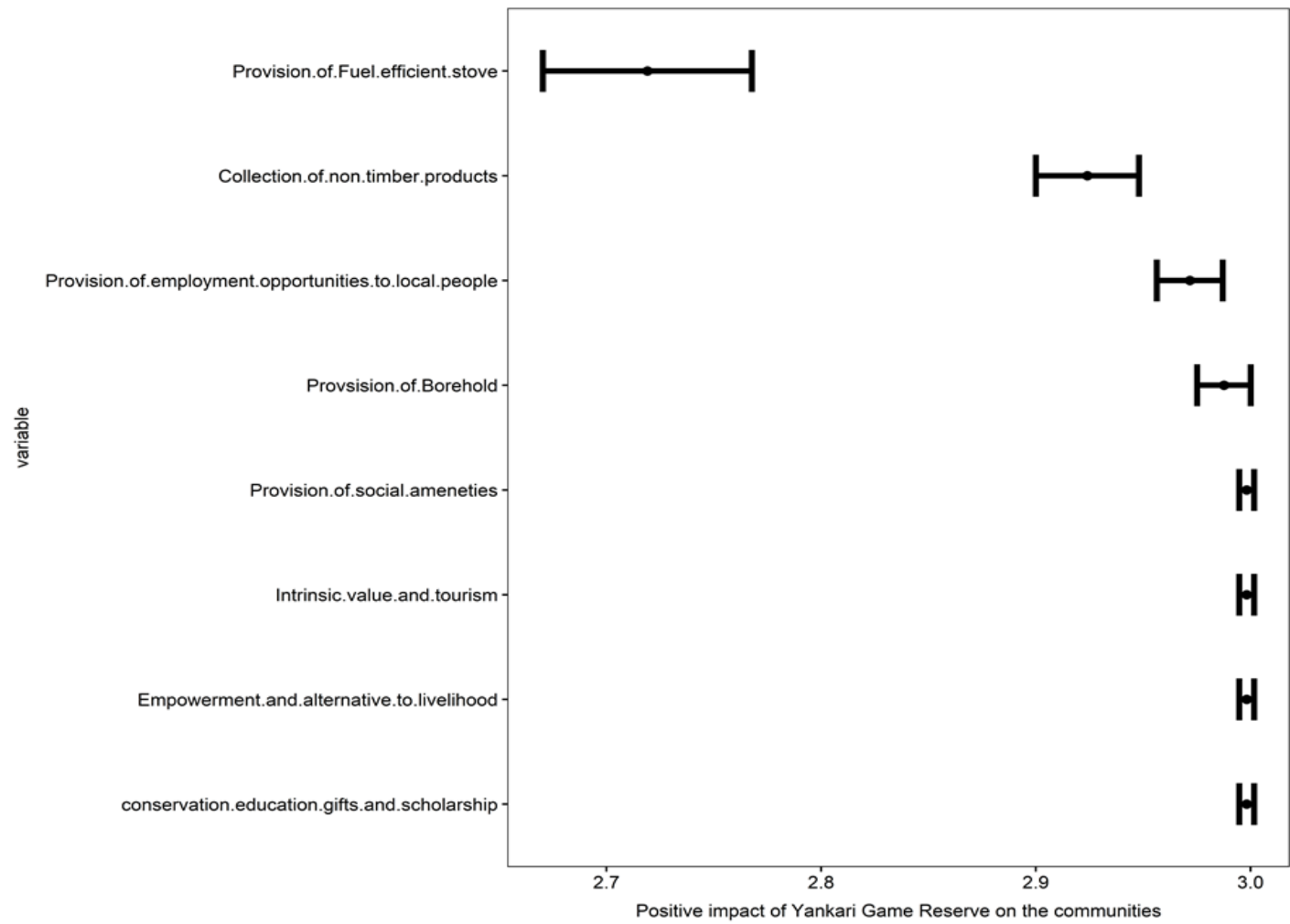
Figure 6. The positive social impact of Yankari Game Reserve on adjoining communities to the reserve (3.0=High, 2.7-2.9= medium)
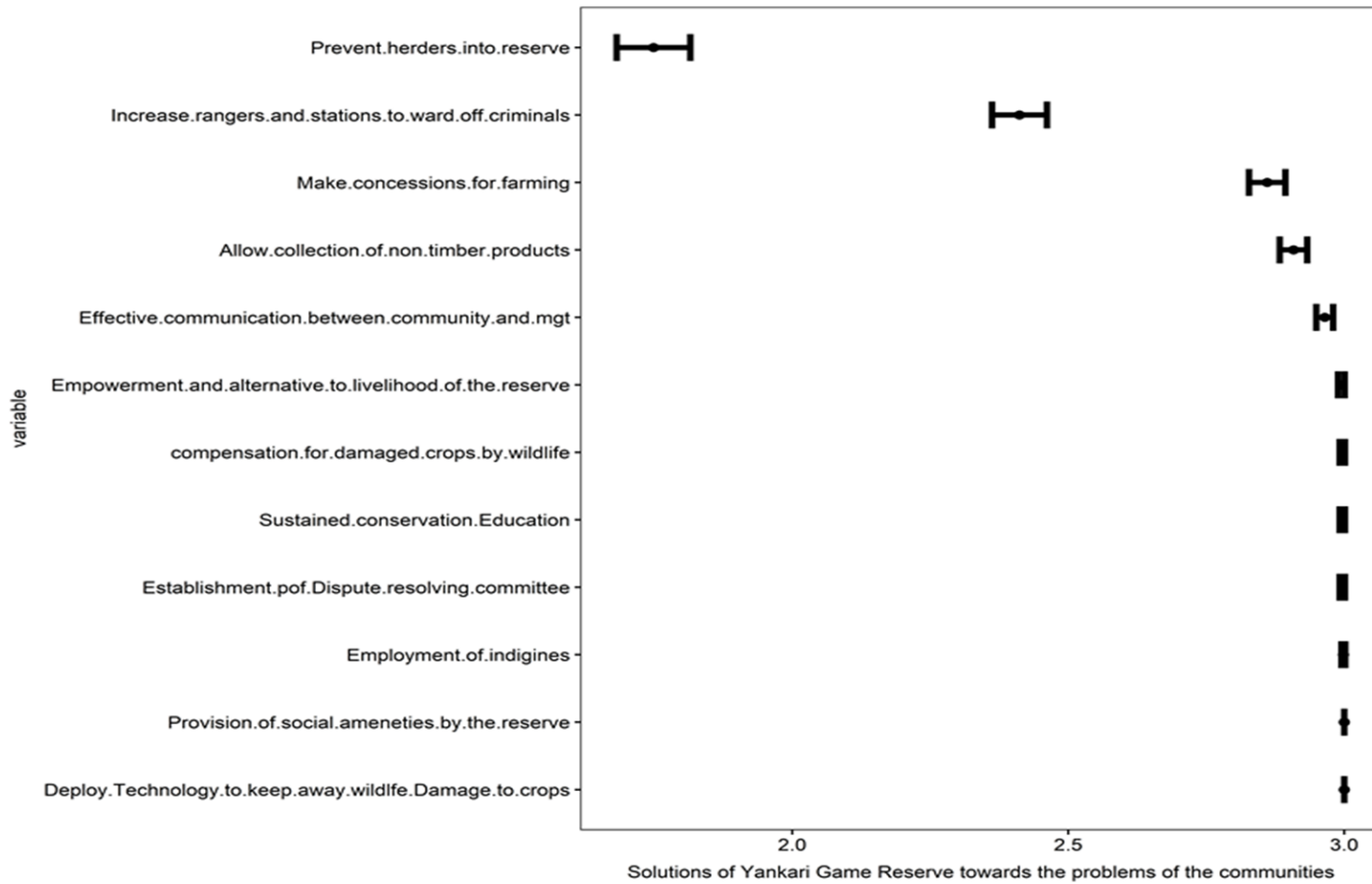
Figure 7. Solution to the negative social impact of Yankari Game Reserve on adjoining communities (3.0=High, 2.0-2.5= Medium).

3.6 Conservation Education Awareness and Establishment of Conservation Site Support Groups

A seminar on conservation education was presented to each community visited on the importance of biodiversity conservation and the need to halt illegal activities that could jeopardize conservation efforts at the Yankari Game Reserve.

During the second stakeholder workshop where conservation education sessions were also held, community members were delighted to receive awareness and enlightenment on the reasons for conservation and protection of biodiversity and what communities adjoining the reserve and humanity in general could benefit from the deliberate efforts at sustainable protection of the Yankari Game Reserve, a unique African Sudan savanna woodland. The need to halt illegal activities such as poaching, grazing, collection of non-timber products, tree felling etc. was emphasized and appreciated. Instances of successful biodiversity conservation elsewhere around the world were also presented to participants during the conservation education seminar to create awareness on the importance and benefits of biodiversity conservation.

In the second workshops conducted across the various communities, stakeholders validated the findings from the first workshop and the household survey outcome. In other words, the stakeholders agreed to the findings in the first workshop and the questionnaire results. Generally, the communities strongly expressed their willingness to support conservation efforts. However, the stakeholders raised some concerns and suggest solutions to the concerns in order to effectively protect the Yankari Game Reserve against anthropogenic activities as follows:

i. Not considering local people adjoining the Yankari Game Reserve the opportunity for employment, adhoc jobs and when the opportunity for employment present itself, there is bias in selecting individuals from various communities.

ii. Lack of provision of alternative to livelihood, social amenities and incentives "*talapi*",

iii. Establishment of dams in strategic areas of the reserve to minimize the problem of crop raiding by wild animals,

iv.   Concerns of wildlife killing livestock and in rare cases humans was strongly raised. For example, the Yalo community reported losing about 20 livestock to wildlife during the year. They therefore opined that the only way to cope this negative social outcome is for the reserve managers and community members to establish a strong mutual partnership for effective management of the Yankari Game Reserve.

3.7 Staff and Management/Evaluation workshop

Evaluation workshop where selected community members, Conservation Site Support Group (CSSG) members, management and staff of the Yankari Game Reserve, members of relevant ministries (environment and tourism), village heads and traditional institutions and politicians were conducted. Outcome of the first workshops and the questionnaire results was presented. Following the presentation, participants made various contributions as follows:

1. Participants acknowledged and appreciated the findings from this study and alluded to how valuable it is to the preservation of the Yankari Game Reserve,

2. The findings from community workshops, meetings and household surveys skewed to community opinions, not putting into account what other stakeholders including the staff and management of the Yankari Game Reserve, Ministries of Environment, Tourism, Justice, Police affairs etc. They recommended further studies to assess negative and positive social impacts from other stakeholder (Ministries of Environment, Tourism, Justice, Police affairs, Rangers, NGOs, politicians and other relevant institutions) and how the negative social impact could be mitigated.

3. Participants advocated for relevant conservation institutional alignment, synergy and inclusive governance of the reserve for effective management outcomes of the Yankari Game Reserve and maximum benefits,

4. Traditional institutions and other community leaders lamented the inability of the management to involve them in the governance of the reserve pointing out that no meaningful conservation success could be achieved without their inputs and cooperation. Management of the Yankari Game Reserve agreed strongly to the fact that

the communities are not being carried along in the governance of the reserve, so they expressed their willingness to review policies on the management of the reserve,

5. Rangers decried lack of adequate personnel to police the game reserve, which could be part of the reasons for persistent of some illegal activities. They suggest a reserve management committee (union) where matters of the reserve could be discussed and resolutions reached with a view to effective and sustained biodiversity conservation of the reserve.

6. The management of the Yankari Game Reserve appreciated the evaluation workshop and agreed to consider implementing key issues raised such as governance, livelihood, human-wildlife conflict, incentives etc. The management of the Yankari Game Reserve seized the opportunity to appeal to the adjoining communities not to engage in illegal activities in the reserve as information available showed that communities connive with poachers from distant communities to hunt wildlife with involvement in wildlife trade.

4.0 DISCUSSION AND CONCLUSION

Findings from this study suggest that there are increased livelihood insecurity among adjoining communities as alternative livelihood activities in protected areas manage by government are not sufficient compensation for livelihood loss.

High negative social impacts were reported by adjoining communities to the Yankari Game Reserve. Communities decried lack of social amenities, incentives and empowerment, loss of livelihood since the relocation of communities from the reserve as well as bias and inadequate employment opportunities to local people on the border of the reserve considered the most important negative social impacts. This is largely the visualization of the negative social outcomes from the communities visited. Workshop participant's opinion on the social impact of the Yankari Game Reserve were generally negative, this was a similar outcome as those of Abukari and Mwayyosi (2020) who studied local communities' perceptions about the impact of protected areas on livelihoods and community development.

In comparison to the negative social impacts, not much was said on the positive social impacts; this is because the communities no longer benefit positive social outcomes in the last 20 years. Prior to 20 years, communities benefited from alternative to livelihood, skill acquisition programmes and empowerment mainly from the GEF project and some positive outcome support from the Bauchi State government in provision of electricity, security, portable water and other low scale project interventions in communities. The finding further revealed exclusion of adjoining communities to the governance processes of the Yankari Game Reserve.

For example, the Kafi community tops the chat in stating the negative social impacts, this is because their community have never been included in any benefit sharing at the instance of the Yankari Game Reserve and the community does not have a voice in the governance of the reserve to which they share common and direct boundary (Abukari and Mwayyosi, 2020). Consequently, the kafi community have become hostile to staff and management including any affiliate of the Yankari Game Reserve and are abetting illegal activities in the reserve principally hunting (Infield, 1988). However, the community is in the forefront of proffering solutions to mitigate the negative social impacts and increasing the positive social impacts; first by

establishing a cordial and mutually beneficial relationship between staff and management of reserve and their community. This classical example was also expressed by many communities adjoining the reserve, although that of Kafi community was exceptionally high.

Again, community members of the Yelwan Duguri unanimously expressed their displeasure in the manner in which reserve managers completely disregard their involvement in the reserve governance (Abukari & Mwayyosi, 2020) especially during the last 20 years. Consequently, they suggested concession of the reserve for farming activities and occupation by community members. Conservation intervention that could support effective and sustainable biodiversity conservation of the Yankari Game Reserve will require consideration of employment opportunities to indigenous local people adjoining the reserve and provision of alternative to livelihood. These are shown from the household surveys. Respondents decried bias in employment opportunities where local people near PA were not given the opportunity for employment, instead, individuals from other part of the State were considered. In addition, deployment of technology to keep away wildlife from damaging crops, establishment of dispute resolving and effective communication mechanisms are panacea to reversal of the illegal negative human activities in the reserve. They also requested a modest entry into the reserve for collection of non-timber products, although this was not as important.

To achieve sustainable biodiversity conservation, conservation strategies requires taking into consideration the needs of local people living right next to protected areas. This was prominent in the outcome this study where stakeholders alluded to the need of synergy, partnership and inclusive governance between reserve managers and adjoin communities to protected areas. It is critical to understand the needs of local people so as to improve and sustain their quality of life and well-being. This could be carried out by understanding the negative and positive social impacts with the view to reducing the negative social impacts (Bentley Brymer *et al.* 2020). Therefore, discovering sustainable solutions to biodiversity conservation that could support both biodiversity and people cannot be overemphasized.

This finding has further underscore the relevance of the involvement of indigenous people in the management of a protected area as expressed by respondents toward offering solutions to the negative social outcomes at the Yankari Game Reserve.

A review of 165 research activities in conserved areas, Oldekop *et al.* (2016) indicates convincing evidence that positive ecological outcomes are linked to positive socio-economic outcomes, which in turn are more likely where co-management arrangements exist. Likewise, a review of community-based projects shows that synergies exist between economic and ecological success (Brooks *et al.,* 2012). These reviews suggest that positive synergies are possible, especially where governance arrangements allow for local involvement, capacity building, secure tenure rights and equitable distribution of benefits. However, by not capturing the full range of wellbeing impacts, or how these affect groups of people in different ways, many studies may fail to acknowledge trade-offs that ultimately affect conservation success and justice.

The local people disposition was positive inspite of the many negative social outcomes revealed by participants of the workshops. Community members are open to constructive and genuine engagement in conservation education awareness, inclusive governance system of the management of the reserve, equitable benefit sharing etc.

4.1 Recommendations and Conservation Action Plan

This study generated more research questions than was envisaged. The following are few recommendations for further studies in the course of conducting this project;

i.   Understudy the response of institutional stakeholders (the ministries of environment, justice, tourism, police, politicians, NGOs, paramilitary etc), staff and management of the Yankari Game Reserve, and rangers on their perspective of the negative and positive social impacts while providing solution to minimise the negative social impacts has become necessary to find a meeting point between reserve managers, communities at the boundary of reserves and other critical stakeholders in the environment,

ii. A need to understand the nexus or interplay between health, economics, and food to the Yankari Game Reserve could also boost protection,

iii.   Institutional stakeholder re-alignment and adjustment of misfit could also be carried out to enable synergistic partnership and mutual benefit sharing,

iv.   More conservation education advocacy to the adjourning communities to the Yankari Game Reserve to inspire further support for conservation of the reserve is also important.

v.   Assess pattern of illegal activities including poaching, grazing, trade in wildlife, and human-wildlife conflict etc. for mitigation actions.

vi.   To effectively conserve the rich biodiversity resource of the Yankari Game Reserve, it is crucial to focus attention on support for positive social outcome and reducing the negative, this is in addition to reviewing the governance system of the reserve to be more inclusive.

4.2 Acknowledgments

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6. 0 APPENDICES

Appendix 1. Photo Gallery of conservation education and community and stakeholder workshop

Research Team Members from the Right to left

Women Workshop in Gaji Gamu

Men workshop at Yalo

Cross section of First Community Stakeholder Workshop in Kafi Community

Conservation Education Session at

Appendix 2. Photo Gallery of conservation education, second, and stakeholder workshop

Evaluation and education Workshop at Yelwan Duguri

Display of Sallah Festival at Kwala

Second workshop at Yalo and Pali