



# **SPECCS**

## **a Standardized Protocol for Evaluating Community Conservation Success**

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Donna Sheppard & Axel Moehrenschrager**





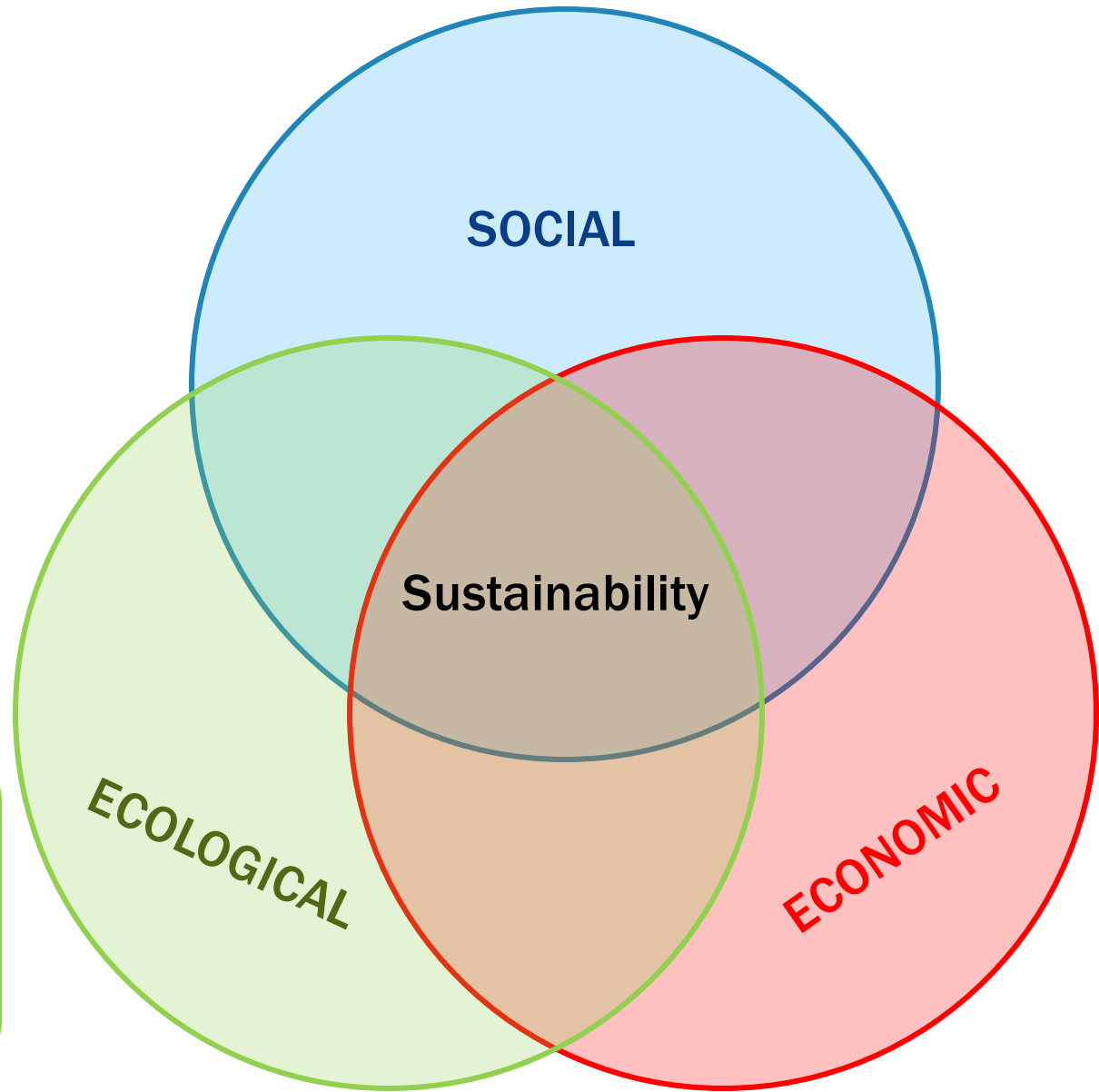
**SOCIAL**



**ECONOMIC**



**ECOLOGICAL**





# Ten years of adaptive community-governed conservation: evaluating biodiversity protection and poverty alleviation in a West African hippopotamus reserve

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## SUMMARY

Community-based natural resource management has been accused of failing on social, economic or ecological grounds. Balanced assessments are rare, however, particularly in West Africa. This paper examines the first 10 years of Ghana's Wechiau Community Hippo Sanctuary using an evaluation framework that considers socioeconomic and ecological outcomes, as well as resilience mechanisms. Building upon traditional taboos against the killing of hippopotami, this initiative has attempted to conserve an imperilled large mammal, protect biodiversity and alleviate poverty amidst a bush meat crisis and complex ethnic diversity. Findings show that the Sanctuary has improved local livelihoods by spurring economic diversification and infrastructure development rates 2–8 times higher than in surrounding communities. Simultaneously, threats to biodiversity have subsided, hippopotamus numbers have remained stable and the Sanctuary's riparian habitats now harbour more bird species than comparable areas nearby. Improved social capital, true empowerment, an equitable distribution of benefits, ecological awareness among children and support for the Sanctuary, even among community members who were disadvantaged at its creation, speak to good long-term prospects. Risks remain, some of which are beyond community control, but evidence of socioeconomic resilience suggests that capacity exists to buffer risks and foster sustainability. Lessons learned from Wechiau translate into recommendations for future planning, implementation and evaluation, including greater interdisciplinary integration and the use of adaptive co-management approaches.

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THematic SECTION  
Community-based natural resource management (CBNRM): designing the next generation (Part 2)

Keywords: community-based natural resource management, displacement, ecosystem services, Ghana, *Hippopotamus amphibius*, local empowerment, sustainability, economic outcomes, resilience, socioeconomic

## INTRODUCTION

Greater global coverage of protected areas (PAs) is needed to effectively stem the ongoing, accelerated loss of the Earth's biodiversity (Rodrigues *et al.* 2004). The prioritization of additional areas for protection should consider not only ecological and evolutionary criteria, but also socioeconomic opportunity costs (Carwardine *et al.* 2008) and assessment of long-term implementation success. Biodiverse areas, particularly those that are often densely inhabited by humans (Sachs *et al.* 2009), are often the creation and enforcement of new protected areas, the creation and enforcement of new protected areas that exclude humans is questioned (Walpole & Waters 2008). Community-based natural resource management (CBNRM), with its dual goal of conservation and poverty alleviation, may improve biodiversity protection prospects in these areas (Wells & McShane 2004). Over the last decade, these areas have been the focus of a number of conservation initiatives, including community-based approaches (Wells & McShane 2004) and community-based approaches (Wells & McShane 2004). Some of these initiatives have been successful (Kellert *et al.* 2001), but others have failed (Wells & McShane 2004; Roe 2008). The interdependence of biodiversity conservation and poverty alleviation is too strong for either goal to be effectively pursued in isolation (Fisher 2004; Sachs *et al.* 2009). The question thus is not whether community-based conservation initiatives are useful, but how they can best be implemented to achieve their dual objective (Wells & McShane 2004). Unfortunately, few balanced assessments that examine socioeconomic as well as

Biological Benefits

Socio-economic Benefits

Linkage Mechanisms

Biological Resilience

Socio-economic Resilience

## THREATS

- Species extinction
- Genetic bottlenecks
- Fragmentation
- Biodiversity loss
- Habitat degradation
- Climate change
- Human-wildlife conflict
- Vulnerability to natural disasters
- Unemployment
- Poor market access
- Poor health
- Poor access to education
- Lack / Removal of rights
- Conflict / Violence
- Corruption
- Inequality
- Loss of cultural diversity
- Instability / Political unrest
- Environmental externalities

## MITIGATING FACTORS

Biological Benefits

Biological Resilience

Socio-economic Benefits

Socio-economic Resilience

Linkage Mechanisms



# SPECCS

## Standardized Protocol for Evaluating Community Conservation Success



**Biological Benefits**



**Biological Resilience**



**Socio-Economic Benefits**



**Socio-Economic Resilience**



**Linkage Mechanisms**

Criteria 1 - 4	Performance (0 - 3)	Analytical Quality (0 - 3)	Study Design Quality (0 - 3)
Criteria 5 - 7	Performance (0 - 3)	Analytical Quality (0 - 3)	Study Design Quality (0 - 3)
Criteria 8 - 11	Performance (0 - 3)	Analytical Quality (0 - 3)	Study Design Quality (0 - 3)
Criteria 12 - 18	Performance (0 - 3)	Analytical Quality (0 - 3)	Study Design Quality (0 - 3)
Criteria 19 - 23	Performance (0 - 3)	Analytical Quality (0 - 3)	Study Design Quality (0 - 3)

# Performance

- criterion 1
- criterion 2
- criterion 3
- ...

- criterion 1
- criterion 2
- criterion 3
- ...

Biological Benefits

Socio-economic Benefits

Linkage Mechanisms

Biological Resilience

Socio-economic Resilience

- criterion 1
- criterion 2
- criterion 3
- ...

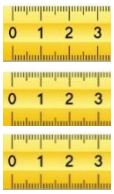
- criterion 1
- criterion 2
- criterion 3
- ...

- criterion 1
- criterion 2
- criterion 3
- ...

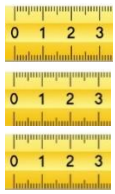


# Performance (0 - 3)

- criterion 1
- criterion 2
- criterion 3
- ...



- criterion 1
- criterion 2
- criterion 3
- ...



Biological  
Benefits

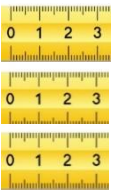
Socio-  
economic  
Benefits

Linkage  
Mechanisms

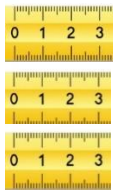
Biological  
Resilience

Socio-  
economic  
Resilience

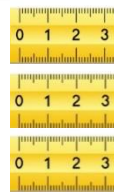
- criterion 1
- criterion 2
- criterion 3
- ...



- criterion 1
- criterion 2
- criterion 3
- ...



- criterion 1
- criterion 2
- criterion 3
- ...

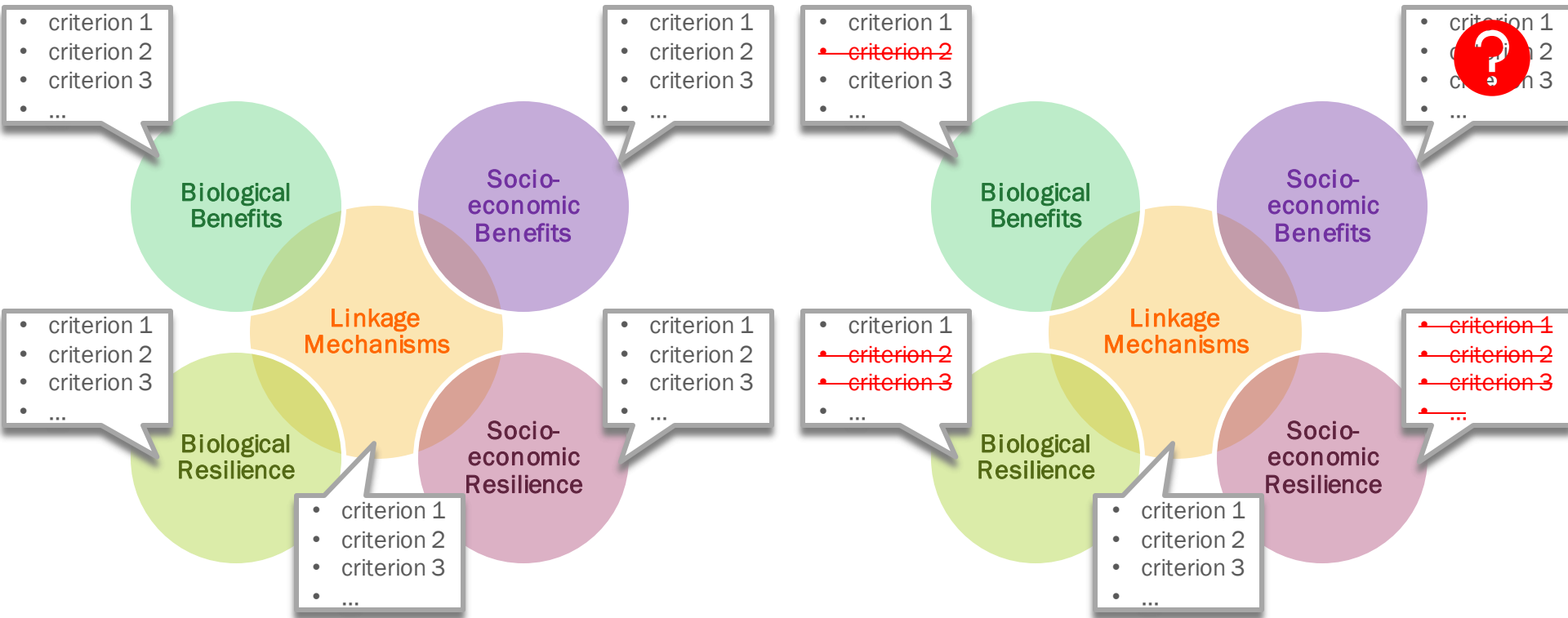




# Performance

100%

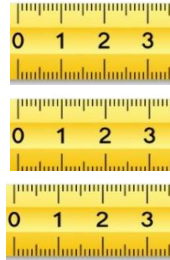
30%



# Data Quality Evaluation

## Performance (0 - 3)

- criterion 1
- criterion 2
- criterion 3
- ...



## Total Quality (0 - 9)



0 = No data      0 = No data  
 1 = Anecdotal / Open to control  
 2 = Bivariate / Qualitative in space OR time  
 3 = Multivariate / Mixed Methods in space AND time

# SPECCS

## Standardized Protocol for Evaluating Community Conservation Success



Biological Benefits



Biological Resilience



Socio-Economic Benefits



Socio-Economic Resilience



Linkage Mechanisms

Average Score Criteria 1-4	Performance Score (%)	Total Quality (%)
Average Score Criteria 5-7	Performance Score (%)	Total Quality (%)
Average Score Criteria 8-11	Performance Score (%)	Total Quality (%)
Average Score Criteria 12-18	Performance Score (%)	Total Quality (%)
Average Score Criteria 19-23	Performance Score (%)	Total Quality (%)

Overarching  
Score  
(%)

# Wechiau Community Hippo Sanctuary





# Biological Benefits



**Biological Benefits**



**Biological Resilience**



**Socio-Economic Benefits**



**Socio-Economic Resilience**



**Linkage Mechanisms**

Criterion	Definition
1. Trend in target of protection	What is the trend in the specific taxon or habitat in terms of population measure or extent?
2. Trend in threats to target of protection	What is the trend in threats to the target of protection?
3. Habitat quality for taxon targeted for protection or of the habitat targeted for protection	How degraded is the habitat and what is the trend in its quality?
4. Umbrella benefits to biodiversity or natural capital more widely	Are there any benefits to nature beyond the specific target of protection?

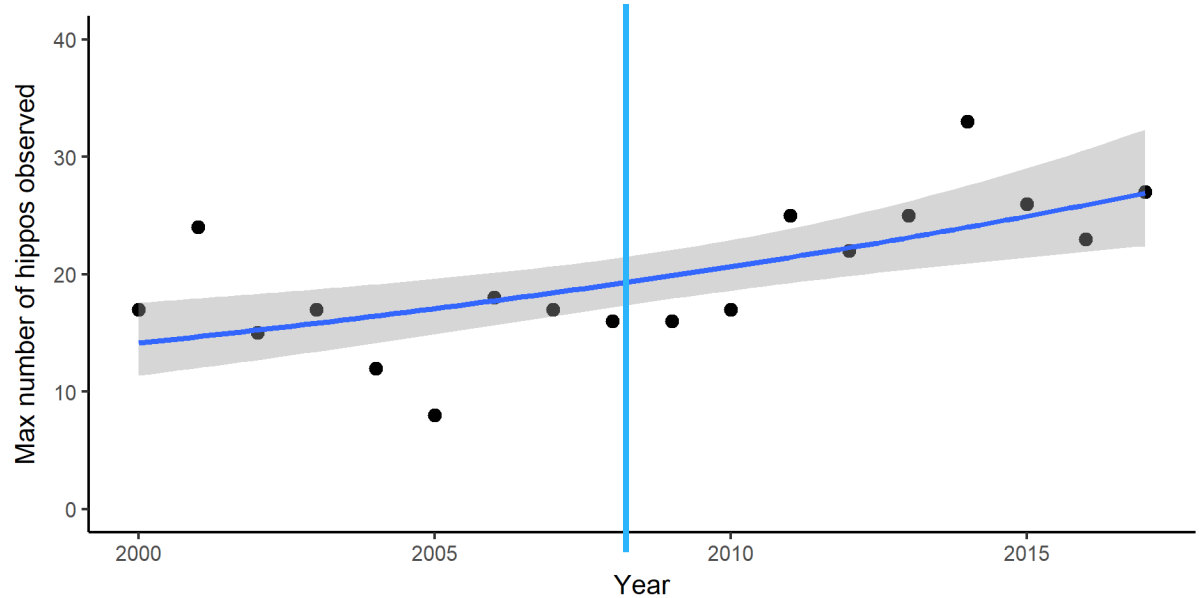
# 1. Trend in target of protection

What is the trend in the specific taxon or habitat in terms of population measure or extent?

Score 0	Score 1	Score 2	Score 3
Declining as severely as or worse than at project initiation	Declining but less severely	Stable but likely below historic maxima or carrying capacity	Increasing or Stable at historic maxima or carrying capacity



# 1. Trend in target of protection



**Performance**

**Quality**

10 year

2

$2 \times 2 = 4$

20 year

3

$2 \times 2 = 4$

# Biological Resilience



Biological Benefits



Biological Resilience



Socio-Economic Benefits



Socio-Economic Resilience



Linkage Mechanisms

Criterion	Definition
5. Connectivity/viability of the target of protection	What is the connectivity or viability of the target species or habitat?
6. Structural integrity of the species or habitat targeted for protection	<p>a) Specific taxon: how diverse is the age, size or life stage structure of the population?</p> <p>b) Habitat: how diverse are the habitat's foundation and/or keystone species in age or taxonomic or functional composition?</p>
7. Project control over threats	How much control or influence over the protection of the target species or habitat does the project entail?



# Socio-Economic Benefits



Biological Benefits



Biological Resilience



Socio-Economic Benefits



Socio-Economic Resilience



Linkage Mechanisms

Criterion	Definition
8. Access to amenities	Has access to amenities improved since project initiation or last evaluation?
9. Employment creation	Have any new employment or income-generating opportunities been created as a result of the project?
10. Capacity building	Has the project increased capacity among members of the community?
11. Fostering cultural diversity	Has the project acknowledged respected and supported unique cultural diversity within the area?

# Socio-Economic Resilience



Biological Benefits



Biological Resilience



Socio-Economic Benefits



Socio-Economic Resilience



Linkage Mechanisms

Criterion	Definition
12. Community rights to land and resources	How empowered is the local community in terms of legal recognition of land title and resource management powers?
13. Capacity to enforce project rules and regulations	Does the community have the necessary resources to enforce the rules & regulations required to achieve biological & socio-economic project goals?
14. Decision balance btw. the local community & external stakeholders	Who has the power to make decisions about the direction & development of the project?
15. Equitability of benefit sharing	How are the benefits of the project distributed across the project area's population?
16. Economic sustainability	How dependent is the project on external financial support in the short & long term?
17. Income diversification	Is the project's funding dependent on a single source or set of sources all sensitive to the same market forces?
18. Social capital to problem solve	Is there sufficient bonding & bridging social capital to effectively mitigate vulnerabilities, and how well are challenges resolved when they occur?

# Linkage Mechanisms



Biological Benefits



Biological Resilience



Socio-Economic Benefits



Socio-Economic Resilience



Linkage Mechanisms

Criterion	Definition
19. Ecological awareness	How knowledgeable are local people or communities about their natural environment and the importance of conservation?
20. Attitudes and emotional investment	How do local communities feel about the project and are they emotionally invested in the project's success?
21. Tangible linkage between biological and socio-economic outcomes	How interdependent are biological and socio-economic outcomes of the project?
22. Local perception of the interdependence between biological and socio-economic outcomes	Do the local communities perceive that socio-economic and biological benefits are interdependent?
23. Investment of project-derived socio-economic gains in conservation	Are the socio-economic gains derived from the project invested in conservation?

# Evaluation Results



## Biological Benefits

75% (47%)

75% (50%)



## Biological Resilience

56% (15%)

44% (15%)



## Socio-economic Benefits

83% (33%)

92% (33%)



## Socio-economic Resilience

81% (25%)

81% (27%)



## Linkage Mechanisms

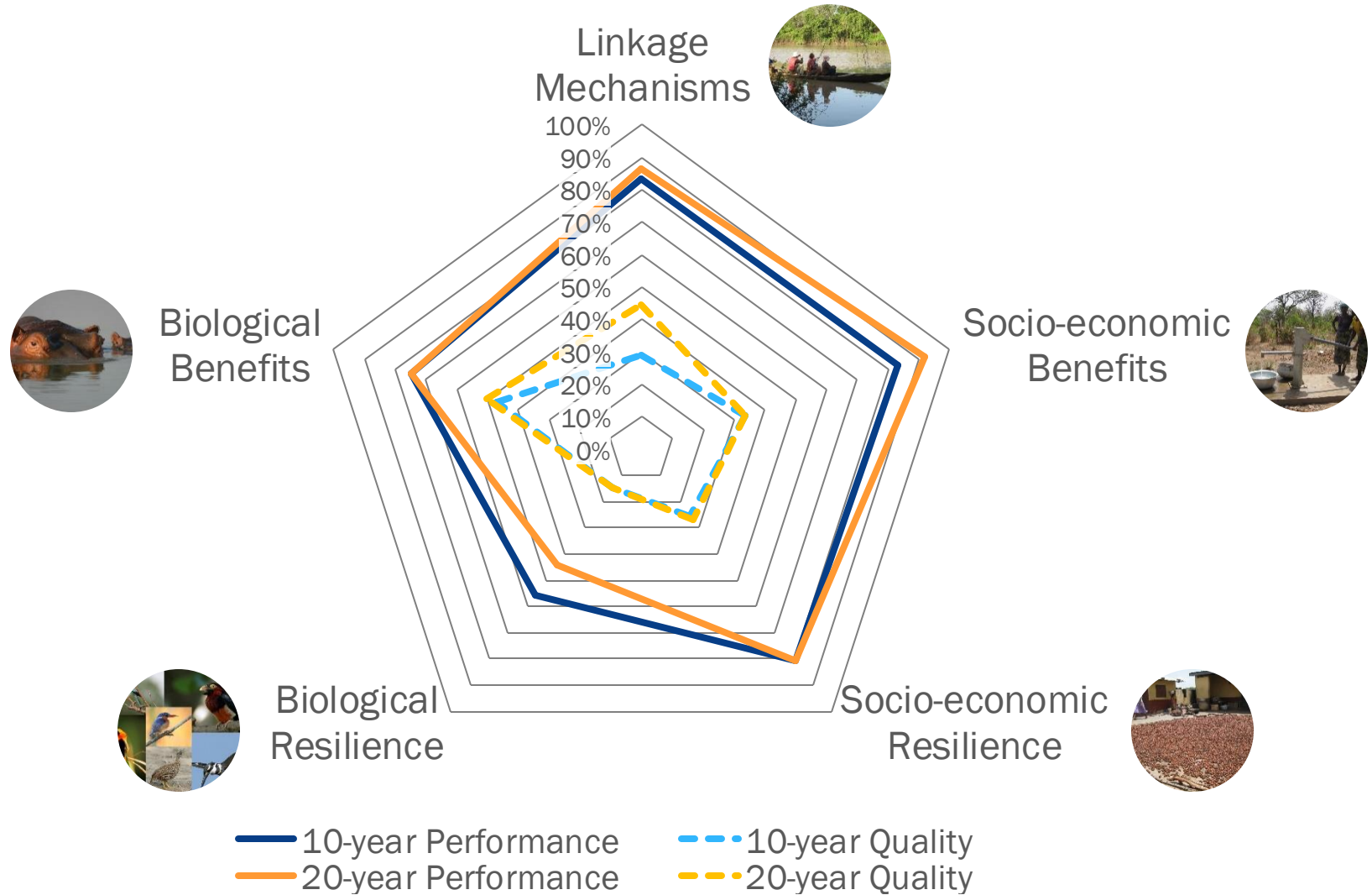
83% (29%)

87% (44%)

Overall Score: 76% (30%) vs. 76% (34%)



# Evaluation Results



[https://calgaryzoolk.shinyapps.io/cbcmatrix\\_app/](https://calgaryzoolk.shinyapps.io/cbcmatrix_app/)

# Summary

- Comprehensive and standardize
- Evaluate strengths and weaknesses
- Compare conservation initiatives
- Evaluate progress over time
- Easy to use
- Online web tool



- Instructions
- Project Details
- Biological**
- Socio-economics
- Linkage Mechanisms
- Evaluation Scores

## Biological Benefits

### 1. Trend in target of protection

What is the trend in the specific taxon or habitat targeted for conservation by the project in terms of population measure or extent?

Not applicable or unable to answer

#### Performance Evaluation

Specify your performance score.



#### Performance Rationale

Sheppard et al. (2010) concluded that the local hippopotamus population was stable, averaging 14 [hippopotami](#) across years. As such, we assigned a 2 for the performance evaluation.

[https://calgaryzoolk.shinyapps.io/cbcmatrix\\_app/](https://calgaryzoolk.shinyapps.io/cbcmatrix_app/)

#### Quality Evaluation

Specify your analytical quality level.



Score = 2: Qualitative analysis or quantitative analysis with descriptive or observational statistics (includes bivariate analyses)

Specify your study design quality level.



Score = 2: Control in either time (i.e. measurements at two or more different times) or space

#### Analytical and Design Quality Rationale

We used hippo census data to evaluate this criterion. Earthwatch Institute volunteers (2000-2004) and trained local staff (2004-2009) conducted quarterly counts of the hippopotamus population within WCHS. Counts were conducted from canoes between 7:00-10:00am, with canoes launched concurrently from 4 locations to cover four adjacent transects that jointly span the 36km of river inside the sanctuary. Two staff per canoe verified each other's observations. We examined trends over time in the maximum total count per year using a generalized linear model (GLM) with a Poisson error structure. These data were used in bivariate analysis (analytical quality score 2) to examine temporal trends of hippos inside the WCHS boundaries (study design score 2).

### 2. Trend in threats to target of protection

What is the trend in threats to the target of protection?



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# PROTECTED AREA 保护区

NO

ADMITTANCE  
TO UNAUTHORISED  
PERSONS

闲人免进



உத்தரவின்றி  
உள்ளே  
பிரவேசிக்க  
கூடாது

DI LARANG MASOK  
JIKA TIADA  
KEBENARAN

TEMPAT LARANGAN பாதுகாப்பு உள்ள இடம்



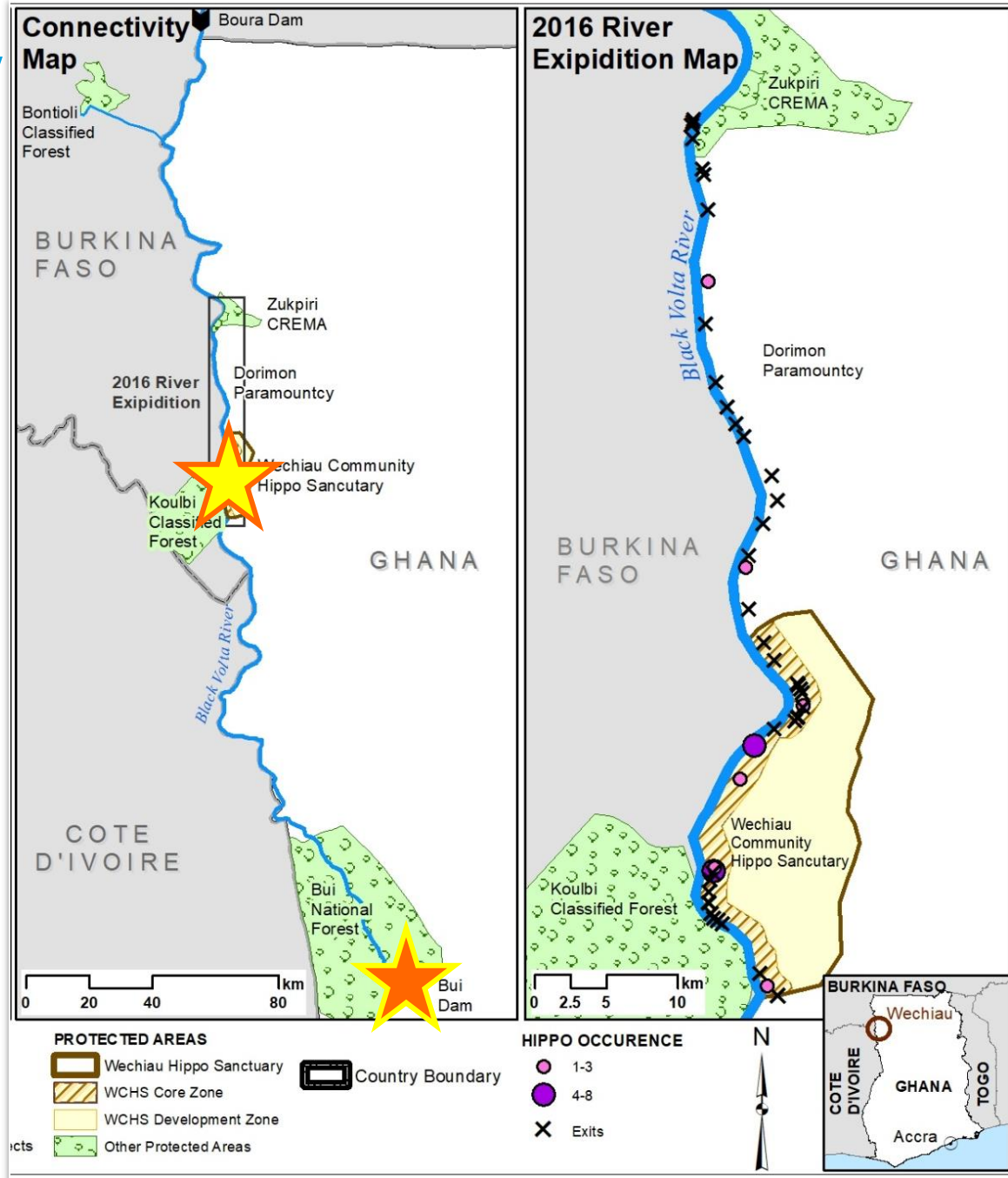
MEXCAN  
PLANTED  
BY PATRICK  
ON

GREENASH  
BY HARRY TRUKU  
GATHURATHRU PRY  
22/10/2010





# 5. Connectivity



**Performance**

**Quality**

10 year	1	1 x 1 = 1
20 year	1	1 x 1 = 1

# 9. Employment Creation



**Performance**

10 year

1

20 year

2

**Quality**

2 x 2 = 4

2 x 2 = 4



# 18. Social Capital to Problem-Solve



**Performance**

**Quality**

10 year

3

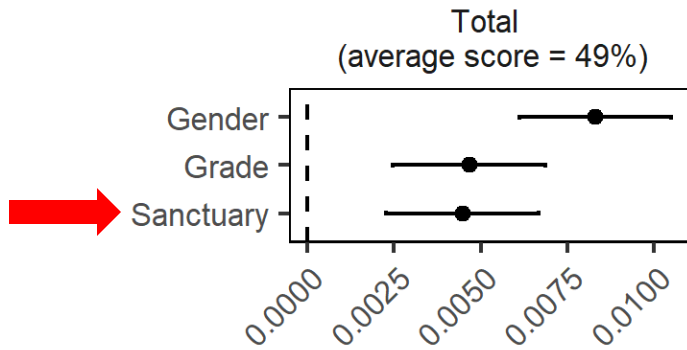
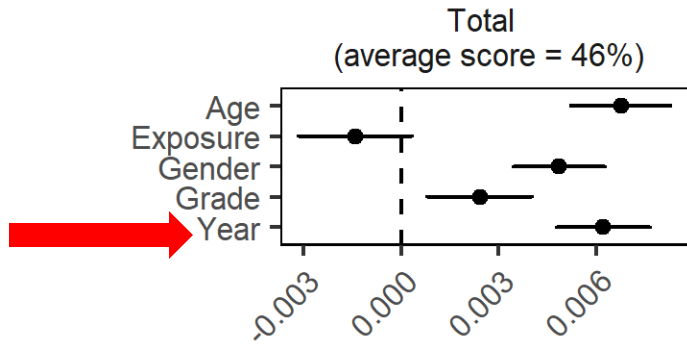
1 x 1 = 1

20 year

2

1 x 1 = 1

# 19. Ecological Awareness



**Performance**

**Quality**

10 year

1

$3 \times 2 = 6$

20 year

2

$3 \times 3 = 9$



# 19. Ecological Awareness



**Performance**

**Quality**

10 year

1

$3 \times 2 = 6$

20 year

2

$3 \times 3 = 9$