

Park dependency and willingness to accept for protected area expansion in Pendjari National Park, Benin



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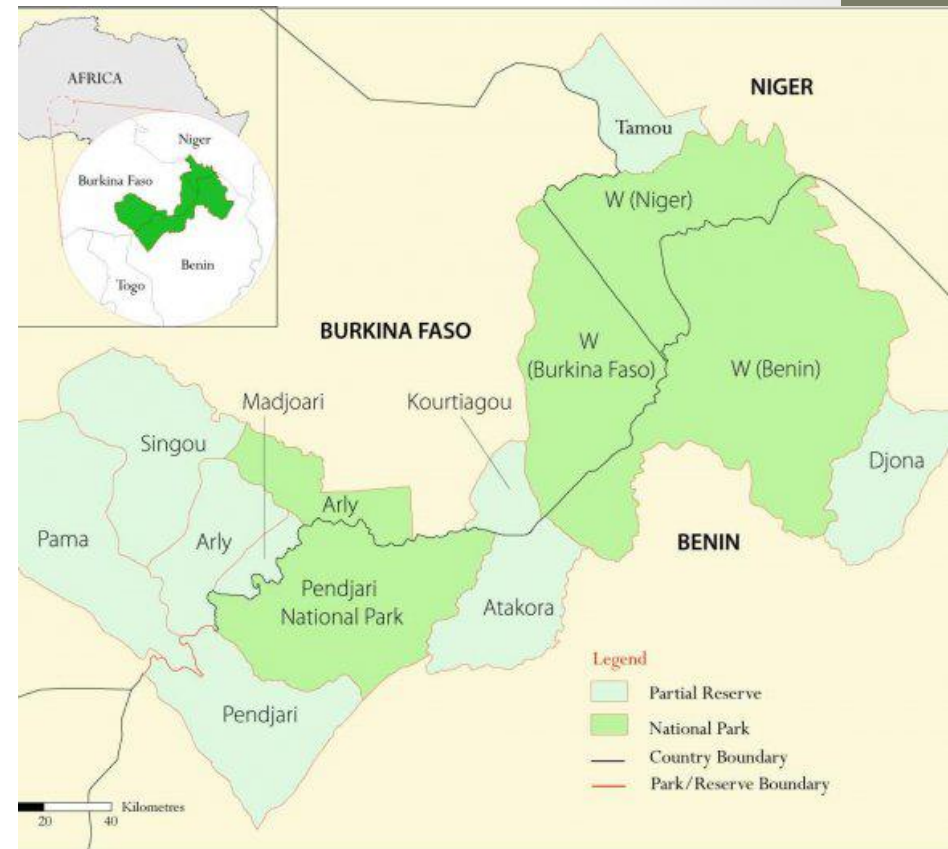
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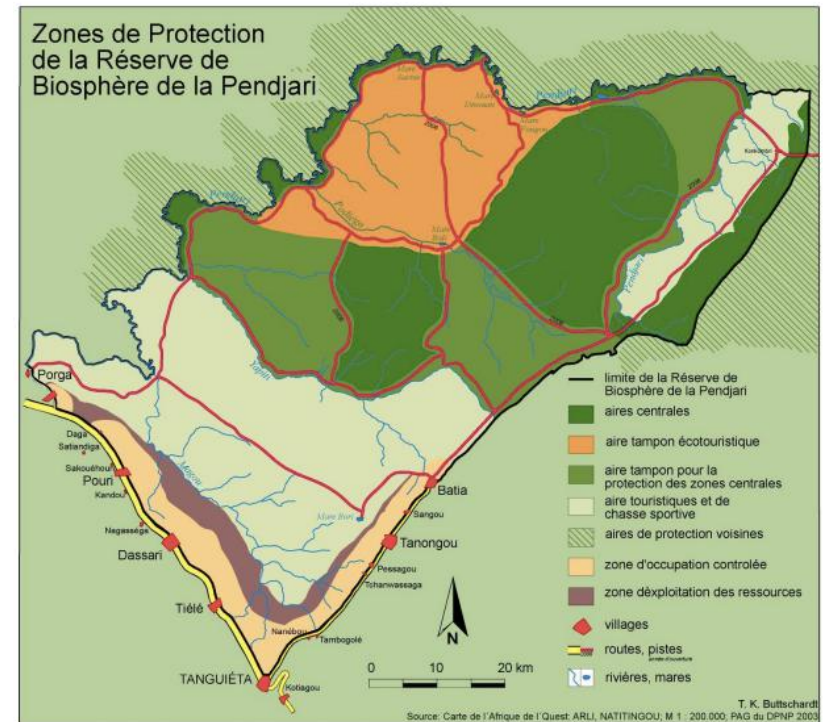
Introduction

- Pendjari National Park is situated in the upper North-west of Benin
 - Part of the transnational WAP complex spread over Burkina Faso, Niger & Benin
 - 4800 sq km
- Management in hands of NGO African Parcs
 - Former management: CENAGREF
- Community involvement through AVIGREF
 - (Village Association of Faunal Reserves Management)



Problem Overview

- Pendjari National Park is surrounded by 23 villages along the two axes that border the park. The population in this area is estimated at 40 000.
- The people living in these villages make use of ecosystem services provided by the national park. Agriculture is considered the most important ecosystem service followed by domestic water use and education (according to Anton De Ryck's study).
- The reserve is split up in different zones
- Threats the reserve has been facing due to human impact:
 - Poaching
 - Erosion of natural resources
 - Demographic pressure on surrounding land



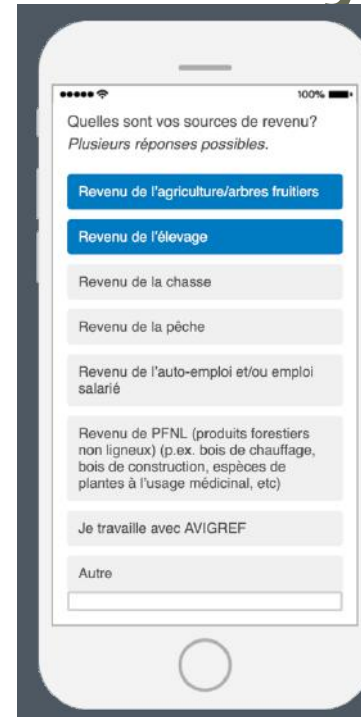
- Central zones: limited to research
- Buffer zones: research, education, hunting, tourism
- Zone d'occupation contrôlée: controlled agriculture

Study objective (threefold)

- 1. Research on the park dependency of the inhabitants of the surrounding villages (in and outside the ZOC)
- 2. Attitude towards conservation and park management
- 3. Research on economic impact of reducing the controlled agricultural area through willingness to accept statements
- Useful input for cost-benefit analyses for government & park management policies

Study method & Survey design

- **General information**
 - Demographic
 - Geographic
- **Economic activities**
 - Crop production
 - Yield
 - Consumption/commercial use
 - Revenues from other economic activities
- **Opinions using Likert-scale statements**
 - Perception on biodiversity conservation
 - Attitude towards (new) park management
- **Importance of park resources**
 - Constant sum scale: dividing 100 points over different park resources according to importance
- **WTA: Contingent Valuation Method (CVM) structure**
 - Stated-Preference
 - Pretest: Bidding game (DBDC) => no variety in data
 - Actual fieldwork: open question & point values

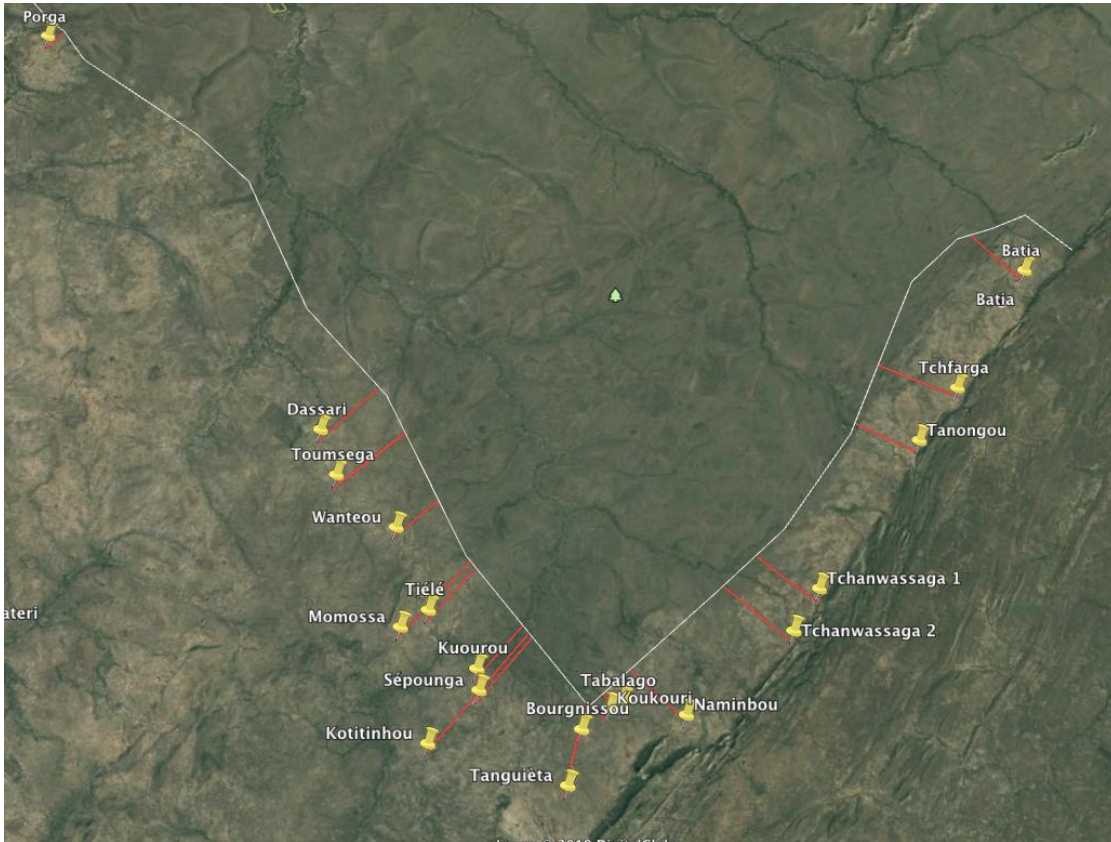


Survey in Qualtrics



Roméo explaining the constant sum question using stones

Sampling Strategy



Selection of villages based on:

- Representative numbers of each ethnic group
- Equal spread over the two axes
 - Tanguieta-Batia
 - Tanguieta-Porga
- Variation in distance from the park (in and outside ZOC)

Data

- **Primary data:** Total of 150 households interviewed
- **Secondary data:** Data on distances to park fence & population sizes retrieved from AP management

Variable	n	%
Age groups		
≤ 30	38	25.3
31 – 45	44	29.3
46 – 60	49	32.7
> 60	19	12.7
Level of education		
Illiterate	85	56.7
Primary education	41	27.3
Secondary education	21	14.0
University	3	2.0
Household size		
1 – 5	24	15.6
6 – 10	64	41.6
11 – 15	40	26.0
>15	22	14.2
Ethnicity		
Berba	97	64.7
Gourmantche	17	11.3
Waama	33	22.0
Peulh	3	2.0

Variable	n	%
Location		
Axis Tanguietà - Batia	70	46.7
Axis Tanguietà – Porga	65	43.3
Tanguietà	15	10.0
Main activity		
Mixed farming	102	68.0
Specialised farming (crop/livestock)	41	27.3
Paid or self-employment	3	2.00
Transformation of raw materials	3	2.00
Fishery	1	0.7
Park dependency (income)		
0%	28	18.92
1 – 50%	12	8.11
51 – 99%	12	8.11
100%	96	64.86

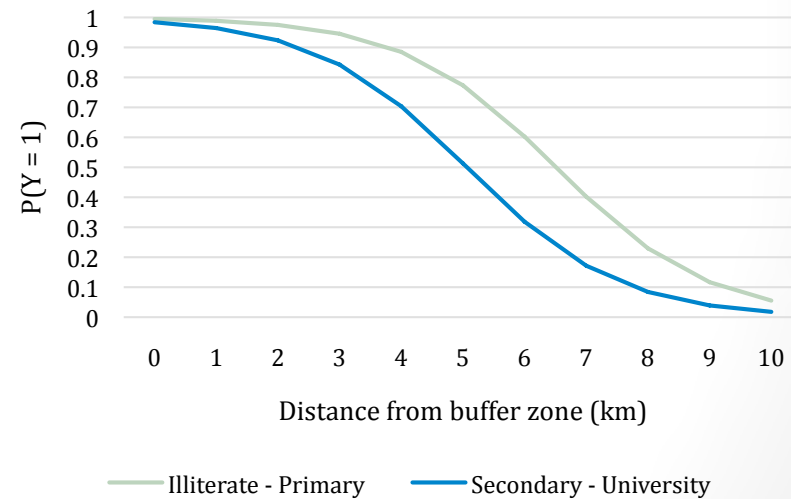
- Logit model for park dependency
- Logit model for attitude towards placement of fence
- OLS multiple linear regression to estimate mean WTA, confidence intervals and variable coefficients

Results: Park dependency

Y = $\begin{cases} 1 & \text{high park dependency} \\ 0 & \text{low park dependency} \end{cases}$

Variables	Estimate	Odds ratio
Educational level		
Illiterate	(reference group)	
Primary education	-0.8331	0.4347
Secondary/university education	-1.1768***	0.1707
Distance from buffer zone (km)		
	-0.8132***	0.4434
(Intercept)	5.2945***	199.2478

Predicted probability of high park dependence



Results: Attitude towards new park policy

Y = { 1 agreement with the placement of fence
0 disagreement with the placement of fence

Variables	Estimate	Odds ratio
Dependency	-0.7368	0.4786
Perception on conservation	2.8626**	17.5066
Ethnicity		
Gourmantché	1.2064*	3.3413
Peulh	-1.0354	0.3551
Waama	0.5729	1.7734
Importance of arable land	-1.0241**	0.3591
(Intercept)	-1.1353	0.3213

Results: Willingness to accept (1)

Baseline model

Variables	Estimate	Standard error
Age	-7,63	7,64
Household income (CFA)	0,04*	0,017
Distance from buffer zone (km)	-1762**	624
Participation in park activities	2022	2466
Dependency		
> 50% dependent on park resources for income	6538*	3115
Educational level		
Primary	-1328	2572
Secondary/University	1635	3204
(Intercept)	19300**	6467

Results: Willingness to accept (2)

Refined model V1

Variables	Estimate	Standard error
Household income (CFA)	0,039*	0,017
Distance from buffer zone (km)	-1849**	610
Dependency		
> 50% dependent on park resources for income	6492*	3062
(Intercept)	17160***	4902

Refined model V2

Variables	Estimate	Standard error
Household income (CFA)	0,04*	0,017
Distance from buffer zone (km)	-2638***	489
(Intercept)	25380***	3039

Discussion and conclusion

- **Distance** from the village until the border of the buffer zone is an important explaining variable in
 - Park dependency
 - Willingness to accept
- Park dependency is linked to **educational level**
- **Policy decisions should consider the importance of the distance of the village to the buffer zone**
- **The need for an integrated approach towards sustainable ecosystem management in Pendjari National Park**