

The Impact Of Wildlife Conservation Policies On Rural Welfare In Zambia

Natural Resource Management and Rural
Development in Zambia:
Moving From Research Evidence to Action

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OUTLINE

- ◆ Game Management Areas
- ◆ Three research questions
- ◆ Data and methods
- ◆ Conclusions
- ◆ Next steps

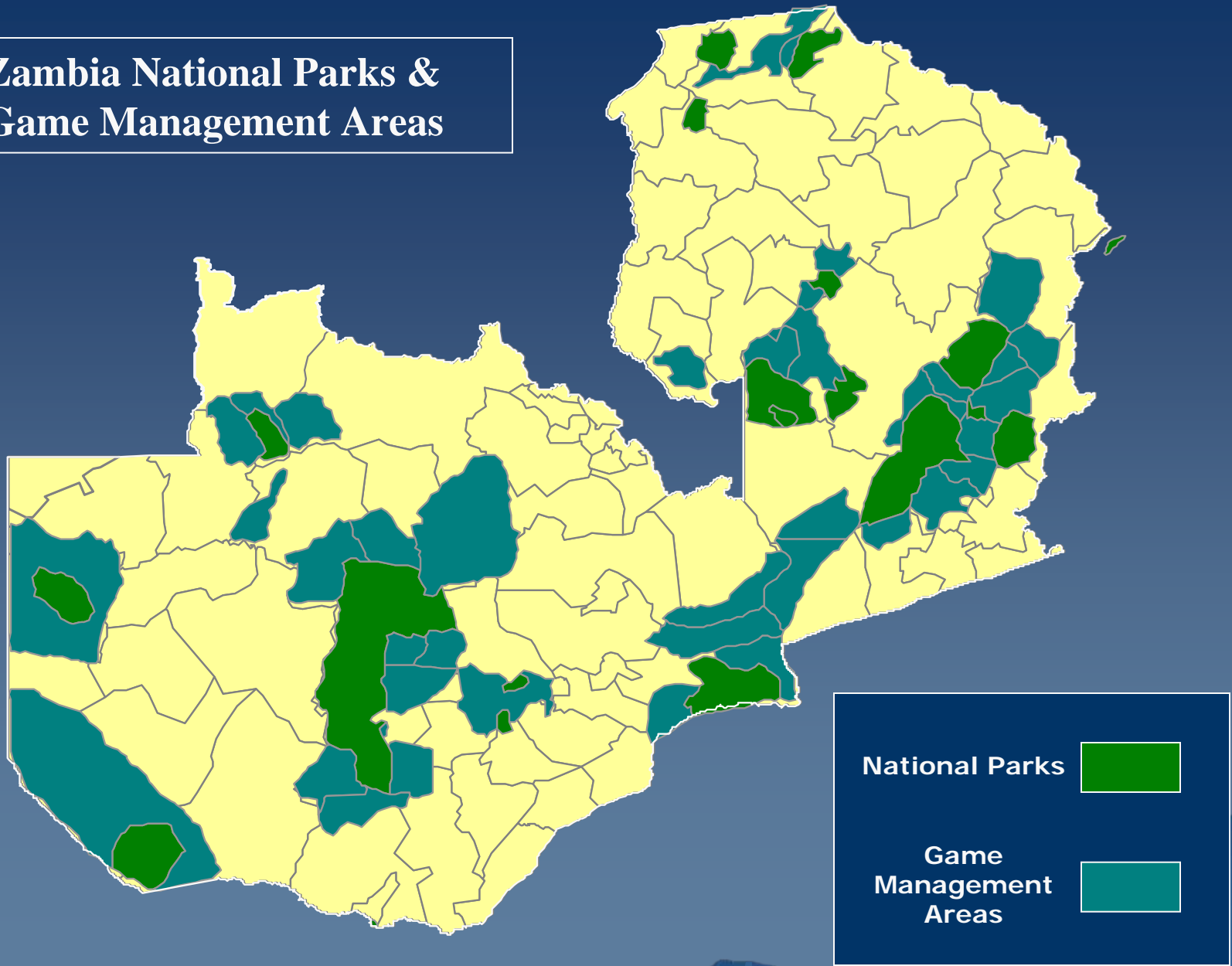


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Zambia National Parks & Game Management Areas

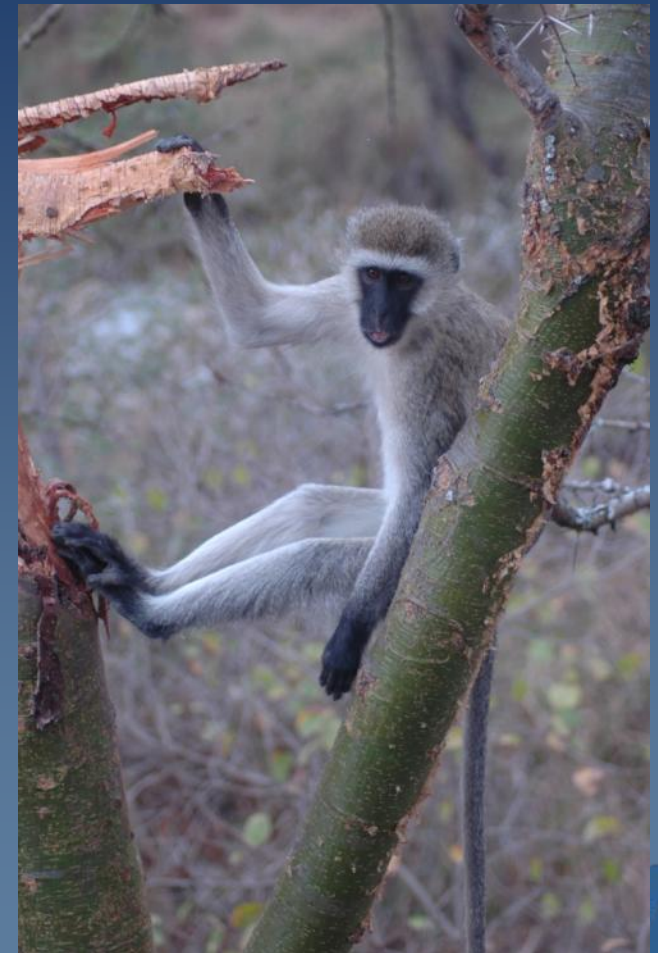


Game Management Areas

- ◆ Zambia Wildlife Authority (ZAWA) shares hunting license revenues and wildlife management responsibilities with communities
 - Community Resource Boards (CRBs)
 - Village Action Groups (VAGs)
- ◆ Community-Based Natural Resource Management: dual objectives of wildlife conservation and rural development
 - Employment of village scouts
 - Development projects

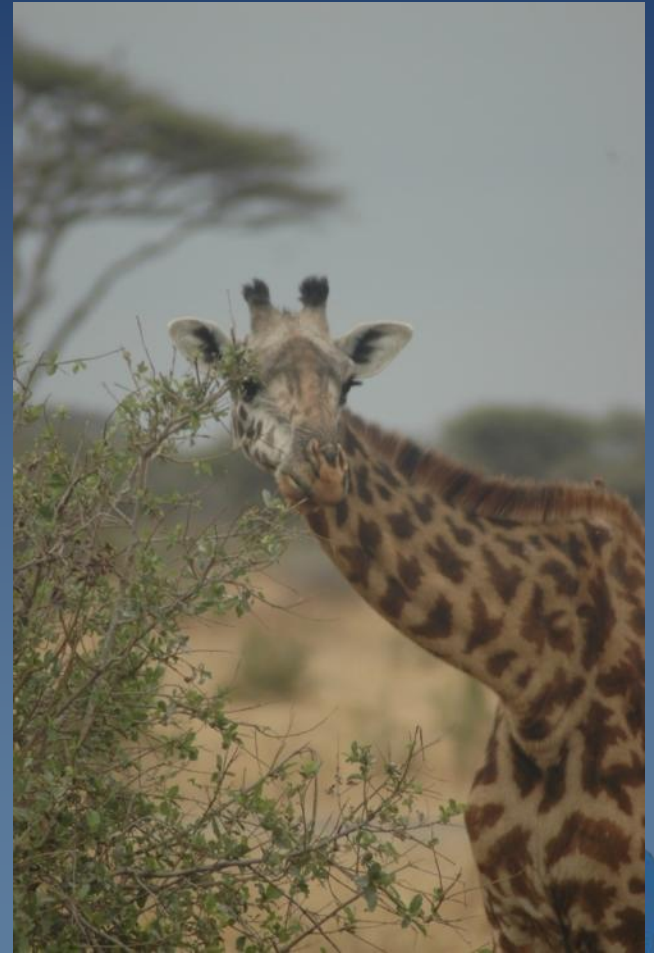
Impact of Game Management Areas

- ◆ Benefits
 - Rural employment
 - Revenue sharing
 - Meat distributed after hunting
 - Development projects
- ◆ Crop damage
- ◆ Opportunity cost of alternative land uses



Three Research Questions

1. What is the effect of GMAs on household income?
2. What are the *sources* of income that generate the GMA effect?
3. What are the effects of GMAs on crop losses from wildlife damage?



Data and Methods

- ◆ Rural household survey
- ◆ 139 statistical enumeration areas (SEAs) adjacent to four national park systems
- ◆ 2,800 households selected
 - About half GMA and non-GMA (control)
 - Only about 32 non-response (1.1%)
- ◆ Two statistical methods
 1. Ordinary least squares (OLS) regression (determinants of household income)
 2. Two-stage regression (probability and value of income, crop losses)

1. GMA Effect on Income

- ◆ What is the effect of GMAs on household income?
- ◆ Ordinary least squares regression to estimate the determinants of household income
 - Function of household and community characteristics (such as education, size of household, assets, infrastructure)
 - Included a variable representing whether the household lives in a GMA

Impact on Household Income

Variable	Coeff (std error)	Sig.
Intercept	13.101 (0.12)	***
Age of household head (in years)	- 0.003 (0.00)	*
Sex of household head (=1 if male)	0.069 (0.06)	
Maximum education (in years)	0.043 (0.01)	***
Number of children (< 15 years)	0.019 (0.01)	
Number of female adults (15-60 years)	0.113 (0.03)	***
Number of male adults (15-60 years)	0.070 (0.03)	**
Distance to nearest main road (km)	- 0.005 (0.00)	***
Cropped area (hectares)	0.039 (0.02)	*
Log of consumer assets (Kw)	0.020 (0.00)	***
Log of productive assets (Kw)	0.010 (0.00)	***
Population density (per sq km)	0.001 (0.00)	***
Infrastructure	0.032 (0.01)	***
Tourist lodge in SEA (=1)	0.186 (0.10)	*
GMA-1 classification (=1 if prime GMA)	0.170 (0.08)	**
GMA-2 classification (=1 if secondary or specialized GMA)	0.022 (0.07)	

R-squared: 0.213

* 10% significance

** 5% significance

*** 1% significance

Distribution of GMA Effect

- ◆ Stratified households by asset quintiles to investigate how GMA effect is distributed

Consumption assets	GMA-1	GMA-2
Lower 2 quintiles	0.033	-0.059
Lower 3 quintiles	0.031	0.040
Upper 2 quintiles	0.046**	-0.008

- ◆ Poorest 40% (and 60%) of the population are not significantly affected by GMAs
- ◆ Wealthiest 40% of the population are significantly and positively affected by GMAs
 - Income gains from living in a GMA are likely to be captured by non-poor segments of the population (better access to financial, human capital)

1. GMA Effect on Income

(continued)

- ◆ GMA households have lower average income
 - Also more remote, less education, fewer assets
- ◆ Households in prime GMAs have 17% higher income than households in other rural areas, controlling for other factors
 - The presence of a tourist lodge in the SEA contributes another 18% of household income
- ◆ Gains from living in a prime GMA accrue to wealthiest 40% of the population

2. Sources of Income

- ◆ What are the *sources* of income that generate the GMA effect?
- ◆ Double-hurdle regression to estimate
 1. the probability of earning income from wage employment
 2. the determinants of wage income
- ◆ Same approach for self-employment income

Impact on Wage Earnings

	Probability		Avg Effect	
Age of household head	-0.000		-0.009	
Sex of household head	0.023	**	0.234	
Maximum education (years)	0.015	***	0.331	***
Number of children	-0.001		-0.043	
Number of female adults	0.000		0.175	
Number of male adults	0.001		0.259	*
Cropped area (hectares)	-0.005		-0.101	
Log of consumer assets	0.002	***	0.037	***
Log of productive assets	-0.001	***	0.035	***
Distance to nearest main road (km)	-0.001	**	-0.018	
Population density	0.003	***	0.004	***
Infrastructure	0.003	*	0.038	
Tourist lodge in SEA (=1)	0.066	***	1.031	***
Prime GMA (=1)	0.078	***	1.160	***
Secondary GMA (=1)	0.074	***	1.245	***

Log-likelihood: -527.9 * 10% significance ** 5% significance *** 1% significance

2. Sources of Income

(continued)

- ◆ Households in prime GMAs are 7.8% more likely to be employed
 - Households in secondary or specialized GMAs are 7.4% more likely to report wage income
 - Households in communities where there is a tourist lodge are 6.6% more likely
- ◆ Households in prime GMAs can be expected to earn 116% more on average from wage employment


2. Sources of Income

(continued)

- ◆ Households in prime GMAs are 6.9% more likely to report income from self employment
 - Effect is less than for wage income
 - Household size (number of children and adults) and infrastructure also contribute to self-employment income



3. GMA Effect on Crop Losses

- ◆ What are the effects of GMAs on crop losses from wildlife damage?
 - ◆ Double-hurdle regression to estimate
 1. the probability of incurring crop losses from wildlife damages
 2. the determinants of the value of crop losses
- 

Impact on Crop Damage

	Probability		Avg Effect	
Age of household head	-0.000		-0.001	
Sex of household head	-0.006		-0.046	
Household size (#)	-0.006	**	-0.076	**
Distance to nearest road (km)	0.001	**	0.009	*
Cropped area (hectares)	0.010	**	0.077	
Consumption assets (Kw)	-0.000		-0.005	
Production durable assets (Kw)	-0.001	*	-0.010	**
Population density	-0.000		-0.000	
Infrastructure	-0.001		-0.013	
Number of scouts (#)	0.004		0.053	*
Value of harvest	0.006	***	0.102	***
Prime GMA (=1)	0.161	***	1.486	***
Secondary GMA (=1)	0.122	***	1.238	***

Log-likelihood: -1513.7 * 10% significance ** 5% significance *** 1% significance

3. GMA Effect on Crop Losses

(continued)

- ◆ Households in prime GMAs are 16.1% more likely to experience crop damages
 - Households in secondary or specialized GMAs are 12.2% more likely to report crop damages
- ◆ Households in GMAs are expected to incur greater losses from crop damage (average = Kw 30,079)
 - Effect is greater in prime GMAs

Conclusions

- ◆ Prime GMAs and tourist lodges contribute positively to rural household income
 - Gains accrue primarily to non-poor households
 - GMA effect is positively associated with income from wage and self employment
 - Policies to build capacity for participation by poor households?
- ◆ Households in prime GMAs are positively associated with both probability and value of crop damage losses
 - Suggests broader role for village scouts to curb crop damage
 - Mechanism for compensating farmers for losses?

For More Information...

- ◆ Food Security Research Project – Zambia
- ◆ <http://www.aec.msu.edu/fs2/zambia>

- ◆ Natural Resource Management, Pro-Poor Tourism, Food Security and Rural Development: Resource Materials
- ◆ <http://www.aec.msu.edu/fs2/zambia/resources/index.htm>

Thank You!

