



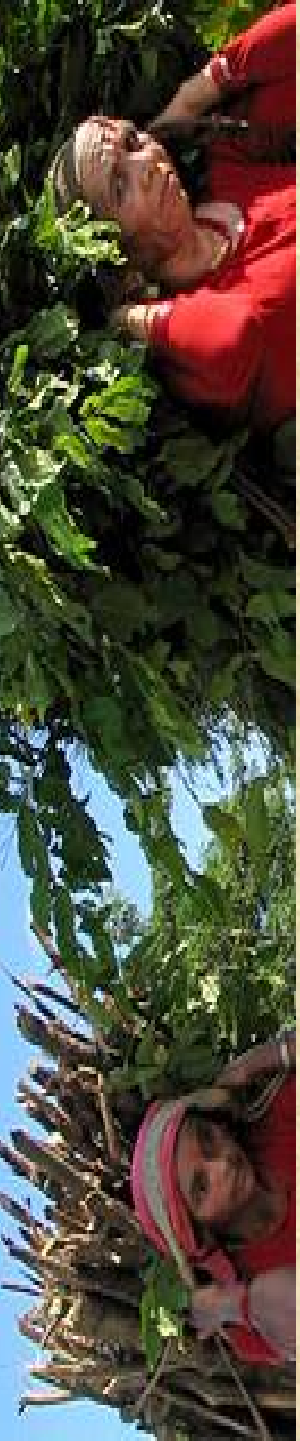
Threats to Biodiversity conservation: Vulnerable Livelihoods and illegal resource extraction in the Royal Bardia National Park, Nepal.

**Shova Thapa
SPRU, University of Sussex, UK**

**Under the supervision of:
Dr. Sigrid Stagl (Supervisor) and Dr. Klaus Hubacek (Co-supervisor)**

Background

- Protected areas are a social space and conservation is a social as well as political process, thus conservation in protected areas fall within the realm of social-ecological system.
- Social-ecological systems being complex, integrated and co-evolving systems impact on one affects the other and in the process both social system and ecosystem adapts and co-evolve.
- From the lens of social-ecological systems, when we are discussing protected areas, communities living around, the biodiversity being protected and the institutions formed for the management of biodiversity as well as the communities all become an interlinked phenomena, however, studies have dealt them as an individual system.
- Similarly, the problems related with protected areas, mainly the park-people conflict had always been dealt with reference to communities involvement in biodiversity damage inside protected areas, but have never been assessed if the feedback to the resources degradation has actually come from it only.
- Thus, this research aims to,
empirically explore the interaction between communities livelihood and biodiversity degradation (mainly vegetation)



Specific Research Questions

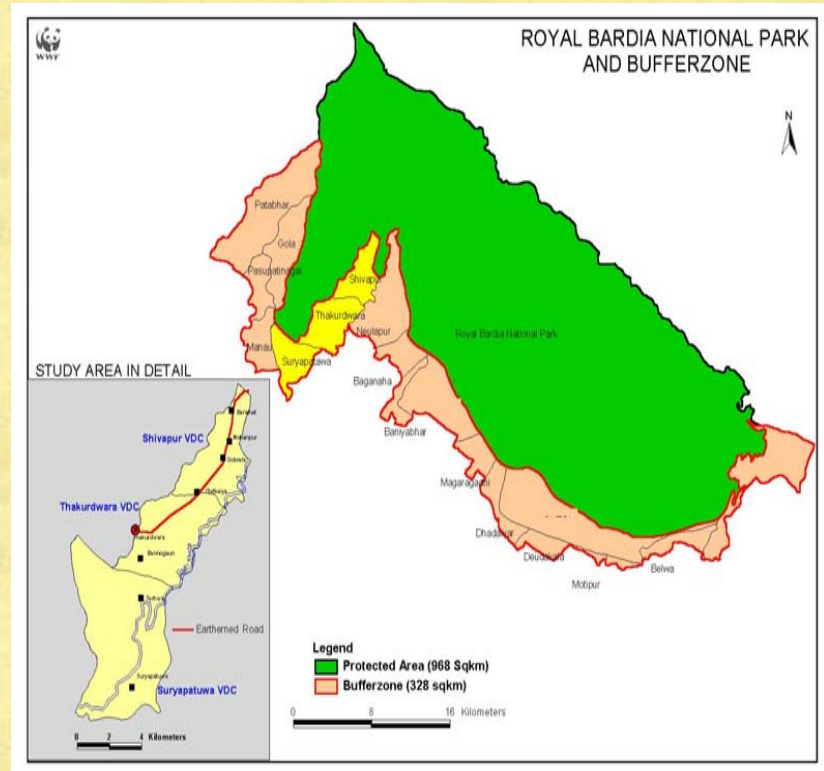
1. What is the livelihood situation of the communities?
2. Is the livelihood strategy depended upon the park resources?
3. Why and what resources are extracted from the park?
4. Do socio-economic variables as well as livelihood factors have any impact on the resource extraction behaviour?
5. Does the current livelihood strategy have any impact on the park biodiversity?



Establish the relationship between the social (livelihood) and ecological (park vegetation) system

Royal Bardia National Park

- Largest national park in low land Terai.
- Contains large number of endangered species.
- Corridor between other protected areas in Nepal and India.
- Rich in floral, faunal as well as inhabitant diversity.
- Studied Villages:
 - Three villages falling within the Buffer Zone
 - with different resource use options
 - intensification of development projects



Methods

- Research Strategy
 - Comparative case study approach

- Data collection methods

Livelihood analysis: Sustainable livelihood framework

Household questionnaire survey of 358 households, 12% of the total households covering household socio-economic characters, livelihood assets, strategies, park problems and impacts, resource extraction behaviour etc.

Vegetation analysis: Species diversity and site-specific ecological indicators

Two sites selected, control (in the park core area) and used (adjacent to the village) for a comparative case study and 12 line transects of 3 Km were laid with 106 plots in each sites for the study.

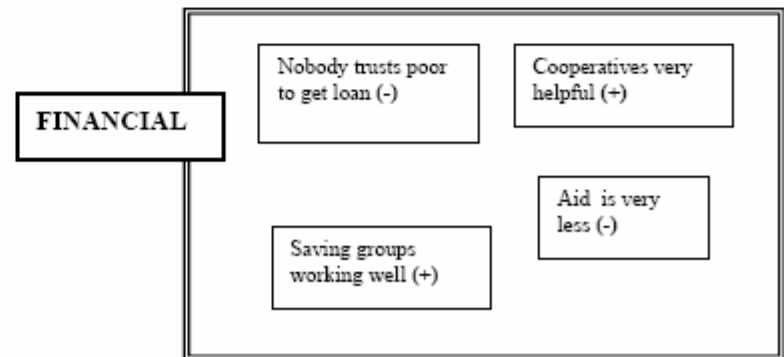
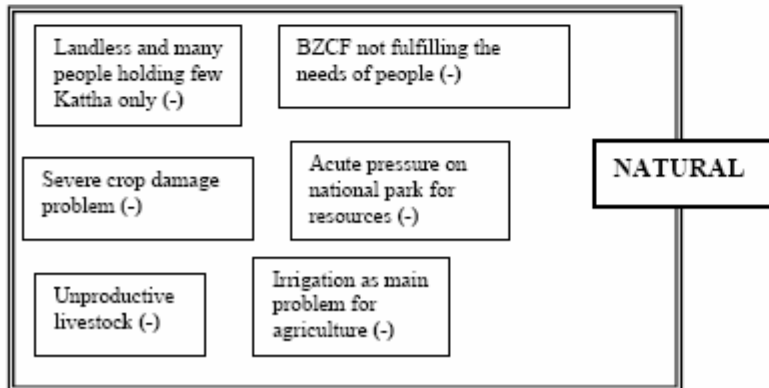
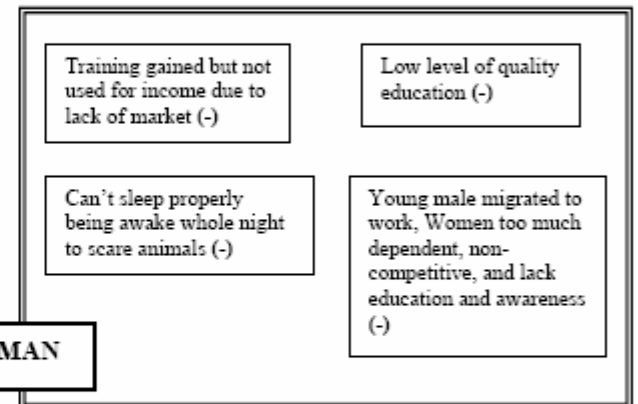
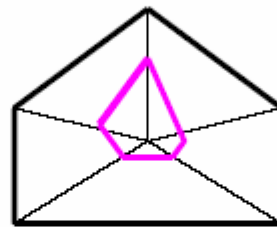
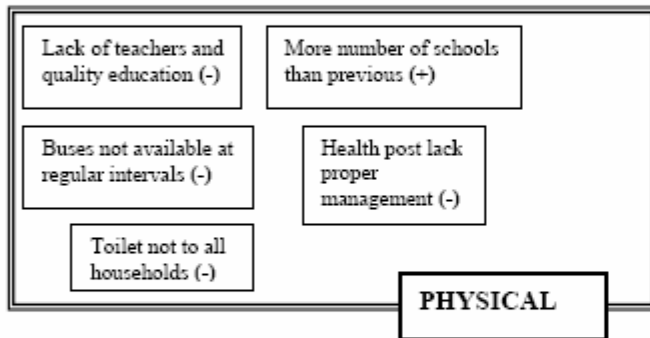
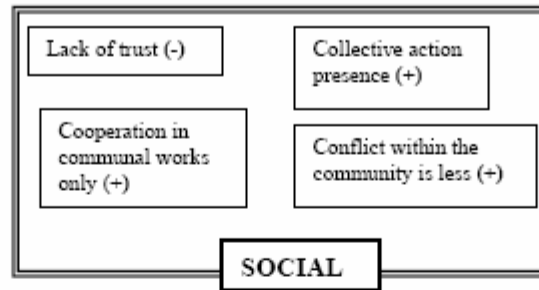
- Data analysis
 - Binomial regression and simple descriptive analysis

Vulnerable Livelihoods

- Park establishment history involved the relocation of four villages from the park to somewhere else without any alternative economic opportunities.
- 90% of the surveyed households had agriculture as their main and the only livelihood strategy. However, agriculture system being a subsistence economy, was halted due to the restriction in resource use. This limited their opportunities for combining other livelihood strategies thus making more dependent on one.
- Wildlife interference with damage on their crops pushed the vulnerable communities into more critical stage as they could not gain the total output from their farmland.
- Grass cutting programme: days reduced from 15 to 3 days due to the problem of illegal fuelwood extraction as one of the main problem.
- 88% of the respondents stressed that the problem of fuelwood is the main constraints they are facing.

Asset Pentagon: Thakurdwara VDC

(Exercise to analyse community situation regarding assets for livelihood)



Illegal resource extraction

- 50 different plant species were identified by villagers that were extracted from the park for different purposes such as house building, fuelwood, fodder for livestock and occasional season vegetable.
- Women and young children were mainly involved in resource collection and they were found active at any time of the day.
- 78% of the households in Shivapur were involved in resource extraction.



Resource extraction: Socio-economic variables

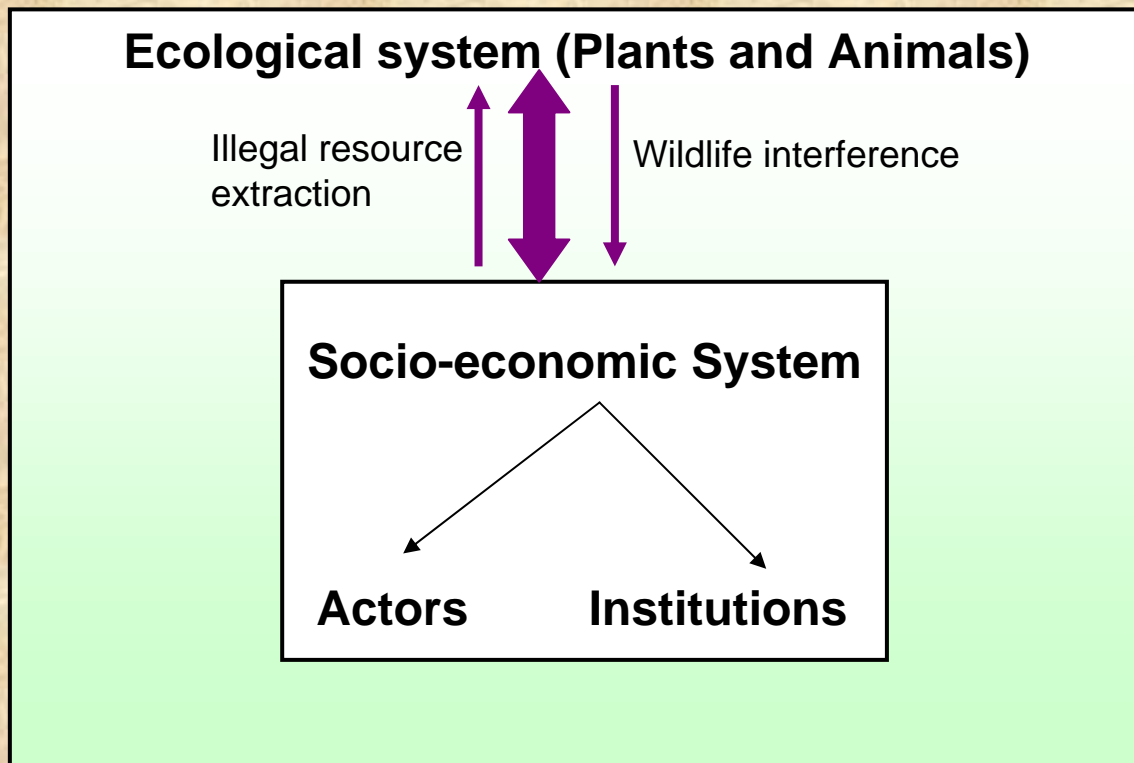
Variables	β	$p \leq$
Distance of household to the park	- 0.77	.006
Size of Land Holding	- 1.020	.047
Percent of crop damage	0.899	.026
Livestock holding	0.25	.823
Reason for extraction: Crop damage	6.926	.000
Reason for extraction: Livelihood Need	- 2.754	.000
Household involvement in the DP	0.936	.036
Conflict with the park	2.710	.006
Wealth Status	0.325	.183
Ethnicity	0.516	.388
Number of females in the household	0.169	.631
Number of assistants in the household	0.203	.365

Summary results from binomial regression models concerning the socio-economic variables.

Vegetation status

- Species Diversity
 - Species diversity was high in the control plot (23 species) with only 10 species found in used plot but the number of species increased as the distance from the village increased inside the park.
- Vegetation Density
 - Vegetation density was high in the control plot (60%) as compared to used plot (20%)
- Difference between habitats in terms of species diversity and distribution (Mann-Whitney Test)
 - Significant with p-value < .001
- Ecological indicators (branches lopped, half removed trees and grass cutting) (Kolmogorov-Smirnov test)
 - Significant with p-value <.001

Discussion



Threats to biodiversity as well as community well-being

Conclusion

- Major problem of fuelwood and no alternative resource area or energy options provided.
- High level of dependency on the park resources due to the economic incentives not being able to meet their needs.
- Economic incentives are more like short term benefits with impacts rather than long-term benefits, e.g. Grass cutting programme.
- Site-specific problems with different socio-economic factors responsible for different villages, but single rule applied when any development projects are introduced.
- Thus, it is recommended that while implementing any projects socio-economic factors are considered and site-specific measures are taken rather than single rule.