HUMAN ACTIVITY IMPACT IN BUFFER ZONES OF PROTECTED AREAS IN VIETNAM, A CASE STUDY OF BACH MA NATIONAL PARK

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ABSTRACT

Bach Ma National Park (BMNP) – a protected area in central Vietnam - is important for conservation of a green transect, stretching from the East Sea to Lao's border. Bach Ma is one of two unique new reference sites in Vietnam that are both a "pilot model about sharing benefit in management, protection and sustainable development of special-use forest" (Decision No.126/QD-TTg). This research evaluated driving forces to BMNP from human activities with the aim of assessing vulnerability of the Bach Ma protected area, using Geographic Information System (GIS). The description of socio-economic background is based on interviews of 207 households in the buffer zone area of BMNP. Data were processed mainly by SPSS v.20 and analyzed with ArcGIS v.10 to determine the characteristics of the spatial distribution of households in the buffer zone. The results of this study will be essential to forecast and prevent environmental risks and to contribute to sustainable resource management and human activities.

Key words: protected area, buffer zone, Bach Ma National Park, households, sustainable development

1. INTRODUCTION

Before the so called "Doi Moi" Renovation policy in 1986, almost all forestry lands in Vietnam were under collective or in the state of farm management. The government could not prevent activities of illegal forest exploitation. Consequently, there was a considerable amount of land that was under open access with no regime of management (Phong T., 2009). As a result of the Renovation policy, many policies and programs have been created to make significant impacts on preservation of land cover resources. Nevertheless, there is still a lack of awareness and misapprehension concerning the magnitude of forest resources to risk reduction.

Not all forest recipients are allowed to receive forest benefits. There are dense populations living in the buffer zones and their livelihood depends on timber and non-timber forest products. The fact is that, if local people do not have the right to enjoy the forest benefits, they would not be motivated to protect forests. This led to severe degradation of forests in both the buffer zones and the parks (Gilmour, D.A. and San, N. V., 1999). Most district and commune officials recognize the importance of buffer zone management to reduce the pressure on the resources of the parks. Therefore, we need to know which forest in which locations is at risk and why (Hua, D. N., 2008).

Bach Ma National Park (BMNP) is one of two new protected areas in Vietnam that

were chosen as a pilot model of sharing benefit in management, protection and sustainable development of special use forest (Decision No. 126 - 2/2/2012). This protected area is located in Central Vietnam, 45km south-east of Hue - the old imperial city of Vietnam. The National Park is important for conserving the only green transect left in Vietnam, stretching from the South China Sea to Laos's border (Lan,. L.V. et al., 2002). BMNP is considered to be an important "Floristic Biodiversity" centre in the Indochina region (An, T. T., and Ziegler, S., 2001). After expanding in 2008, the BMNP includes areas under the administrative boundaries of the two provinces of Thua Thien Hue and Quang Nam Province. Buffer zone areas have 62 607 habitats in total of 13 211 households (Bach Ma National Park, 2011). There is no resident living in the core of BMNP, except some monks of the temple which are staying Bach Van Tu and Truc Lam. The ethnic composition of the buffer zone in BMNP is Kinh, Katu, Van Kieu and Muong.

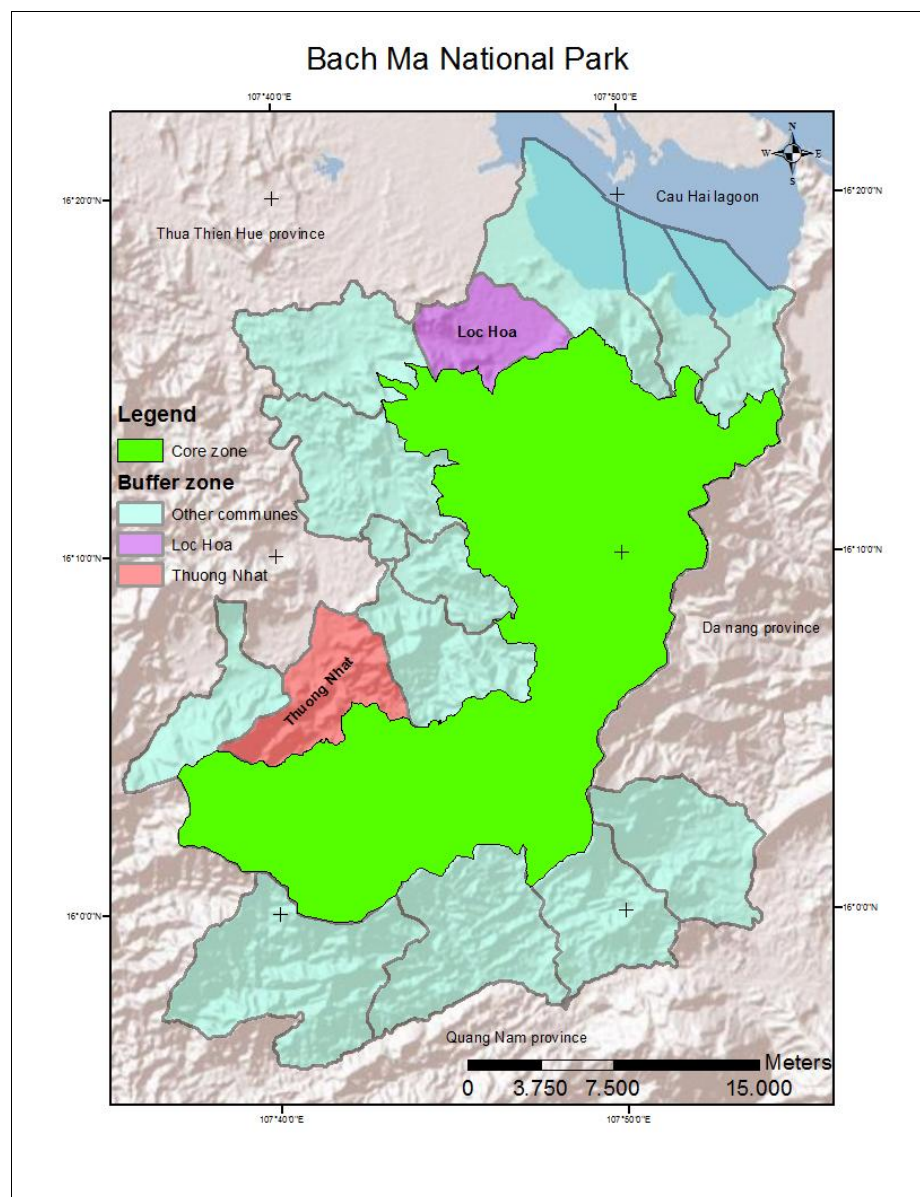The research involves two typical communes in the buffer zone: Loc Hoa and Thuong Nhat commune (Figure 1).

Figure 1. Position of case study area.

2. METHODS

The data collection of 207 households (HHs) was carried out in two typical communes of the buffer zone. The survey instruments involved in this study were a set of questionnaire forms. Before making the interviews, a pre-test was carried out to check the suitability of questions in the area. In each interviewed household, the content of each questionnaire focused on real situation of the social-economic condition, forest related activities such as illegal logging, hunting, and water supply. Additionally, pictures and GPS information of selected HHs were captured by Garmin Oregon 550.

All data from interviewed HHs have been unified together, verified and processed by statistical methods using SPSS v.20. The spatial data consists of digital maps from different sources with various formats like MapInfo, Microstation, ArcGIS. These data are compiled and analyzed by GIS-software tools, including MapSource, FME (Feature Manipulation Engine) an integrated collection of tools for spatial data transformation and translation) and finally analyzed in ArcGIS v.10. These data were referenced in different coordinate systems, mainly the VN2000 and UTM (WGS84) format which are both commonly used in Vietnam. Therefore, all data were transferred into UTM Zone 48 North using the WGS-84 Datum.

3. RESULTS AND CONCLUSIONS

3.1. Socio-economic situation

Thuong Nhat is a mountainous buffer zone commune which is located in the Nam Dong district. The commune has 7 villages with 470 HHs and two ethnic communities living together. 92.3% of the inhabitants of Thuong Nhat are Katu ethnic minority and only 7.7% is a group of the Kinh people who immigrated in the commune recently. The Kinh people mostly work related to business or government employees. This commune was chosen as a pilot area in the buffer zone of the BMNP for the new decision of sharing benefit (Decision No. 126/QD-TTg, 2012). This is also a new commune that lies in the buffer zone after the decision of extending the BMNP in 2008. Therefore, updating the commune data is necessary.

Loc Hoa commune is a typical buffer zone commune located in Phu Loc district. The commune includes 10 villages with 587 HHs and has 100% of Kinh people living in the area.

According to the decision of the prime minister about Vietnamese poverty standards for the period from 2011 to 2015 in rural areas, HHs living in rural areas in Vietnam are divided into 3 groups:

+ Poor household: income ≤ 400 thousands VND/person/month (~19.2 USD),
+ Near poor household: income is from 401 - 520 VND/person/month
(~19.25 – 25 USD),
+ Non-poor household: income is > 520 VND/person/month (> 25 USD).

Interview data of 105 HHs in Thuong Nhat commune and 102 HHs in Loc Hoa commune showed that, Thuong Nhat has 51.4% poor HHs and 33.3% non poor HHs in comparison with 31.4% poor HHs in Loc Hoa and 53.9% non poor HHs (Table 1). The reason for this difference is that most of the people in Thuong Nhat are Katu ethnic minority group. They are not in high education and so their livelihood depended mainly on unstable forest resources. Also, the main residential group in Loc Hoa commune is Kinh people, who live in more accessible areas and have more possibilities to reach a higher education. Their life doesn't depend much on forest.

Table 1. Households' poverty state.

Households' state	Thuong Nhat (%)	Loc Hoa (%)
Poor household	51.4	31.4
Near poor household	15.2	14.7
Non poor household	33.3	53.9
Total	100	100

There are 15 selected HH interviews in each of 7 villages in Thuong Nhat commune. These HHs live in the average altitude from 60 to 140m. Classification of elevation is based on the Advanced Spaceborne Thermal Emission and Reflection Radiometer Global Digital Elevation Model (ASTER GDEM). The data are posted on a 1 arc-second (approximately 30-m at the equator) grid and referenced to the 1984 World Geodetic System (WGS84)/1996 Earth Gravitational Model (EGM96) geoid.
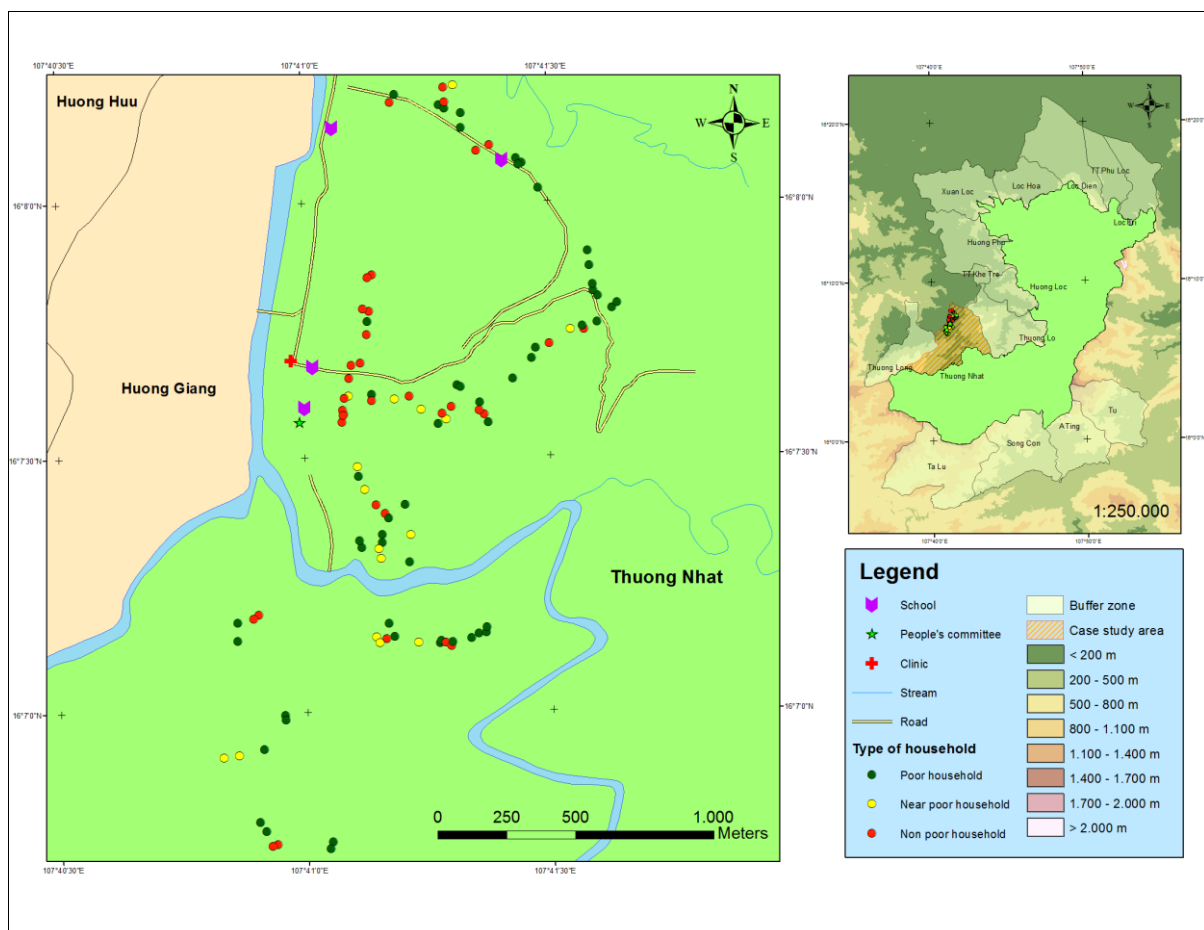

Figure 2. Spatial distribution of households in Thuong Nhat commune and poverty state.

3.2. Human activities impact on buffer zone

Illegal land invasion was found in the buffer zone and boundaries of BMNP. Local people use invasive land mostly for reforestation. The main cultivated plant is Acacia because of its high market demand. Invasive area is not large but is considered as a serious impact on a large scale with many participators. One of the causes is that the determination of the boundary is not clear and boundary pillars are still thin. In addition, the system of digital maps and hand maps do not meet the requirements necessary for use in the field by rangers and field staff.

Results of the survey investigation shows that illegal hunting is still a relatively common problem in the buffer zone area which are adjacent to the National Park, especially in the communes which are located in the new expansion of the BMNP from 2008. Fishing and other aquatic products from river, streams are quite serious issues. Fishing with explosives or electricity is still being recorded in many parts of the buffer zone (interviewed households, 2012).

Excessive exploitation of forest products, especially illegal logging has been reported from the ranger stations of the BMNP. The National Park has many remarkable activities of protection and management but prevention of illegal logging activities is still not very effective.

Katu is the main ethnic minority group in Thuong Nhat commune. They have low level of education (mostly primary school) and live highly dependently on forest resources. The poor HHs have not enough productive land so they must go to the forest to hunt or cut wood and non-wood materials for use or sale as forest products.

Table 2. Information of illegal logging and hunting activities.

State	Thuong Nhat (%)	Loc Hoa (%)
Unknown	35.2	82.4
Know	64.8	17.6
Total	100	100

The Thien Vien Truc Lam temple was built in 2006 in the center of the Truoi river within the Loc Hoa commune. The existence of Truc Lam temple has attracted many tourists. Results from interviewed HHs in the commune showed that many HHs in the area improved their living based on tourism services such as ferryman or trading. As a religious belief, many people release aquatic species such as fish, red-eared sliders into the Truoi river. The appearance of alien species, especially a number of invasive red-eared sliders, threaten the regional ecology.

4. DISCUSSION

The buffer zone plays an important role in the conservation of the protected areas. Therefore, a management plan for the buffer zone should be suited able to the management plan for the protected area. The key function to protect forest is that ranger staff and managers of BMNP should combine with the unions and local government to strengthen

education about forest protection and sustainable development. Special programmes should be created, such as: focusing on improving the socio-economic condition of buffer zone inhabitants in order to take pressure off the parks; encouraging the participation of local communities of the buffer zones in planning and management of conservation activities; assisting local communities to plan and manage natural resources in the buffer zones in a sustainable manner; coordinating investments and encouraging special projects in the buffer zones that support the conservative objectives.

The quantity of ranger staff in BMNP is still low. However, they have to protect and manage a very large forest area in complex conditions (37487 ha). Moreover, the buffer zone area stretches over fifteen communes with 58676 ha and the current status of residential land, agricultural land and forest land use is mixed together. Therefore, to limit the illegal land invasion, at the same time as providing public, management activities and the definition of the BMNP boundaries should be increased for rangers and field staff. In addition, all documents, databases and maps should be completed with high accuracy and maps of sensitive areas should be standardized with higher scale to get more information in detail.

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