

POSSIBILITY OF ADAPTIVE MANAGEMENT FOR NATIONAL PARKS: CASE STUDY OF XUAN SON NATIONAL PARK

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Abstract: Adaptive government is assumed growing importance in natural resource management literatures, focusing on learning and adaptation among actors at different administrative level and geographic scales. The article identifies some challenges that the authority of Xuan Son National Park is facing in conducting resource management and conservation. Moreover, Discussion on the possibility of applying the adaptive management approach to manage the park also raised. In order to conduct the research, secondary and primary data sources were used for the analysis. In particular, deep-interviews were conducted with stakeholders of the park.

Keywords: Adaptive management, natural resource management, national park.

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I. INTRODUCTION

“National parks are the areas established to protect natural biodiversity along with its underlying ecological structure and supporting environmental processes and to promote education and recreation” [4].

In Vietnam, National park means a kind of special-use forest which plays an important role to the nation. A national park has common functions of a special-use forest and possibly any of the following main functions: natural conservation and nature reserve; species/habitat conservation; and landscape protection; historical sites and the provision of recreation and tourism [1].

In order to conduct the governance of Vietnam’s national parks, several ministries and agencies are involved in the protection process. The Ministry of Agricultural and Rural Development and their provincial departments have overall responsibility for managing protected areas. The Ministry of Agricultural and Rural Development directly administers national parks with special nature conservation status or those with areas extending across more than one province [6]. Other national parks are managed by the Provincial People’s Committees and their departments. Each Provincial People’s Committee has responsibility for establishing and staffing the national park’s management boards, as well as allocating the capital and budget for them. The

Ministry of Natural Resource and Environment is responsible for conducting the state management for the biodiversity of protected areas [5]. However, it is unclear between administrative levels about responsibility for the management and administration of protected areas.

Xuan Son National park has its characteristics that cause difficulties in conservation and management, such as a national park managed by provincial authorities, residential communities locate within the boundary and a transboundary park. The aim of this paper is to identify some challenges that Xuan Son Park's authority is facing in conducting resource management and conservation, to discuss the possibility of applying the approach of adaptive management, a management mechanism is to deal with uncertainty in interactive social-ecological systems and also to promote shared understanding of stakeholders with regard to ecosystems, to manage the park.

II. METHODOLOGY

To develop the arguments and analysis, firstly, we conducted a literature review to develop an understanding of adaptive natural resource management. Secondly, primary data focusing on the conservation and management of Xuan Son National Park were collected according to the following main subjects of interest: management methods, financial sources, park staff, cooperative activities in conservation and management of natural resources. 30 deep-interviews were conducted with the park's staff, local authorities and local residents.

III. LITERATURE REVIEW ON ADAPTIVE MANAGEMENT, COMMUNITY-BASED CONSERVATION AND NATIONAL PARKS

Adaptive management was developed by two ecologists, C.S. Holling and Carl Walters in the 1960s. They combined the advantages of trial-and-error and scientific learning. "Adaptive management is the process of treating management as an experiment. By doing this, the practicality and importance of trial and error are added to the rigor and explicitness of the scientific experiment, producing learning that is both relevant and valid" [9]. Adaptive management, also known as adaptive resource management, is a structured, interactive process of robust decision making in the face of uncertainty, with an aim to reducing uncertainty over time via system monitoring. In this way, decision making simultaneously meets one or more resource management objectives and, either passively or actively, accrues information needed to improve future management. Adaptive management is a tool which should be used not only to change a system, but also to learn about the system [8]. Adaptive management is based on a learning process, so it improves long-run management outcomes. The challenge in employing this approach is finding the correct balance between gaining knowledge to improve management in the future and achieving the best short-term outcome based on current knowledge [3].

There are two varieties of adaptive management - passive and active [14]. It is easy to confuse passive adaptive management with trial-and-error approaches [11]. Trial and error

depends on person and place, and forms of trial-and-error are on-the-job-training, expert opinion. Although our previous knowledge is tested through our experience, trial and error learning is site specific and learner-specific due to depending on individual experience [9]. Passive adaptive management is a less demanding form of adaptive management. Although learning is still a major objective of the activity and the activity is conducted as much as like an experiment as possible, some aspects of an experiment are missing [9].

Active adaptive management is a comprehensive way to apply adaptive management, which was developed by Walters and Holling. The process of active adaptive management follows a series of steps that resembles the scientific method but is applied in management-type settings [9] (Figure.1).

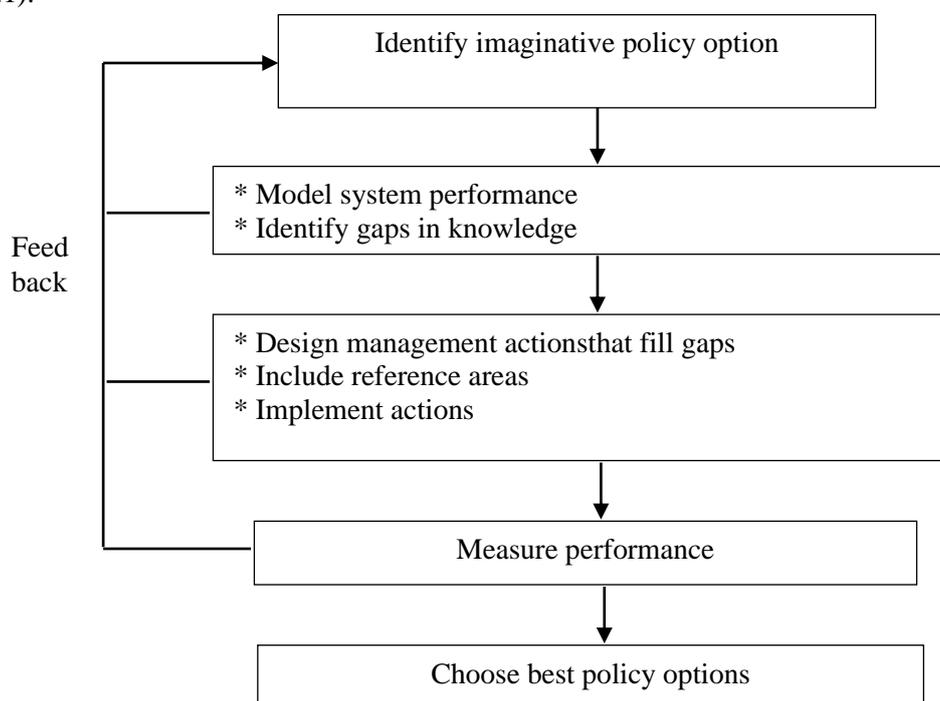


Figure 1. The active adaptive management process, as developed by Walters and Holling [9]

Adaptive management was initially applied within the context of natural resource. Applications of adaptive management deal with uncertainty in the management of such renewable resources as fish and wildlife [15]. According to Wilhere (Wilhere, 2002) p.21, “adaptive management is a thoroughly new paradigm for managing natural resources” [16]. This method also has taken long to develop and apply to conservation, including predator control, fire management and habitat management [10, 12]. Adaptive management is an approach that has more recently been employed in implementing international development programs [7].

It is interesting that adaptive management complements the current trend in protected area management where local residents and community members are more common to involve in buffer zone development and protection of protected area resources. New turn in protected area

management where resident populations are treated as potential partners in protection, the goals of conservation and development are combined. Local residents are often seen not only just as resource users, but also as effective managers [1]. There are still difficulties to apply adaptive management as the basic of protected area management because of the dispute over the form and nature of the community and how it is to be involved in conservation [2]. Although there are disputes over the relations between communities and conservation, the involvement of communities in protected area management remain critical due to the potential gains [1].

IV. CASE STUDY – XUAN SON NATIONAL PARK

Xuan Son National Park was established in 1986 as a nature reserve and upgraded to a national park in 2002 under the decision No. 49/2002/QĐ-TTĐ of the Prime Minister. It is located at the west of Xuan Son district, at the extreme south-eastern extent of the Hoang Lien Mountains and in the watershed of the Red River. It comprises 15,048 ha in the transboundary area of Phu Tho, Hoa Binh and Son La provinces: the north is next to Thu Cuc commune, Tan Son district, Phu Tho province; the east is next to Tan Phu commune, Tan Son district, Phu Tho Province; the south is next to Da Bac district, Hoa Binh province; and the west is next to Phu Yen district, Son La province.

Xuan Son National Park has a diversity of forest vegetation types and species. In terms of plants, 1,259 vascular species have been identified, belonging to 699 genera of 185 families in 6 branches. The park is also home to 370 animal species. belonging to 94 families. Especially, the Park has 47 plant species and 51 animal species listed in Vietnam’s Red Data Book and IUCN Red list. Both tree stands and animals are strictly protected under Law for Forestry of Vietnam.

Xuan son National Park has more challenges than other national parks as there are buffer zone areas with some residential communities locating within the boundary of the park and it is also a provincial transboundary park. There are 9 buffer zone villages of 4 communes with 430,5 ha and 2984 residents locating within the boundary of the park. Table 1. describes the data of the number of villages, households and residents locating inside and outside the boundary of the park.

Table 1. Residents living in the buffer zone of the park

No.	Position	Number of villages	Number of households	Number of residents
1	Inside the border	9	794	2984
2	Outside the border	20	9575	9575
Total		29	12559	2908

According to the interviewees, local residents are minority ethnic groups and mainly Muong and Dao, and their living standard is still low and dependent on natural resources, such as collection of firewood, medical plants and agriculture practice on the steep sloping areas. According to Le Thanh An et al. (2018) Population and resource use pressure within and around national parks is the highest major cause of limitation of management capacity in Vietnam [13]. It is similar to the situation of Xuan Son National Park. 100% (20/20) respondents who are the park’s staff and local officials indicate that people living inside the boundary of the park is one of

big challenges to resource management and conservation activities. 80% respondents who are local residents mention that their livelihood partly depends on natural resources. In addition, locating in the transboundary area the park remains barriers although the boundaries are just provincial, hence it is necessary to have a close cooperation between local communities and the park authority and between different provincial governments in conservation activities. 90% respondents who are the park's staff indicate that it is really difficult to work other provincial residents and to establish a close cooperation with other provincial communities living next to the park. According to Agrawal [1] “the extent of linkages across the different levels of administration that are involved in the management of the protected area: from the top management to the local residents” is one of primary factors that affects the feasibility of using adaptive management techniques. For example, community-based conservation can be seen as a unique opportunity to deploy adaptive management techniques for protected areas and it is even greater to involve local residents and communities [1].

Another difficulty is that Xuan Son National Parks is one of 28 national parks of Vietnam that is managed by provincial authorities. By 2020, 34 national parks had been officially established in Vietnam and 28 national parks, including Xuan Son National Park are managed by provincial authorities. Financial sources of funding for the park mainly originated from provincial and central budgets. This is another challenge in conservation activities of the park due to the lack or delay of provincial budgets. Financial funding is one of the major causes of limited management capacity for national parks in Vietnam. According to Le Thanh An et al. (2018), lack of funding for national parks is the second highest major causes of limited management capacity of national parks in Vietnam [13].

Under Law for Forestry, No. 16/2017/QH14 and the decision No. 24/2012/QĐ-TTg on investment policy of special-use forest development, stage 2011 – 2020, The Board of Xuan Son National Park has contracted with the local households, local residential communities to manage and protect forests with the payment of the average of VND 100,000 per ha per year from annual state budget since 2015, detail in table. 2.

Table 2. Household groups and communities participating in protection of special-use forest

Year	Household group		Community		Total	
	Number	Area (ha)	Number	Area (ha)	Number	Area (ha)
2015	2	301.20	15	9,498.80	17	9,800.00
2016	3	303.80	15	9,496.20	18	9,800.00
2017	4	282.90	15	9,517.10	19	9,800.00
2018	4	228.60	15	9,571.40	19	9,800.00
2019	16	217.80	15	9,582.20	31	9,800.00
2020	16	217.80	15	9,582.20	31	9,800.00

The Board of Xuan Son National Park has contracted with the local household groups and residential communities to manage and protect 9,800 ha of special-use forest. In 2020, the number of household groups and residential communities participating in the management and protection of special-use forest were 16 and 15, respectively. The State budget also support the investment

for the buffer zone residential communities in hamlets and villages in order to co-manage special-use forest, the supporting rate for each hamlet and village is VND 40 million per village per year. Although the local households and residential communities have participated in special-use forest management and protection, their involvement just a kind of co-management. The benefits that the local residents and community just is a small amount of money (VND 100,000 per ha per year), and this does not encourage responsibilities of local populations.

V. CONCLUSIONS

Xuan Son National Park is one of Vietnam's national parks and its functions within the system of special-use forests, which is considered a part of the backbone of the national strategy for nature protection and conservation in Vietnam.

The local households and residential communities have involved in the activities of forest management and conservation. However, the participatory method is just special-use forest management, and they just receive 100,000 VND to protect one hectare of special-use forest.

It is necessary to encourage to apply the method of adaptive natural resource management to conservation in Xuan Son National Park, such as the development of activities of forest environment services, perform eco-tourism business in special use forests in accordance with law to generate revenues to offset the costs, raising income for officials, public servants and employees and gradually replacing investment from the state budget and improve the local people's lives in the buffer zone.

Local authorities should support investment and create a benefit-sharing mechanism for the economic sectors, village communities to participate in investment and protection and development of special forest.

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