

RESEARCH PROPOSAL

HABITAT MANAGEMENT OF JAVAN RHINO  
(*Rhinoceros sondaicus* Desm. )  
IN UJUNG KULON NATIONAL PARK, WEST JAVA

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A. Title : Habitat Management of Javan Rhino (*Rhinoceros sondaicus* Desm.) in Ujung Kulon National Park, West Java.

### B. Background and Justification

Three species of rhino occur in South East Asia, namely : the Indian or greater one-horned rhino (*Rhinoceros unicornis*), Javan or lesser one-horned rhino (*Rhinoceros sondaicus*) and Sumatran two horned rhino (*Dicerorhinus sumatrensis*). Through out their range the rhinos are threatened by extinction and are, therefore, have been included in 1978 IUCN Red Data Book as endangered species. Among the three species of rhino extant in South East Asia, the javan rhino faces the bleakest prospect of longterm survival, because of its small population size (40 - 60 individuals in 1987) remaining only in Ujung Kulon National Park, West Java make it very vulnerable to sudden perturbation of its environment. Today, the Javan Rhino is considered as the rarest large mammal of the world.

Nardelli (1987) pointed out that a single population, like the Javan rhino population, in a single habitat is very vulnerable to natural disaster, drought or flood, poaching, demographic instability, inbreeding depression etc. There is also some tentative evidence the Ujung Kulon area may have reached its maximum carrying capacity for the Javan rhino, with the population levelling out in 1975.

Looking at the figures of annual census since 1980 (Sadjudin, 1987), the population of the Javan rhino appears to have declined recently. At the beginning of 1982, five rhinos (representing  $\pm 10\%$  of the population at that time) were found dead in the same area. The cause of its death still remains uncertain. Investigations revealed only that they died suddenly from a still mysterious epidemic and infectious

disease apparently resembling anthrax and possibly connected with the invasion of domestic animals in the wild rhino habitat. However, research before that time has been sound tentative evidence that there might be the alteration of vegetation structure in the rhino habitat disadvantageous to them in term of food plant preferences. Possibly linked with the alteration of vegetation structure is the invasion trend of some plant species, eg. *Arenga obtusifolia* and *Dillenia* spp.

The Directorate General of Forest Protection and Nature Conservation (1987) pointed out that one of the primary problems closely related to the survival of the Javan rhino population in Ujung Kulon National Park is the uneven distribution of preferred food plant species in their habitat. It is suggested that in some restricted areas, measures should be taken to increase the productivity of the rhino habitat. However, this should be supported by research activities, primarily on the ecological dynamics of the rhino habitat, hence, mismanagement of the measures can be avoided at early stage.

Based on the conditions and problems mentioned above, research aimed to formulate the habitat management of the javan rhino should be carried out in sufficiently detail. This will lead to a proper management for the longterm survival of the Javan rhino.

### C. Objectives

This research is aimed to :

1. Identify ecological dynamics of the Javan rhino habitat.
2. Identify the productivity of palatable food plant species.
3. Predict the carrying capacity of the rhino habitat.
4. Formulate the technical plan of rhino habitat management in Ujung Kulon National Park based on longterm investigation.

The results of the research will avoid and reduce the probability of certain mismanagement, which may lead to the extinction, of the rhino.

The results will also provide a proper technical guidance for rhino habitat management and it, therefore, will become a valuable model for other large mammals in Indonesia.

#### D. Approaches and Methods

##### 1. Location

This research will be carried out in Ujung Kulon National Park, West Java, especially in those where the Javan rhino concentration occurs, namely (Sadjudin, 1987) : southern part of Gunung Telanca extending eastwards to the area of Citadahan, Cikeusik and Cibandawok. The research will also be conducted in the areas where the rhinos or its footprints have ever been found, among other in Nyiur and Jamang swampy areas, Tanjung Balagadigi, Cigenter and Cihandeuleum, Karang Ranjang, Pangarok and Tanjung Telereng.

##### 2. Scope

The research will be focused on habitat aspects which are important in formulating the technical plan of the habitat management of the Javan rhino, namely :

- a. The succession of vegetation in the Javan rhino habitat.
- b. Habitat heterogeneity, consist of vegetation association which is utilized by the Javan rhino for their daily activities, ecotone or edge effects and habitat preference.
- c. Food sources problems, involved all aspects which related to the Javan rhino survival, among other are : food plant species and its distribution pattern, food plants preference or palatability, habitat productivity and carrying capacity of the habitat for the rhino population.
- d. Important aspects of physical environment of the Javan rhino habitat, among other are : water resources availability, climate fluctuation, soil fertility and physiography.
- e. Environmental pressures of the Javan rhino survival, especially social (human) and ecological pressures.

### 3. Methods

The research will be started by literature study to identify the recent status of the Javan rhino investigations. A year to five years field observations (see Table 1, time schedule and duration) will be carried out based on the objectives of research aspects.

Several permanent plots, each with size of 1 - 4 ha (depend on species-area curve analyzed by nested plot sampling), of vegetation analysis will be established and observed for identify the vegetation structure and floristic composition, phenology of the Javan rhino food plant species and succession trend in the Javan rhino habitat. The vegetation data will be used in the calculation of plant species density, dominance and importance value index, plant species diversity and equitability, similarity of plant community (Mueller-Dombois and Ellenberg, 1974; Cox, 1975; Soerianegara and Indrawan, 1985). The succession trend will be analyzed by the principal component analysis (Westman, 1984; Ludwig and Reynolds, 1988). Beside of that, a profil diagram representative for each plot will be drawn to reflect the pattern of vegetation coverage.

To identify the distribution pattern of food plant species, a transect will be established. The data will be calculated by quadrat variance methods (Ludwig and Reynolds, 1988). The food plants preference or palatability will be analyzed by rank preference index and/or Manly's Alpha (Krebs, 1989).

To identify the preferable food plant species productivity, several fenced permanent plots will be established by using randomized block design. Prediction of the carrying capacity of the Javan rhino habitat will be approached based on the preferable food plant productivity, food requirement of the Javan rhino, and as far as possible, will also consider the proper use factors in term of areas and plant part eaten by the Javan rhino.

The physical environment of the Javan rhino habitat will be monitored periodically by relevant tools and methods.

An unstructured interview with native people, hunter or poacher (if any), park ranger and other staffs of Ujung Kulon National Park, will be carried out to identify the human pressure to the Javan rhino survival.

Based on the data analysis mentioned above, a technical plan of the habitat management of the Javan rhino will be formulated and further examined in a small scale in the field.

#### 4. Time Schedule and Duration

The duration of the research is five (5) years. The time budget is scheduled as shown in Table 1.

Table 1. Time schedule of the research

No.	Activities	Y E A R				
		1	2	3	4	5
1.	Preparation (literature search and interview)	XXXX				
2.	Field orientation	XX				
3.	Field investigation on :					
	a. The succession of vegetation	XXXXX	XXXXX	XXXXX	XXXXXXXX	
	b. Habitat heterogeneity	XXXXX	XXXXX	XXXXX		
	c. Food sources problems	XXXXX	XXXXX	XXXXX	XXXXX	
	d. Physical environment	XXXXX	XXXXX			
	e. Environmental pressures	XXXXX				
4.	Laboratory analysis (for soil and herbarium)		XXXXXXXX			
5.	Data compilation and analysis		XXXX	XXXX	XXXX	XXXXX
6.	Formulation of technical plan for habitat management of the Javan rhino				XXXXXXXXXXXXXXXXXXXX	
7.	Interim report		XX	XX	XX	XX
8.	Final report					XX
9.	Seminar		X	X	X	X

## G. References

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