EVALUATION CRITERIA FOR DETERMINING PRIORITIES FOR WILDLIFE CONSERVATION

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Introduction

Biodiversity, now a commonly used word, describes the diversity of nature - variability of ecosystems, species and genes in a given assemblage (McNeely, 1988). About 1.6 million species have been identified but actual number on earth range between 5 to 30 million (Erwin, 1991). India is one of the twelve 'megadiversity' countries in the world with immense biological diversity which is estimated to be over 45,000 identified plant species and 81,000 identified animal species representing about 7% and 6.5% of world's flora and fauna respectively.

One third of its 15,000 flowering plants are found only in India and in case of fauna the extent of endemism is estimated at about 62%. The endangerment and vulnerability of some 10% of plant species and over 21% of the 372 mammal species indicates a widespread degradation of ecosystems that has significant economic implications. Losses of species and habitats are taking place at rates never before witnessed by the world. These losses are attributed to various factors contributing to a diminished quality of life for generations to come.

Endangerment and rarity of species

Drawing up lists of rare and endangered species requires not only a method of establishing priorities for conservation but also requires surveys and monitoring so that degree of threat can be recognized as such. Some information is available for major wildlife in India but not for minor fauna and flora.

Late Sir Peter Scott initiated the idea of IUCN Red Data Books which was made open to public subscription in 1966 [illegible]s to draw attention to the conservation needs of endangered species throughout the world. IUCN Red Data Books attempted the assignment of the threat categories which have been defined as follows :

Endangered : Species or sub-species in danger of extinction with unlikely future survival under the existing operating factor are categorised as endangered species. Those species can be included in this category whose number has been reduced to a critical level and whose habitats has been drastically reduced so that they are thought to be in immediate danger of extinction. Asiatic Lion in Gir and Indian Wild Ass in Rann of Kutch, Great Indian Bustard and Lesser Florican are examples in this category.

Vulnerable : Species or sub-species believed likely to move into the endangered category in the near future under the continuance of existing factors are categorised as vulnerable species. Population of such species are normally decreasing because of our exploitation, destruction of the habitats

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and environmental disturbance. Species with depleted population and continuously decreasing, or species with abundant population but under threat from serious factors operating throughout range, are also included in this category. Natural regeneration of some species like *Sterculia urens, Boswellia serrata, Commiphora wightii* is absent in Gujarat with fast declining population and these species are categorized as vulnerable in Gujarat State.

Rare : Species or sub-species with small world population that are not at present endangered or vulnerable, but are at risk and are usually localised within the restricted geographical area of particular habitat, are categorised as rare species.

The three categories of threat plus extinction are :

(a) *Critical* : 50% probability of extinction within 5 years or second generations which ever is longer.

(b) *Endangered* : 20% probability of extinction within 20 years or 10 generations which ever is longer.

(c) *Vulnerable* : 10% probability of extinction within 100 years.

There are some species which are abundant elsewhere but are endangered or rare in an area or country as per above criteria and such species are categorised as regionally or nationally endangered, or rare. Example in this case is Wild Dog and Barking Deer in Gujarat State. Population of these two species is reduced to critical level in forests of South Gujarat and exterminated in other part of the State. These two species are regionally categorised as endangered but nationally vulnerable.

Wildlife Conservation

Wildlife conservation gained momentum in the country after enactment of Wildlife (Protection) Act, 1972. Majority of national parks and sanctuaries were created between the period from the year of notification of the Act to 1990. Objective criteria such as existence of important wildlife, species richness and rarity status have been used along with subjective value judgement as a basis for selecting area as park or sanctuary. Some of the Protected Areas (PAs) have been declared on the basis of recommendation of individuals without going into the merit of the case. The network of PAs now consists of 83 national parks and 447 sanctuaries covering over 1,50,000 km^2 area along with seven biosphere reserves in the country.

In the beginning of the wildlife conservation programme in India, one or two important species of the area were the target of conservation effort. Constitution of PAs for conserving Tiger, Elephant, Lion, Leopard, Crocodile, Rhinoceros, Blackbuck, Chinkara, Great Indian Bustard etc. are the steps taken in this direction which also helped in protecting rich forest along with diverse flora and fauna.

Although area under PAs in India is above world average but all sites do not get adequate protection due to legal issues and prevailing local conditions in and around the PAs. Condition of some of the PAs is precarious as they are not managed as per provisions made in the law. Last two decades in India witnessed the declaration of many areas as PAs without deliberating issues and going in detail about merits. This has already created a difficult situation of management resulting in conflict between local people and authorities or between

State Government and Forest Department in most of the States. Settlement works and declaration of final notifications are pending for majority of PAs with State Governments. Many less important areas have been included in the categories of PAs whereas some of areas representing unique ecosystems and standing in high ranking are left out. State Governments now doubt the intentions of Forest Department as well as Government of India and are hesitant to accept recommendations for declaring new area as PA. In some cases, the Governments have started considering the denotification of some areas and Gujarat Government has already done in case of Narayan Sarovar Sanctuary in Kutch causing serious setback to conservation programme. Several court cases and public litigations have further complicated the issue, resulting in mistrust and conflict among all i.e. Judiciary, Governments and Forest Departments. The prevailing situations could have been avoided if evaluating, ranking and prioritisation of habitats could have been done on merits.

Species ranking

Wildlife found in India are distributed in five schedules of Wildlife (Protection) Act, 1972. Schedule I animals are considered rare and endangered from the criteria of national standard and high degree of protection has been provided in the law. 138 species of mammals, reptiles and birds along with several species of crustacea and insects are listed in Schedule I which need to be reconsidered on the basis of some established criteria.

Population of some of the species has improved and they are no more endangered. Blackbuck population in Gujarat State has increased from 1580 in 1977 to 13250 in 1994 with wide distribution in Saurashtra and North Gujarat which has started causing serious damage to agricultural crop in Mehsana, Amreli and Bhavnagar Districts. In changed situation, this species should be deleted from Schedule I. Similarly, population of Leopard has increased in most of the area which has resulted into conflict between animals and local people. Control of Leopard population is a challenge for the Forest Department. Pea Fowl has wide distribution throughout the country with very high population in PAs. The species is religiously protected and cannot be considered as endangered or rare. Being a national bird, the species can be kept in Schedule I otherwise it deserves exclusion from the list.

On the other side Blacknecked Stork is rarely seen in coastal zone of the Gulf of Kutch and it is doubtful that the number of birds may not be in three digits in India. This species deserves higher degree of protection. The Saras Crane, the largest and most magnificient Crane in the world is a resident bird. Population of this Crane is declining fast due to destruction of habitat and loss of breeding ground. This bird has important place in our culture and literature and deserves to be included in Schedule I. Rarity, endangeredness and vulnerability of species and ranking of conservation value of habitats would facilitate an agreement on a list of biodiversity i.e. a priority list which in turn would be of immense use for deciding conservation strategy.

Habitat evaluation and prioritisation

Different methods were proposed and developed for ecological evaluation and assessment of biotic communities and wildlife habitats in western countries and they were soon followed by reviews.

Table

Priority Ranking of Protected

Points allotted

Attributes	BAN	GIR	MNP	VNP	BAR	AMB	DHR	PAN	JES	JAM
1	2	3	4	5	6	7	8	9	10	11
1. Uniqueness of habitat	2	4	4	3	1	1	5	1	1	1
2. Habitat diversity	2	5	4	2	2	3	2	2	2	2
3. Diversity of mammals & reptiles	4	5	3	3	3	3	3	4	3	3
4. Diversity of birds	3	5	4	3	3	3	4	3	3	3
5. Diversity of plants	5	3	4	1	3	3	2	3	4	3
6. Support to rare and endangered spp.	3	5	3	3	3	2	4	2	3	2
7. Extent of area	1	5	3	1	1	1	5	1	1	1
8. Watershed conservation	2	5	1	1	2	3	1	3	3	3
9. Environmental regulations	2	4	3	2	3	4	3	3	5	3
10. Recreation and tourism	3	5	4	3	1	2	4	1	2	2
11. Education, research and monitoring	3	5	4	5	2	2	4	2	2	2
Total (55 points)	30	51	37	27	24	27	37	25	29	25

Note: BAN = Bansada National Park, GIR = Gir National Park and Sanctuary, MNP = Marine National Park, Jamnagar, VNP = Velavadar National Park, BAR = Badra Lion Sanctuary, AMB = Ambaji Balaram Sanctuary, DHR = Drangadhra Wild Ass Sanctuary, PAN = Paniya Sanctuary, JES = Jessore Sanctuary, JAM = Jambughoda Sanctuary.

Species diversity have been obtained from various sources including management plans and points allotment for the attributes are based on existing available information.

Some methods evaluate and priortise habitat on basis of ecological, historical, cultural and educational factors to measure the conservation value. Trans (1974) published an approach to the priority ranking of natural areas in North America and Ogle (1981) developed a criteria for ranking forests for wildlife in New Zealand. Trans allocated points for quality, commonness, community diversity, size and buffer area for the wilderness area for ranking habitat which may be suitable to the Western America but not for other parts of the world. Ogle adopted the factors like representativeness, extent of area, extent of forest cover near the habitat, habitat diversity, habitat modification, birds diversity and rarity of fauna for ranking

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Areas in Gujarat State
to the PAs

HIN	KUT	NAR	PUR	RAM	RAT	SHO	BUS	GAG	KHI	NAL	POR	THOL
12	13	14	15	16	17	18	19	20	21	22	23	
1	5	3	1	1	2	3	2	1	3	4	1	1
1	2	3	2	1	3	3	1	1	2	2	1	1
2	3	3	3	3	2	4	2	1	1	2	-	1
3	3	3	2	3	3	3	2	2	3	5	2	3
2	2	2	5	2	4	5	1	1	1	1	1	1
2	3	4	3	2	3	4	3	1	2	2	1	1
1	5	3	1	2	1	4	1	1	1	2	1	1
2	1	2	3	1	3	4	1	1	1	1	1	2
2	1	3	3	2	3	3	1	1	2	3	2	2
2	2	2	3	1	3	4	1	-	2	5	1	1
3	3	3	3	1	3	4	2	-	3	4	1	1
21	32	31	29	19	27	41	17	10	21	31	12	17

HIN = Hingalgadh Natural Education Sanctuary, KUT = Kutch Desert Sanctuary, NAR = Narayan Sarovar Sanctuary, PUR = Purna Sanctuary, RAM = Rampara Sanctuary, SHO = Shoolpaneshwar Sanctuary, BUS = Kutch Bustard Sanctuary, GAG = Gaga Great Indian Bustard Sanctuary, KHI = Khijadia Bird Sanctuary, NAL = Nalsarovar Bird Sanctuary, POR = Porbandar Bird Sanctuary, THOL = Thol Bird Sanctuary.

habitat to determine intrinsic conservation value. There have been some excellent theoretical innovations in evaluation and assessment of nature conservation although not all have been tested in practice.

Exact information about the number of flora and fauna, extent of distribution of species, rarity and abundance of some of the species, factor operating for disturbance of the area, rate of depletion of species and environmental benefits from the area are not available for many ecosystems. In the background of these limiting factors in Gujarat State, an attempt has been made to develop a method which may not be very accurate to evaluate the conservation value of different areas but to provide some information about the ranking.

There is no doubt that red lists do play a valuable role in conservation by drawing

attention to the growing list of threatened species. Conservation of single endangered species, saving the last fragments of nature, overall aim to maximise biodiversity, preservation of unique and rich biodiversity area form the basis for selecting area under PA. The criteria for key site selection should be the subject of many critical appraisals. Area (size and extent), diversity (variety and richness), naturalness, uniqueness, rarity, fragility, typicalness, recorded history, position in an ecological or biogeographical unit, potential value should constitute the criteria for selecting any wilderness area as a national park and sanctuary.

On the basis of exercises carried out in developed countries, an attempt has been made in this paper to evolve a new methodology suiting the requirement of Gujarat State. Content in this paper is a personal view which has been written not only to provide rationale underlying evaluation and assessments but also to expose the application of this topic in evaluating conservation strategy in the country. There has to be some kind of selection which favours greater protection and greater efforts to conserve and protect certain species and communities on the basis of its merits. Method prescribed in this paper is subject to modification after deliberating various issues. Maximum weightage in this case is allotted to biological and ecological features which decide conservation value of the area.

The use of indices to express the value of a biotic community has been accepted in other countries for ecological evaluation of biotic communities. Although different attributes may deserve different points but it is difficult to fix relative value. For purpose of exercise, an outline of various attributes within each category and points awarded are shown below. Information for some important attributes like diversity of minor species (insects, algae etc.) are not available due to inadequate study of the area and these are ignored in this exercise.

Criteria for point allocation for priority ranking of natural area

There may be many more attributes to natural areas which can be added to modify the criteria. Ecological evaluation and assessment is dependent on the availability of good data and also reliable identification of taxa. Total eleven attributes have been identified for wilderness area in Gujarat State and five marks have been allotted to each attribute. The criteria is tested for all wildlife Protected Areas in Gujarat State and its result is indicated in Table 1.

A. Ecological and biological features

Uniqueness and uncommonness : (i) Internationally unique or very uncommon, no occurrence of such habitat in the world, nearly complete conversion of type, restricted occurrence of internationally rare and endangered species (Example - Little Rann of Kutch, Greater Rann of Kutch are true saline desert which are incomparable in the world - 5 points). (ii) Nationally unique or uncommon, partial conversion of type (3-4 points). (iii) Regionally unique supporting enough number of wildlife (2 points). (iv) Common, frequent to abundant in present landscape, adequately represented in other PAs (1 point).

Habitat/community diversity : A measure of the area derived by type of ecosystem or forest sub-types within area - one point for each of three sub-types.

Diversity of mammals and reptiles : 57 species of mammals and reptiles have been recorded in Gir forest which is highest in Gujarat. One point is alloted for each 12 species of mammals and reptiles recorded in the area.

Diversity of birds : About 300 birds are recorded in Gir which is highest in Gujarat. Hence one point for every 50 species of birds is alloted subject to maximum of 5 points.

Plant diversity : Wilderness areas have not been studied and actual status of plant diversity is not known for all forest areas. Over 570 and 450 flowering plants have been recorded in Shoolpaneshwar and Gir respectively but actual number may be higher. It is estimated that rich forests in Dangs, Valsad and Shoolpaneshwar support over 700 plant species. Thus, one point is allotted to every 120 species of plants in the area.

Support to rare and endangered species : Out of 138 species listed in the Schedule I, about 35 species are found in Gujarat, and 16 of them are recorded in Gir which is highest among all wilderness areas in the State. Thus, one point for every three species listed in Schedule I is allotted for calculating weightage to any PA.

B. **Environmental and utility value**

Extent of area : One point for every 2 km^2 area of the PA with maximum of five points is allotted. There would be some deviation in case of wetlands and grasslands.

Watershed conservation, maintenance of watershed health and catchment area of irrigation project : Outstanding - 5, high - 3, moderate - 1.

Environmental regulation - fragility of the area, moderating effect on climate, controlling the progress of desert, recharging ground water and controlling salinity, protection to soil : Outstanding - 5, high - 3, moderate - 1.

Natural scenic beauty, cultural and historic value, recreation and tourism services - existing position and potential for development : Outstanding - 5, high - 3, moderate - 1.

Education research and environmental monitoring (Area used for nature education no. of research and study project taken up etc.) : Outstanding-5, high-3, moderate-1.

Range of ecological and non-ecological criteria mentioned in above table is used to evaluate and assess the ranking of PAs in Gujarat State which is indicated in Table 1.

Conclusion

The assessed value as indicated in Table 1 for all 23 PAs in Gujarat State vary from maximum of 51 for Gir Sanctuary and National Park to a minimum of 11 for Gaga Great Indian Bustard Sanctuary. This exercise may also provide information that some of non-protected areas have high ranking but could not get place in protected category due to non adoptation of established methodology. Application of such criteria before the declaration of some areas as PAs would have resulted into exclusion of them from consideration as park as sanctuary. Such type of habitat or species evaluation tools may be of immense use for conservation planning in the country.

This technique of habitat evaluation provides some information about the relative

conservation value which should not be adopted in all cases as criteria for deletion of area from the category of PA because they are constituted for different purposes. For example, the ranking of Kutch Great Indian Bustard is low but it is created in the largest grassland of country, primarily to conserve prime habitat of Great India Bustard and Lesser Florican which are endangered birds listed in Red Data Book and meet the specific objective for conservation. Thus, any PAs with low ranking can have high conservation value if it fulfills the specific objective of the conservation.

SUMMARY

In this paper an attempt has been made to evolve a new methodology, tested for all Wildlife Protected Areas in Gujarat. The method prescribed is subject to modification after deliberating various issues. Maximum weightage is alloted to biological and ecological features which decide the conservation value of the area.

वन्य प्राणी संरक्षण की पूर्वताएं निश्चित करने के लिए मूल्याँकन कसौटियाँ

एच०एस० सिंह

सारांश

प्रस्तुत अभिपत्र में गुजरात के सभी वन्य प्राणियों के लिए बने सुरक्षित क्षेत्रों के लिए परीक्षित एक नया रीति-विज्ञान विकसित करने का प्रयास किया गया है। निर्धारित किए इस तरीके में विभिन्न मुद्दों पर विमर्श करने के बाद यथा आवश्यक संशोधिन भी किया जा सकता है। इस तरीके में जैविकीय और परिस्थितिविज्ञानीय विशेषताओं पर अधिकतम बल दिया गया है जिनसे किसी क्षेत्र का संरक्षण मूल्य तय किया जाता है।

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