

Rapid Assessment of Impacts of Proposed Ghatila Bandhara Near Mandarki Village on Adjoining Wildlife Values

Report



Submitted By

Centre for Environment and Social Concerns

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Bopal, Ahmedabad 380058 (Gujarat, INDIA)

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Assessment Team

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1. Context

The Little Rann of Kachchh is a unique landscape in the sense that it has the characteristics of both deserts and wetlands. It is a low lying area where altitude varies between 1 - 9 m above sea level. During the monsoon, several ephemeral rivers drain their water into the Rann and thus function as hydrological 'sink'. At the same time, saline sea-water from Gulf of Kachchh enters the south-western part of the Rann through Hadakiya Creek (commonly known as Surajbari creek). Such inflow of water, transformed the Rann into a large shallow brackish-water wetland. In subsequent warmer months, however, the flooded water used to evaporate and Rann gradually transformed into a saline, dusty desert. Due to its seasonal dynamics (dry and wet phases), the LRK support a rich diversity in faunal species. Thus, while the LRK is the last home for the only surviving population of highly endangered wild ass (*Equus hemionus khur*), it also supports more than 200 species of birds and falls in the route of winter migration of large number of bird species.

For above defined reasons, and also to conserve wide spectrum of arid biodiversity, an area of about 4953 sq km, mostly of the LRK, was notified as Wild Ass Sanctuary (WAS). The sanctuary was notified first in 1973 and included 4840.90 km² area of LRK. An area of 112.81 km² along the Greater Rann of Kachchh was further added through a second notification in 1978. In total, the WAS extends in 4953.71 km² area. Importantly, while the LRK is free from human habitation, 108 villages surround it. Salt-farming, prawn fishing, livestock rearing and rainfed farming are the four major livelihood base of majority of population living in these villages.

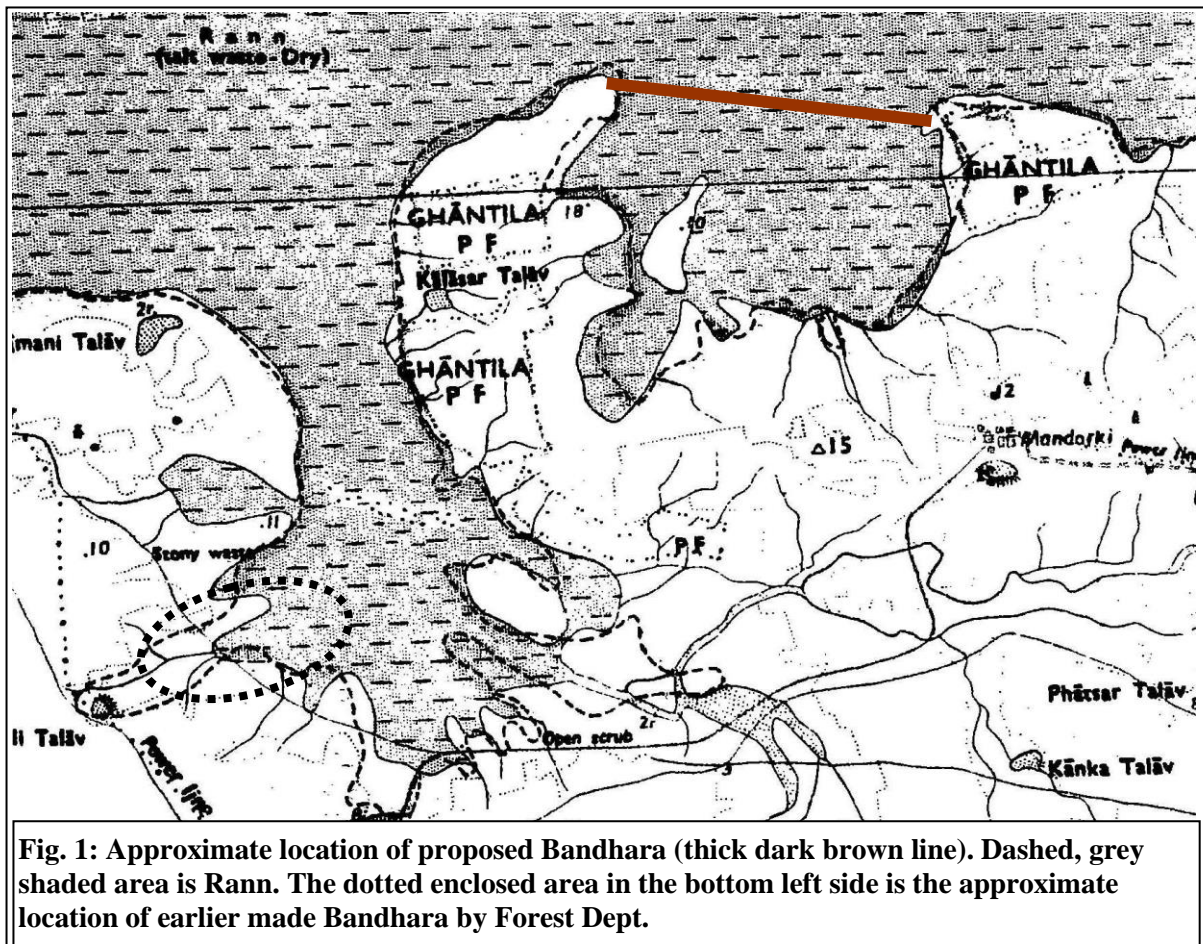
As described earlier, every year most part of the LRK normally turned into a saline, brackish water reservoir due to its inundation by mixing of rains and run-off water with tidal water. Due to brackish water, the soil as well as ground water salinity is quite high along the boundary of LRK. Often, these saline water spread beyond the boundary of LRK through the narrow stream channels (or small creeks) and low lying areas, causing substantial damage to the productivity of common lands as well as private agriculture fields. In long run, this is considered to have serious economic losses to local communities. At hind sight, due to proximity with tidal inlet (i.e. Surajbari creek) and presence of slightly deeper channels, this problem is more prominent in the areas adjoining to southern boundary of LRK.

One of the technological solutions to arrest this problem of surface salinity ingression is to make a bund to stop brackish water flow from Rann sides to land side, especially in the low lying areas or small water channels or creeks. Construction of such bunds would thus arrest

the progress of salinity in landward side. Importantly, such bunds would also store substantial fresh water run-off during the monsoon, which can be used for small irrigation purpose.

2. Present Project

Keeping the above in view, Irrigation Department through its Salinity Ingression Prevention Scheme (SIPS) circle proposes the construction of an earthen bund in the Mandarki village to halt the progress of salinity in the village mainland. While the main purpose of this project is to improve land quality by stopping salinity ingress toward mainland (the environmental benefits!), it also aims to generate other social and economical spin-offs by storing freshwater runoffs during monsoon. The location and approximate position of proposed earthen bund is presented in **Fig. 1**. Importantly, the proposed site for Bandhara construction, falls within the limits of notified Wild Ass Sanctuary and thus under the administrative jurisdiction of State Forest Department¹.



Accordingly, the bund is proposed in the Mandarki village. Where, by constructing an earthen bund of approximately 2495 meter length, the brackish water from Rann side will

¹ As a matter of fact, the Irrigation Dept. had initiated the work for construction of earthen bund in the proposed site. But the work was immediately halted once it came to notice to Wild Ass Sanctuary officials.

stop spreading and will not be in direct contact of mainland. The construction of bund will also store approximately 1.225 million cubic meter of runoff water from a catchment area of about 8.25 sq km. As per the storage capacity of this reservoir, approximately 400 ha of agriculture area can be brought under irrigation. The salient features of the project are given in **Table 1**.

Table 1: Salient Features of Ghatila Bandhara Project	
Parameters	Details
Village	Mandarki
Taluka	Maliya
District	Rajkot
Longitude	70°51'30"
Latitude	23°10'15"
Total Catchment Area	8.25km ²
High Tide RL	3.20 meter
FSL RL	5.00 meter
HFL RL	5.66 meter
Top of Dam RL	7.20 meter
Gross Storage Capacity	1.225 million cubic meter
Dam Type	Rolled filled type earthen dam
Length of Dam	2495 meter
Flood Lift	0.66 meter
Free Board	1.54 meter
Design Discharge	142.618 cumecs
Command area	400 hectare
Beneficiary Villages	Mandarki & Ghantila
Source: Irrigation Dept. (Project Construction Division No. 3), Rajkot	

3. Objectives

Following were the objectives of this study:

- (1) To assess the potential impacts of proposed Bandhara on wildlife values
- (2) To suggest measures for mitigating the impacts, if any.

4. Assessment of Impacts

With the kind of time and resources available to conduct this study, it was not possible to provide a comprehensive account of impacts of proposed Bandhara on wildlife values. However, based on existing information and knowledge about wildlife of the area, limited field surveys, interaction with villagers and concerned field staff of Forest Department, key conservation concerns associated with proposed construction of Bandhara were identified. Thus following two broad approaches were followed:

- (1) Field visit of proposed site and adjoining areas for the understanding of ecological and associated socio-economical issues.

- (2) Questionnaires based survey to account knowledge and perception of local communities regarding the project and wildlife. This was done through interaction with the local villagers. Four villages were covered to account this that include, Mandarki, Ghatila, Kumbhariya and Venasar.

4.1 Existing Wildlife Situation

Based on the interaction with field staff of Forest Department and interviews with local people, it was revealed that the project sites and its adjoining areas support good diversity of wildlife. Important mammalian species include Wild Ass (*Equus hemionus khur*), Chinkara (*Gazella bennetti*); Nilgai (*Boselaphus tragocamelus*), Wolf (*Canis lupus pallipes*), Fox (*Vulpes bengalensis*), Jackal (*Canis aureus*), Jungle Cat (*Felis chaus*), Desert cat (*Felis sylvestris ornate*) and Wild Boar (*Sus scrofa*). In addition to these, it also support many small mammals including the Porcupine (*Hystrix indica*) and Pale Hedgehog (*Paraechinus micropus*). The information about the birds and herpatofauna, as provided by villagers and forest staff was quite sketchy and thus not comprehensive. However, following bird species were reported from the area: Lesser flamingo, Greater flamingo, Demoiselle cranes, Common cranes, White pelican, Coot, Little cormorant, Cattle egret, Pond heron, Black ibis, Spoonbill, Pintail, Grey partridge Common peafowl, Green bee-eater, Crested lark, Small blue kingfisher, Koel, Indian ring dove, Indian sandgrouse, Black-winged kite etc. It is important to note that entire LRK support 29 species of herpatofauna (reptiles and amphibians), 178 species of birds and 33 species of mammals (GEER 1999). Among the birds, a total of 97 aquatic bird species were recorded from the landscape of which 73 were winter migratory (GEER 1999). Other than these, the LRK also support 22 fish and 11 prawn species. *Metapanaeus kutchensis* is an endemic prawn species that occurs only in the Gulf of Kachchh and used the vast flooded expanse of LRK as their nursery ground. During monsoon a lucrative fishery, especially of *Metapanaeus kutchensis*, used to flourish in the LRK, sustaining the livelihood of large number of fishermen. The fishing activities are mostly concentrated along the southern boundary of LRK.

Among all the wild animal species, Wild Ass is the flagship species for the entire Little Rann of Kachchh landscape. The species is found only in Rann of Kachchh landscape. According to wildlife census in 2004, there were about 4000 wild asses in the entire Little Rann of Kachchh and surrounding landscape. While, Rann and the bets are the ideal habitats for Wild Asses, about one third (i.e. 31.3%) of total population are also reported inhabiting fringe areas of Rann. While precise data on population of wild ass is not available for the proposed Bandhara site and its adjoining areas, the wild ass census in year 2004 estimated about 380 wild asses in Halvad and Maliya zones (**Table 2**). The discussion with villagers also suggested that about 250-300 wild asses are using various habitats around proposed Bandhara site. This suggests that the area is supporting good population of wild ass.

Survey Zone	Rann	Fringe	Total
Halvad Zone	164	79	243
Maliya Zone	66	73	139
Total	230	152	382
Source: Forest Dept.			

4.2 Important Conservation Concerns

Clearly, the impact of proposed project needs to be assessed in the context of conservation of three major animal groups – the wild ass, the aquatic birds and the fish and prawns. sDuring the study, following conservation issues were found associated with the construction of Bandhara:

1. That the proposed project will augment and store freshwater in a water scarcity zone, it is always considered good for wildlife as well as human and livestock populations. While, the water can be used for drinking purpose by wild animals (including wild asses) and livestock, the same can also be used by farmers for irrigation purpose, although to a limited extent.
2. The Bandhara construction would cause submergence of about 200 ha area. This also means that the construction of Bandhara would carve out an area of about 200 ha from the Rann. In the context of nursery and growth of many species of fish and prawns, the carved out or submerged area is quite negligible compared to vast, open stretch of Rann. Thus, the project would not affect the species diversity and productivity of fish and prawns in the LRK, in any obvious manner. As a matter of fact, the project would not affect the ecology of fish and prawn species in the LRK area. Rather, if use judiciously, this can be developed into a freshwater fishing ground and thus can contribute to the livelihood of local communities².
3. As described earlier, the flooded phase of LRK supports many species of winter migratory aquatic birds. Thus, many of these migratory aquatic birds would likely to use shallow water reservoir, created as a result of Bandhara, and colonize there. This would help in enhancing the biodiversity values of area.
4. As described earlier, Wild Ass and many other wild animal species, inhabiting and using the nearby areas of project site, would get benefit of improvement in drinking water availability. This would certainly help in building their population in the region. There is, however, a serious conservation concerns associated to this availability of drinking water to wild animals. In fact, it is reported elsewhere (BCRLIP, 2007) that almost on the entire periphery of LRK the Wild Ass and other ungulates are dispersing out in search of water

² Interaction with people in Mandarki village suggested that at present fishing is not practiced by locals. However, quite a few of these families are interested in adopting fishing practice in the submerged area.

and food and in the process damage the crops in the agriculture fields. This is identified as one of the most critical issues in conservation of wildlife species in LRK in general and in Wild Ass Sanctuary in particular. The environs of present project area, as described above, support a population of about 300 Wild Asses. The enhanced availability of drinking water, after the construction of Bandhara, would likely to increase the congregation of Wild Ass and other ungulates (like Neel Gai), around the proposed submergence area. This congregation can lead to crop damage, especially in those farms which are located close to project site. Discussion with farmers in Mandarki and other adjoining villages like Ghantila and Venasar suggest that the farmers are already facing the problem of crop damage by Wild Asses at different levels (Table 3). Detail of response by different farmers in sample villages is presented in **Annexure-1**. It is therefore, quite likely that the frequency and magnitude of problem of crop damage would increase by some factor after the completion of this Bandhara. Thus human-wildlife conflicts in the peripheral areas of the reservoir would be on rise, a situation not warranted for the wildlife conservation in LRK and Wild Ass Sanctuary.

Table 3: Extent of crop damage by wild asses in Mandarki.			
Crop	Avg. Production (Mann / Bigha)	Seasons (Months)	Scale of Damage by Wild Ass
Kapas	6	Jun.-Mar.	High
Mugfali	8	Jun-Oct.	High
Bajra	10	Jun-Oct.	High
Jar	4	Jun-Oct.	High
Mag	2	Jun.-Oct.	Moderate
Math	2	Jun-Oct.	Moderate
Aeranda	17	Jun.-Oct	Moderate
Source: Present Survey			

- The discussion with irrigation department officials suggested that other than environmental benefits of improving the quality of otherwise low productive (mostly saline) lands, one of the social objectives of constructing the Bandhara was to store the monsoonal run-off water and makes it available for the purpose of support-irrigation to adjoining farms. Thus, in a post project scenario, agricultural productivity in these lands is likely to increase by some factors. However, the benefits of providing water for irrigation purpose also need to assess in the context of availability of drinking water for wildlife (including the Wild Ass). At the hind-sight, it seems that both these benefits are cross purpose. Since critical period of drinking water requirement for wild animals and water requirements of farmers for irrigation needs, are quite overlapping (especially, during late winter and summer months), there are bound to be some conflicts for its allocation. In all probability farmers' group will use most of the water for their farming purpose, leaving limited or almost no water for wildlife purpose. This ultimately defeats one important purpose of constructing the Bandhara- the conservation gains for Wild Ass Sanctuary. In a sense, unless some management system is evolved, most of the water in

the reservoir will be used for livelihood (farming) purpose, and thus during the pinch period in summer, when wild animals actually need that water, there would be nothing left for them. Thus, the conservation benefits from the augmented water may be realized only to limited terms and extent.

6. Discussion with Forest Dept. revealed that the concerned Territorial Forest Division had constructed a similar type of Bandhara structure, very close to the present project site (see Fig. 1). It is commonly known as Sagar Bandhara. It was constructed about 6-7 years ago within the Wild Ass Sanctuary area and also having almost similar objectives. Comparatively this Bandhara is quite a smaller structure than that of proposed one. During the field work study team had visited the submergence area of this Bandhara. The water depth was found quite low. However, discussion with local farmers and field staff of Forest Dept. revealed that quite a few farmers are extracting water from this small reservoir (Table 4). However, due to poor maintenance and management, the bund is broken and breached and is currently not functioning optimally. Thus, in the context of proposed Bandhara in Mandarki village, it strongly highlights the role of management of both Bandhara as well as augmented water for extracting greater conservation as well as livelihood benefits.

#	Village	No. of Farmers
1	Mandarki	12
2	Venasar	25
3	Kumbhariya	35
4	Ghatila	10
	Total	82

Source: Present Survey

Based on above understanding, no direct impacts on wildlife values are visualized. However, in the context of proposed Bandhara project, following three issues are considered important and critical for wildlife conservation, which need attention:

- a. The building of wild ass and other wildlife population due to improved water availability could lead to crop damage and human- wildlife conflicts in the area
- b. The period of need of water for irrigation and wildlife purpose are somewhat antagonistic in nature and could lead to diversion of most of water for human needs than for wildlife
- c. Lack of management and maintenance system of Bandhara or similar structure in the earlier times, forgo the desired or stated benefits for both conservation and local livelihood

5. Mitigatory Measures

Following measures are suggested to address the above issues and thus to mitigate potential impacts of Bandhara construction:

1. To address the issue of increasing crop damage related human-wildlife conflicts, a ‘**crop compensation fund**’ should be created by concerned Irrigation Department by contributing between 1-2% of the total cost of the project. The fund should be jointly managed by the farmers of Mandarki village and Forest Department (Wild Ass Sanctuary). However, for this, a framework needs to be evolved through a consultative process with initial handholding by competent NGO.
2. It is important to understand that through this project, two types of assets will be created—the physical (the earthen bund and its ancillaries) and stored water. In order to ensure equitable sharing of stored water between irrigation and wildlife needs, an efficient water sharing system need to be evolved. For effective conservation gains from the augmented water following need to be done: (i) Concerned Irrigation Dept.; Wildlife Division of Forest Department and communities should jointly prepare a comprehensive water and associated wildlife resource management plan within the existing legal framework as driven by Wildlife Protection Acts; (ii) Promote stakeholder driven participatory irrigation management (PIM) practices with adequate allocation of water for wildlife purpose; (iii) The stored water should be managed jointly by beneficiary farmers and Forest Dept.. While, the technical and financial responsibility of maintenance of Bandhara should lie with Irrigation Dept; (iv) for long-term conservation gains and to promote participatory water management system, Irrigation Department should create a ‘**water management fund**’ by contributing between 1-2% of total cost of the project. The fund will be managed jointly by beneficiary farmers and Forest Dept. For this, a framework needs to be evolved through a consultative process with initial handholding by competent NGO.
3. A ‘**wildlife contingency fund**’ of about 1-2% of total project cost need to be created for addressing any unwarranted issues that can emerge after completion of the project and also to monitor the wildlife population in the area. The fund should be managed jointly by people of Mandarki village and concerned Wildlife Division of Forest Department.

Acknowledgement

Study team accord special thanks to Dr. Bharat Jethwa and Dr. Chitranjan Dave for accompanying in the field and provided critical views on the various aspects of the wildlife and ecology of Little Rann of Kachchh. Study team thanks people of Mandarki, Ghantila and Venasar villages for providing important insights about the project and wildlife and ecology of the area. Study team also wish to thank Irrigation Dept. for providing logistic support during the field work.

Annexure-1

Current Status of Crop Damage Issues

Village Name	Name of Farmer	Land Holding (in Bigha)	Crop Damage in %				
			Wild Ass	Wild Boar	Others	Total	
Mandarki	Aapabhai Sadur	70	10	20	1	31	
	Manjuben Govindbhai	51	15	20	1	36	
	Ratilal Mohan	10	5	15	1	21	
	Jivrajbhai Mavjibhai	50	5	15	1	21	
	Bharatbhai Devsi	35	10	20	1	31	
	Bhavan Seth	10	5	15	1	21	
	Dulabhaji Govindji	10	10	10	1	21	
	Narsibhai	20	10	15	1	26	
	Avg.			8.75	16.3	1	26
Ghatila	Prabhaji Bhojani	70	10	15	2	27	
	Dulabhaji Laxman	30	5	10	2	17	
	Mohanbhai Kailasbhai	30	5	10	2	17	
	Gogha Kana	21	5	10	2	17	
	Samji Madsai	20	10	10	2	22	
	Haribhai Madsai	20	10	10	2	22	
	Avg.			7.5	10.8	2	20.33
	Kumbhariya	Khengarbhai Karmanbhai	25	5	10	2	17
Nagjibhai Devjibhai		15	10	10	2	22	
Mohanbhai Tapabhai		17	10	10	2	22	
Laxman Horabhai		15	10	10	2	22	
Sukhabahi Horabhai		15	10	10	2	22	
Avg.				9	10	2	21
Venasar	Khengarbhai Bhanabhai	20	10	10	2	22	
	Rambhai Parbatbhai	50	10	10	2	22	
	Devrajbhai Viralbhai	20	10	10	2	22	
	Gagubahi Khimabhai	12	10	10	2	22	
	Samabhai Lakhabhai	10	10	10	2	22	
	Dambhai Devsibhai	10	10	10	2	22	
Avg.			10	10	2	22	