

Status of Gharial and Mugger in Orissa

Dr LAK Singh

THE PRESENT STATUS OF gharial and mugger in Orissa and, in fact, all over the country, is not completely known because of lack of systematic coordination either at the national or state level during the last one decade. Data is available only in fragments and that too from a few places. However, at most of these places, the efforts seem to have been to keep alive the technique of crocodylian rearing and management that was so well generated under Indian conditions, with technical and financial collaboration from FAO/UNDP mostly during the first ten years following 1974.

The present sorry state of affairs has resulted from a combined effect of the following happenings.

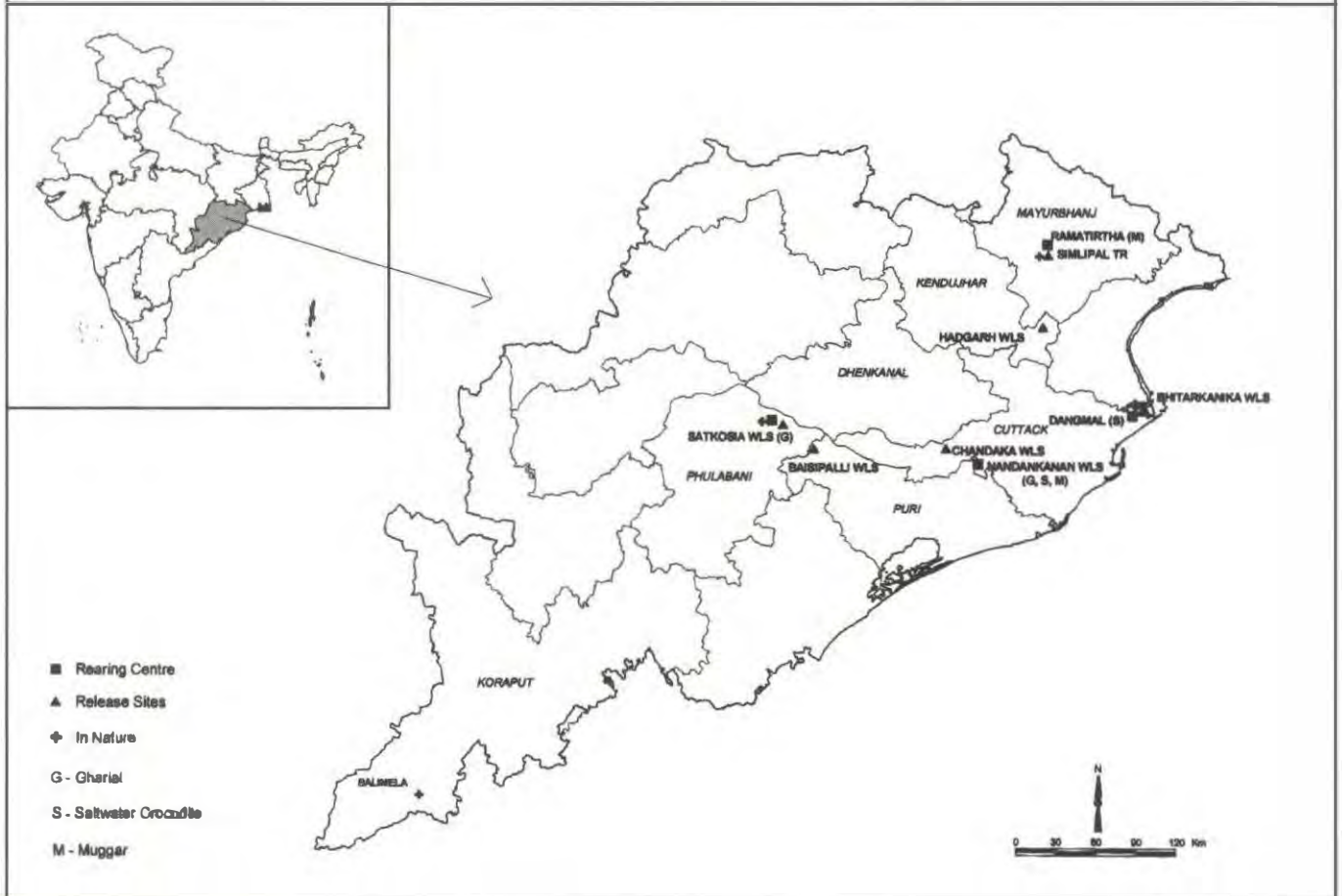
- a) Production of a large number of captive stock without adequate suitable places for release.
- b) Growth of human population leading to reduction in undisturbed habitats for released crocodylians back in the wild.
- c) Unplanned financial assistance from Government of India.
- d) Closure of continued international assistance through FAO/UNDP.

- e) General disapproval of the idea of commercial utilization.
- f) Absence of a national-level monitoring institution after closure of the erstwhile Central Crocodile Breeding and Management Training Institute and its later incarnation as Crocodile Research Centre of Wildlife Institute of India at Hyderabad.

Orissa is the only state in the country where all the three Indian species of crocodylians - gharial (*Gavialis gangeticus*), mugger (*Crocodylus palustris*) and saltwater crocodile (*Crocodylus porosus*) are found in their natural habitats. It was in this state that the Indian Crocodile Project was launched first and researchers worked full-time to generate a database to assist conservation.

Starting in 1975, the Orissa state programme developed three research and conservation units at Tikarpada, Dangmal and Ramatirtha for captive rearing of the gharial, estuarine crocodile and the mugger respectively. It included the management of three crocodylian sanctuaries at Satkoshia Gorge, Bhitarkanika and Hadgarh, and management of mugger crocodiles in the Similipal

Figure 1 - Crocodiles in Orissa



Tiger Reserve. Apart from these, captive breeding facilities were developed for all the three species at Nandankanan.

THE GHARIAL IN ORISSA

The gharial once inhabited all the major river systems of Orissa, namely, the Mahanadi, Brahmani and Baitarani. Their occurrence in Sileru and Saberi, the tributaries of the Godavari system have also been recorded. However, by 1975, only Mahanadi was left with some adults and juvenile gharial.

Realising that because of heavy loss of eggs and hatchlings, the recruitment of crocodilians was low in nature, the 'rear and release' technique was adopted for their

conservation. And Satkosha Gorge Sanctuary was especially established to augment the protection measures initiated for the gharial, .

The gharial project at Tikarpada was the first of its kind in the country. Here, initially, the gharial eggs or hatchlings were brought from Nepal and later from the National Chambal Sanctuary.

The 'rear and release' technique involved a five-steps operation :

- 1) Collection of eggs laid in wild, to reduce predation of eggs;
- 2) Incubation of eggs under hatchery-conditions with

- proper supervision, to reduce embryonic mortalities and produce more 'fit' hatchlings;
- 3) Rearing of hatchlings under high standards of husbandry, to achieve higher juvenile-survival;
 - 4) Releasing young gharial when about 1.2m body length at appropriate places, allowing them sufficient time to settle down in the habitat before the monsoon; and
 - 5) Monitoring of the released gharial to ascertain the efficacy of the conservation programme.

Some of the significant management actions taken up with an intention to manage gharial as the 'flagship species' in the Mahanadi were as follows :

Satkoshia Gorge Sanctuary

A 30km length of the river Mahanadi, encompassing the once famous habitat of gharial, the Satkoshia gorge and the adjoining forests on the northern and southern sides, were gazetted as the Satkoshia Gorge Sanctuary in May 1976, with a total area of 795.5sq.km. In November 1981, another 168.4sq.km, covering the Baisipalli Sanctuary in its south were added to it. In 1989, an area of 384sq.km. was identified as the core area of the sanctuary. Later, the entire area of the Satkoshia Gorge-Baisipalli Sanctuary was placed under the administrative

control of the Satkoshia Wildlife Division for some years. The experiment ended in 1993-94 and the areas were transferred back to the territorial forest divisions. The sanctuary is now under the jurisdiction of five Forest Divisions - Angul, Athgarh and Athmalik in the north, and Boudh and Nayagarh in the south. Efforts are afoot to revive the separate status of the Satkoshia Gorge Sanctuary either under Project Tiger or Project Elephant.

However, looking at the 'non-survival of gharial in Mahanadi', it has been concluded that the riverine stretch of the sanctuary has proved to be inadequate for gharial.

Induction of gharial guards

The gharial project has served as a means to involve public into the conservation programme. The induction of riverside fishermen as Gharial Guards and other educated youth in the captive rearing programmes have helped to demonstrate the employment opportunity offered by the conservation scheme. It has also helped to earn the goodwill of the public.

Bamboo rafting

Rafting of bamboo by the Titaghur Paper Mill was one of the major factors adversely coinciding with the breeding season of the gharial. Fortunately, this activity has ceased since 1987 although it was too late to offer the benefits in the first phase of the conservation programme.

Fishing regulation

As a major step to regulate fishing in Mahanadi, permits are being issued to authorised fishermen. Fishing camps on the riverbanks have been banned. However, the entire practice of fishing in the rivers needs to be looked at afresh, and open cast fishing replaced with inland captive fish-farming to engage the fishermen who are totally dependent on river-fishing but finding it increasingly less rewarding.

Permit for navigation

Boats using the river stretch within the sanctuary need to have permits and thus a record of their movement is maintained to evaluate navigation activities. However, this needs to be replaced with other easier and quicker modes of transport outside the water surface.

Non-survival of gharial in Mahanadi

As part of the crocodile conservation programme, over 700 juvenile gharial have been released in the Mahanadi. These juveniles have originated from the rivers Narayani and Kali in Nepal, and the National Chambal Sanctuary and the captive breeding programme in Nandankanan in India, supported by a male received from the Frankfurt zoo. However, the resighting of gharial after release has been as low as 5%. A host of factors are responsible for, first, the near-extinction of the natural population of gharial in Mahanadi, and second, the non-survival of most juveniles in the desired stretches of the river.

Geographic isolation of the population of gharial in Mahanadi may have occurred over geologic time, followed by localization of the main breeding populations in recent historical times. Later, isolation of the populations appears to have led the populations to suffer gradual erosion in its gene-pool because of the decreasing number of breeding individuals. The chain of events from geologic through historic to recent times may have led gharials in Mahanadi to a stage of near-extinction.

Moreover, since *Gavialis gangeticus* is the oldest crocodylian and the sole surviving member of an evolutionary line, it may be that the concept of 'species senescence' is operating on the gharial and that this "antique crocodylian" is more sensitive to the environmental changes. The species continues to survive where such changes have been relatively low (e.g. National Chambal Sanctuary). Therefore, when the genetic make-up of the gharial species has eroded because of 'species senescence', the released gharial (in Mahanadi) require a very favourable, 'non-struggling' environment to settle and flourish. But in the face of certain traditional practices of use of the river and the rising demographic pressure, the released juveniles have not received such an ideal and favourable environmental setup in Mahanadi. It may not be out of place to mention that even in Chambal, Girwa, Son and Ken sanctuaries all juvenile gharial rehabilitated under the

conservation programme do not survive.

Besides, the Satkoshia Gorge of Mahanadi appears to be an 'adult habitat', while the 'juvenile habitats' available outside the Gorge, between Larasara and Mundali, are under heavy human use. Man-made pressures and inadequate use of these habitats for restocking may have prevented the juveniles to settle in Mahanadi. But the use of the place without providing adequate protection could prove counter-productive.

Gharial also faces a natural competition from the 'better fit' muggers. Interference by human and conservation mistakes committed by releasing muggers in the habitats of gharial can only help further the mugger species push the gharial out of its niche.

Finally, the most deterministic forces for the present status of gharial in Orissa have their origin as the multi-faceted 'human factor'. The mode of fishing and the habits of people of Satkoshia Gorge Sanctuary are dominated by boating activities which are incompatible with conditions required for a sanctuary for gharials.

The narrow width of the river in the Satkoshia Gorge and the absence of mid-water islands worsen the situation for gharial. Therefore, apart from evolutionary and biological reasons, the incompatible human activities, centered around boating and rafting are considered as major

reasons for the non-survival of gharial in the narrow Satkoshia Gorge of Mahanadi. (See Box 1 below)

The mugger in Orissa

The distribution of mugger is now limited to rivers of Similipal, Balimela reservoir, the Mahanadi river system and isolated freshwater swamps in southern Orissa. Major conservation work has been in progress in Similipal since 1979. Results of a survey conducted in November-December 1979 indicated that the mugger had virtually become extinct in Similipal, possibly because of (i) fishing by nylon nets and explosives, (ii) use of insecticides with an intention to control malaria, (iii) fire in the riverbanks forming nesting sites, and (iv) natural effects of predation and exhumation by wildboars, monitor lizards and mangoose, etc. There were no indication that the Khadias which are a digger-cum-gatherer tribe collected mugger eggs too.

The mugger conservation project in Similipal began with an initial stock of muggers brought from Tamil Nadu. The objectives were to release muggers in Similipal and maintain a breeding stock in captivity to produce juveniles for future releases in Similipal and elsewhere. From 1984 onwards the juveniles have been captive-bred at Ramatirtha near Jashipur.

The release of juvenile muggers in the river systems of Similipal in 1981- 1998 have been as follows:

Box 1
Summary of some of the measures proposed

(I) Declaration of Mahanadi Sanctuary	Area: (Including Satkoshia Gorge) Larasara to Mundali along the main river; one km distance of main tributaries, 500m wide along each bank. Area : Larasara-Sonepur
(II) Future release of gharial in river Mahanadi	Size : 1.2m and over Number : Groups of thirty Time : November each year Monitoring : By using radio-tracking method
(III) Release of gharial in river Brahmani	Carry out a survey of the river including Rengali Dam and Samal Barrage
(IV) Compatible and sustainable utilisation of Fish resource	(1) Promote pisciculture farms (2) For 10 yrs stop collection of fish spawn except for bio-technological research (3) Allow night-time prawn capture only from tributaries, for limited periods (4) Purchase all nylon set nets from fishermen
(V) Regulation of navigation in Mahanadi Sanctuary	(1) Initially for ten years ban all navigations except those for environmental protections (2) Promote a colony of potter at Narasinghpur (3) Replace the motor-boat at Tikarpada with one which is environmentally compatible

<u>River System</u>	<u>Nos. Released</u>	
B.Balanga	176	survival. However, since the management of the sanctuary is still being affected by human dimensions in various forms, it is felt that the release of mugger juveniles should be continued at a modest rate of 30-40 juveniles a year until more number of adults get settled and communal nesting becomes pronounced.
Khairi	127	
West Deo	287	
East Deo	42	
Khadkei	18	
<i>Total</i>	650	

The monitoring results of 1999 indicate that over 10% of the released stock are readily traceable. This is better than the natural rates of recruitment and

Apart from the above, muggers have also been released in

Satkoshia Gorge Sanctuary and Chandaka Elephant Reserve. Hadgarh Sanctuary, earlier earmarked for management of mugger crocodiles, is being planned to be managed under Project Elephant, which will simultaneously provide attention to the wetland habitat.

The overall status of mugger in Orissa is that the species is now

seen in habitats where there were none or were rare, but breeding in the wild is not remarkable. Captive stocks are available at Ramatirtha, Tikerpada and Nandankanan, which serve mainly for tourism and educational purposes but also ensure that the indigenously developed technique of captive management continues to survive at these locations.