

Policies that work for rhino conservation in West Bengal

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Abstract

The number of rhinos in West Bengal, India, has been increasing greatly since 1994. Gorumara National Park has seen numbers rise from 15 in 1994 to 28 in 2005, and Jaldapara Wildlife Sanctuary from 35 to just over 100, according to official statistics. Today, Jaldapara has the third largest rhino population in Asia. No rhino poaching has been reported in either protected area since 1996.

This paper examines why the Forest Department of West Bengal has been so successful in rhino conservation. The main reason is that the central and state governments have allocated considerable sums of money to the budgets of these two rhino areas. This has allowed the employment of many people who patrol intensively and has made it possible for the Forest Department to donate generously to projects for the poor people living around Jaldapara and Gorumara. There is thus a close relationship between the department and the local people who act together to deter poaching of rhinos.

Résumé

Le nombre de rhinos du Bengale occidental, Inde, a beaucoup augmenté depuis 1994. Le Parc National de Gorumara a vu sa population passer de 15 en 1994 à 28 en 2005, et le Sanctuaire de la Faune de Jaldapara est passé de 35 à plus de 100 d'après les statistiques officielles. On ne signale aucun braconnage dans ces deux aires protégées depuis 1996.

Cet article étudie pourquoi le *Forest Department of West Bengal* réussit si bien dans la conservation des rhinos. La raison principale est que les gouvernements central et de l'Etat ont alloué des sommes considérables au budget de ces deux zones à rhinos. Ceci a permis d'employer de nombreuses personnes qui patrouillent intensément, et le Département des Forêts a pu donner généreusement à des projets pour les personnes pauvres qui vivent autour de Jaldapara et de Gorumara. Il y donc une relation étroite entre le département et les personnes pauvres qui agissent ensemble pour décourager le braconnage des rhinos.

Introduction

The rhinos in the state of West Bengal, India, are the least known of the main rhino populations of Asia. Conservationists find this surprising, because from the late 1980s rhinos in Gorumara National Park and Jaldapara Wildlife Sanctuary (both in Jalpaiguri District) have increased notably with little poaching. There are now more rhinos in Jaldapara than in any other protected area in Asia except in Kaziranga and Royal Chitwan National Parks. Jaldapara holds the third largest population in all of Asia—around 90–100 animals.

In 1978, according to the West Bengal Forest Department, about 19 rhinos remained in Jaldapara, compared with 75 in the late 1960s, mainly due to severe poaching for their horns. These 19 animals reportedly increased to 96 in 2004, according to an

official census—one of the fastest increases for any rhino population worldwide. A similar situation prevails in the much smaller Gorumara National Park, where during the same period (1978–2004) its rhino population expanded from 8 to 25.

This paper examines the reasons why the West Bengal Forest Department has been so successful in increasing its rhino numbers and in almost completely eliminating poaching.

Only two places in West Bengal still have rhinos—Gorumara covering 80 km² and Jaldapara, 216.5 km². They are located in the north, near the border with Bhutan. I visited both protected areas in December 2005 and interviewed personnel, mainly from the West Bengal Forest Department located throughout the state. I also met conservationists in New Delhi, but most were not so familiar with West Bengal's rhinos.

Results

Gorumara National Park

RHINO NUMBERS AND POACHING INCIDENTS

In 1895 Gorumara was made a forest reserve. In 1949 the reserve, then covering only 8.5 km², became a wildlife sanctuary. In 1994, the sanctuary was expanded to 79.99 km² and turned into a national park (Singhal and Gupta 1998).

One of the earliest estimates of rhino numbers was in the mid-1930s, when there were around 4–5, rising to about 12 by 1940. In the mid-1950s, the population probably reached an all time low for the 20th century, at just 3 animals. From then until 1993 the number rose to about 15 with at least 9 others known to have been poached (Martin 1996a). Details of the poachers, middlemen and markets for horn for Gorumara and Jaldapara's rhinos for the 1960s to 1997 are well recorded (Bist 1994; Martin 1996a,b, 1999).

From 1994 to 2005 the rhino population in Gorumara grew from 15 to about 25 (see table 1). Only one animal was brought into Gorumara over

this period, a male in 1995 from Assam (Raha 1996), which remained in the park until 2004 and was then taken to the Calcutta Zoo. Various censuses showed there were 19 rhinos in 1998, 22 in 2002, and 25 in 2004.

Table 1. Official estimates of West Bengal's rhino population, 1994–2005

Year	Rhinos in Gorumara National Park (no.)	Rhinos in Jaldapara Wildlife Sanctuary (no.)
1994	15	35
1995	16	35
1996	18	42
1997	?	44
1998	19 (census)	55 (census)
1999	19	55
2002	22 (census)	85 (census)
2004	25 (census)	96 (census)
2005	28	105

Sources: Thapliyal c. 2003; Singhal and Gupta 1998; West Bengal Government 2004; unpublished statistics from the West Bengal Forest Department



Esmund Martin

An amusing rhino statue stands at the entrance to Gorumara National Park.

The last rhino known to have been poached was in June 1992. This rhino had strayed out of Gorumara into the nearby Apalchand forests and was killed. The local Mech people took some of the skin, nails and intestines for medicine but left the meat. The Forest Department later recovered the various body parts (MK Nandi, Conservator of Forests, West Bengal, pers. comm. 1993; Bist 1994).

GORUMARA BUDGETS

What factors led to this great success in rhino population growth in Gorumara? First, the staff are honest, competent, motivated and hard working. Second and of notable importance, the state and central governments allocate a high budget to the park (which is part of the Jalpaiguri Forest Division). The budget for Gorumara is combined with that for Neora Valley National Park and expenses for forest staff elsewhere in the division. Thus, while the central government figures are available solely for Gorumara, the state government ones can be estimated based upon the number of employees in Gorumara (47%) versus the total number in the division.

Three main categories make up Gorumara’s budget: the state plan is largely for capital expenditures; the non plan, also money from the state, is mostly for recurrent expenses such as salaries, medical costs, electricity and vehicle maintenance; and the central sponsored scheme (CSS), which is money from the central government, is for increasing the grass habitat as preferred by rhinos, constructing wallows, and making other such improvements. Funds in this third category have increased massively (see table 2), with a seven-fold increase in US dollars from 2000/01 to 2004/05.

In 2005 the Jalpaiguri Forest Division had 134 permanent employees, 63 in Gorumara. Thus if we

Table 2. Budget for central sponsored scheme for Gorumara National Park, 2000/01 to 2004/05

Financial year	Rupees	US dollar equivalent
2000/01	1,000,000	21,739
2001/02	1,500,000	31,120
2002/03	8,016,100	167,002
2003/04	5,631,700	125,149
2004/05	6,507,500	148,913

Source: West Bengal Forest Department, Jalpaiguri, unpublished

use 47% of the budget for the state plan and the non plan for Gorumara and 100% for CSS, we obtain a figure of USD 344,387 for the average annual budget for Gorumara for the three-year period of 2002/03, 2003/04 and 2004/05 (see table 3). This approximate figure is no doubt an underestimate as there are at least 30 casual workers stationed in Gorumara who are not included.

Table 3. Estimated annual budget for Gorumara National Park, 2002/03 to 2004/05

Financial year	Rupees	US dollar equivalent
2002/03	17,574,046	366,126
2003/04	14,649,548	325,546
2004/05	14,923,076	341,489

Source: Calculated from statistics supplied by the West Bengal Forest Department, Jalpaiguri, unpublished

In 2003/04 and 2004/05, two more funding sources were initiated to aid local people and the habitat in North Bengal (referring to the northern part of the state of West Bengal). The first, The North Bengal Project, is a fund from the state government to uplift the social and economic conditions of the poor and minority people of North Bengal. The starting budget for Jalpaiguri Forest Division was 490,000 rupees (USD 10,900) and the following financial year it was increased four-fold to 1,949,602 rupees (USD 44,600) with some of this money going to the people around Gorumara. The second source of funds, called the Rehabilitation of Degraded Forests, is from the National Agriculture and Rural Development Bank based in Bombay. The initial funding was 1,317,512 rupees (USD 30,149). This is helping to alleviate pressure on the forests within the park by, among other activities, planting trees in the forest areas around the park.

The recent budgets for Gorumara translate into one of the highest per square kilometre for any government-protected area for large animals in the world—USD 4305/km² per year on average (2002/03 to 2004/05) for the 80-km² park. Known recent budgets for other protected areas are few, but as a comparison Kibale National Park (766 km²) in Uganda (which has an elephant population) spent USD 179/km² in 2000 (Struhsaker et al. 2005). In Nepal’s Royal Chitwan National Park, the budget in 1997/98 for the 932 km² was about USD 1000/km² (excluding non-government organization (NGO) as-



Tourists to Gorumara National Park can spend the night there only when the small, 2-suite Forest Guest House is not being used by government officials.

sistance), and for Royal Bardia National Park's 968 km² it was about USD 700/km² (also excluding NGO assistance), based on Martin (1998).

Thus, the budget for Gorumara grew considerably from the 1990s allowing a higher concentration of manpower, which in turn has prevented any rhino poaching recently. In 2005, there were 63 permanent staff plus 30–35 casual labourers. This works out at over one person per square kilometre. For comparison, in Garamba National Park in the Democratic Republic of Congo, where there is the last known population of northern white rhinos, there are about 250 park staff for 4900 km² or one person per 20 km² (Kes Hillman Smith, rhino conservationist formerly in Garamba National Park, pers. comm. March 2006).

IMPROVEMENTS IN CONSERVATION POLICY FOR GORUMARA

The large budget for Gorumara has allowed staff to improve their management strategy in several ways. Patrolling in the park is now better, community help has

increased, and compensation to the villagers for wildlife damage is better managed. Staff are now working with villagers in gathering intelligence and are collaborating with them in patrolling outside the park.

Inside Gorumara, the Forest Department has improved its patrolling camps and modernized the radio network. Patrolling, although still quite traditional, is effective. In the grasslands, where most of the rhinos congregate, domesticated elephants are used; in the forest area, where staff can hide themselves, foot patrolling is more common. The large number of staff has permitted intensive patrolling during both day and night. This is one main reason why there has been no rhino poaching in the park for years. However, illegal hunters still pursue other mammals. For instance, in May 2005 four tribal poachers (members of tribal communities) were arrested on the park boundary for killing a wild boar with a bow and arrow (Bimal Debnath, range officer, Gorumara National Park, pers. comm. 2005). In December 2005 several people with fresh deer meat were arrested outside the park (D Bera, range officer, Gorumara South, pers. comm.

2005). In 2005, staff shot dead an illegal tree cutter who was part of a gang in the park. Illegal tree felling and firewood collecting are common problems. Some tribal women are paid 100 rupees (USD 2.22) a day to illegally collect twigs and branches. Sometimes a group of up to 100 such women enter the park illegally to collect forest products. Patrol work is thus important to prevent poaching inside the park.

Another factor that has hugely assisted rhino conservation is that park officials have a large budget to spend on items that people living around the park need. Thousands of very poor people live scattered around Gorumara—farmers, scheduled castes “untouchables” and tribals. The farmers are very traditional and do not have irrigated fields, relying instead on rainfall for growing rice; some have low-grade cattle. Most of these marginal farmers along with landless labourers are based in small villages fringing the park (Singhal and Gupta 1998). Most have organized themselves into eco-development committees. In 2005 there were 11 such committees with 1601 members representing about 6500 individuals. These committees advise the Forest Department on specific local needs. In turn, the Forest Department provides projects and assists people, particularly the poorest, with basic amenities irrespective of their class, religion or caste. Aid includes water pumps, paths, roads, electricity, and books for students. The Forest Department also helps set up fish ponds, piggeries, chicken hatcheries and wilderness camps for Indian tourists. They teach women how to make handicrafts, they employ and train guides to teach school children how to entertain tourists with cultural dances and songs, and they employ local people to repair roads and clear fire lines within the park for a minimum daily wage (in 2005, 67.34 rupees or USD 1.50), which is slightly higher than what they would earn from local government authorities as labourers (Koushik Sarkar, Assistant Divisional Forest Officer (Wildlife), Jalpaiguri, pers. comm. 2005). At local request, the Forest Department has also put up electric fences to prevent rhinos and elephants from wandering out of the park, thus protecting people and their crops. The Forest Department started this assistance in the mid-1990s, and early in the present decade large amounts of money were allocated for this purpose. The department is careful to spread the benefits fairly through the eco-development committees for their communities and avoids giving any one family more than one form of assistance in a year.

The department compensates these 6500 individuals and also others outside the park boundary and beyond for conflict with wildlife: crop damage, damage to property, livestock death, and most importantly, death and injury to people. Any crop damage (such as by elephants, wild boars and peacocks) is compensated by up to 2500 rupees (USD 56) a hectare. Owners of huts destroyed by elephants, for example, are given a maximum of 1500 rupees (USD 33), while the Forest Department also pays up to 450 rupees (USD 10) for a cow, goat or pig killed by a wild animal. Families outside the park who have lost a member to a wild animal receive 30,000 rupees (USD 667) and those wounded receive medical care paid for by the department (Debnath and Sarkar, pers. comm. 2005). In 2004, the worst case of death around Gorumara occurred when five villagers brought back to their house a harvested crop, and an elephant followed them and killed them all inside the house to eat the crop (Bera, pers. comm. 2005).

All these funding schemes to help the poor around Gorumara have resulted in strong cooperation between the villagers and the Forest Department, which has further reduced illegal activities. Their relationship is so good that since 1999, villagers have been organizing units themselves to patrol areas along the park boundary voluntarily. They also patrol jointly with the Forest Department staff: the village volunteers just outside the boundary and park staff just on the inside. Many local people guard against poachers.

Formal and informal intelligence-gathering activities have recently been very effective—another reason for the absence of rhino poaching in Gorumara. In 2000 or 2001 the Forest Department set up a control cell against illegal trade to investigate illegal activities and to make arrests. Two operations were carried out in the first five months. Two people were arrested in Siliguri who were said to have possessed tiger skins, and one person who had obtained an elephant tusk was arrested at Birpara (north-west of Jaldapara). A month later the cell collapsed due to overall poor management (Debnath, pers. comm. 2005). In 2005 an informal intelligence-gathering network was started instead, mostly based on information supplied by people living on the park boundary who sympathized with the park officials. It works very well. Not much money is allocated to this (Debnath, pers. comm. 2005) as the Forest Department believes it is not necessary because local people around the park appreciate the department’s activities for the community and

will thus report potential rhino poachers entering Gorumara (Sarkar, pers. comm. 2005). If traders or poachers try to organize their activities in these fringe villages, local people will likely report them to park authorities of their own accord without money changing hands for information, as usually occurs elsewhere. As one range officer said, 'We now have thousands of pairs of eyes preventing poachers instead of the 63 pairs belonging to our staff,' (Debnath, pers. comm. 2005).

Jaldapara Wildlife Sanctuary

RHINO NUMBERS AND POACHING INCIDENTS

In 1932 the Bengal Rhinoceros Preservation Act was promulgated specifically to help the greater one-horned rhino. Nine years later, Jaldapara encompassing 99.51 km², was set aside as a game sanctuary to conserve rhinos. In 1976 it was expanded to 115.53 km² and the name changed to Jaldapara Wildlife Sanctuary. In 1990 the sanctuary was almost doubled to its present size of 216.5 km², making it more than 2.5 times larger than

Gorumara National Park (Pandit 1997). Gorumara is located in Jalpaiguri Forest Division; Jaldapara is in neighbouring Cooch Behar Division.

In the early 1930s there were an estimated 45 rhinos in Jaldapara and numbers increased to a maximum of 75 in the middle and late 1960s. Due to severe poaching, which killed at least 28 animals from 1968 to 1972 and another 18 from 1972/73 to 1985, their numbers declined to a low of about 20 (Martin 1996a). In 1988 the official estimate was 24 and a year later 27. It must be noted that although the official figure given for 1986 is 14, officials believe it should have been 24 to fit with the other statistics, and must have been a typographical error (S.C. Dey, the then Conservator of Wildlife for West Bengal, and P.T. Bhutia, Conservator of Forests Wildlife Circle (North), Jalpaiguri, pers. comm. 2005). Alternatively this low figure could be due to a miscount that year (MC Biswas, District Forest Officer, Cooch Behar Division, pers. comm. 2005).

The rhino population of Jaldapara increased from around 30 in 1990 to a census figure of 55 in 1998.

Esmond Martin



Paintings on the outside of the Hollong Forest Lodge publicize wildlife conservation. Built in 1972–1973, the lodge has seven bedrooms.

By 2002 the census estimate was 85 rhinos and in the 2004 census, 96. There is a discrepancy in these figures as well as they jump too high from 1988 to 2002 (and only one rhino was brought into the sanctuary in 1995). Either the first set of figures (from 1986 to 1998) is too low from undercounting or the second set (from 2002 onwards) is too high. S.C. Dey believes the latter is probably the case but that today they number at least in the high 80s. The staff at Jaldapara believe their latest census figures are correct and the earlier ones are underestimates.

In 1996 the last known Jaldapara rhino was poached after it wandered out of the sanctuary. A gang of three or four people followed the rhino and shot it with a country-made muzzle loader. They were later arrested and the Forest Department recovered the horn. In 2000 the horn was stolen from a rhino that had died naturally in the Torso River. Forest staff investigated the case and arrested a local Bengali, recovering the horn also (Anjan Guha, Assistant Wildlife Warden, Jaldapara Wildlife Sanctuary, pers. comm. 2005).

Since 1996 some poaching of other wild animals has continued in and around Jaldapara but in low numbers; deer poaching has almost stopped. Although there is still demand for products from elephants, leopards and wild boar, poaching is only occasional.

JALDAPARA BUDGETS

The great reduction in poaching, especially for rhinos, has been made possible, as for Gorumara, by the high budget for the sanctuary. Similar to Gorumara, most funds come from the central government (called CSS) and from the state government (state plan and non plan). Again there is no specific budget available for the state funds for Jaldapara, but the figures can roughly be calculated from statistics for the entire Cooch Behar Division. The permanent staff for Jaldapara number 187, which is 41.6% of the total for the division. Thus by using 41.6% of the division's total funds, Jaldapara's figures can be established for these state budget sectors. There are two CSS funds, one entirely for the sanctuary and the other fund known as Project Elephant that gives about 80% to Jaldapara.

Three additional funds to Jaldapara are Swarnajayanti Gramin Rojgar Yojna, Forest Development Agency, and Grants in Aid for Zilla Parishad (part of the local self-government). These cover the

Cooch Behar Division and are also calculated for Jaldapara using 41.6% of the total figures.

The figure for the state plan plus the three additional funds for Jaldapara for 2003/04 was 4,322,612 rupees (USD 96,058), and for non plan was 19,932,081 rupees (USD 442,935). The CSS figures for Jaldapara Wildlife Sanctuary were 6,964,648 rupees (USD 154,770), and for Project Elephant 1,178,719 rupees (USD 26,194). The grand total thus was 32,398,060 rupees (USD 719,957) for 2003/04, the last published financial year. This figure is an estimate based mostly on statistics from the West Bengal government (2004). The total budget for 2004/05 is not yet known but has been estimated by the Conservator of Forests of the Wildlife Circle (North) at around 30,000,000 rupees (Bhutia, pers. comm. 2005), very close to my estimate calculated for the previous financial year. This 2004/05 figure works out at USD 3171 per km² for the 216.5-km² sanctuary.

This sizeable budget has permitted the Jaldapara authorities to employ a large number of people. Besides the permanent staff of 187, there were about 100 casuals, many of whom are involved in protection duties. Thus, there is over one person per square kilometre in Jaldapara, similar to Gorumara. Although not all are involved directly in anti-poaching activities, simply their presence in the park serves as a deterrent.

CONSERVATION POLICY IMPROVEMENTS FOR JALDAPARA

The high budget for Jaldapara, as compared with most such protected areas, has allowed increased expenditure in four main categories: patrol, intelligence gathering, community help, and compensation. The latter two areas of improved support have in turn enabled park staff to win the support of the local people, further reducing poaching.

Senior staff in the sanctuary implement an intensive protection strategy. A typical day's activities include the following. From 5 a.m. to 9 a.m. the sanctuary is patrolled and 'screened' (careful examination of the area) for elephants. From 9 a.m. to 3 p.m. the staff change over to foot patrols, and from 3 p.m. to 7 p.m. they patrol once more for elephants. Staff use vehicles from 7 p.m. to 10 p.m. to patrol around the sanctuary. From 10 p.m. to 5 a.m. the night staff operate from 12 anti-poaching camps with three people in each, often using elephants during the rainy season, but in the dry months on foot and by vehicle. These camps are scat-

tered throughout the park, allowing 36 patrollers per night. They are all supplied with firearms (12 bore and .315 rifles), searchlights and a radio system. Thus, for 24 hours a day the sanctuary is intensively patrolled (Guha, pers. comm. 2005).

Intelligence gathering also plays a key role in protecting rhinos within Jaldapara. Different from Gorumara, it has established an intelligence network with 25 to 30 informers, called 'source' people who are paid, but only after they provide credible information that leads to a successful operation. Up to 10,000 rupees per case can be given to an informer. From 2003 to 2005 an annual average of 100,000 rupees (USD 2220) was paid to these source people (Biswas, pers. comm. 2005). Businessmen sometimes use the Jaldapara area as a corridor to move all types of illegal wildlife products through India, such as tiger parts, ivory, leopard skins and musk, as it is geographically close to Bhutan, China and Nepal (Martin

1999). Consequently the intelligence network also contributes to the arrest of these wildlife traders.

Huge sums of money (from CSS, the State Forest Department, and the rural development budget of the state government) have been invested in the local communities around Jaldapara to discourage them from illegally exploiting the forests and instead to support the sanctuary. The Forest Department, with the cooperation of the eco-development committees (as for Gorumara), has set up alternative income-generating activities, such as mushroom farms, piggeries, irrigation agriculture and poultry farms. Education facilities have also been improved.

Human-wildlife conflict is a serious problem in the region. In 2004, elephants killed 25-30 people in the northern part of West Bengal, including 6-8 people around Jaldapara (Guha, pers. comm. 2005). The Forest Department compensates for all deaths from wildlife. People near Jaldapara, as for Gorumara, receive benefits for other wildlife damage as well. This has greatly contributed to the well-being of these poor people. As a result, they often freely give the Forest Department information on 'potential' poachers.

Human-wildlife conflict is also a serious risk for the sanctuary staff. In 2004 rhinos injured four members of the Forest Department, two of whom died; two more staff were killed by rhinos in 2005. Wild elephants killed three staff in 2005. Because of the high danger, as an incentive to work in the sanctuary, the family of a member of staff killed receives at least 200,000 rupees (USD 2778) in total, half from the Forest Department and half from an insurance scheme set up by the Wildlife Trust of India (Guha, pers. comm. 2005, 2006).

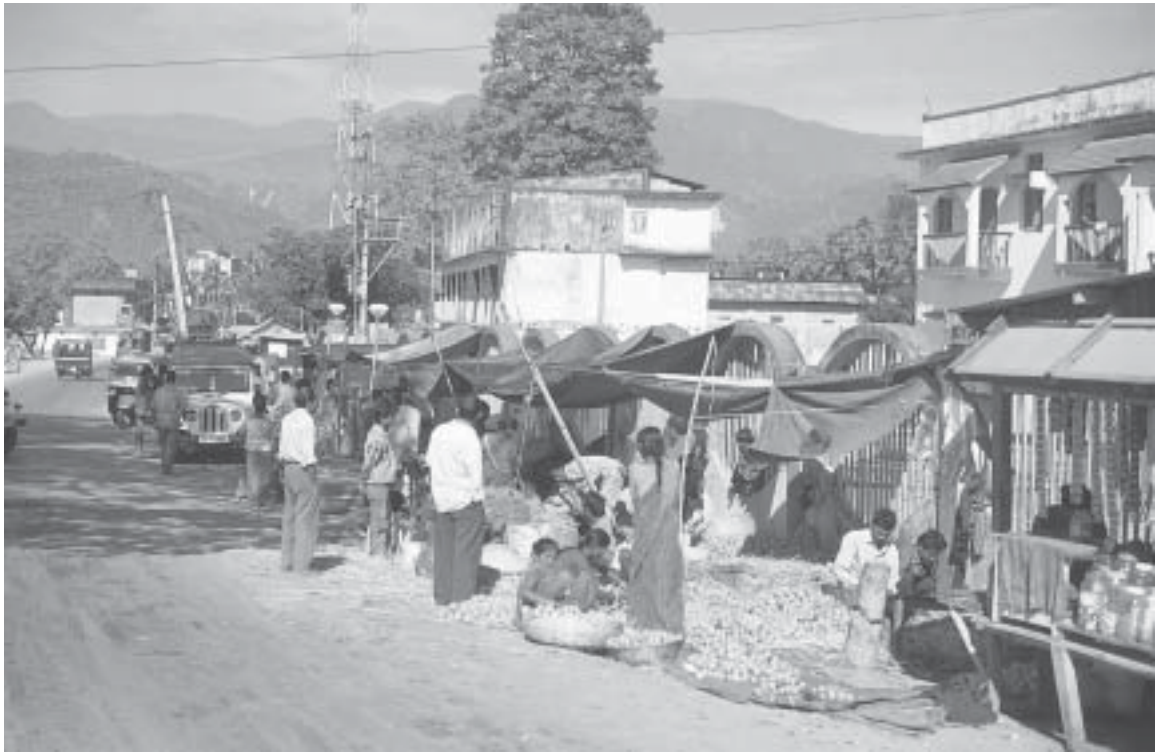
All these activities carried out by the Forest Department in and around Jaldapara have reduced poaching, especially of rhinos. It has taken a large amount of public money to achieve this success.

Discussion

Compared with other government-protected areas with rhinos in Asia and Africa, one may well ask, why does the Forest Department in West Bengal put so much more money into rhino protection—more than almost any other place—with so little economic return, such as from tourism? The amount of money allocated from the West Bengal and central governments to wildlife and its habitat development for the entire state has increased eight-fold in rupees (almost



Watchtowers inside Jaldapara Wildlife Sanctuary serve the dual purpose of allowing visitors to view the wildlife and sanctuary staff to keep an eye out for poachers.



Bhutanese oranges come south to the town of Jaigaon, and wildlife products, including rhino horn, pass through here on their way to Phuntsholing in Bhutan.

three-fold in US dollars) from 1989/1990 to 1999/2000 (see table 4). This certainly is not due to revenue collected from tourists, although this has risen. In the financial year 2004/05, 16,294 (including only 118 foreigners) visited Gorumara and 2778 (including only 98 foreigners) visited Jaldapara. An Indian adult pays only 25 rupees (USD 0.57) to enter Jaldapara and 40 rupees (USD 0.92) for Gorumara. So there is very little profit when you consider the overheads incurred from collecting it. There are extremely few beds in either park to earn revenue. In

1958 and 1973 two very small lodges opened in Jaldapara providing 10 double rooms, and later another in Gorumara with three rooms. There are only a few places to stay outside. Around Gorumara there are nine lodges with about 232 beds and around Jaldapara only three lodges with 102 beds; most operate at low occupancy rates. All but one of these was built between 1998 and 2005. None is of a high standard so they have not attracted many foreigners, who usually spend more money than Indians. These lodges employ only a few people. In late 2005 (the tourist

Table 4. Budget in US dollars for wildlife and habitat development for the state of West Bengal, 1989/90 to 1999/2000

Year	Non plan and 7th/8th plan	State plan	Central sponsored scheme	Total
1989/90	1,664,967	321,987	267,417	2,254,371
1991/92	1,630,426	275,969	460,543	2,366,938
1993/94	2,143,065	463,226	741,548	3,347,839
1995/96	2,599,912	960,500	819,500	4,379,912
1997/98	4,056,447	681,158	981,105	5,718,710
1999/2000	5,022,989	611,122	814,575	6,448,686

Source: Thapliyal c. 2003, calculated from rupees to US dollars

and dry season) those around Gorumara had 50 employees and around Jaldapara only 40 employees.

The main reason the West Bengal government has put in large amounts of resources to protect Gorumara and Jaldapara is because the officials (who are mostly from the state) believe that these areas are part of their state's natural heritage, of which they are intensely proud. Jaldapara is shaped like a pair of trousers, so it has long boundaries that need extra protection. The central government also has been increasing its support because the money has been well spent and rhino conservation has been such a success. Government departments in West Bengal are especially noted for being less corrupt than some others in India. This is partly because there is a very active press that exposes corruption and mismanagement; there is a large literate population that complains about corruption; and there is also a local form of self-government called a *panchayat*, which is vigilant. There is hardly any political victimization in posting and deploying staff so officials are not discriminated against and instead are chosen on merit. The West Bengal government is noted for hiring staff who are honest, have personal acumen, are experts, and are committed to their job. The Forest Department has a policy of keeping a qualified person in wildlife conservation in a specific position for as long as that person is productive; it does not move staff after a year or so as can happen elsewhere (Dey and Guha, pers. comm. 2005). In addition, the Forest Department has an ideology and a sense of purpose. These attributes have helped it to obtain support from other departments such as the civil administration, police and judiciary (Dey and Biswas, pers. comm. 2005).

As the Forest Department in West Bengal is so committed, it attracts competent government staff. Salaries are not high; a guard or a mahout earns only 2700 to 4400 rupees (USD 62–101) a month, while a forest ranger (a senior position) earns 4500 to 9700 rupees (USD 103–226). They certainly do not join the department for good salaries. Instead, they join to support the department because it is extremely effective in wildlife conservation and management. Many officers wish to play a part in this successful work as they believe, far more so than conservationists in many parts of the world, that wild animals have a right to survive, despite the burgeoning human population, and must be helped to do so, even at high expense with few economic returns. They do not support the view that 'wildlife must pay its way'; they are

dedicated to protecting wildlife as a vital resource in a country where so little wild habitat is left.

Some improvements are still needed, however, in managing Gorumara and Jaldapara. Some of the senior staff members believe that both areas have nearly reached their carrying capacity for rhinos as only a small part of the habitat is suitable for them. Therefore, what is required is further enhancement and expansion of the grassland areas inside the sanctuary and park, and even possibly beyond to increase the habitat suitable for rhinos. A further requirement is that the rhino census techniques be as accurate as possible to remove any doubts on numbers based on discrepancies with past data collection, as occurred in Jaldapara.

Conclusion

The West Bengal Forest Department has successfully reversed the severe rhino poaching in Gorumara and Jaldapara that took place up to the late 1970s. Numbers of rhinos have increased from a low of about 26 then to over 100 today. The Forest Department, with additional financial help from the central government, has done this with virtually no assistance from NGOs. This is unlike Assam, Nepal, Malaysia and Indonesia, where protected areas with rhinos have received substantial NGO contributions. The key to West Bengal's rhino success has been due to its outstanding government staff and high government budgets. The Forest Department has put into place many honest, skilled, hardworking and motivated personnel. The staff is backed by a sizeable budget, one of the highest for any government-protected rhino area, which allows intensive patrolling. Although Gorumara is a national park and Jaldapara a wildlife sanctuary, both are well protected with staff density of over one person per square kilometre. Large financial inputs go to the poor communities living around Gorumara and Jaldapara. The Forest Department invests heavily in infrastructure, income-generating projects and education, and also provides compensation for human deaths, injuries and crop damage inflicted by wildlife. In turn the local people cooperate with the department by providing information on possible rhino poachers and even by carrying out their own foot patrols. The result is that there has been very little rhino poaching since the mid-1980s and a rapidly increasing rhino population.

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