

Rhino poaching in Assam: challenges and opportunities

Esmond Martin^{1*}, *Bibhab Kumar Talukdar*² and *Lucy Vigne*³

¹ & ³PO Box 15510, Nairobi 00503, Kenya; email: rhino@wananchi.com

²Aaranyak, 50, Samanwoy Path Survey, Guwahati—781028, Assam, India

*Corresponding author

Abstract

Kaziranga National Park (NP) in Assam, India holds about 71% of the world's wild population of the greater one-horned rhino. It was therefore a shock to conservationists when they learned that in 2007 about 20 animals were poached, a four-fold increase compared with the previous six years' annual average. We analyse the reasons for this surge, which included the hasty choice in the change of top officials in Kaziranga, many vacancies in frontline staff who are needed to oversee the protection regime of Kaziranga day and night, and a shortage of funds for intelligence gathering. In Orang NP there was heavy poaching in 2008. New poachers entered the Park and the under-staffed frontline forest guards were not equipped to fight them. In contrast, there were no rhinos poached in Pabitora Wildlife Sanctuary (WLS) in either 2007 or 2008. This was because of a very close relationship between its staff and the local villagers.

We recommend ways to improve the protection of Assam's rhinos. These include how best to deter rhino poachers, especially with effective court cases, the urgent need to crack down on the rhino horn trade network that is based in Dimapur, Nagaland, and the importance of further strengthening the relationships between the Forest Department and the local people around rhino protected areas.

Key words: Greater one-horned rhinos, Assam, park management, rhino poaching, rhino horn trade, Nagaland

Résumé

Le Parc National Kaziranga (PN) dans l'Assam, en Inde abrite approximativement 71% de la population mondiale du grand rhinocéros unicolore à l'état sauvage. C'était par conséquent un choc pour les défenseurs de l'environnement d'apprendre qu'environ 20 animaux ont été braconnés en 2007, une augmentation de quatre fois par rapport à la moyenne annuelle des six dernières années. Nous analysons les raisons de cette montée qui comprenait un choix hâtif dans le changement des cadres supérieurs dans Kaziranga, beaucoup de postes vacants parmi le personnel de terrain qu'il fallait pour superviser le régime de protection de Kaziranga jour et nuit, et une pénurie de fonds pour la collecte des informations. Dans le PN Orang il y avait beaucoup de braconnage en 2008. De nouveaux braconniers sont entrés dans le Parc et les gardes forestiers de terrain en sous effectif n'étaient pas équipés pour les combattre. Par contraste, il n'y avait pas de rhinocéros braconné dans le Sanctuaire de la Faune de Pabitora en 2007, ni en 2008, grâce aux liens très étroits entre son personnel et les villageois locaux.

Nous recommandons des voies à suivre pour améliorer la protection des rhinocéros d'Assam. Celles-ci comprennent la façon dont on peut dissuader au mieux les braconniers de rhinocéros, surtout par des procès efficaces, le besoin urgent de réglementer le réseau du commerce de la corne de rhinocéros basé à Dimapur, Nagaland, et l'importance de renforcer les rapports entre le Département des Forêts et la population locale vivant à proximité des aires protégées du rhinocéros.

Introduction and methodology

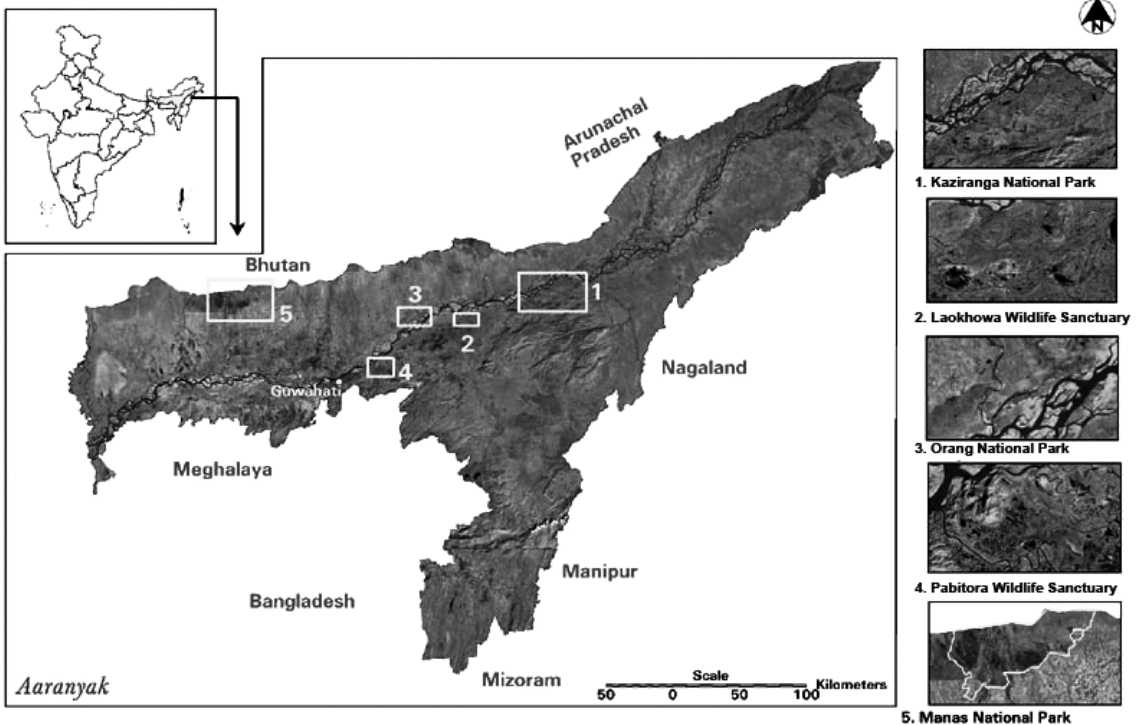
The State of Assam in north-east India held approximately 2050 rhinos in 2008, the largest number for any country in Asia. More than 90% were in Kaziranga NP where they were well protected from 2000 to 2006, with an average of only five rhinos poached each year. In 2007, however, poachers killed 20 rhinos in Kaziranga. In 2008 the situation improved with only 10 killed. Orang NP (officially called Rajiv Gandhi Orang NP) suffered its worst poaching for nine years in 2008. In the small Pabitora WLS, however, there was no rhino poaching in 2007 or in 2008, from which lessons can be learned.

The fourth area in Assam with rhinos today is Manas NP. They had been nearly wiped out by 2002/3 (R. Bhattacharjee, former Deputy Director of Manas NP, pers. comm. December 2008). In December 2008 there were five that had been re-introduced by the Forest Department and NGOs between 2006 and 2008.

Following fieldwork in Assam in December 2008/January 2009, when one of the authors (EM)

interviewed Forest Department staff in Guwahati, Kaziranga, Pabitora and Orang (see Map 1), and collected data and information from NGOs, tour operators and former rhino poachers, the authors discussed the challenges that face Assam and how these can be addressed. The purpose of this paper is first to describe recent rhino poaching in Assam, look at anti-poaching efforts, stockpiles of rhino horn and budgets, and to discuss the conservation strategies for Assam's greater one-horned rhinos. The State Forest Department looks after the wildlife in Assam, and this paper appraises their policies for rhino protection, along with those of NGOs, including help to the local communities. Recommendations to further improve the protection of rhinos are given.

Manas NP was excluded from this study as the five newly re-introduced rhinos have not been threatened with poaching; some were still enclosed in a small boma.



Map 1. Rhino bearing areas of Assam, India.

Results

Rhino poaching in Kaziranga in 2007 and 2008

Kaziranga NP consists of 430 km² of land and water bodies that were gazetted in 1974 plus six additions that total 429 km² (although the largest has not yet been gazetted) making a total of 859 km² under the control of the Forest Department for rhinos and other wildlife. The Park, however, is slowly shrinking as the Brahmaputra River on the northern boundary is shifting southwards. There were 1855 rhinos in the Park in 2006 according to the latest rhino census (Talukdar 2006). While 3–8 rhinos were poached each year from 2000 to 2006, with 5 poached in 2006, according to the Forest Department and NGOs; the figure rose sharply to 20 in 2007, but came down to 10 in 2008.

Officials say that in 2007 16 rhinos were poached, according to statistics from the Divisional Forest Office (DFO) Kaziranga, December 2008. NGOs and the media, however, recorded 20 poached rhinos in 2007 in and around Kaziranga. Of these, 14 carcasses were found in the original 430 km² area: 6 in the Burapahar Range, 4 in the Agorotoli Range, 3 in the Bagori Range and 1 in the Kohora Range. They were all shot except for one killed in a rhino pit trap in the Agorotoli Range. Beyond this area, the six other rhinos were all shot dead: two in the East Assam Wildlife Division, two in the Golaghat Wildlife Division, one in Gohpur and one in North Karbi Anglong Wildlife Sanctuary (see Map 2).

In 2008 the number of rhinos poached declined to 10. The Forest Department recorded seven poached rhinos: four within and three outside of Kaziranga NP. All were shot. The media and local NGOs, however, reported three more that were shot dead outside Kaziranga. Normally, poachers remove only the horn, but in one instance in December 2008 poachers also took the tail, nails and ears. This female rhino had strayed out of the Park and was shot 25 km from the Park boundary. The carcass was put into a pit in the backyard of a homestead and a chemical was poured over it to speed its decomposition. Police and Forest staff found the remains a few days later.

Poaching gangs usually consist of three to five people. According to several sources, generally one helper is local and familiar with the area; another, also usually local, carries the provisions; and one or two others are from Nagaland, but occasionally from

the Karbi Anglong area directly south of the Park, who are in charge of the gang and who do the shooting. The Nagas bring rifles, commonly .303s from Dimapur, a trading town on the Assam-Nagaland State border. They give an advance payment of 2000–30,000 Indian Rupees (INR) (USD 42–625) to the field helpers and sometimes promise to pay more money after the rhino is killed, although this does not usually materialize. The poachers shoot one rhino per park visit and usually only remove the horn. The Nagas then return to Dimapur with their guns and the horn, preferring to walk all the way to avoid detection. A trader in Dimapur, who may or may not have organized the gang, pays INR 200,000–500,000 (USD 4167–10,417) per kg for the horn.

In December 2008, one of the authors (EM) interviewed two men who had been members of separate poaching gangs. One was an 18-year-old named Rajen, a poor firewood collector from the Karbi tribe. In 2007 he met four Nagas who had come from Dimapur. They offered him the job of being a field helper for several trips into Kaziranga. They paid him INR 9,000 (USD 220) in advance, claiming they would pay more later. This is equivalent to about 3 months' earnings for collecting firewood at the time. They also employed three poachers from the Karbi Anglong region to shoot the rhinos with .303s brought from Dimapur. The gang entered the Park in January, May and July 2007 and shot a rhino on each visit. They brought with them water, dried food, knives and an axe and arrived between 1900 and 2100h, staying for up to 24 hours. The first two rhinos were killed with one bullet each and the last took three bullets. They removed the horn in less than five minutes using their knives and axe. On all three occasions they handed the horn over to a Naga trader outside the Park, who then took two or three days to



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Figure 1. Mother rhino and calf in Kaziranga National Park.

walk to Dimapur with the horn. Rajan was told that the Naga gave the shooters INR 200,000–300,000 (USD 4876–7296) per kg for the horn. Rajan hid in the forest during these months to avoid detection. He returned for a fourth and last trip into the Park, but Park staff shot dead one of the shooters in the gang and caught two others while Rajan escaped. In August 2008, Rajan's parents brought their son to the Forest Department to surrender.

The second poacher interviewed was Balak, an illiterate 28-year-old firewood collector, also from the poor Karbi tribe. Three Nagas recruited him in Balijuri village in the Karbi Anglong area in 2006; he had just left his own village after rowing with his family. He received INR 5000 (USD 111) in advance to be their field guide. The gang had to enter the Park five times before managing to kill a rhino due to the heavy presence of Park staff. On the fifth time, they entered the Park at 0300h and shot a rhino with four bullets from a .303 rifle at 1400h. The Nagas took the horn and went on foot back to Dimapur. Balak then returned to Balijuri but did not receive more money. Later, the eco-development committee in his home village found out about the poaching and pressurized Balak to surrender.

A member of each of three other poaching gangs had surrendered recently and were now paddy field workers. All were poor, uneducated young Karbis from near the Park and had been recruited as field helpers. One received INR 2000 (USD 46) in advance in total and twice the gang escaped from the Park—each time with a horn. The other two entered Kaziranga once; their gangs failed to kill a rhino and they received no payments.

In 2007 officials killed 5 poachers, arrested 18 others, confiscated four .303 rifles, and seized 29 rounds of ammunition. The Forest Department also confiscated one horn. In 2008 officials killed a rhino poacher, arrested 35, recovered one .303 rifle with 28 rounds of ammunition, and seized 1 complete horn, 2 horn pieces, 16 nails, 9 skins, and a rhino tooth (information from the DFO's office, Kaziranga).

Assam officials have very little hard information about the trade itself. It is not clear how the horns move on from Dimapur, or where they go. Several members of the Forest Department staff believe horns may go via West Bengal, Bhutan and Nepal through China to eastern Asia. Another possible route is from Dimapur via Myamnar (formerly Burma) into Thailand.



Figure 2. Assam's storerooms have the largest number of full greater one-horned rhino horns in the world. Most were from Kaziranga.

Rhino horn stocks from Kaziranga

Rhino horns that are found in the field and confiscated are marked and locked up in storerooms in the Park and later go to the State Treasuries. In 2008 the Treasuries held 1238 horns that had been collected since 1973 from Kaziranga. Individual weights are also recorded (information from the Kaziranga rhino horn registry book). In December 2008 there were 42 rhino horns still held in Kaziranga; therefore the total stockpile from Kaziranga was 1280 horns. The heaviest weighed 2.04 kg. The total weight was not given, but an adult rhino horn weighs on average about 750 g.

Kaziranga's budget

Kaziranga's official budget consists of funds from the State of Assam ('State non-plan'), mainly salaries, and from the Central government ('Central Sponsored Scheme'), especially development funds. Kaziranga's official annual average budget for 2006/7 and 2007/8 was INR 89,927,701 (USD 2,140,588). Salaries and wages for all official funds made up 58% and from State non-plan 93%.



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Figure 3. For many years forest guards have been trying to stop East Bengal/Bangladesh immigrants from entering Assam's Laokhowa Wildlife Sanctuary for forest produce as the Forest Department wishes to reintroduce rhinos; all 40 had been poached in 1983/4.

NGOs (such as Aaranyak, David Shepherd Wildlife Foundation, European Association of Zoos and Aquaria, International Rhino Foundation, The Rhino Foundation for Nature in NE India, Wildlife Trust of India and WWF) also contribute funds, materials and expertise, which amounted to a minimum of USD 88,000 on average per annum for 2007 and 2008.

The density of rhinos in the Park (1855 divided by 859 km²) is 2.16 rhinos per square km. If the official budget is divided by the number of square kilometres in the Park (USD 2,140,588 divided by 859 km²), the annual sum available is USD 2492 per km. If NGO donations are added to this figure (about USD 100 per km² extra per annum in 2007 and 2008) the total is USD 2594 per square km. This is about 50% higher than the budget for Chitwan National Park in Nepal, a rhino protected area of similar size (Martin et al. 2009), and much higher than rhino protected areas in Indonesia and Vietnam—which have lost most of their rhinos in recent years to poachers.

Rhino poaching in Orang in 2007 and 2008

Orang NP, an area of 78.80 km², is about 80 km west of Kaziranga on the northern side of the Brahmaputra River. The latest census in 2006 counted 68 rhinos. From 2001 to 2005 one rhino was poached on average per year, three were poached in 2006, three in 2007 and seven in 2008, according to the Forest Department and NGOs. In 2006, 2007 and 2008 all were shot dead; only one of these was killed outside the Park, in 2008.

There are usually four or five people in a poaching gang. Those with the guns are Karbis from Assam or poachers from Nagaland and Manipur States east of Assam. The field helpers are thought to be mostly immigrants originating from East Bengal/Bangladesh, who are the main inhabitants of the fringe villages surrounding the Park. The gang leaders pay the field helpers INR 20–50,000 (USD 417–1042) each to join the gang. The gang enters the Park at about 0300h, bringing supplies of dried food, water bottles, mosquito repellent, nets and one or more rifles; they stay

in the Park for up to several days until they have killed a rhino. Then they quickly leave under darkness with the horn, which usually ends up with middlemen in Dimapur who pay up to INR 500,000 (USD 10,417) per kg (Jayanta Deka, Range Officer, Orang NP, pers. comm. December 2008).

In 2005 the Park authorities arrested 19 rhino poachers and seized INR 367,000 (USD 8156) in cash, which was said to be used to buy a rhino horn. In 2006 they killed a rhino poacher and apprehended 22 others. In 2007 they arrested 16 rhino poachers and confiscated two .303 rifles with ammunition and one hand-made gun. In 2008, up to September, the Park staff caught eight rhino poachers and interrupted three gangs from removing three horns (statistics from Orang NP).

Rhino horn stocks from Orang

All recovered rhino horns go to the State Treasury. In total from 1974 to December 2008 there have been 80 horns sent to the Treasury (statistic from Orang's rhino horn registry book).

Orang's budget

Orang's official budget consists of funds, mainly for salaries, from the State of Assam ('State non-plan'); there is almost no money from the central government. Orang's official State budget for 2006/7 and also for 2007/8 was INR 7,625,000 (USD 178,780 and USD 174,087) respectively. There was a small additional sum from the central government in 2006/7 but nothing the following year. NGOs (International Rhino Foundation, WWF and Aaranyak) also contribute resources and expertise.

The density of rhinos (68 divided by 79 km²) is 0.86 rhinos per square km. The official amount of money available to spend per square km in Orang NP was USD 2,204 in 2007/8 (USD 174,087 divided by 79 km²), plus the small sum from NGOs.

Rhino poaching in Pabitora from 2006 to 2008

Pabitora WLS lies about halfway between Guwahati and Orang NP. The Sanctuary is only 39 km², of which only about 16 km² is suitable rhino habitat. In February 2008 there were 92 rhinos counted, a healthy growing population, despite its small size (statistic from Range Office, Pabitora). About 20–40 rhinos, however, have to go outside the Sanctuary each night

to graze in the villagers' rice, mustard or wheat fields due to their high density (the highest in Asia). Around Pabitora there are 33 villages with at least 10,000 people and thousands of cattle. Some villagers short of grazing lands drive their cattle into the WLS to feed in the daytime. Thus rhinos and villagers' cattle compete with each other for food.

From 2000–2005 poachers shot dead five rhinos and electrocuted three others. In February 2006 another rhino was shot dead outside the Sanctuary. No rhinos are known to have been illegally killed in 2007 or in 2008, despite being easy to spot with such a high density and despite so many wandering out of the protected Sanctuary.

Rhino poachers live in the area, although they were not successful in 2007 and 2008. Similar to Kaziranga and Orang, this gang consists of a couple of shooters, usually from Nagaland, and at least one field helper. These helpers are thought to be immigrants originating from Bangladesh who, as around Orang, are the main settlers in the area. The poachers are recruited from villages that are not on the fringes of the Sanctuary. The field helpers usually receive an advance payment of INR 20,000–30,000 (USD 456–684) to join the gang. The shooters take the horns to Dimapur where they receive INR 200,000–300,000 (USD 4,566–6,849) per kg—again similar to Kaziranga and Orang (according to a poacher who in 2007 gave information to Mukal Tamuli, Range Officer, Pabitora (pers. comm. December 2008)).

Between 2005 and 2008, Pabitora WLS staff arrested eight members of poaching gangs (only one inside the Sanctuary) and confiscated five guns. They were all thought to be immigrants originating from Bangladesh except for one poacher, a Naga with a .303 rifle caught in 2007. The most recent arrest was in 2008 when the Forest Department, through an informant, raided a house near the Sanctuary and arrested two field helpers with three guns.

Rhino horn stocks from Pabitora

There are 16 rhino horns held by Pabitora staff, collected between 2003 and mid-December 2008, the heaviest was 1.8 kg. Horns collected earlier were sent to the Nagaon Treasury, but the Range Officer did not know how many (Tamuli, pers. comm. December 2008).

Pabitora's budget

Pabitora's government budget is made up of funds from the State of Assam (State non-plan, consisting of salaries, and State plan, which is for other recurrent expenses), plus funds from central government ('Central Sector Scheme'). Pabitora's official annual average budget for 2006/7 and 2007/8 was INR 8,575,500 (USD 195,788). Of this total, salaries and wages made up 67%, with 22% for other recurrent costs from State funds and 11% from central government (usually for development costs) (statistics from the District Forest Office, Guwahati Wildlife Division, December 2008).

NGOs (including WWF, Aaranyak and the Wildlife Trust of India) give their expertise and assistance; recent donations include a vehicle, a motorbike and some funding for intelligence activities.

The density of rhinos, if they were all in the Sanctuary (92 divided by 39 km²) is 2.36 rhinos per square km. If the official budget is divided by the number of square km in the Sanctuary (USD 195,788 divided by 39 km²) the average annual sum available for the last two years was USD 5020 per square km, plus a little extra from the NGOs. This is double the amount spent in Kaziranga and Orang, but the animals continually leave the sanctuary at night so in reality a larger area requires protection.

Discussion

Why did rhino poaching rise substantially in 2007 in Kaziranga and how was it curtailed in 2008?

The year 2007 spiked with 20 rhinos poached compared with 5 in 2006 and 10 in 2008. One of the main reasons could be that a new senior officer was appointed to Kaziranga NP; it took him some time to understand the poaching threats and to learn how to combat them. Due to the sudden increase in poaching, the morale at the front line sank. When the senior officer received information on poachers, the response to counter the attack was not adequate to keep pace with the poachers. The poaching was also due to apathy from the State government in providing timely support to the Park. In addition, three frontline staff members were arrested by police regarding a case where a poacher was shot dead. All these issues broke the spirit of the frontline staff in Kaziranga.

Another problem was a shortage of staff in 2007.



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Figure 4. Indian rhino horns weigh, on average, 750 grams and are highly prized for East Asian medicines; customers believe these small horns are more potent than the larger African horns.

Figures show that, from the financial year of 1 April 2007 to 31 March 2008, although the Park was allocated 562 permanent staff, only 463 of these positions were filled (statistics from the Divisional Forest Officer, Kaziranga, December 2008). This was because many permanent staff members had been retiring and were not being replaced because the State government did not have the funds and political commitment to fill the vacancies. This problem had been accumulating for at least 10 years. Many staff were older, lacking the zeal and physical ability to patrol effectively as they had earlier. There were 138 anti-poaching camps within the Park in 2007, but they were not adequately staffed. There should be five men per camp according to Abhijit Rabha, Conservator of Forests, Wildlife, Assam (pers. comm. December 2008). There are

50–52 domesticated elephants used for tourism and patrols, but only half the mahouts were permanent due also to staff cutbacks (Suren Buragohain, Director of Kaziranga, pers. comm. December 2008).

A third problem was that the staff did not have enough intelligence funding in 2007 for their needs (D.D. Gogoi, DFO, Kaziranga NP, pers. comm. December 2008). This, together with a lack of adaptive strategies on how to react to information, meant intelligence activities were generally inadequate.

Not much money was available for revamping the deteriorating anti-poaching camps, or for training workshops to upgrade patrol skills, nor were there adequate funds to modernize firearms and communications equipment. One senior officer explained that instead, too much priority was placed on funding entertainment and hospitality, and that too many staff were being sidelined to deal with VIPs rather than concentrating on anti-poaching needs.

In 2008 there was a turning point that produced strong action from the State and Central governments and from NGOs. On 19 January poachers shot at a rhino and her calf that had walked 200 m out of the Park near Kohora. The calf died almost immediately, but the female temporarily fell down; the poachers removed the horn while she was still alive. The mother got to her feet and wandered around for 36 hours, finally dying from excessive bleeding. Before she died, one of the authors (BT) photographed the injured rhino and shared the horrifying picture with important contacts around the world and asked for letters of protest. On 23 January he sent the protest letters to the Prime Minister, Manmohan Singh. Conservationists and the media put additional pressure on the Assam police to catch the poachers and to confiscate arms and ammunition, which often come from civil areas into the national park. Action was almost immediate. The Prime Minister spoke to the Chief Minister of Assam, who ordered the police to respond immediately. They arrested more than 10 rhino poachers and traders around Kaziranga NP and rhino poaching declined. Some of the main NGOs allocated emergency money for intelligence gathering, extra fuel, a new vehicle and anti-poaching equipment; this assistance and upgrading of the Park started in March (Tariq Aziz, WWF India, pers. comm. December 2008 and January 2009).

In May 2008, the Divisional Forest Officer was replaced by a highly experienced man who immediately reinstated leadership, discipline and morale, especially among the Forest Guards. More Forest Guards were moved into the Park from elsewhere and the number of Home Guards used for anti-poaching

increased from fewer than 80 to 120 (Gogoi, pers. comm. December 2008).

The Forest Department became much more active in eco-development schemes than they had been for a long time. They increased training for the local villagers in the tourist sector to reduce unemployment, for example by allowing more villagers to be tour guides; some 88 guides were taking their own vehicles with tourists into the Park. The Forest Department also established a traditional Karbi restaurant with local employment that was opened in October. These schemes boosted relations between Kaziranga and the local villagers. These improvements in 2008 resulted in the decline in rhino poaching from 20 in 2007 to 10 in 2008.

Orang's difficulties to combat rhino poaching in 2008

The main reason for the illegal killing of seven rhinos in 2008, as opposed to three the year before, was that some of the experienced Forest Guards had been transferred out of Orang NP. They had been isolated there for years and had wanted to move. Other people were recruited, but they were less experienced and did not have the know-how and tactics to prevent poaching effectively. In 2006/7 there were 63 permanent staff, 34 casuals and 12 Home Guards, a total of 109, and 13 vacancies; in 2007/8 there were an additional 36 Home Guards and six of the vacancies were filled by the Bodoland Territorial Council (BTC) (Statistics from the Range Office, Orang NP, December 2008). Extra staff did not help much with the experienced staff gone. Some poor local villagers (again, people thought to be immigrants originating from East Bengal/Bangladesh), aware that patrolling was weaker in 2008, became rhino poachers. In 2008 there was almost no money spent on intelligence gathering by the government, so the number of poachers grew.

Orang NP is geographically isolated compared with Kaziranga NP and Pabitora WLS. Kaziranga is on a national highway and Pabitora is the closest rhino protected area to Guwahati (and thus popular), but Orang is cut off on the north side of the Brahmaputra River where tourists rarely go. In 2007/8 for Kaziranga there were 59,746 visitors (of which 6106 were foreigners) and the Park earned INR 9,164,424 (USD 209,233). For Pabitora there were 9–10,000 visitors, mostly from Guwahati, and the Sanctuary earned INR 650,000 (USD 14,840). Orang, however, had 1596 visitors (215 foreigners) and the Park earned just INR 278,500 (USD 6,358) (statistics from the three Forest Department offices, December

2008). Orang is a low profile park; the State and Central governments have not been allocating sufficient funds to the Park for some years. Facilities are run down and there is a shortage of accommodation. Senior Forest Officers from Guwahati rarely go to Orang and do not see that it is in poor shape.

These problems are the main stumbling blocks facing Orang and seem hard to overcome compared to Kaziranga, which receives a lot of attention, being a World Heritage Site. Pabitora is another important site, because it is popular with Guwahati picnickers, but Orang is on the fringe and lacks strong support, even though it is officially named after the former Prime Minister, Rajiv Gandhi.

How was rhino poaching prevented in Pabitora in 2007 and 2008?

There has been a serious improvement in stopping rhino poaching, with none poached in 2007 and 2008 compared with 2.6 rhinos poached on average annually in the previous 20 years.

Pabitora received almost twice as much funding per km² from the government compared with Kaziranga and Orang (USD 5020 versus USD 2592 and USD 2204 per km² respectively, on average annually in 2007 and 2008). This permits a very high ratio of personnel per km²: 2.6 men per km² compared with 0.77 for Kaziranga and 1.9 for Orang (statistics from Kaziranga NP, Orang NP and Pabitora WLS, December 2008). Pabitora has always received substantially more manpower per km², so this alone has not been the reason for the lack of recent poaching.

What has improved, in comparison with earlier years, is a much more positive relationship between the Sanctuary staff and the local people, preventing potential poachers. There has been a cumulative improvement, supported by official funds, to arrange meetings at schools and villages to motivate people about the wildlife conservation.

NGOs have been funding informers since 1999, but increased their financial support in 2008. Sanctuary staff members have been developing their intelligence network over the years and the injection of informant funds lent to the prevention of rhino poaching entirely in 2007 and 2008. In 2008 the Range Officer had available INR 10,000 (USD 228) per month for intelligence, INR 5,000 of which came from Aaranyak. Staff members pay for information from reliable sources on a regular basis. If a poacher is caught with arms, the informer could receive INR 20–30,000 (USD 457–685). Many former poachers

have been converted into informants, so active poachers nowadays fear to operate because the chances of getting caught are greater than before (Tamuli, and S.K. Silsarma, DFO, Pabitora, pers. comm. December 2008).

Pabitora is so small that it is easier for Sanctuary staff to communicate with the fringe villagers, as there are fewer of them, compared to Kaziranga and Orang, which have extensive boundaries. There are few eco-development projects, but these have not been as necessary because close relations have been developed anyway through meetings and campaigns. These factors have allowed more effective operations and improvements in anti-poaching over the years.

Recommendations

Having assessed the threats posed to rhinos in Assam, recommendations for follow-up action, in order of effectiveness against rhino poaching, are given below.

1. High budgets must be maintained for Assam's rhino areas. Any vacant positions amongst the field staff must be filled and kept filled by permanent staff. The Forest Guards need to receive a wage-increase from approximately INR 6,700 (USD 153) a month to INR 10,000 (USD 228) to motivate them in their high-risk profession. Much of their accommodation requires repair and threadbare uniforms need to be replaced. Other important items needed are torches and a mobile communication system; these are items NGOs could readily supply.
2. The most successful way for the senior staff to stop poachers is through intelligence money for gathering information on potential poachers and traders. More intelligence funds are required for all rhino protected areas. This money must be provided by NGOs because government departments cannot easily authorize such funds, as they cannot obtain receipts from informers. Money must be given to those Range Officers and DFOs who have a strong proven track record in dealing with intelligence funds.
3. Relations with the people surrounding rhino protected areas need improvement. Campaigns, such as those that have worked around Pabitora, should be copied in Kaziranga and Orang; successful programmes to teach the villagers about protecting their rhinos should be modified according to the needs of each site. More eco-development projects—especially related to tourism, which employs local

- people—will enhance positive relations.
4. NGOs need to monitor the anti-poaching activities in Assam's rhino protected areas more regularly to be aware of any developing problems. They ought to visit these areas accompanied by a senior Forest Officer from Guwahati who is influential on how funds should be allocated. Together they can see to it that the correct action is implemented to improve rhino protection as and where necessary.
 5. The Forest Department staff in rhino protected areas should send regular reports to the central office, especially on poaching incidents. The Forest Department should then give important information to NGOs, so they can respond quickly if there is an increase in rhino poaching threats, and help by providing more funding support. The Forest Department does not usually have access to immediate extra funds in times of crisis as NGOs do.
 6. An NGO, in co-operation with the Forest Department, should collect a set of rhino anti-poaching and conservation guidelines from Department staff. There have been some excellent and dedicated staff over the years whose knowledge and techniques in motivating their field staff etc, ought to be recorded. An NGO could produce a manual, frequently updated, for the benefit of new staff or for those being transferred to new areas. Then, information and expertise, otherwise lost when effective staff are replaced, retire or die, is saved, and their methods can continue to inspire and guide their successors who then do not have to start afresh and make errors that cost rhinos' lives.
 7. A prominent figurehead should take on the cause for Orang NP and bring in assistance needed for the Park, thereby overcoming the bureaucracy's control that hampers the survival of Orang's rhinos. Perhaps, as it is called Rajiv Gandhi Orang National Park, a member of that family could become involved in helping to protect it.
 8. The police and customs officers need to be told by high authority to put a priority on wildlife crimes. In turn they need training by qualified staff or NGO members such as from TRAFFIC, to identify wildlife products and how to catch wildlife traders.
 9. TRAFFIC and other NGOs urgently need to reveal the trade routes for rhino horn leaving India and identify the traders in Dimapur; almost nothing is known about these middlemen. The Nagaland authorities must apprehend these criminals.

10. The main impediment to bringing an end to poaching is the poachers' correct perception that they will not be jailed for any length of time if caught. The arrest of poachers by the Forest Department is routinely undertaken, but the Forest Department lawyers have problems in framing the cases and completing the investigations. What is needed is a small group of skilled lawyers in the Forest Department who can prepare a proper criminal case that can be won in court. Fines and jail sentences need to be increased substantially—and publicized—in order to deter poachers and traders.

Conclusion

Competent staff and appropriate budgets for Assam's rhino protected areas have enabled this remote state in India to be one of the best rhino success stories. Assam is home to 77% of the world's wild population of greater one-horned rhinos; in 2007 and 2008 fewer than 1% of these rhinos were poached annually. It is imperative, however, to keep vigilant; if political disturbances occur, as happened recently in Manas NP and in Nepal, the number of rhinos poached could increase dramatically. NGOs and Forest Department officials can further improve their collaboration to tighten up their guard for this important rhino population and be a model to conservationists worldwide.

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