



Chillies – a hot and spicy solution to successfully tackling human-wildlife conflict in India

An Animals on the Edge report, written by Chris Weston

In 2002, while working on an assignment in Kenya, I met a village farmer named Matunde. The cause of our meeting was a dead elephant on the outskirts of the village – another seemingly innocent victim of the constant conflict between humans and wildlife. I say “seemingly” because, while many in the West see elephants as exotic tourist attractions and icons of Africa’s wild savannahs, in Matunde’s eyes, this elephant was an unwelcome intruder – one of many – that threatened his crops and, with it, his family’s wellbeing and security.

Matunde’s predicament – to protect the welfare of his family or the life of a wild animal – is far from unique. Human-wildlife conflict (HWC) occurs around the world, affecting many species, in particular large, often endangered, mammals. It is not restricted to particular geographical regions or climatic conditions and, almost without exception, it has negative implications for wildlife, as it creates deep and passionate animosity amongst impoverished rural communities that manifests through encroachment on protected areas, poaching and excessive resource use, threatening and undermining conservation efforts.

While researching for Animals on the Edge (AOTE) in India, I encountered several villages where HWC, predominantly caused by wild herbivores destroying crops, resulted in both retributive killings and accidental human-caused mortality of wildlife. In the case of the latter, tigers – classified as Endangered by the IUCN (International Union for Conservation of Nature) – are often the inadvertent victims of snares laid to trap crop-raiding herbivores.

The financial cost of HWC

While the financial cost of HWC to farmers and communities remains excessive, the negative impact on wildlife will continue. In the state of Rajasthan, Sariska Tiger Reserve supports a human population of about 107,770 people, distributed in 117 villages. A study into HWC in the area attempted to quantify the cost to families of living in close proximity to the reserve by estimating crop and livestock losses, given that agriculture and livestock farming are the primary economic activities in the area. The study concluded that, in monetary terms, the annual average value of crop losses equated to between US\$67 and US\$91 per household, depending on the distance of the village from the reserve boundary. While such figures may seem trivial to you and me, when your average wage is less than US\$1 per day a mean loss of US\$79 is a significant sum – equivalent to around 22% of annual income.



In a second study, conducted in Bhadra Tiger Reserve, in the state of Karnataka in southern India, which supports around 3,000 villagers, crop damage caused by elephants was calculated to amount to 0.82 tonnes per household, or 14% of total annual production. In monetary terms, this loss equated to 30% of average annual income. In both cases, the cost to families and communities living within the designated buffer zones and on the borders of protected areas, and already living in abject poverty, is significant and sufficient enough to be the root cause of HWC.

Current HWC solutions

Current solutions to the issues resulting from HWC are numerous. One of the simplest is to erect a physical barrier – a fence – to prevent spatial overlapping. However, fences often prove to be ineffective in the medium- to long-term. In Gujarat, western India, for example, a chain link fence was erected along the eastern boundary of Gir National Park to prevent lions and leopards from straying into community areas, and to prevent illegal grazing of domestic animals inside the park. However, the experiment proved to be financially unviable and was only partially successful. Burrowing animals, such as wild boar, breached the barriers, permitting access to other species.

Physical barriers can also upset the ecological equilibrium and population dynamics of a region. Kruger National Park in South Africa is a prime example. The size of Belgium, Kruger covers a substantial area and, until recently, was fenced on all sides. In many ways it has become a victim of its own success. In 1995, Kruger held around 8,000 elephants, approximately 1,000 more than experts said the Park's vegetation could support. Now the Kruger elephant population is estimated at 14,000 and the park's management are concerned that large areas of the game reserve are being denuded of vegetation and their goal of preserving bio-diversity is being compromised.

Voluntary resettlement

Voluntary resettlement of human populations is a solution that is being adopted in India, having been moderately successful elsewhere. Where the socio-economic benefits are sufficient – better access to essential resources, higher levels of security, financial compensation, and the removal of political and cultural barriers – communities are often willing to accept resettlement from their traditional lands as a solution to HWC. However, the process in India is being compromised by politics and alleged corruption.

For example, in a recent effort to stem the tide of declining tiger populations, the government upped the budget for resettlement of people within forest areas from US\$2,565 to US\$25,641 per family. Despite the improved financial incentive, however, little appears to have been



achieved on the ground. In the spring of 2009 I visited Kanha National Park in Madhya Pradesh, a location for one of the resettlement programs. A source told me that although the families targeted for resettlement outside of the park were eager to move, and the money to pay the necessary compensation had been made available to local authorities, the cash (in excess of US\$2.5-million) had been sitting in a bank account for several months, gaining a significant amount of interest. My source implied that those controlling the money were using it for personal, financial gain.

Cash compensation

Another solution that has been adopted is the payment of compensation in the form of cash to farmers for crop and livestock losses. However, such mitigating strategy schemes typically fail to appease claimants because bureaucracy and corruption burden them, and the cost to farmers in time and money usually far exceeds the value of the compensation awarded. While researching in India in 2008 I spoke to a group of farmers in Kohka village, close to Kanha National Park. One of the farmers cited a claim he had made for the loss of four cows. The cows were worth 20,000 rupees (c. US\$428); his award was half that value, took five months to process and was only settled once a bribe had been paid to a government official.

Similar schemes in other parts of India are equally ineffective. In a study conducted in the state of Karnataka, investigations revealed that only 14% of claims for crop losses were ever settled, with reimbursements taking up to six months to process. Of the claims that were successful, the final payment equated to around just 26% of the value claimed. In Himachal Pradesh, the report found that around just half of agro-pastoralists claiming compensation for livestock losses received monetary reimbursement, which covered only 3% of the total annual loss.

There is also concern amongst officials and conservationists about improving and enforcing such schemes, their argument being that a well-developed compensation scheme would result in inflated claims and attract people from outside affected areas thus exacerbating the problem. Neither do such schemes encourage villagers to protect their holdings and to co-exist with wildlife. They are sound arguments and cash compensation as a strategy for solving the problem of HWC is by most groups considered to be unsustainable.

The chili solution

While researching for AOTE the problem of HWC in India I came across an innovative solution to the problem that had its roots in Africa. Around the same time I met the village farmer, Matunde, in Kenya in 2002, twelve hundred miles away in Harare, Zimbabwe, a chance meeting between a Louisiana-born elephant biologist and a self-professed serial entrepreneur from Australia, resulted in the establishment of The Elephant Pepper Development Trust (EPDT),

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which has developed ways to use chilli peppers to keep elephants from raiding farms, and to financially support farmers at the same time – a natural way of protecting both the animals and the African farmers.

“They practically fight over my okra when I take it to the market in town.” George Imusho smiles proudly as he overlooks his farm and talks about his recent success. Okra is one of the crops the Zambian grows to support his family of eight. His farm, an 18-hectare property just outside of Livingstone, is situated on the banks of the Zambezi River, an idyllic location, but also a popular corridor for elephants. “They used to come to my land almost every week and destroy part of my farm,” says Imusho. “It would take me about four months to grow the crops again and restore the damage.”

Elephants and people have been in conflict as long as people have been growing crops. “This forms a major problem in a large part of the continent,” says Nesbert Samu, manager of the African Wildlife Foundation in Livingstone. “And it is a conflict that is hard to fight. Elephants use the same corridors throughout their lives, and if your farm happens to be in one of those corridors, it is guaranteed that your crops will be damaged.” Traditional techniques of keeping the animals at a distance, such as beating drums or cracking whips have only a temporary effect. The animals eventually get used to the noises, and stop associating them with danger.

Livingstone, a town with a population of 110,000, is a good example of the persistent conflict. “Livingstone is in the middle of a major corridor for elephants,” explains Samu. “The town is situated between three large natural areas; Hwange National Park in Zimbabwe, Mosi-ao-Tunya National Park, in Zambia, and Chobe National Park in Botswana. Around 140,000 elephants walk between the three parks.” With an expanding population in Livingstone and a growing number of elephants in the area, humans and elephants are increasingly forced to coexist. Every year, this causes the death of several elephants, as Samu points out. “If there are persistent complaints about certain elephants, they eventually get killed by local authorities.” Moreover, the conflict threatens the livelihoods of farmers like Imusho. “The animals don’t just eat the crops, they also destroy the farms by simply walking through them. And these farms are often the only source of income for large families.”

At the beginning of the year, one of Imusho’s neighbours told him about a new way of keeping elephants at a distance – chilli pepper. Slightly sceptical, but with great interest, the farmer approached the EPDT in Livingstone. The Trust’s representatives visited Imusho at his farm, handed him chilli pepper seedlings, and explained how to use the peppers. “I am still developing and testing some of the methods, but the chilli peppers have already made a difference,” Imusho says. “The elephants still come up to my farm, but they usually move away when they smell the chilli. I even saw a big bull recently who grabbed some of the peppers, but quickly ran away once he realized what it was.”

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The concept of using chilli to ward off elephants developed in Zimbabwe's Zambezi Valley in the mid 1990s. Michael Gravina, one of the founders and directors of the project, met American zoologist Loki Osborn, who was doing research on the elephant-human conflict. Supported by the Wildlife Conservation Society and the US Fish and Wildlife Service, Gravina and Osborn started testing low-tech, natural, and inexpensive methods of deterring elephants. "At one point, we decided to try pepper spray, since this is successfully being used on various other animals, such as bears in North America," explains Gravina. "And this proved to be effective; elephants were irritated by the spray's smell and burning sensation, and they seemed unable to habituate to it. The only problem is that the spray is unaffordable for the average African farmer. So we started developing cheaper ways of applying the main ingredient, while achieving the same effect."

Chilli plants are intrinsically deterrent crops, and the EPDT encourages farmers to create a buffer zone of the spicy plants around their land. Just growing the peppers is, however, insufficient. Therefore, the project has developed a series of ways to deploy chilli as a weapon in the conflict. The farmers are taught, for instance, to burn the peppers, which spreads the smell. They also learn how to crush the peppers, mix them with engine grease, and smear them on their fences. When elephants touch this substance, it greatly irritates their skin. "Once elephants have had an unpleasant experience with the smell or taste of chilli, it is not likely that they will ever come back to the same place," Gravina explains.

After they have used their chilli peppers to deter elephants, farmers are often left with a large surplus. To give farmers an extra income, Elephant Pepper, the commercial branch of the Trust, buys these peppers from them, providing continuous financial support to participating farmers. "We have always recognized that conservation is not a priority for most African farmers. People who live in poverty will obviously focus on their own survival rather than the survival of wildlife, especially when wildlife is jeopardizing their livelihoods. In order to involve people in the protection of elephants, it is essential to lift them out of poverty first." With the surplus of chilli peppers, Elephant Pepper produces a series of sauces and spices that is sold internationally. The profits of this venture go back into the trust.

The EPDT currently supports over 1,500 farmers in and around Livingstone, and Gravina's goal is to get this number to 3,000 by the end of 2009. "This does not mean that elephants will never form a problem again for these farmers," Gravina emphasizes. "We don't offer a silver bullet. Farmers have to be prepared to put time and effort into growing the peppers and implementing the different techniques." But the project does offer an alternative to traditional methods that is more effective in protecting elephants and more lucrative for farmers, as Samu points out when he says, "It is a great example of how wildlife conservation and development work can complement each other."



Creating a paradigm

With the research available from the Elephant Pepper Development Trust, AOTE approached a wildlife biologist in Madhya Pradesh who is developing a model farm close to the boundary with Kanha National Park, to assess whether chilli would prove effective as a deterrent against invading ungulates. After initial research indicated several types of chilli plant that would grow year-round in India's climate, the chilli solution now forms part of the model farm experiment. Our first task is to analyze the effects of chilli on animals such as deer and wild boar – the animals most commonly involved in HWC in India – as opposed to elephants, to which most of the existing research applies.

If the experiment proves successful, the next step would be to follow the example set by the EPDT, providing seedlings to farmers and educating them in how to adopt the practices that have proved so successful in Zambia and Zimbabwe. The successful migration of community-based conservation ideas lies at the heart of AOTE's mission to find solutions that enable impoverished communities to become financially self-sufficient, raising them above the poverty trap and encouraging them to protect wildlife and natural resources. In chilli, we may have found our paradigm.