

# SOUTH ASIAN ASSOCIATION FOR REGIONAL COOPERATION

Human-Wildlife Conflict in the Mountains of SAARC Region Compilation of Successful Management Strategies and Practices



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Human-Wildlife Conflict in the Mountains of SAARC Region -Compilation of Successful Management Strategies and Practices

> Mountain Ecology Division SAARC Forestry Centre Thimphu, Bhutan 2014

# Foreword

Human-Wildlife Conflict (HWC) occurs when the wildlife's requirements overlap with those of human populations, creating costs to residents and wild animals. It is more serious where wildlife population density is higher and habitats are fragmented. Such conflicts are becoming more prevalent as human populations increase and diversify, development expands, resources shrink, the global climate changes, and other factors increase the human-wildlife interface.

The problem is more serious in the SAARC region as the costs are more severe because of dense rural human population with considerably low income levels. Human Wildlife Conflicts is perceived as the major cause of poverty in rural Bhutan and the situation is not very different in other parts of the SAARC region. The economic losses due to small animals are also quite significant especially in the mountains.

If sustainable solutions for wildlife and people are not adequate, local population develops negative attitudes towards forests and wildlife, exacerbating the conflict and undermining conservation efforts. Hence, it is necessary to ensure that conservation solutions are socially, ecologically, economically and politically robust and sustainable. The SAARC Forestry Centre intended to identify and publish the successes from the SAARC region achieved in the field of Human-wildlife conflict resolution.

Six success stories presented here cover a wide range of innovative HWC resolution models dealing with early warning systems, sterilization efforts, effective and cheaper electric fencing, other barriers, offsetting economic losses through damage compensation and insurance, conservation education and economic incentives.

I would like to thank the authors for their valuable contribution and also appreciate the team at the SAARC Forestry Centre for having put in considerable efforts in screening the various papers received, selecting and editing the same to meet the format of this publication.

We hope that this publication titled 'Case studies on successful resolution of Human-Wildlife Conflicts in the mountains of the SAARC Region' would be useful to a range of stakeholders in the SAARC region as well as across the world for gaining insight, replication and further development.

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# SHIFTING PERSPECTIVES IN HUMAN WILDLIFE CONFLICT: UNHEARD VOICES FROM THE SIKKIM AND DARJEELING HIMALAYA

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# Summary

The case study highlights the nature of human wildlife conflict (HWC) in remote mountainous areas of Sikkim and Darjeeling, making a case that while being different to conflicts caused by larger mammals in the plains, conflict brought about by a host of small animals also has grievous impact on communities' lives and livelihoods. These communities live in difficult circumstances far removed from social amenities and HWC adds a heavy burden on their food and livelihood security. Being located in a globally significant biodiversity hotspot, the Eastern Himalaya, where conservation efforts take centre stage, their plight has remained understated and unheard. Under the circumstances, the case study narrates HWC management measures undertaken by forest fringe communities, building upon existing knowledge and strengthening their ongoing practices as possible measures of managing HWC. It also presents the coming together of two non- governmental organisations, WWF- India and DLR Prerna to address the issue of HWC in the landscape bringing about larger learning and facilitation on best practices. The limited conceptual and policy focus and resultant neglect of this critical issue of mountain HWC makes voicing the issue an important management measure. The paper also highlights the need to bring about more interdisciplinary discourse, convergence and investment to address this growing phenomenon which impacts lives of people.

**Keywords:** Human wildlife conflict and management, Sikkim and Darjeeling Himalaya, Forest fringe communities

# Background

# Locating Human Wildlife Conflict in Sikkim and Darjeeling Himalaya

The state of Sikkim and Darjeeling district in West Bengal, India, tucked within the borders of Nepal, Bhutan, China and Bangladesh, have a common narrative as the upper and middle watershed of the mighty River Teesta. However, the socio-political history of the region is not the same. Sikkim became a constituent state of India in 1975, prior to which it was ruled by a king as an Indian Protectorate. Darjeeling has a contested history of formation with a colonial history as well as continual manifestations of regional autonomy demands of Gorkhaland, a state within India<sup>1</sup>.

<sup>&</sup>lt;sup>1</sup>The history of Darjeeling is contested from the perspective of ownership and identity with sections of the present day district coming under Sikkim, Nepal and Bhutan. The British created Darjeeling under the Bengal Residency as a sanatorium and later developed it for interests in Tea and Forests - Darjeeling District Gazetteer LLS OMalley 1907. The demand for separation from Bengal begins before Indian Independence with the demand first placed in 1911 and continues today with the recent agitation resulting in the creation of the Gorkhaland Territorial

The common narrative is seen in the inclusion of Sikkim and Darjeeling as part of the Eastern Himalaya, among Earth's biodiversity hotspots (Myers *et al.* 2000, Sunar et al 2012). "Its richness in biodiversity has many factors including its location at the juncture of two continental plates placing it in an ecotone represented by flora and fauna from both. The complex and steep topography brings about large-scale climatic variability across the north-south axis further contributing to the diversity." (ICIMOD, 2001).



Figure 1. Locating Sikkim and Darjeeling in the case: Map by Partha S. Ghose

The celebration of the biodiversity richness from a conservation lens can be seen in the way the region has a large portion of the land under forests with a high concentration of Protected Areas.

Describing forests in Sikkim, "luxuriant forest abounding in all parts of the state, nearly 82% of the total geographical area is under the State Forest Department". The state has eight protected areas covering almost 31% of the total geographical area. (<u>www.sikkimforest.gov.in</u>). Likewise, the District of Darjeeling has 1303 km<sup>2</sup> of forest area which amounts to 41.3% of the total 3149 km<sup>2</sup> of the district. Darjeeling has four protected areas covering 364.2 km<sup>2</sup>(<u>www.wildbengal.com</u> Directorate of Forests, WB) with Senchel Wildlife Sanctuary, one of the oldest in India, declared in 1915.

With over 15 years of conservation initiatives in the Sikkim and Darjeeling Himalaya by WWF India and DLR Prerna, the authors have observed that the conservation discourse in Sikkim and Darjeeling has a history of being shouldered by the Forest Department, with people's participation still minimal or totally non-existent. Participatory models of Joint Forest Management (JFM) do not address key issues of ownership, decision making spaces, participation and access and benefit sharing (Chakraborty, R., and Shrestha P., 2011.).

Administration, 2011, an autonomous governance institution with West Bengal and differing in physical boundaries than the Darjeeling District.

Similarly, in the context of Forest Rights Act, which changed the notion of ownership of forests and raised questions of historical injustice, the track record of implementation is poor. (Report on Implementation of the provisions of the "Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006" in the State of West Bengal. "A Citizen's Report on Status and Recommendations 2012 on Community Forest Rights under Forest Rights Act by Vasundhara and Kalpavriksh in collaboration with Oxfam for West Bengal" MoEF/MoTA Committee on Forest Rights Act, Report of visit to Sikkim State Consultation on FRA,22-24 September, 2010.)

# Getting to know human wildlife conflict within mountain communities

Sikkim and Darjeeling are experiencing an escalating phenomenon of human wildlife conflict (HWC) in recent times. Consultations and interviews with communities living next to protected areas in both Sikkim and Darjeeling between 2009 and 2014 have highlighted that HWC is emerging as core issue in the last 10 to 15 years. These consultations were undertaken by World Wide Fund for Nature (WWF-India) – India in Sikkim and Senchel Wildlife Sanctuary of Darjeeling and Singalila National Park in Darjeeling by DLR Prerna, a Darjeeling based non-governmental organization, the latter being supported from Rufford Small Grants Foundation. In addition, community representatives have also been trained to collect daily data on HWC in the Singalila National Park fringes since 2011 under DLR Prerna's initiative.

In the past 10 to 15 years, HWC has gone beyond the nominal loss to people having to give up agriculture totally or change their profile of agriculture as an adaptation to the conflict. It is no longer restricted to the forest fringe communities but is spreading out to communities beyond. The issue has become a focal point of community conversations, almost equal to weather discussions in this part of the Himalaya, yet it still remains being discussed locally and has not found its way to corridors of power and policies. Reasons are multiple, chief among them being the irrefutable fact that HWC discourse is currently mega-fauna and plains centric. Mountain HWC is the result of a complex myriad of primarily small mammals raiding crops and livestock that do not stand the same graces as the prima donna mega fauna of conservation or are not listed as problem animals of HWC. The limited space for people's participation has meant that a core community issue has not gained prominence as much as it should have in policy debates. This gets compounded with the fact that the focus is on the region's investment in conservation for national and global good which is not always sensitive to micro-local needs. Forest villagers are a miniscule percentage of population and extremely marginalized, making their voices difficult to climb the ladder of voices that are heard.

# **Programme activities**

# Mapping stories of Human Wildlife Conflict in Sikkim and Darjeeling



Figure 2. Community consultation at Uttarey, Sikkim (*Pic: WWF – India*)

Community consultations in Sikkim were conducted in the fringe villages of four protected areas Pangolakha Wildlife, Fambong Lho Wildlife and Barsey Rhododendron Sanctuaries Khangchendzonga and National Park. Detailed survey on HWC patterns, main problem animals, crop loss data, measures taken by communities, compensation details were undertaken. In Darjeeling, the community consultations revolved around

the fringe and core villages of Senchel Wildlife Sanctuary and Singalila National Park. HWC was also mapped in community consultations which enabled deeper reflections on flows and patterns of HWC within a village set up. The communities were facilitated to draw a base resource map of the village, demarcate movement of animals, most vulnerable areas, immediate forest types and geography that would influence HWC. On this base map, every month an overlay of animal movement was layered which enabled the analysis of patterns and flows of HWC at the village level. Cropping patterns, seasonal mapping and forest changes, disaggregated the conflict for each village. Daily data collected in 11 forest villages fringing Singalila National Park since 2013 in Darjeeling, with partnership of community representatives, DLR Prerna and Ashoka Trust for Research and Environment and Ecology (ATREE), showed production of crops and damage to these crops in greater detail.

The geographical spread of the protected areas in the consultative process has ensured a good representative of Sikkim and Darjeeling landscape. Most of these communities have very small landholdings of 2 to 10 acres with agriculture being their primary livelihood. They grow a host of crops with potato, maize, millets, legumes, greens, squash and pumpkins being the primary crops. All the communities have livestock and some have pastoral roots as recent as a generation ago. They have a close association with the forest and depend on it for many purposes including for food, fodder, fertilizer, timber and firewood. These communities are far removed from existing social infrastructure and access to the market leading to issues of opportunity deficits and remunerative justice. Adding to the existing burden, human wildlife conflict has emerged as an extreme challenge to their lives and livelihood.

The species of animals causing damage to crops and livestock and their degree varied considerably across the different village clusters in Sikkim and Darjeeling. The main ones were wild pig (*Sus scrofa*); Himalayan crestless porcupine (*Hystrix hodgsoni*); barking deer (*Muntiacus muntjak*); Assamese macaque (*Macaca assamensis*); yellow-throated marten (*Martes flavigula*); a number of birds, the identified ones being: eagle, laughing thrush, oriental turtle dove (*Streptopelia orientalis*), bulbul; mouse; rat; squirrel; jackal (*Canis aureus*); Indian hare (*Lepus nigricollis*); Asiatic black bear (*Ursus thibetanus*); large Indian civet (*Viverra zibetha*); jungle cat (*Felis chaus*); leopard (*Panthera pardus*). The list is a diverse range of predominantly small animals and in combinations cause havoc to agricultural production.

Wild pig ranks among the topmost conflict causing animals, especially in the higher mountain villages. Most describe that wild pigs have made a foray into the villages in the last 10 to 15 years only. As more data is being generated with closer observations, the list of animals in HWC is increasing. The list of birds gets more detailed and their role in damage is significant and cannot be ignored. It must be noted that human life is only endangered with incidences of bear and human conflicts. Importantly, retaliatory actions are not heard of across the landscape.

Within the limited mountain agricultural productivity and exploitative market, HWC takes a large toll on the communities. To cite just a few examples from the consultations and data collected over a period of time, in Samanden Forest Village, Singalila National Park, Darjeeling, HWC cases was recorded for 17 different crop types. The top three animals engaged in HWC, namely wild pig, porcupine and barking deer destroyed 25.2%, 24.1% and 19.78% respectively

of the total estimated yields<sup>2</sup> of these crops: beans, peas, potato, squash, maize, millet, radish, soyabean and pumpkin in Samanden Forest Village during 2011 and 2012. This data shows that the size of the animal is not proportional to the damage caused, as an animal as small as the porcupine was also recorded to cause extensive damages.



Figure 3. Wild Pig inside Barsey, Sikkim captured on camera trap, (*Pic: WWF – India*)



Figure 4. Destruction of maize in Samaden FV, Darjeeling (*Pic: Sailesh C Sharma, DLR Prerna*)

The figures in Table 1 show the extent of crop loss around Barsey Rhododendron Sanctuary in Sikkim, which ranges from a low of 11.67 per cent to a high of 64.44 per cent. The list of crops includes both important cash crops like cardamom and legumes and food crops of potatoes and maize. Potato is equally an important cash crop for farmers.

Table 1. Percentage crop damaged of estimated annual yield of villages fringing Barsey Rhododendron Sanctuary, Sikkim 2012-13

Villages	Maize	Potatoes	Beans	Peas	Cardamom	Soyabean	Millet	Cabbage	Chayote
Gumpadara	34.64	30.07	39.75	38.1	42.67	64.44	25	0	0
Upper									
Mukrung	38.77	36.22	34.21	35.3	40	0	0	25	0
Simphok	35.29	44.55	38.06	27.6	0	32.26	0	16.67	50
Average of									
3 villages	36.23	36.95	37.33	33.7	27.56	32.23	11.67	13.89	16.67

In terms of livestock depredation, poultry was the most affected in majority of the villages and yellow-throated marten followed by raptors like eagles and kites was the predominant poultry damaging species. In some cases jackals also preyed on poultry. Sangkhola-Chowri cluster in Sikkim showed that leopards were primarily predating upon Dzos, mix of yak and cow. Data from other villages indicated that livestock including cows, goats and horses were lost to leopards on a regular basis. Leopards preyed on domestic dogs too.

<sup>&</sup>lt;sup>2</sup> The survey calculated the estimated yield of each crop of each village by aggregating the data from each household and against that estimated yield, crop damaged (local unit of measure was used) was recorded. The local unit of measure was standardized and the crop damaged was then converted to percentage of the estimated yield.

The emerging data shows that HWC affects both nutrition and economic security of communities who are already living in difficult circumstances. This high rate of loss in expected income is substantial in any economic context, but for marginalized communities it has devastating consequences. Primary livelihood security is at threat, and the threat continuing every year with no solution in sight has rendered communities helpless. In most instances, the village economy is now being supplemented by incomes that are derived from migration and wage labour, with solutions for HWC still remaining beyond the reach of communities.

In Sikkim, a set of rules and guidelines exist for assessment and disbursement of compensation for damage to crop and livestock in the fringe of Protected Areas. Most often, amounts were distributed without actual regards to the quantum of damage and the process fails to reach the genuine victims. Only 4% of the respondents in Pangolakha and Fambong Lho fringe areas had received compensation, while the number was 29% in case of Barsey Rhododendron Sanctuary. In the case of Darjeeling, however, there were no instances of compensation being given ever to any of the affected households nor were the villagers aware of if any such complaints would be addressed.

Community costs of human wildlife conflict raises critical questions of, should not conservation be sensitive to local communities too and address issues like HWC? The lack of redress for HWC in Sikkim and Darjeeling throws the question of where is the remunerative justice for people who are the main stewards and custodians of conservation.

# Human wildlife conflict resolution

Creating spaces for HWC conversations was an important step in addressing the issue. This was a shift from the traditional intervention logic of community conservation efforts by reducing pressure or dependency on forests, to the acknowledgement that conservation efforts have a direct negative impact on people's lives. It was an acknowledgement that the issue needs to be addressed for what it is and not from a perspective that efforts will lead to a greater good for humanity and life.

Mapping exercises enabled deeper reflections on flows and patterns of HWC within a village set up. Cropping patterns, seasonal mapping and forest changes<sup>3</sup> disaggregated the conflict for each village. Daily data collection showed details of productivity of crops and damage to these crops.

This extended dialogue was an extremely important learning process to map the conflict, learn from existing management practices and create pathways for further action. Most communities partially fence their land, erect scarecrows, stand vigil, rattle tins, bang drums and used catapults to ward of animals. However, on the whole these practices work well for a short span of time only. Also these efforts are extremely capital intensive and resource heavy, so, limited to community actions, these interventions were proving to be losing battles against the animal raids.

<sup>&</sup>lt;sup>3</sup> During 2011 to 2012 there was excessive fruiting of *Litho carpus* in the forest which made food easy and plentiful to wild pigs reducing crop raids. Since then there has been yearly excessive fruiting even though community observations put the cycle of excessive fruiting to approximately once in 10 years.



Figure 5. Bamboo fence in Darjeeling, *Photo -Roshan P Rai (DLR Prerna)* 

Figure 6. Stone Wall in Sikkim, *Photo -Sailesh C. Sharma (DLR Prerna)* 

Building on the existing community interventions, strengthening of the fences was undertaken as one of the major interventions. Most communities have been fencing off their most important crops with a bamboo fence. The fences are expensive and not very efficient in terms of warding off animals as well as have a very short life span. Fences in villages in Darjeeling had been strengthened with barbed wire, supplied by the forest department in the past. Community initiatives have also included long term investment of dry walls as well as trenches outside of the fences. Innovative measures which includes nets as fences with lights to ward off animal depredation in Barsey Rhododendron Sanctuary have been implemented.

Diversification of the fences to have multiple functionality lead to the notion of bio-fences or living fences which is one the main interventions that was initiated by DLR Prerna in Darjeeling. A bio-fence is a thick mesh of multiple plants grown around a village or farm boundary to ward of animals. A list of species for the bio-fence emerged from each village consultations and the species of the bio-fence to have functions of warding of animals, fodder source, soil conservation, diversification of livelihoods and biodiversity values.

Tea<sup>4</sup> was introduced as one of the species as it is not eaten by any of the animals coming into conflict and it also provides an additional livelihood option. Stock for other species used in bio-fence was sustainably extracted from the forest with permission and support from the forest department. Working with limited resources meant prioritizing bio-fences in most vulnerable zones of the village that emerged out of the mapping exercises. This process strengthened community decision making processes, optimum resource utilization and evolution of site specific strategies for bio-fences.

Linkage with the forest department was further strengthened and welcomed by the department. Forest Department Staff who deal with communities on a day to day basis are constantly aware of the issue of HWC but with lack of policy support are unable to take action.

In 2013-2014, five villages in Singalila National Park, Darjeeling fringe were given Indian Rupees 8000 and 1000 tea saplings each to strengthen their bio-fences. This exercise brought

<sup>&</sup>lt;sup>4</sup> Tea, *Thea chinensis syn. Camellia sinensis*, was introduced to Darjeeling by the British from China and none of the animals feed on it.

#### Human-Wildlife Conflict Resolution in the Mountains of SAARC - Success Stories

about process as well as product innovation where communities figured out how best they could maximize the resource opportunity. At the end of one year, 3350 metres of bio-fence with a survival rate of 70% was built. Each village undertook the bio-fencing exercise in different ways such as providing for half wage rate for people who had to go to the forest to collect plant material, a picnic for the community on the days of planting, every household coming out with at least one adult member for strengthening the bio-fence and voluntary service. This meant that in the five villages, at least double the length and size of bio-fences were built within the resource available.



Figure 7. Bio fence at Dara Gaon, Forest Village, Darjeeling, *Photo - Roshan P Rai (DLR Prerna)* 

Figure 8.*Chirrata*, *Photo – Sailesh C. Sharma (DLR Prerna)* 

Expanding the cultivation of Chirrata (*Swertia chirrata*), a crop not affected by wild life and with a high medicinal market value, from a few families to the larger community diversified livelihood base was also another intervention. Chirrata is a relatively easy crop to grow and is grown on the sides of terraces which increased the growing space in the land. Forest department support ensures legality of the crop as not extracted from the wild. Such crops are being further explored.

In addition to the adoption of community interventions, the main intervention in Sikkim has been to look at convergence of government schemes for HWC management. Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) has redefined employment guarantee and community asset building in India. Taking this opportunity, community dialogues in Uttarey and Ribdi villages bordering Barsey Rhododendron Sanctuary, in West Sikkim brought about the enlistment of fencing and bio-fencing as activities under MGNREGA. This process brought into focus HWC within the gamut of Panchayati Raj Institution, local rural self-governance, which predominantly talks about rural development and does not always engage with conservation especially in Sikkim and Darjeeling<sup>5</sup>.

<sup>&</sup>lt;sup>5</sup>Panchayati Raj is a contested institution in Darjeeling within the autonomy status of Gorkhaland Territorial Administration with resultant people's participation space limited.

At a community level, the process expanded the resource scope of asset building and development needs and priorities. At the state level, it facilitated the HWC discussion to go beyond the boundaries of the forest department and conservation organizations to initiate a much needed diversification of stakeholders for interventions. The process sets precedents that others can adopt.

Data collection, presentation and leveraging the stories that they told was key to taking them to spaces critical for policy changes. This was extremely important as the stories had never been closely heard beyond mid-management level even within the forest department. The gravity and authenticity of the stories were always questioned or relegated to a lower order priority as it did not involve the species commonly talked about in HWC or the problem animals of HWC. Smaller mammals also meant that it was concluded that the damage was way too small to be considered. Presentations of these stories backed by so called hard data, scientifically collected and collated at different forums like the Forest Department, West Bengal Fact Finding Commission on Environment (Non-Official) North Bengal Bench, 2012; Sustainable Mountain Development Summits II and III, Indian Mountain Initiative<sup>6</sup>, 2012 and 2013 onwards has resulted in a wider solidarity, acceptance and understanding of HWC.

At a broader level, the issue of HWC also brought about a partnership of two NGOs, WWF India and DLR Prerna, which resulted in confirmation of data and community experiences, cross learning as well as adapting some of the community interventions across the landscape.

# Results

# Efficacy of the interventions to manage HWC

Even though the bio-fence was located in most vulnerable zones of the fringe villages only, its effect in reducing HWC has been recorded by the villagers. Communities of 5 forest villages came together and creatively strengthened 3350 metres of bio-fences putting in efforts that were beyond available resources. Its efficacy is seen in the acceptance of bio-fences by other communities like Chongri in Sikkim, and Darjeeling, the forest department and as well as continuing community investment in strengthening it.

Crops like *Chirrata* and tea is increasingly being spread within communities of Singalila National Park and Khangchendzonga Biosphere Reserve as a means of adaptation and conflict resolution of HWC as both the crops are not harmed by wild animals and offer alternate livelihood options.

Community based data collection on a regular basis in a large geographical spread in Sikkim and Darjeeling has enabled the raising of the issue in key forums. This constant dialogue and debate on the issue of HWC and its impact on communities has garnered solidarity and understanding which was not there a few years back. State level discussions in Sikkim now have HWC listed as one of the agenda and highest forest personnel talk about it officially. Not only that, the department is undertaking HWC management measures like solar fencing of Kitam Bird Sancturary Sikkim. There is growing awareness that there is need to know more about HWC in

<sup>&</sup>lt;sup>6</sup>Indian Mountain Initiative (now called Integrated Mountain Initiative) is a movement of 11 mountain states and districts of Darjeeling and North Chachar Hills.

Sikkim and Darjeeling using the lens of mountains. The need for an integrated approach and convergence as a strategy is being discussed.

Enlistment of HWC in MGNREGA has diversified the stakeholder groups of the issue beyond the traditional organizations dealing with conservation. This is essential as management interventions for HWC is extremely capital intensive, making it impossible for a single organization or community to address it single handedly. Interventions are also not unilateral but multilateral and interdisciplinary requiring diverse knowledge and skill sets. This is a critical aspect of the case study as HWC management in mountain spaces of Sikkim and Darjeeling are extremely capital intensive and beyond the reach of communities, civil society or a single department. It calls for concerted efforts at an interdisciplinary level and convergence of multi-stakeholders.

The issue of HWC brought in partnership WWF-India, Sikkim and DLR Prerna, Darjeeling, two civil society organizations with no previous history of collaboration and a recognition that the issue is way bigger than a single organization to address.

Thus, the interventions of communities and civil society at a community level has definitely evolved management measures that have noticeable impacts in management of HWC, but conversations in corridors of power will ensure policy support leading to long term interventions at a landscape level and not just piecemeal interventions.

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