e-ISSN 2785-2709

Lagoonscapes
Vol. 2 – Num. 1 – June 2022

Ante-Litteram One Health in India
Three Examples of Community-Based Debate and Action on Multispecies Wellbeing

Deborah Nadal
University of Glasgow, UK

Abstract Historical research on One Health is offering interesting information about the development of this concept within human and animal health institutions and professions. In contrast, little is known about whether and how local communities have discussed – in their own terms – and managed One Health issues. This paper presents three examples of community-led debate and action on One Health in India: the eco-religion of Bishnois, the collapse of the vulture population, and plastic pollution in cows' bodies. More research from the social sciences and the humanities is necessary to understand and learn from the dynamics of multispecies entanglements at the local level.

Keywords One Health. India. Bishnois. Vulture crisis. Plastic pollution. Community values.

Edizioni Ca'Foscari

Peer review

Submitted 2022-03-20
Accepted 2022-05-20
Published 2022-06-22

Citation Nadal, D. (2022). "Ante-Litteram One Health in India. Three Examples of Community-Based Debate and Action on Multispecies Wellbeing". *Lagoonscapes*, 2(1), [1-18].

DOI 10.30687/LGSP/2785-2709/2022/01/002

1 Introduction

The fact that human, animal, and environmental lives are entwined is pretty self-evident. Yet, over space and time, human societies have not always been inclined to acknowledge this and to live in accordance with this vision of multispecies existence. Those who have done so, are likely to have described and verbalised the interdependence of human, animal, and environmental health in very different, context-specific ways. In the West, 'One Health' is, alongside the less-used 'EcoHealth', and 'Planetary Health', the phrase currently used to describe the:

> integrated, unifying approach that aims to sustainably balance and optimize the health of people, animals and ecosystems. It recognizes the health of humans, domestic and wild animals, plants, and the wider environment (including ecosystems) are closely linked and inter-dependent. The approach mobilizes multiple sectors, disciplines and communities at varying levels of society to work together to foster well-being and tackle threats to health and ecosystems, while addressing the collective need for clean water, energy and air, safe and nutritious food, taking action on climate change, and contributing to sustainable development. (OHHLEP 2022)

In ancient history, healers were often priests who, having gained anatomical and pathological skills from slaughtering animals and deciding on their purity for sacrifice, cared for both humans and animals. Then, during the Chinese Zhou Dynasty (11-13th century), veterinary medicine appeared as a discipline distinct from human medicine and it remained so for several centuries. The two disciplines reconciled in the nineteenth century. First, with the advent of cellular pathology, scientists like Rudolf Virchow developed a strong interest in comparative medicine. Then, in 1976, Calvin Schwabe, a veterinary epidemiologist and pioneer of veterinary public health, consolidated the idea of 'One Medicine'. Importantly, his thinking grew out of working with the Dinka, a traditional pastoral society native to South Sudan (Zinsstag et al. 2011, 148). Finally, on the 29th of September 2004, 'One Health' was used formally for the first time during a symposium at the Rockefeller University in New York, titled *Building Interdisciplinary Bridges to Health in a Globalized World*, where the Wildlife Conservation Society brought together human and animal health experts. This meeting resulted in a set of 12 priorities to combat health threats to human and animal health through an international, interdisciplinary approach. Known as the 'Manhattan Principles', these priorities formed the basis of the 'One Health, One World' concept (Evans, Leighton 2014, 417).

Since 2004, the One Health agenda grew and developed and academic research on it – both on the practical implications and outcomes

e-ISSN 2785-2709

of One Health implementation as an institutional response to growing health concerns at the human-animal-environmental interface, and from an epistemological perspective – expanded accordingly. This is not the place where to travel through this vast and ever-expanding corpus of knowledge, but two points are worth-stressing here.

First, an important limitation was identified in the One Health, One World idea. As the geographer Hinchliffe explains,

> Although these efforts to work across disciplinary boundaries [the domains of veterinary, human, and environmental health] are welcome, there are also risks in seeking unity, not least the tendency of one health visions to reduce diversity and to under-value the local, contingent and practical engagements that make health possible. (Hinchliffe 2015, 28)

The danger is what sociologist Law calls a "One World metaphysics": in the case of One Health, this would result from an excessive focus on the transmission of pathogens rather than on the socio-economic configuration of health and response to disease at the local level. More attention should then be given to *local worlds*, and not just 'One Health', where

> health is dependent upon a patchwork of practices, and is configured in practice by skilled people, animals, micro-organisms and their social relations, (Hinchliffe 2015, 28)

and health management depends on different pieces of knowledge working together. Unfortunately, research on indigenous knowledge and the One Health idea remains limited (Hillier 2021; Riley 2021).

Second, community engagement is widely acknowledged as crucial to understanding and doing One Health efficiently and sustainably (Mitchell 2021). This is so because One Health is – or should be – a unifying approach by definition. A bottom-up approach is considered important to counterbalance the widespread tendency, at least in public health, to ignore the high risk of failure involved in top-down and one-size-fits-all strategies that do not take into account local needs, experiences, concerns, and priorities – or local worlds. Institutional and academic work on One Health, especially in Africa, is starting to increasingly pay attention to community-based surveillance (Dickmann 2018) or participatory research and policy design (Henley, Igihozo, Wotton 2021) as practical ways to go beyond the vague principle of community engagement and to focus, instead, on community empowerment.

This paper briefly presents three examples of One Health entanglements in India: the worldview of the Bishnoi community of the Thar desert, known for their willingness to sacrifice their lives to

save the trees and animals that share their delicate ecosystem; the almost-extinction of three species of vultures and the devastating impact on two multispecies communities that are now struggling to be healthy without these archetypical scavengers; and the ubiquity of plastic on the streets, in the rumen of cows, and eventually in the bodies of those who consume their dairy products. These three issues have three things in common: they have existed before One Health was formalised both as a theoretical concept and a practical agenda; they have been experienced, understood, discussed, and managed by the community itself much earlier than local, national, or international institutions; they give environmental health the importance that formal, institutional and academic work on One Health often overlooks (Esseck 2018). The materials this paper grounds on include three locally-produced documentaries (*Willing to Sacrifice*, *The Vanishing Vultures*, *The Plastic Cow*),[1] local and national webpages (such as community blogs, Facebook pages, etc.), and – to a lesser extent – the notes, pictures, and grey literature that I collected during my various trips to India for my fieldwork on free-roaming animals in the cities of Delhi and Jaipur (Nadal 2020), and on dog-mediated rabies in rural Gujarat and Maharashtra (Nadal et al. 2022).

2 Bishnoism

In Jodhpur, every tourist agency proposes a cultural tour to Bishnoi villages, variously described as "an eco-friendly sect of Hindu religion", "nature worshippers", "warriors of Mother Nature", or "India's first environmentalists". Located in the Thar desert, the biggest desert in India, these tours usually favour the easiest-to-reach Bishnoi villages. They often leave out three villages that, for the Bishnois themselves – around 1 million people, concentrated in rural Western Rajasthan but also found in rural and urban Punjab, Haryana, and Madhya Pradesh –, are particularly significant: Pipasar, Khejarli, and Vodha.

Pipasar is the native place of Guru Jambheshwar, also known as Guru Jambhaji, the founder of the Bishnoi Sampradaya. Born in 1451 and a cow herder until the age of 34, he spent the last 51 years of his life travelling and producing 120 *shabad*, poetic verses that he used to spread his message among the newly created Bishnoi community (Jain 2011, 51). The sect was founded in 1485, in Sambarthal, near Bikaner. The term 'Bishnoi' is composed of *bish* (twenty) and *noi*

1 https://www.idfa.nl/en/film/87dcc044-b1f0-48fb-9fe2-29c6d0035e6c/willing-to-sacrifice/docs-for-sale; https://www.worldcat.org/title/vanishing-vultures/oclc/457489009; https://karunasociety.org/the-plastic-cow-project.

e-ISSN 2785-2709

(nine). In 1485, Guru Jambheshwar created twenty-nine key principles for those who want to identify themselves as Bishnois. These tenets exist as lessons learnt during the severe drought and subsequent famine that had been hitting the area for years (Lal 2005, 194). He saw his co-villagers first cutting shrubs and trees to feed their animals, and then being resource- and hope-less as the drought continued and claimed animal and human lives. What, in modern terms, we would describe as sustainable management of plants (especially *khejri* trees, *Prosopis cineraria*, the State tree of Rajasthan) and water became key to his philosophy, which grounds on the protection and improvement of health and well-being in an all-encompassing way. Of his 29 principles, ten regard personal hygiene and environmental sanitation; eight are about animal and plant health and the preservation of biodiversity; seven prescribe healthy social behaviour; and four concern the worship of God (Jain 2011, 59). The second group of rules includes recommendations such as being compassionate towards all living beings; taking wood only from dead trees and branches (but preferring cow dung to wood for cooking purposes; additionally, Bishnois do not use wood for cremation, because they bury their dead); removing living beings from firewood; not killing animals (hence practicing vegetarianism) and not selling them to slaughterhouses; providing shelter to abandoned farm animals to allow them to reach a natural death (instead of being slaughtered); and not castrating bulls (because of the pain inflicted on the animal). Besides the 29 principles, Guru Jambheshwar's *shabad* often talk about the equality of souls among humans and non-humans (Reichert 2015, 11).

Khejarli is where the protective attitude of Bishnois towards trees entered local history on the 9th of September 1730 (Chapple 2011, 340). In that period, the Maharaja of Jodhpur, Abhay Singh, needed wood for the construction of a new palace and sent soldiers to cut *khejri* trees in the village, whose name at the time was Jalnadi. The villager Amrita Devi non-violently opposed this by hugging a tree and claiming that, even if one were to get their head severed to save a tree, still it is a cheap bargain (several versions exist of this now popular Bishnoi saying). Unimpressed by her values, the Maharaja's men decapitated Amrita Devi and her daughters, who had followed her example. As the news of the menace to *khejri* trees spread, people from 83 nearby Bishnoi villages met at Jalnadi and decided to collectively replicate Amrita Devi's form of resistance. In total, 363 Bishnoi men, women, and children were killed. Touched by their devotion to the cause, the Maharaja personally visited the village to apologise and ordered a decree forever protecting Bishnoi land from hunting and logging. This exemption exists still today, in and around the village whose name has been changed to Khejarli, after the trees' name. Some 250 years later, the Khejarli massacre inspired the world-famous Chipko Andolan (literally, hugging movement) of Uttarakhand,

considered the first non-violent social and ecological movement by rural communities, particularly women, for the conservation of India's forests (Jain 2011, 52). In 1988, the Government of India named the Khejarli village as the first National Environmental Memorial. In 2013, the Ministry of Environment and Forest inaugurated the Amrita Devi Bishnoi National Award for individuals or institutions involved in the protection and conservation of wildlife. The first award was given posthumously to Ganga Ram Bishnoi, a youth from Chirai village killed by the poachers he was pursuing in 2002 (Indian Environmental Portal 2003).

Vodha is the village where, according to their Facebook page, the non-governmental organization Bishnoi Tiger Force (BTF) is based.[2] BTF was formally registered in 2007 but it started as a collective initiative in 1999, after an event that had Bishnois on all national newspapers. In 1998, the villager Poonamchand Bishnoi took the Bollywood superstar Salman Khan to the court for allegedly killing two blackbucks (*Antilope cervicapra*, an almost-extinct species whose hunt is illegal throughout India) in Kankani village when he was in Bishnoi territory for the shooting of a movie. The whole community fought for this case for 20 years, until, in 2018, the actor was sentenced by a local court to 5-year imprisonment (*The Economic Times* 2018). BTF was then created as a social movement dedicated to taking and following up protest politics over wildlife protection and sustainable ecology (Sinha 2018). The NGO's logo has an antelope, the number '29' among its antlers, the words 'save animal' on its sides, and the name 'Bishnoi' under it. Local Bishnois participate in this initiative in various forms, by organising protests for the survival of Thar (e.g. when the government orders the construction of infrastructure in critically important bio-diverse areas without adequate, public discussion about the environmental impact of this, such as in the case of the Gorakhpur Nuclear Power Plan in Haryana – Manav 2012), supporting law enforcement in the local forest department (e.g. by informing them about poachers), and studying law to be eventually able to seek justice themselves in cases of local environmental crimes (Rahman 2020).

In general, Bishnoi villages are usually portrayed by local and government Rajasthani tour operators, national media, national and international websites for environmental activism, and scholarly reports too (Chapple 2011; Jain 2011; Reichert 2015), as the "oasis in the Thar", especially for animals. There, wild birds feed on the 10%-share of harvest that Bishnoi farmers put aside every year for them, and antelopes and deer regularly graze in a designated portion of their farmlands, because Bishnois believe that all living be-

2 https://www.facebook.com/rajeshgeelabishnoi/.

e-ISSN 2785-2709

ings have a "right to survive and share all resources" (Bishnoi 2010, 32). Some settlements are well-known for their community-run and temple-based shelters for orphaned and injured wildlife and abandoned farm animals. Pictures of Bishnoi women who breast-feed baby gazelles circulate on the Internet (Humairah 2017). Finally, in the small Khejarli hospital, the Bishnoi doctor who runs it provides medical care to both humans and animals (Reichert 2015, 61). Moreover, like other communities in the Thar desert, Bishnois plant trees and shrubs not only in open lands but also in the fields, as a barrier to soil erosion; they maintain efficient water harvesting systems to irrigate fields and allow the self-sufficiency of the community; and, at the centre of their villages, they have an *oran* (i.e. a large piece of biodiversity-rich land, kept in its natural form, to provide an alternate livelihood to locals in the form of seasonal desert fruits and fodder for livestock and wildlife) and a *johd paytan* (i.e., an artificial water body catchment).

To sum up, this community is considered the living example of how "by virtue of its simple approach to life" (Humairah 2017), "the natural co-existence among all the species" (United Religions Initiative 2017) can be acknowledged, valued, and protected. Bishnois' frugal approach to life is based on ideals that are ultimately dictated by the context-driven practical necessity to live, in a harsh environment like the desert one, in harmony with "trees, animals and human beings – a perfect ecosystem" (Humairah 2017). The fact that Bishnois had been preserving wildlife well before the Wildlife Protection Act came into existence in 1972 is considered a proof

> that the need to save nature does not arise from laws, but from an inherent understanding of knowing that we exist because of nature, and it's not the other way around. (Patil 2020)

3 Skies Without Vultures

During the screening of *The Vanishing Vultures*, among the dozens of scenes of animal pain and death I was sadly getting used to, an image struck me above all the others. It portrayed an amount of life – of vulture life – I had never seen before, through a screen or in person. A picture taken at the Timarpur landfill in Delhi in the 1970s captured, in a single shot, thousands of vultures, patiently waiting for a meal, sitting wing-to-wing. At that time, India had probably 40 million Oriental white-backed vultures (*Gyps bengalensis*). Thirty years later their population had crashed, falling by more than 99.9%. A similar demographic collapse occurred in two other species of vulture endemic to South Asia: the long-billed vulture (*Gyps indicus*) and the slender-billed vulture (*Gyps tenuirostris*) (Prakash 2007, 127).

The reason for this decline – the fastest ever happened to a bird species in recorded human history – was discovered in 2003: it was diclofenac, a nonsteroidal anti-inflammatory drug (NSAID) first introduced in India as an analgesic and antipyretic for human use (Oaks 2004). In the 1990s, it was then launched for veterinary purposes, mainly for the treatment of inflammations (such as mastitis), pain, and injury in domestic livestock. Soon thereafter, it began to intoxicate and decimate the vulture population. Surprisingly, while these birds are exceptionally resistant to lethal bacteria such as anthrax, they are unusually sensitive to even small doses of diclofenac. Shortly after consuming meat from the carcasses of livestock recently injected with the drug, they develop visceral gout and die of kidney failure. As vultures are obligate scavengers, they are usually the first to find carcasses and feed on them in large groups, so the body of a single animal is enough to decimate an entire flock. In 2006 and 2015, the production and sale of diclofenac for, respectively, animal and human use, were regulated. Meanwhile, safe alternatives (such as meloxicam) were identified but, in 2017, diclofenac still accounted for 10 to 46% of all NSAIDs offered for sale in livestock treatment (Galligan 2020, 341). In 2019, new research reported a still alarmingly low number of vultures (Prakash 2019, 55). This crisis occurred all over India, but it was in Mumbai that the alarm rang the loudest. Mumbai is home to one of India's oldest scientific organisations, the Bombay Natural History Society (BNHS), and the largest Parsi community in the world.

BNHS, and Dr Vibhu Prakash in particular, first studied this phenomenon at Keoladeo National Park, in Rajasthan (Prakash 1999). This State is part of the so-called 'cow belt', defined as an economic, political, and cultural region that extends in Northern India, from Rajasthan in the West to Jharkhand in the East, where cows are an important element of the religious, economic, and political life. The very large numbers of livestock historically reared in this region and the fact that, in orthodox Hinduism, cows should not be slaughtered, have literally fed the increase of the vulture population. In rural areas, beyond the borders of villages, carcass dumps are part of the natural-cultural landscape, where the bodies of cattle that died of disease, injury, or old age are discarded and left for scavenging animals to consume. Because of the importance that cows have in the life of their owners, and the cheap price of diclofenac, this drug is massively used, not only by qualified veterinarians but often directly by cattle owners, to save the animals from death. When their drug-filled dead bodies reach the carcass dumps, vultures are condemned to a lethal intoxication. At Keoladeo National Park, the local colony of *Gyps bengalensis* went extinct by 2003. On the outskirts of Bikaner, a city in Western Rajasthan, in the Jorbeer Conservation Reserve, a carcass dump that long served as an ideal site for bird-watching

and vulture research, dogs have now filled the ecological niche left vacant by vultures (Subramaniam 2016). Research is trying to demonstrate and quantify the cause-effect relationship between the vulture decline and the increase in the dog population, dog bites, and canine and human rabies cases (Markandya 2008).

Besides regulating the production and sale of diclofenac to avoid further deaths, a vulture breeding programme was launched in 2004 to protect vultures in an artificial, diclofenac-free environment while the drug is gradually removed from cows and the whole natural-cultural environment. Thanks to national and international funding and knowledge-sharing, the BNHS now manages four conservation centres (in Pinjore, Haryana; Bhopal, Madhya Pradesh; Rani, Assam; Rajabhatkhawa, West Bengal) and five more will be built as per the *Action Plan for Vulture Conservation 2020-2025* (*Down to Earth* 2020). When possible, vulture reintroduction into the 'wild' will depend on the presence of so-called 'Jatayu restaurants', named after the King of Vultures in the epic of Ramayana. Jatayu restaurants, already implemented in Nepal, are vulture-safe zones where vultures are ensured uncontaminated food, by establishing nearby cow shelters that buy or rescue sick, abandoned, or old cows and ensure that they spend their last years of life in a way that ensures their welfare and the survival of the vultures that will eventually feed on them.

In Mumbai, the disappearance of vultures was not noticed by bird experts or cow owners, but by the Parsi community (Van Dooren 2010). Migrated from Iran (Persia in the past, from which 'Parsi' comes from) between the 8th and 10th centuries CE, Parsis are a small community who follow Zoroastrianism. Among the most distinctive features of this religion is how funeral rites are performed. To avoid contaminating with *nasu* (polluting corpse matter) the Earth, Water, or Fire, Parsis practice *dokhmenashini*, the 3,000-year-old tradition of disposing of the dead by exposing them to scavenger birds and the sun. Bodies are placed on stone beds on the roof of a *dakhma*, also known as a tower of silence, which is an 8-10-feet high, circular, rather flat structure with a pit in the middle, where dried bones are eventually collected and mixed with lime for a faster disintegration. In Malabar Hill, in South Mumbai, Doongerwadi is a 54-acre uninhabited, tree-covered land with some *dakhma*, inside which only corpse bearers (*khandia*) are allowed and over which vultures have been unavailable for more than three decades now. Since then, Parsis' bodies have been rotting in the open for months, while the occupants of neighbouring buildings have begun to complain about the stench left by the disappearance of vultures (Bhutia 2015).

Since then, the debate within the Parsi community of Mumbai first, and between it and local government bodies and the 5-km away BNHS then, has been intense regarding whether and how to safeguard the system of *dokhmenashini*. This paper will not go into the details of

this sensitive dispute, for the complete appreciation of which a far more extensive understanding of Parsis' history, culture, and religion would be necessary. Yet it will touch upon some elements that are relevant to One Health entanglements. Broadly speaking, two main scenarios have been discussed (Hinnells 2005, 117). The first one renounces vultures and looks at technology for a new solution. Like the Parsis of Hyderabad, the community in Mumbai had the option to resort to a solar panel installed by the *dakhma* that concentrates the sun rays to the roof of the building and speeds up the decomposition of corpses (Umanadh 2020). From a technical point of view, the drawback of this strategy is that the intensity of sunshine, hence the speed of decomposition, depends on weather conditions: insufficient heat on cloudy or rainy monsoon days will be ineffective; excessive heat could even burn the corpses, which goes against the Parsis' traditional refusal of cremation. From the perspective of an ancient religious tradition, this solution represents an evident departure from it, which only a part of the Parsi community is in favour of (*Parsi Khabar* 2018).

The second scenario involves breeding a local colony of vultures inside a purpose-built 'Doongerwadi Aviary'. The discussion about this project started in 1998 and is not over yet, as several issues (often of One Health nature) have had to be addressed. In 2010, the Bombay Parsi Punchayet (a charitable trust and apex body representing Mumbai's Parsis) commissioned a preliminary project for the aviary to the architectural firm Heatherwick Studio of London. On the firm's website, it is possible to admire the rendering of a huge yet almost invisible cocoon of 30-feet high nets and poles that keeps the dead in the *dakhma* and the vultures and the sun in the sky together.[3] The project was meant to be led by BNHS, based on their successful experience with the older breeding centres. Yet, due to a lack of adequate space and facilities, BNHS proposed the construction of a main breeding centre on the outskirts of Mumbai and a smaller satellite centre within Parsi funeral grounds. Because of the high costs involved (for which a partnership between the Bombay Parsi Punchayet and the Government of Maharashtra would have been necessary) and the lack of guaranteed success, the project reached an impasse (Bandyopadhyay 2015). In terms of the sustainability of the project, an important matter regarded the fact that only diclofenac-free human (Parsi) bodies can be fed to vultures. This requires that the doctors or the relatives of the deceased formally certify that no diclofenac (as well as other NSAIDs included in an ever-expanding list of confirmed or potentially toxic drugs) has been given to the patient in the last 72 hours of their life. Alternatively, a test could also

3 http://www.heatherwick.com/projects/spaces/tower-of-silence/.

be performed on every corpse to determine its right to be offered to vultures. If this mechanism failed once, the consequences for the entire project would be severe. Some Parsis considered this whole process too laborious and disrespectful of mourning (*Parsi Times* 2012). Another concern derived from the difficulty of reconciling the Parsi rule that only human bodies can be exposed in the *dakhma* with the insufficient amount of food for the vulture colony if no animal carcasses can be provided as a supplement (*Parsi Times* 2012).

At the time of this writing, the Doongerwadi Aviary has not become reality yet and the option of the solar panels has been implemented – temporary or for good, this still has to be decided by the Parsi community. Soon after implementation, the corpse bearers that work in the *dakhma* have sounded several alarms about human and ecosystem health. First, solar reflectors can focus sunlight on only a small part of a body at any given moment, so these people now have to manually move each decaying corpse several times a day, for no less than ten days, for it to be uniformly dehydrated. When there are too many corpses to manage, the *khandia* are told to dump them in the central pit after three days, decomposed or not (Bhutia 2015). Second, the crows that are taking advantage of the absence of vultures and the suboptimal efficiency of sun rays are said (especially in the non-Parsi press) to occasionally drop body parts on the public roads around the Parsi sacred area (Hinnells 2005, 116).

4 Plastic-Fed Cows

Rumination represents an evolutionary adjustment among herbivores, who must constantly be on the alert for predators and thus need a feeding behaviour that allows them to store considerable quantities of food after rough chewing and fast swallowing. For Indian free-roaming cows, a counter-revolutionary adjustment could be advantageous, because their unselective feeding is now turning them into the first victims of one of the major problems of our time: the ubiquity of plastic in the environment and animal bodies, both human and nonhuman. Currently, more than disease, malnutrition, and road accidents, plastic and other inorganic materials (clothes, sand, shards of glass and ceramics, needles, blades, wires, sanitary napkins, and even small electronic devices) are the primary cause of death for India's free-roaming cattle (Government of the National Capital Territory of Delhi 2001, 26). Once ingested, these materials form a stiff pack inside the cow's rumen (one of the four compartments of the cow's digestive system), which continues to grow in size as the animal feeds on more foreign matter. Many of the cows on the streets of India seem well-fed, or they may look pregnant, but according to a veterinarian at the Shri Krishna Goshala in Delhi, at

least 85% of them in fact experience an excruciating death under the weight of the plastic they have consumed (Nadal 2020, 74). In September 2016, the national newspaper *The Times of India* published an article about a cow who was found to have 100 kg of plastic in her stomach (Kaushik 2016). Anyway, India's vast animal welfare community had already known about this problem some years early, thanks to the documentary *The Plastic Cow*.

In 2012, the Karuna Society for Animals and Nature, an animal welfare organisation in Andhra Pradesh, showcased the ordeal of these animals on the screen. Cows are not the only animals exposed to plastic while feeding, but they are probably the ones that ingest the highest amount of it, because while foraging from fruits and vegetable leftovers, they end up eating anything that smells or looks like food. India's garbage collection system is largely undifferentiated, so edible and non-edible waste is discarded together or gathered in the same place. Additionally, most garbage is left in the open – in open garbage bins, in roadside garbage heaps, or in *dalao* (covered structures for garbage disposal hardly closed to the outside) – and is very easily accessible by animals. Plastic ends up in cows' bellies both as single plastic items that the animals unselectively eat, or as the bags that contain household waste. Since these plastic bags are knotted at the mouth, cows, unable to undo the knot or tear the bag (as dogs and monkeys do), eat food leftovers including the plastic. Slowly, over months or years of roaming free on the road, they become filled with plastic.

Unlike other species, cows are also the only ones for which a rumenotomy is the only chance of survival. The documentary shows what a rumenotomy is, and its authors explain that witnessing their first rumenotomy was a life-changing experience.[4] During a rumenotomy, the rumen is incised via the left abdominal wall of the cow to remove the block. A usually yellowish or brownish tangle that, to me, reminds of knots of sun-drying seaweed on the beach, is slowly taken out, bit by bit, until the rumen of the animal reaches its normal size. If the animal survives the surgery and recovers well from it, their food will need to be controlled for an extended period, to make sure that the same problem does not happen again or too soon, when another surgery could be too risky. As the staff of the Karuna Society for Animals and Nature write on their website,

> Performing rumenotomies is not the answer to the plastic cow, only a total ban on plastics and removal of animals from the garbage-dump will solve the problems. We continue the surgeries as it is a life-saving procedure for the individual animal.

4 The Plastic Cow Project: https://karunasociety.org/the-plastic-cow-project.

In February 2012, two animal welfare associations (VSPCA in Vishakapatnam and Karuna Society for Animals and Nature in Puttaparti) and three individuals filed a case in the Supreme Court of Delhi, for animal rights and a complete ban on plastic bags. This event launched what has been defined as "a collective effort to save the Indian cow from plastic". Philip Wollen, of the Winsome Constance Kindness Trust (the Australian association that has funded plastic-cow surgeries in Puttaparti and other animal welfare organisations), advocates for action by saying that "The unholy alliance of plastic, carelessness and negligence is not only torturing the Indian cow to death but it has also infected farming communities, rivers, forests and oceans, killing elephants, donkeys, fish, turtles and sea birds" (The Plastic Cow Project's website).

The case was made that plastic enters not only the body of cows, fatally blocking their digestion system, but also the body of humans each time they consume dairy products coming from plastic-eating cows. In fact, only a small portion of free-roaming cattle, such as barren or old cows or young males that are useless in the milk industry, are completely abandoned (Nadal 2020, 166). Most free-roaming cattle are owned, and they are let to roam either because they are temporarily not lactating (so their owner wants to save on their food) or because their owner does not want or cannot provide for their food. Until they reach sexual maturity and the process of impregnation-lactation-impregnation is started on them, it is not uncommon for female calves to be tied inside *dalao* (garbage collection sites) where they can fill their stomach on rubbish instead of milk or fodder (Nadal 2020, 164). Ironically, the garbage trucks that regularly empty the *dalao* often have the image of a cow nursing her newborn calf painted on the back. Since the process of the formation of the plastic tangle takes time in their rumen, these animals' body is and remains contaminated for a long time, before or during lactation. Moreover, through cows, plastic ends up in the body of vultures as well. During post-mortem examination, it is not uncommon to find a significant amount of plastic, crockery pieces, and other non-edible items in their stomach (Abi Tamim Vanak, personal communication).

In May 2012, in response to the Plastic Cow Petition, the Supreme Court announced that it may be considering a total ban on plastic bags. Since then, the process has gone through several phases. In 2015, the Plastic Waste Management Rules went into effect at the national level, increasing the thickness of plastic bags so that their cost would discourage people from using them (Sambyal 2014). In early 2017, in Delhi, increasing environmental concern pushed the National Green Tribunal to ban the manufacture, import, sale, and use of bags, cutlery, cups, and other forms of single-use plastic. Each State issued its laws, the enforcement of which was nevertheless slow and patchy. Meanwhile, animal welfare activists have continued to urge

citizens to dispose of domestic waste in an animal-friendly way, placing edible food in newspapers or on the ground and inorganic trash in hermetic containers and sites dedicated to that purpose.

5 Conclusions

The three cases presented in this paper show very well the level of complexity that One Health entanglements can reach, and the implications that this has on various aspects of the life of multispecies societies. Even though most Bishnois are born into the community and are shown how to healthily co-exist with the other elements of their ecosystem, every person who is ready to apply the 29 principles set by Guru Jambheshwar can join this group and their lifestyle. The Bishnois tenets involve almost all aspects of a person's life, including faith, personal and house hygiene, social human relations, the use of environmental resources, and the relationship with animals. For Bishnois, these rules are not meant simply as guidance on how to live, but also principles worth their death if this means saving a blackbuck or a *khejri* tree. For the Parsis, the absence of vultures leaves their dead deprived of the comfort of tradition and turns them into a source of environmental pollution that the community is struggling to find a technically-efficient and religiously-acceptable solution to. For Khojeste Mistry, a trustee of the Bombay Parsi Punchayet, the collective decision of building the Doongerwadi Aviary "would be a marvelous statement, both for conservation and ecology, and because we would also be being faithful to our theology" (*Parsi Khabar* 2011). In rural areas, those who live and work in cattle carcass dumps are now eye-witnessing the redistribution of ecological tasks among animal species, and the new dynamics of transmission of diseases like canine rabies. Along every street of urban and rural India where plastic waste is discarded inappropriately, cows are dying from a slow, painful, and silent death. While the environmental degradation caused by the mismanagement of plastic is there for people to see, the extent of the ordeal that the Indian cattle population is going through is hard to imagine until a rumenotomy shows it in its sad brutality. Meanwhile, whenever people consume dairy, they are reaping the contaminated fruits of their lacking or insufficient care for environmental health.

India's apex bodies in the fields of human, animal, and environmental health are working to build a solid One Health infrastructure at the institutional level (Asaaga et al. 2021). While this is commendable, it is equally important that the country – such as any other in the world – looks at its more or less recent history of ante-litteram One Health issues to understand and learn from how the affected communities experienced, understood, debated, and probably success-

fully managed them. India's rich cultural and religious history can be a window through which to observe current and future threats to multispecies health and to secure human, animal, and environmental wellbeing. The social and historical sciences and the humanities, which are still a minority in One Health research, have a crucial role to play.

Bibliography

Asaaga, F.A.; Young, J.C.; Oommen, M.A.; Chandarana, R.; August, J. et al. (2021). "Operationalising the 'One Health' Approach in India: Facilitators of and Barriers to Effective Cross-Sector Convergence for Zoonoses Prevention and Control". *BMC Public Health*, 21, 1517. https://doi.org/10.1186/s12889-021-11545-7.

Bandyopadhyay, T. (2015). "Mumbai's Vulture Breeding Programme Has Fizzled Out: BNHS". *DNA*. https://bit.ly/3ml4faa.

Bhutia, L.G. (2015). "Khandias: The Keepers of Doongerwadi". https://bit.ly/38SHFCD.

Bishnoi, N.R. (2010). "Religions' Attitude towards Nature: An Overview". Bishnoi, K.R.; Bishnoi, N.R. (eds), *Religion and Environment*, vol. 2. New Delhi: Arihant Prakashan Pvt. Ltd., 25-44.

Chapple, C.K. (2011). "Religious Environmentalism: Thomas Berry, the Bishnoi, and Satish Kumar". *Dialog: A Journal of Theology*, 50(4), 336-43. https://doi.org/10.1111/j.1540-6385.2011.00634.x.

Dickmann, P.; Kitua, A.; Apfel, F.; Lightfoot, N. (2018). "Kampala Manifesto: Building Community-Based One Health Approaches to Disease Surveillance And Response—The Ebola Legacy—Lessons from a Peer-Led Capacity-Building Initiative". *PLoS Neglected Tropical Diseases*, 12(4), e0006292. https://doi.org/10.1371/journal.pntd.0006292.

Down to Earth (2020). "Conservation Centres in 5 States Among Host of Ideas to Protect Vultures". *Down to Earth*. https://bit.ly/3aJRin0.

Esseck, S.Y. (2018). "Environment: The Neglected Component of the One Health Triad". *The Lancet. Planetary Health*, 2(6), 238-9. https://doi.org/10.1016/S2542-5196(18)30124-4.

Evans, B.R.; Leighton F.A. (2014). "A History of One Health". *Revue Scientifique et Technique*, 33(2), 413-20. http://dx.doi.org/10.20506/rst.33.2.2298.

Galligan, T.H.; Mallord, J.W.; Prakash, V.M.; Bhusal, K.P.; Sarowar Alam, A.B.M. et al. (2020). "Trends in the Availability of the Vulture-toxic Drug, Diclofenac, and Other NSAIDs in South Asia, as Revealed by Covert Pharmacy Surveys". *Bird Conservation International*, 31, 337-53. https://doi.org/10.1017/S0959270920000477.

Government of the National Capital Territory of Delhi (2001). "Evaluation Study Report on Seven Gau-Sadans Functioning in Delhi". http://delhiplanning.nic.in/sites/default/files/Evaluation%20Study%20of%20Gau-Sadans.pdf.

Henley, P.; Igihozo, G.; Wotton, L. (2021). "One Health Approaches Require Community Engagement, Education, And International Collaborations—A Lesson from Rwanda". *Nature Medicine*, 27, 947-8. https://doi.org/10.1038/s41591-021-01350-5.

Hillier, S.A.; Taleb, A.; Chaccour, E.; Aenishaenslin, C. (2021). "Examining the Concept of *One Health* for Indigenous Communities: A Systematic Review". *One Health*, 12, 100248. https://doi.org/10.1016/j.onehlt.2021.100248.

Hinchliffe S. (2015). "More Than One World, More Than One Health: Re-Configuring Interspecies Health". *Social Science & Medicine*, 129, 28-35. https://doi.org/10.1016/j.socscimed.2014.07.007.

Hinnells, J.R. (2005). *The Zooroastrian Diaspora. Religion and Migration*. Oxford: Oxford University Press.

Humairah, I. (2017). "The Bishnois, India's Original Environmentalists, who Inspired the Chipko Movement". *Ecologise.in*. https://bit.ly/3MoBJPt.

Indian Environmental Portal (2003). *Award for Wildlife Conservation*. http://www.indiaenvironmentportal.org.in/content/167164/award-for-wildlife-conservation/.

Jain, P. (2011). *Dharma and Ecology of Hindu Communities. Sustenance and Sustainability*. London: Routledge.

Kaushik, H. (2016). "Veterinary Doctors Find 100 kg of Garbage in Cow's Stomach". *Times of India*, 3 September. https://bit.ly/3xkJnG8.

Lal, V. (2005). "Bishnoi". Taylor, B. (ed.), *Encyclopaedia on Religion and Nature*. London: Continuum, 194-5.

Manav, S. (2012). "Public Hearing a Farce: Bishnoi". *The Tribune*, 15 July. https://www.tribuneindia.com/2012/20120716/haryana.htm#1.

Markandya, A.; Taylor, T.; Longo, A.; Murty, M.N.; Murty, S. et al. (2008). "Counting the Cost of Vulture Decline: An Appraisal of the Human Health and Other Benefits of Vultures in India". *Ecological Economics*, 67(2), 194-204. https://doi.org/10.1016/j.ecolecon.2008.04.020.

Mitchell, J.; Cooke, P.; Ahorlu, C.; Arjyal, A.; Baral, S. et al. (2021). "Community Engagement: The Key to Tackling Antimicrobial Resistance (AMR) Across a One Health Context?". *Global Public Health*. https://doi.org/10.1080/17441692.2021.2003839.

Nadal, D. (2020). *Rabies in the Streets: Interspecies Camaraderie in Urban India*. University Park: Penn State University Press.

Nadal, D.; Hampson, K.; Lembo, T.; Rodrigues, R.; Vanak, A.T.; Cleaveland, S. (2022). "Where Rabies Is not a Disease. Bridging Healthworlds to Improve Mutual Understanding and Prevention of Rabies". *Frontiers in Veterinary Science*. https://doi.org/10.3389/fvets.2022.867266.

Oaks, J.; Gilbert, M.; Virani, M.; Watson, R.T.; Meteyer, C.U. et al. (2004). "Diclofenac Residues as the Cause of Vulture Population Decline in Pakistan". *Nature*, 427, 630-3. https://doi.org/10.1038/nature02317.

OHHLEP (One Health High-Level Expert Panel) (2022). *One Health High-Level Expert Panel. Annual Report 2021*. https://bit.ly/3tiJgsb.

Parsi Khabar (2011). "World's Biggest Aviary Built so World's Oldest Religions Can Feed Corpses to Vultures". *Parsi Khabar*. https://bit.ly/3Q0rPXb.

Parsi Khabar (2018). "Intelligent Conservatism Can Improve Parsi Survival Prospects". *Parsi Khabar*. https://bit.ly/3mLGisR.

Parsi Times (2012). "25 Crore Aviary Project Is an Unviable Proposition". *Parsi Times*. https://bit.ly/3ya8ZWx.

Patil, A. (2020). "The Bishnois Have Been at the Forefront of Environmental Conservation for Centuries". *Parsi Times*. https://bit.ly/3xjQkHs.

Prakash, V. (1999). "Status of Vultures in Keoladeo National Park, Bharatpur, Rajasthan, with Special Reference to Population Crash in Gyps Species". *Journal of the Bombay Natural History Society*, 96(3), 365-78.

Prakash, V.; Galligan, T.H.; Chakraborty, S.S.; Dave, R.; Kulkarni, M.D. et al. (2019). "Recent Changes in Populations of Critically Endangered *Gyps* Vultures in India". *Bird Conservation International*, 29, 55-70. https://doi.org/10.1017/S0959270917000545.

Prakash, V.; Green, R.E.; Pain, D.J.; Ranade, S.P.; Saravanan, S.; Prakash, N.; Venkitachalam, R.; Cuthbert, R.; Rahmani, A.R.; Cunningham, A.A. (2007). "Recent Changes in Populations of Resident Gyps Vultures in India". *Journal of the Bombay Natural History Society*, 104(2), 129-33.

Rahman, A.P. (2020). "Bishnois Organise and Educate Themselves to Take Environment Conservation Beyond Religion". *Mongabay*. https://bit.ly/3mkgcwI.

Reichert, A. (2015). *Sacred Trees, Sacred Deer, Sacred Duty to Protect: Exploring Relationships between Humans and Nonhumans in the Bishnoi Community* [MA thesis]. https://ruor.uottawa.ca/bitstream/10393/32877/1/Reichert_Alexis_2015_thesis.pdf.

Riley, T.; Anderson, N.E.; Lovett, R.; Meredith, A.; Cumming, B.; Thandrayen, J. (2021). "One Health in Indigenous Communities: A Critical Review of the Evidence". *International Journal of Environmental Research and Public Health*, 18(21), 11303. https://doi.org/10.3390/ijerph182111303.

Sambyal, S.S. (2014). "A Review of the Draft Plastic Waste Management Rules, 2015". *Down to Earth*. https://bit.ly/3O15VS1.

Sinha, B.L. (2018). "Bishnoi Tiger Force (BTF): Expounding the Thar beyond Religion". *Sahapedia*. https://www.sahapedia.org/bishnoi-tiger-force-btf-expounding-the-thar-beyond-religion

Subramaniam, M. (2016). "The Dogs: An Excerpt from 'Elemental India'". *The Caravan*. https://caravanmagazine.in/vantage/elemental-india#sthash.QcSFoDNU.dpuf.

The Economic Times (2018). "How a Committed and Inspired Bishnoi Community Did Salman Khan In". *The Economic Times*, 5 April. https://bit.ly/3x6y1o4.

Umanadh, J.B.S. (2020). "Last Rites: Parsis Turn to Tech as Vulture Numbers Decline". *Telangana Today*, 2 December. https://telanganatoday.com/last-rites-parsis-turn-to-tech-as-vulture-numbers-decline.

United Religions Initiative (2017). "Bishnoi: Not Just a Community, a Belief System that Supports an Environmental Commitment". https://bit.ly/3Q79mse.

Van Dooren, T. (2010). "Vultures and Their People in India: Equity and Entanglement in a Time of Extinctions". *Manoa*, 22(2), 130-45. https://doi.org/10.22459/AHR.50.2011.03.

Zinsstag, J.; Schelling, E.; Waltner-Toews, D.; Tanner, M. (2011). "From 'One Medicine' to 'One Health' and Systemic Approaches to Health and Well-being". *Preventive Veterinary Medicine*, 101(3-4), 148-56. https://doi.org/10.1016/j.prevetmed.2010.07.003.