

## I. Pharmaceutical Care: Diclofenac, a Pharmacon of More-Than-Human Health

*Daniel Münster and Ursula Münster*

After Mr. Chandran committed suicide, the Indian government offered his wife Ramini a dairy cow and a calf. This gift was part of an Income Generating Scheme for impoverished widows of farmer suicides in India. Like many widows of small-scale settler farmers in the Wayanad district of Kerala, Ramini was struggling to make a living while dealing with the debts her husband had amassed in failed operations of ginger cultivation. Initially, Ramini hoped that the cows would produce steady income with the sale of milk to the local Milk Society. However, the "gift" of a high-yielding hybrid dairy cow came with a trade-off that put her on a treadmill of commercial inputs. With her cows, Ramini also entered the "chemosocial worlds" (Shapiro and Kirksey 2017) of productivist dairy farming.

Ramini's cows were crosses of Indian *Bos indicus* breeds with high-yielding European *Bos taurus* breeds such as Swiss Brown and Frisian. In its biopolitical fight against "unproductive landraces" the government of Kerala introduced these breeds in the 1960s as part of a large-scale dairyfication program, known as the White Revolution, which has since boosted milk production. Breeding with native bulls was made illegal which led to a near extinction of native breeds in the state (Münster 2017). Caring for "improved" hybrid breeds of cows demanded of small-scale farmers like Ramini the need to buy costly feed, keep her cows in a shed and spend money on medicine. The same Veterinary Officer who had arranged the delivery of Ramini's "European" cow from a breeding station also administered their pharmaceutical care. If Ramini failed to provide proper infrastructure, food and chemicals, her cow would give less milk, and she risked losing yield and income.

The introduction of hybrid cows in India coincided with global trends of a chemicalization of agriculture (Carson 1962), medicine (Hardon and Sanabria 2017), and veterinary science (Brown and Nading 2019). Critical anthropologies of pesticides, synthetic fertilizers and antibiotics have documented the toxic relations of food production in multispecies worlds (Dowdall & Klotz 2014; Münster 2025). In the shadow of antibiotics, Diclofenac, a common pain killer also for human use, has become a "blockbuster drug" (Sunder Rajan 2017, 39) in more-than-human medicine. High-yielding cows undergo relentless cycles of pregnancy by artificial insemination, birth, and lactation. In India, Diclofenac was the drug of choice to treat the many pains of high-performance cows, among them mastitis, a painful inflammation of the udder.

Diclofenac is a cheap, nonsteroidal anti-inflammatory drug (NSAID) and thus within the same class of pharmaceuticals as Aspirin (ASS) or Ibuprofen. Synthesized in the 1960s by chemists at the Swiss pharmaceutical company J.R. Geigy AG (Sallmann 1986), Diclofenac has been sold since 1973 under the brand name Voltaren as over-the-counter remedy for arthritis pain in humans and domestic animals. With the end of patent protection, it has

become one of the most widely used NSAIDs across the world, and its generics are available in India under a variety of brands. Like all NSAIDs, Diclofenac inhibits the enzymatic production, called cyclo-oxygenase (or COX 1 and COX2), of prostaglandin, a compound responsible for inflammation and pain in the body. Diclofenac was developed as a novel drug specifically for its "high activity" and "outstanding tolerability" (Sallmann 1986) compared to other NSAIDs – at least in mammalian bodies. However, Diclofenac is a fluid drug, "ever evolving in relation to [its] context" (Hardon and Sanabria 2017, 118). When its molecules and their metabolites cross bodily boundaries and accumulate "downstream" of human and animal consumption, the remedy turns into a poison.

Human and other mammalian bodies metabolize Diclofenac and excrete it via the kidneys and the renal system. Healthy mammalian kidneys can deal with the drug reasonably well. To birds, however, Diclofenac is a deadly toxin. Birds who ingest Diclofenac die of severe renal failure as the effect of kidney necrosis (Meteyer et al. 2005). Wildlife biologists and forensic veterinarians in South Asia have established the connection between Diclofenac and the catastrophic extinction for Asian vulture species (Cuthbert et al. 2011; Oaks et al. 2004). Vultures are particularly affected because, as scavengers, they feed on the carcasses of domestic animals. Thereby, vultures have the ability to "twist death back into life" (van Dooren 2014, 53) and thus make an essential contribution to multispecies health and disease control in the forest. People who care for vultures in the forests of India know Diclofenac one of the most "devastating environmental toxicant[s]" (Naidoo and Swan 2009), responsible for the collapse of 99 percent of India's vulture populations, a globally endangered keystone species (Botha, A. J. et al. 2017).

Activists and scientists at the Wayanad Wildlife Sanctuary claim that vultures feed on the carcasses of cattle illegally released into the forest for grazing (Sashikumar and Vishnudas, 19). A regular veterinary dose, administered three days or less prior to the death of a domestic animal, can kill a large group of vultures feeding on a drugged carcass. Based on emerging evidence of avian kidney toxicity, scientific and political pressure led to the eventual ban of Diclofenac for veterinary use in India in 2006. However, many veterinarians consider Diclofenac so important for the care of milk cows that they continue to use the drug illegally by misappropriating drugs designated for human use only. Pharmaceutical companies played along by labelling the liquid 30 ml vials, popular among veterinarians injecting the drug, as multi-dosage preparations for human usage (Mohamed 2017).

Diclofenac is a pharmacoon of chemicalized agriculture in India. It is a "drug that may act as a poison or a remedy" (Stengers 2010, p. 29). Following the chemical substance across contexts and species lines reveals how a core substance of scientific milk production becomes an environmental toxin when reaching so-called non-target species. In the chemosocial world of post-Green revolution agriculture, the same pesticides that made speculative cash cropping possible also contributed to the death of farmers. Government

programs, such as the one offered for Ramini, did not turn away from chemical care, but extended the modern pharmaceutical to small-scale dairy farming. For Ramini, caught up in a treadmill of debt, Diclofenac was a remedy that allowed her to make a living with the precarious body of a hybrid cow. The poisonous qualities of the pharmaceutical showed their effects beyond the realm of domestication and production, killing vultures. Following the substance and conceptualizing Diclofenac simultaneously as pain relief and toxin reminds us of the need to firmly situate the anthropology of more-than-human care within wider political ecologies of postcolonial landscapes in the Anthropocene.

### **References**

Brown, Hannah; Nading, Alex M. (2019): Introduction: Human Animal Health in Medical Anthropology. *Medical Anthropology Quarterly* 33 (1), pp. 5–23, checked on 9/12/2019.

Carson, Rachel (1962): Silent Spring-I. *The New Yorker* (May 16). Available online at <https://www.newyorker.com/magazine/1962/06/16/silent-spring-part-1>.

Cuthbert, Richard; Taggart, Mark A.; Prakash, Vibhu; Saini, Mohini; Swarup, Devendra; Upreti, Suchitra et al. (2011): Effectiveness of action in India to reduce exposure of Gyps vultures to the toxic veterinary drug diclofenac. In *PloS one* 6 (5), e19069. DOI: 10.1371/journal.pone.0019069.

Dowdall, Courtney; Klotz, Ryan J. (2014): Pesticides and Global Health. Understanding agrochemical dependence and investing in sustainable solutions. Walnut Creek, CA: Left Coast Press (Anthropology and global public health, Volume 1).

Hardon, Anita; Sanabria, Emilia (2017): Fluid Drugs. Revisiting the Anthropology of Pharmaceuticals. In *Annu. Rev. Anthropol.* 46 (1), pp. 117–132. DOI: 10.1146/annurev-anthro-102116-041539.

Meteyer, Carol Uphoff; et al. (2005): Pathology and proposed pathophysiology of diclofenac poisoning in free-living and experimentally exposed oriental white-backed vultures (*Gyps bengalensis*). In *Journal of Wildlife Diseases* 41 (4), pp. 707–716. DOI: 10.7589/0090-3558-41.4.707.

Mohamed, Imranullah (2017): HC turns down plea of pharma firms in Diclofenac case. In *The Hindu*, 10/24/2017. Available online at <https://www.thehindu.com/news/national/tamil-nadu/hc-turns-down-plea-of-pharmacompanies-in-diclofenac-case/article19914580.ece>, checked on 4/23/2020.

Münster, Daniel (2017): Zero Budget Natural Farming and Bovine Entanglements in South India. In *Rachel Carson Center Perspectives* 2017 (1), pp. 25–32. Available online at <http://www.jstor.org/stable/26241413>.

Münster, Daniel (2015): "Ginger is a gamble". Crop Booms, Rural Uncertainty, and the Neoliberalization of agriculture in South India. In *Focaal: Journal of Global and Historical Anthropology* 71, pp. 100–113. DOI: 10.3167/fcl.2015.710109.

Oaks, J. Lindsay; Gilbert, Martin; Virani, Munir Z.; Watson, Richard T.; Meteyer, Carol U.; Rideout, Bruce A. et al. (2004): Diclofenac residues as the cause of vulture population decline in Pakistan. In *Nature* 427 (6975), pp. 630–633. DOI: 10.1038/nature02317.

Sallmann, Alfred R. (1986): The History of Diclofenac. In *The American Journal of Medicine* 80 (4), pp. 29–33. DOI: 10.1016/0002-9343(86)90076-8.

Shapiro, Nicholas; Kirksey, Eben (2017): Chemo-Ethnography: An Introduction. In *Cult. Anthropol.* 32 (4), pp. 481–493. DOI: 10.14506/ca32.4.01.

Stengers, Isabelle (2010): *Cosmopolitics I*. Minneapolis: University of Minnesota Press.

Sunder Rajan, Kaushik (2017): *Pharmocracy. Value, Politics, and Knowledge in Global Biomedicine*. Durham: Duke University Press.

van Dooren, Thom (2014): *Flight ways. Life and loss at the edge of extinction*. New York: Columbia University Press.