

# Dharma in the Mahabharata as a response to Ecological Crises: A speculation

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## Abstract

Without doing violence to Vyaasa, the Mahabharata (Vyaasa 3102 B.C.E.) can be properly viewed through an ecological prism, as a story of how "Dharma" came to be established as a result of a conflict over social policies in response to on-going environmental/ecological crises. In this version, the first to recognize the crises and to attempt to address them was Santanu, King of Hastinapur (a town established on the banks of the Ganges). His initial proposals evoked much opposition because they were draconian and oppressive, and were rescinded after his death. Subsequently, one of Santanu's grandsons, Pandu, and his children, the Pandavas, agreed with Santanu that the crises had to be addressed and proposed more acceptable social policies and practices. Santanu's other grandson, Dhritarashtra, and his children, the Kauravas, disagreed, believing that nothing needed to be done and opposed the proposed policies. The fight to establish these policies culminated in the extended and widespread "Great War" (the "Mahaa-Bhaarata") that was won by the Pandavas. Some of the proposed practices/social policies became core elements of "Hinduism" (such as cow protection and caste), while others became accepted elements of the cultural landscape (acceptance of the rights of tribes to forests as "commons"). Still other proposals may have been implied but never became widespread (polyandry) or may have been deemed unacceptable and immoral (infanticide). The Pandavas' proposals helped the culture survive and became the "Dharma" for the new age that followed the war. As elements of Hindu orthodox religion, they continue to the present day. *What follows from here on in this article is based on a speculative re-telling of one of the core texts of the modern world, exhibiting pointed artistic license rather than traditional narrative fidelity.*

A series of tectonic events in the Himalayas resulted in repeated floods of the Indus. Meanwhile, the Yamuna shifted course to the east and the Sutlej to the west thus starving the then great river Saraswati of its major sources of water. Refugees from the Saraswati valley migrated to the existing upper Gangetic settlements of Hastinapur and Panchala thoroughly stressing the ability of those regions to support them. Prior to this forced movement, the slow eastward expansion of the Indus-Saraswati culture had stalled because their agricultural tech-

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niques were inadequate to till the Gangetic plain. The Santanu/Pandu/Pandava proposals enabled the culture to survive the short-term strains caused by the tectonic events and supported the longer-term expansion into the Gangetic plain.

The epic poem is believed to have been put down in its final form between 400 B.C.E and 200 A.C.E. (over a thousand years after the events). The composer is supposed to be Krishna Dvaipayana Vyaasa. Vyaasa is apparently a pseudonym and may have been a single poet or a group of poets. The genius of Vyaasa (the poets) has been to take barely comprehended stories from the already distant past and re-tell them so that they make sense to their audience two thousand years ago. For instance, a policy of male infanticide is re-told as a fairy-tale of a goddess killing her male children. Infants may die naturally during famine or during floods, but under extreme conditions, a “one child per family” policy might force parents to abandon “excess” children. Other policies included a “hydraulic empire” (Wittfogel 1957) that managed common water resources – the state taking responsibility for managing the unstable riverine environment rather than leave it to inadequate local actions; cow protection – this would have provided famine insurance for the Indian farmer (and may have been sponsored by Krishna, an ally of the Pandavas, considered an incarnation of Vishnu by the contemporaries of the poets); the use of an iron plough – this would have made expansion into the Gangetic plain possible (Balarama, “the ploughman” is Krishna’s brother, and is also considered an incarnation of Vishnu); and, finally, a totalitarian caste system – the state, by guaranteeing jobs to most people would enable both individual and group to survive without ruinous internal competition. Vyaasa also used metaphor extensively to represent the reaction to issues in concrete dramatic elements. For instance, he/they re-interpreted the inability of Dhritarashtra (the father of the Kauravas) to see the growing crisis and his sons’ stubborn opposition to change as a “blind” fond father who coddled his stubborn eldest son and his hundred brothers.

Some of the policies described above became core elements of “Dharma”, right behavior as enunciated by the common religion of the people. Using religion as the carrier for these practices ensured that they would survive for a long time. It would be an error for us to assess these practices in terms of our contemporary morality, though it can be tempting. The practices ensured cultural survival at that time and for a long time thereafter. At the same time, if the practices survived unchanged past the point of relevance, they could become dangerous for the culture in the face of a different threat. We suggest that the caste system was one such practice that made it impossible for the people of India to respond constructively and defensively to British colonialism.

We live in an era facing environmental and ecological catastrophe as a result of the past and present actions of humanity. Not just the human species, but all life on earth appears to be at

risk. If “we” are to survive, humans need to develop new principles for behavior and, concurrently, implement multiple projects (not just one project) to correct our excesses; these must happen simultaneously, not one at a time or piece-meal, and must be accepted by almost all of us and must be maintained for a long time. A new “Dharma” is needed and the postulated Indian experience indicates that, in religious form, it can work over a long period of time. Our tolerance for change would be tested because for our contemporary morality cannot be the touchstone by which this new Dharma is to be assessed.

The principles of “Deep Ecology” are a candidate for such a new Dharma. There is much to admire in them and it is possible that there is little time for debate (or that it is even past time for debate). But democratically conducted debate is a necessary check when policies become unbalanced, and the Indian experience is cautionary in that respect. The Indian solution failed when confronted by an exploitative and extractive external colonialism. In the context of a unified Earth-Home isolated in an infinite cosmos, it may feel like a science fictional suggestion (there is nothing like the British East India Company out there, we hope), but the new Dharma should support mechanisms to monitor its continued efficacy and adjust appropriately, or else, we will have failed.

### ***The Mahabharata***

Any Indian will describe the Mahabharata as:

*... the story of a war between cousins over succession to the kingdom of Hastinapur, a city-state on the bank of the upper Ganges.*

From such trivial beginnings a great epic has been constructed that proclaims of itself that it contains everything:

*What is found in this epic may be elsewhere;  
What is not in this epic is nowhere else.*

The city of Hastinapur located on the banks of the Ganga dominated the region northeast of the modern city of Delhi. India, being an ancient land, has many regions where history has happened. For example, the nearby battlefield of Panipat has seen four major historic battles in the last 1000 years. Hastinapur lays claim to pre-historic happenings. Broadly defined, the area between modern Delhi and the foothills of the Himalayas, drained by the rivers Yamuna and Ganga constitute a wide “gateway” to the Gangetic heartland. To the east, the land is flat and in ancient times was forested. The west is a well-watered, easily tilled plain, to the south of which lies the Thar, the Great Indian Desert. The core story of the Mahabharata takes place in this “gateway”. If true, this story comes from a time long before any surviving historical records.

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What makes the Mahabharata interesting is what has been added beyond the simple story. The war as described is huge – over 4 million warriors and soldiers die; its effects are huge – one cosmic era ends and the “current” one begins a few years later; the metaphysical rationale is huge -- the Pandavas and Krishna define the “dharma” for the new era and the Kauravas are not just the losers, they are a-dharmic, against dharma, and therefore evil. The Mahabharata is source material for Indian practical advice – many Indians will refer back to the Mahabharata to find metaphors for some current situation. Stubborn people are compared to Duryodhana (the eldest Kaurava); evil ones to Dushasana (the second Kaurava); the cunning to Shakuni (the maternal uncle of the Kauravas); the father who is blind to his child’s faults is Dhritarashtra. On the side of dharma, the hesitant to act are directed to read Krishna’s advice to Arjuna in the Gita; Yudhishtira is the wise ruler who sticks by the truth, except once; Yudhishtira addiction to gambling is disastrous, and so on.

Why did this particular dynastic succession conflict attain immortality? Dynastic conflicts are a dime a dozen. We tend to think of dynastic conflicts as simple, and many are, but the interesting ones hide their complexity. As a rationalist and empiricist who does not seek explanations based on divinities, I tend to dismiss the explanation that the god Vishnu was born as Krishna to kill all evil-doers; I dismiss the explanation that a new cosmic era began with this war; and I dismiss the explanation that the Pandavas were morally superior to the Kauravas (for the victors wrote the final version of the story). But the Pandavas and Kauravas did differ on how to behave and we can use that as a guide to understanding.

My assumption is that the dynastic succession conflict must hide some more fundamental disagreement. There are no archaeologically attested facts to go on, so what I propose is based on a re-interpretation of events in the text. That is, the primary conflict was over responding to something; the choices that made up that response define “dharma” for a new age. In this context (how to define dharma for a new dispensation), the simple answer offered in the epic that the Kauravas were evil and the Pandavas good is not necessarily best.

This article proposes a rationale for the conflict and for the characterization of the winners as the supporters of dharma. I suggest that the region surrounding Hastinapur suffered environmental damage and ecological disruption; consequently, disagreements arose over policies for addressing the problems. These disagreements grew over a few generations and ended in a Great War.

### ***Before: The little that is known***

The third millennium B.C.E. saw a number of changes in the climate and geography of the Indo-Gangetic plain. Sometime

during that period, the Yamuna changed its course. Just north of the Aravalli ridge, near modern-day Delhi, the Yamuna switched from flowing west to join the Saraswati and headed east to merge with the Ganges far downstream at Prayag near modern Allahabad. Other tributaries of the Saraswati, for instance the Sutlej, also changed their course, possibly in related tectonic events in the Himalayas. The result was that the Saraswati dried up and instead of being the wide river mentioned in the Rig Veda (Various 3150 B.C.E.), it became the hidden third river of Hindu legend that merges with the Yamuna and the Ganga at Prayag (further downstream near the modern city of Allahabad).

As a result of the drying up of the Saraswati, settlements on the river banks were abandoned. Some of these have been discovered and excavated. There is no evidence for any kind of massive destruction such as might be caused by war. The settlements were abandoned for some other reason. Other settlements appear at other locations, some of them appearing to come into existence as perfectly planned towns (possibly the famous ones at Mohenjo-Daro and Harappa fell into this category). Though the Indus-Saraswati culture is widespread and seems to have been prosperous, it does not appear to have spread rapidly into the Gangetic plain and that is a bit of a mystery. We will make a comment on this mystery before going on.

There is some evidence that farmland in the Indus-Saraswati culture was tilled with wooden ploughs drawn by oxen. The evidence is limited – toys have been found that imply the use of the cow as a draught animal; archeologists have identified ploughed land near ancient Indus-Saraswati sites. The Gangetic plain is a highly fertile alluvial plain and should have been a natural direction for expansion of settlements. The problem was that the alluvial soil, though fertile, was clayey and difficult to till (Agarwal 1970). In fact, the iron plough is indispensable for large-scale agriculture in the Gangetic plain and the wooden plough is not good enough. Without the iron plough, the primary form of agriculture is slash-and-burn – a clearing in the forest is burnt to provide a layer of ash and for two or three years crops can be grown without tilling before the land is abandoned. I postulate that this was the reason for the slowing down or halt in the expansion of the Indus-Saraswati culture.

Hastinapur, the city of the Kurus, represented the eastward limit of migration by settlers from the Indus-Saraswati culture. This migration had come to a halt before the time of Santanu, the great-grandfather of the main actors in the Mahabharata. Though the Mahabharata refers to other kingdoms to the east such as Kashi and Magadha I suggest that some of these references and associated stories are interpolations – ancient interpolations perhaps, but interpolations nonetheless. That is because Kashi and Magadha are known as great kingdoms at a later time in history, but there is no evidence of great settlements in the third millennium B.C.E.. When the Saraswati dried up and the Indus and its tributaries showed signs of instability, refugees poured into the

kingdom of Hastinapur. A situation, already under stress because of the difficulty of cultivation by the Ganga, became more difficult. Initially, Hastinapur encouraged the immigrants to pass through to the trans-Ganges region that was the *janapada* (“republic”) of Panchala. But this was a short-term solution because slash-and-burn could only sustain a limited population. By the time of Santanu, Panchala had become hostile to further immigration through Hastinapur. This did not solve any problem; it just increased the intensity of the shouting.

### ***What we surmise***

When the crisis started, the population of Hastinapur increased dramatically. The expectation was that the refugees/migrants would return to their own lands when the rivers returned to their previous conditions. Years went by and the rivers continued to be unstable and it became clear that something had to be done to deal with the problems created by the increasing population – the refugees in the meantime were assimilating into the economic life of Hastinapur. This set the stage for a series of innovative initiatives in social policy. I am tempted to call them “experiments”, but they were not experiments in any scientific sense – no hypotheses, no controls, no underlying model being tested – rather, they were more or less ad-hoc proposals backed by the king’s faction. Some of these proposals were draconian and all of them were oppressive; the king’s faction, supported by King Santanu, which sponsored them, did not brook opposition. Among other criteria, the policies were acceptable to most of the elite, specifically, the brahmanas and the kshatriyas. Despite the success of some of the policies, they did not suffice – the problems that were being addressed continued and grew in magnitude. Santanu’s immediate heirs died, possibly as a result of wars with lands upstream. Over time, opposition to the policies that survived changes in rulers may also have developed. Santanu’s grandsons, Pandu and Dhritarashtra, took opposing positions – Pandu wanted to continue Santanu’s policies, while Dhritarashtra led an increasingly reactionary opposition that took the extreme position that nothing needed to be done. Pandu died prematurely, leaving five young sons, called the Pandavas; Dhritarashtra, regent for Pandu’s eldest son Yudhishtira, could not completely dismantle the policies he inherited from Pandu. When Yudhishtira came of age, he wanted to restore his father’s policies. Dhritarashtra’s sons, the metaphorical hundred Kauravas, took up their father’s cause in opposition to the Pandavas. By this time, a set of viable policies appears to have emerged that had the support of a wide-spread regional coalition, but the Kaurava opposition was also strong enough to provoke a Great War.

What were these policies?

### ***Policies***

#### **Male Infanticide**

The traditional story begins with the following episode:

*Santanu, the King of Hastinapur watches in horror while seven sons are killed at birth by their mother...*

The Mahabharata then proceeds to explain away the actions of the mother for she is Ganga, the goddess of the river, and is liberating the souls of seven minor divinities cursed to be born as humans. The father Santanu does not stop her, for he promised the goddess when he married her that he would not question any of her actions. The ultimate cause of this situation lies in the past in heaven – Santanu is the reincarnated King Mahabhisva who, while in heaven, had not averted his eyes when the wind blew the goddess Ganga's clothes and exposed her nakedness! Despite this background, Santanu is human after all – he interferes when Ganga tries to kill his eighth son. But that, too, is explained away – the eighth divinity to be cursed to be born as a human had been further cursed to a long life as a human.

The story of Ganga and Santanu is a fairy-tale. But there is a reason for the fairy-tale. The writers of the poem could not understand why seven children were killed. From the poet's point of view, the killings of Santanu's children had to be justified. What if there was a different justification – what follows is based on such a speculation.

The tectonic events mentioned above were followed by an extended drought and resultant famine. Any society faced with extreme famine has to determine what to do about babies born during that time. Sex happens, women get pregnant, and babies are born – this cannot be stopped without birth-control technology. Such technology did not exist then. If a baby is born during a famine, it will most likely die. Keeping such a baby alive at whatever cost is not an option, for the whole family could die along with it. But the situation is fraught with moral hazard even for a culture that accepts the need to make such decisions, and that makes it necessary not to leave it to parental discretion. Four other options exist – kill all babies, kill boys only, kill girls only, or keep the healthiest. Determining which babies are healthiest is difficult at best and definitely creates a moral hazard for the people who must decide. This is particularly true if the social group consists of multiple families. If girls are killed then when the famine lifts – note that we have assumed an extended famine that has wiped out saved surpluses – there will be a shortage of girls and the older women will not be fertile any more. Under the assumed conditions, the only realistic option is to kill some female and many male babies, but not all male babies. But the selection cannot be left to the parents but must be enforced by an impersonal rule. By its very nature, such a rule would be oppressive and draconian.

We hypothesize that the king (or queen if the society was matriarchical, or an assembly of the people in a republic) may have ruled that each family could only have a single child of each sex.

It is possible that the ruling king or queen lost seven boy babies to this rule. From the point of view of the poet embedded in an extremely patriarchal society, the killing of boys would have seemed particularly appalling and hence the need to find divine explanations for an otherwise commonplace if heart-wrenching event.

There is another wrinkle to the traditional story – when Santanu questions Ganga about the eighth child, she explains who she is and disappears with the child. Eight years later, Santanu comes across a boy who is “playing” with the river – he is damming the river with his arrows. As Santanu watches amazed at the skill of the boy, Ganga reappears and introduces the boy as his son, Devavrata.

From a narrative point of view, this restores the boy to his father and sets the stage for the rest of the epic. But this also implies another technology and associated policy new to the culture – building dams and retaining ponds.

#### **A Hydraulic Empire: Irrigation-based Agriculture**

The Mahabharata is curiously vague on the need for empire, though Yudhishtira is encouraged to declare one. His brothers and others in the kingdom ask him to conduct the Rajasuya sacrifice that would proclaim him as suzerain over the other kings. Yudhishtira questions the rationale but is told that a king must be ambitious. Krishna is consulted but he goes straight to the heart of the matter – Yudhishtira can only be Emperor if he defeats Krishna’s enemy Jarasandha. Yudhishtira agrees, but the argument is left unrefuted. Why is an empire needed? The Pandavas do not have a large army, and in fact Jarasandha is killed by challenging him to single combat. Other rulers, including Duryodhana are equally powerful but they do not challenge Yudhishtira. What we are left with is a puzzle. Somehow the Pandavas, in establishing Indraprastha, became essential to the survival of both the Indus and the Gangetic communities. The Mahabharata does not shed light on what made it possible for Yudhishtira to be accepted as Emperor.

Observation: the people who settled Hastinapur and lands further east came from the Indus-Saraswati culture that had relied on snow-fed rivers that flooded and deposited silt. They had not needed to build tanks to store rainwater. Only superficial tilling, if any, was required to grow one or more crops a year. However, tectonic events in the Himalayas had changed the way the Indus, the Saraswati, and the Ganga were flowing. During the period of this story, the flow in all three rivers would (might) have become inconsistent. Building dams and creating extensive irrigation systems would address the problem, but such systems need to be regional rather than merely local if they are to succeed.

Building tanks to hold water and irrigation systems to deliver water to fields would have made it possible for settlements to continue on the banks of the Indus and the Saraswati rather than



migrate en masse to the Gangetic plain. However, the consequent loss of silt deposition would have made agriculture more difficult and even if that problem could be overcome, the irrigation structures would need to be maintained and could be easily destroyed by further calamities or in wars. That is, water-control technology would have slowed the migration but not halted it. Another implication is that, for the first time, an *empire* was needed. The waterworks needed were extensive – from dams and embankments built in the Himalayan foothills to irrigation canals and channels for farms in the Gangetic settlements.

If an empire is needed, where should its center be? Hastinapur which was bearing the brunt of the crisis is a candidate. The old Indus-Saraswati settlements and areas downstream (Sindh, Dwarka) are candidates. The new settlement in previously virgin lands not beholden to anybody, Indraprastha, is a candidate. With the support of Krishna of Dwarka, Yudhishtira pulled off this coup and qualified to be the emperor.

#### **Cow Protection and the Iron Plough**

A wide variety of world cultures value the cow – for the Masai in Africa, for the ancient Egyptians, from ancient Greece to modern Europe, the cow represents wealth. Even in China, where milk was not drunk, the cow was valuable. But only in India is the cow sacred. Not just sacred, but also not considered appropriate for consumption (many sacred things are eaten, so this is an important distinction).

Gandhi hailed the cow as the savior of the Indian farmer. The cow is not viewed in this light – as “savior” – by any other culture. Why is the cow a savior? The answer to this question has been formulated by the anthropologist (and one-time chairman of the Department of Anthropology in Columbia University) Marvin Harris in a collection of popular works (Harris 1975). A farmer who eats his cows in a time of drought (and the associated failure of crops and possibly famine) will not have a cow as a draught animal when the situation changes. Farming in the Gangetic plain depends on the cow and bull to pull the plough. From the farmer’s perspective saving the cow is a long-term requirement that may be difficult to justify during a famine when the daily crisis is hunger. Hence, saving the cow needs to be a religion.

Any number of animals could qualify as a draught animal, for instance, the horse, the donkey, the water-buffalo, the camel, the yak, and so on. But only one animal, the Indian cow, also called the “Brahmin” cow is both a draught animal and can subsist on food that humans cannot consume. Uniquely, the Indian cow and bull have a hump that enables them to survive long periods without water. If we look at other animals, they are less ideal in the context of India. The ideal food for horses is not hay, but must include substantial quantities of oats or other cereal, and hence compete with humans. Horses do not do well during heat waves and droughts. Nor do buffalo (they need water) or yaks (they are adapted to colder climates). Camels do well during famine and

droughts but they are larger and undisciplined as draught animals.

In addition to the cow, the farmer needs an iron or iron-tipped plough. As we discussed earlier, the alluvial soil of the Gangetic plain makes it difficult to till. And the Ganga is unlike the Nile in Lower Egypt which floods annually and deposits fresh silt – the Ganga only does this in its lower reaches in the modern states of Bengal and eastern Bihar. The iron plough makes agricultural settlements feasible, the cow makes it possible to have a long-lasting culture. So, to paraphrase Gandhi, the cow is the savior of the Indian farmer who ploughs his land with iron.

There are a number of Krishnas who show up in the Mahabharata and associated Puranas – Krishna the cowherd (“Go-pala”) who recognizes the importance of the cow, Krishna the liberator of the Yadavas, the people of Mathura, Krishna the statesman who advises the Pandavas in the war, and Krishna the philosopher who reconciles Arjuna to his role in the war. These are all conflated together into a single Krishna. Of all these Krishnas, arguably the most celebrated and the most admired is Krishna the cowherd (as child, lover, protector, and so on). By recognizing the cow as essential to the Indian farmer and Indian agriculture, he made settlements in the Gangetic plain possible.

A number of stories about Krishna concern his conflict with Indra. The Govardhana Hill episode in which Krishna raises the hill to protect his people from storms caused by Indra can be read as a metaphor for Krishna’s advocacy of a different attitude towards rain and rivers. The people who settled Mathura came from the Indus/Saraswati valley where storms and river floods were celebrated. Where they had come from, the floods deposited silt that made agriculture possible. Where they had now settled, the floods destroyed crops and cattle and eroded the land. Where they had come from, famines and droughts had been rare – in the new environment, these were common. The cow took on a new role – it became the savior of the farmer. It is possible that Krishna recognized this and converted his people from Indra-worship to cow-worship – the name Govardhana (“The cow that brings prosperity” or “That which prospers with the cow”) for the hill associated with the episode is significant.

Balarama (the “Plough man”), the older brother of Krishna the cowherd, adds a wrinkle to the Krishna story by recognizing the evangelist who popularized the plough. The cowherd and the ploughboy, Krishna and Balarama, are auxiliary characters to the development of the conflict in the Mahabharata. But they have significant roles – Krishna acts during the war as counselor for the Pandavas and appears as a well-wisher and relative (uncle-by-adoption). Balarama befriends both sides and is angry when the war is planned, initiated and finished when he is gone. Their names indicate the roles they play in developing the principles of cow protection and ploughing.

### Caste

The Mahabharata has multiple episodes in which caste differences justify the actions of its heroes. If we accept the generally accepted modern belief that the caste system is unfair and oppressive, it is a surprise that the “good guys” (the Pandavas) are the ones who support the caste system. And the Pandavas support the caste system despite the internal evidence in the Mahabharata that the result is unfairness and oppression. For instance, when Karna (the lost first son of Kunti, the mother of the Pandavas) attempts to enter a tournament in which all the princes compete, he is disbarred because he cannot show that he is a Kshatriya, but is apparently the son of a lower-caste father. All of Duryodhana’s attempts to promote Karna to the Kshatriya caste fail. The pathos is heightened for Karna is of course the eldest “Pandava”, and is arguably the best archer on the field.

The Mahabharata repeats this formula in the story of Ekalavya the son of a tribal chief who is not accepted as a student by Drona the teacher of the cousins because he is not a Kshatriya. He studies archery in secret with an image of Drona as his teacher and threatens to be the best archer in the world. Arjuna, the third-born Pandava, discovers this and reminds Drona of his promise that Arjuna would be the pre-eminent archer of his time. Drona then demands Ekalavya’s right thumb as *guru-dakshina*, thus crippling him as an archer. The Mahabharata justifies this action – Ekalavya had violated caste rules.

Some crises affect rich and poor differently. In the same city suffering from famine, we can have a rich man who eats well while the majority fast and the poor starve. The organization of societies and the attendant politics have to do with how resources are to be allocated. In the mythical beginning of all cultures, people lived for themselves or shared everything equally. As time progressed, some people became more powerful while others became weaker; the more powerful ones demanded and got more resources, while the less powerful received less than their share. The differential allocation is rationalized in many ways – the more powerful are said to have worked harder or smarter or simply worked more or spent less and saved more. As generations progressed, this list of reasons for the entitlement included inheritance – the more powerful inherited their right to greater resources and this justified their power. It isn’t necessary to agree with any particular story of how power and wealth came to be asymmetrically distributed – it is enough to note that there are many rationales for inequality and many justifications for maintaining that state.

A caste system in which power distribution and wealth distribution are asymmetric is maintained by a combination of carrots and sticks. The sticks are obvious – force, either with a police or with the army, is used to ensure that the many do not rise in protest. The carrots are more subtle but insidious – the poor promised jobs linked to their family or manor during normal times, promised an insurance policy against abandonment when things

go bad. In exchange, they stay within their caste and perform according to the obligations of the caste. Even if a common sweeper would be a great painter, he could not be permitted to change his career for that would weaken the basis for the system. Admittedly this is a tragedy, justified by the short-term loss to the person being outweighed by the long-term gain in stability to the society.

The Mahabharata is honest and brutal about the caste system. The caste system was unfair and people suffered as a result. But it was “the right thing”. It enforced moderate consumption on the mass of the people. In a time of crisis, when resources were limited, this frugality helped them cope. Their rulers, the Kshatriyas (and in some ways, the Brahmins) could live a little more lavishly but the rulers were few in number and their excess consumption did not usually affect the overall consumption greatly. The system worked if the rulers delivered on their promises when times were bad; mostly it muddled through for many rulers only delivered partially; it was possibly a matter of luck that it never completely broke down.

However this changed. The difference between the excessive consumption of the rich and the moderated consumption of the poor became extreme and the excesses of the rich did affect the overall consumption. As we will discuss later, the successful development of the caste system doomed the long-term success of the culture.

#### **The Rights of Forest-dwellers**

There are two major episodes and one minor one in the Mahabharata illustrating the relationship between the Pandavas and the denizens of the forests that covered much of the land. The first occurs when the Pandavas create their new capital Indraprastha; the second is the confrontation with a crane-like creature, a yaksha, at a forest lake; the minor one has to do with a dream.

The Pandavas and the Kauravas reconcile for the first time after the Pandavas marry Draupadi (thus allying themselves with Panchala, usually in conflict with Hastinapur). To avert possible civil war, Dhritarashtra gives the Pandavas the Khandavaprastha, a forested region southwest of Hastinapur and on the eastern side of the Aravalli ridge. Arjuna, with Krishna’s help, sets fire to the forest and kills all the creatures in the forest as they try to escape. The slaughter is fearsome. The only creatures that survive are the birds that flew away and a reclusive *asura* architect, named Maya. Maya pleads with Krishna for his life and in exchange builds the new Pandava city.

The river Yamuna flows through this area now – as we mentioned earlier, during the third millennium B.C.E., the Yamuna did not flow this way but flowed west of the Aravalli ridge (to join the Saraswati). If its change of direction pre-dated the gift of title to the Pandavas, it would explain both the reputation of

Khandavaprashtha as a desolate and inhospitable region as well as the Pandavas' success in settling there.

But, as the Mahabharata makes clear, the Pandavas destroyed a complex forest community. Nagas, tribal people believed to be the forest dwellers, and identified with snakes were killed. Arjuna and Krishna fight and kill not just Nagas, but all types of demons – Asuras, Danavas, Rakshasas, and Kimnaras – as well as the Gods who try to prevent the slaughter. The Mahabharata literally goes overboard in describing the opposition overcome by Arjuna and Krishna as they burned the forest and its inhabitants. Having destroyed the forest, they build a glorious new capital city on the banks of the river. They challenge another would-be emperor Jarasandha to a wrestling match and win despite his magical powers of recovery. They celebrate with a “Rajasuya Yagna” (the Imperial Sacrifice) claiming dominion over the known world. Yudhishtira is crowned emperor. They mock their cousins when they visit. They exude arrogance – this is the high watermark of the Pandavas' life in the Mahabharata, for they are quickly brought down and sent into exile by the turn of the dice in a gambling game.

During the Pandavas' exile, they wander through the forest of Dvaitavana and wreak havoc to the fauna. Every day they kill animals in the hundreds. At one point (The Mahabharata, 3/40.244), Yudhishtira dreams that a group of deer plead with him to stop killing them as only a small seed group is left. Thereupon, he recognizes that they have over-hunted the forest and persuades his brothers and wife to move to the edge of the desert (the forest of Kamyaka by Lake Trnabindu) further away from their lost kingdom. This minor episode highlights the beginning of Yudhishtira's recognition that the world is shared with other beings with rights to be recognized. His brothers and Draupadi agree to move but they have not achieved his insight. Kamyaka forest is not a safe haven for the Pandavas and they have to fight the Sindhu king Jayadratha to rescue the abducted Draupadi. So they return to Dvaitavana and subsist on fruits.

They are no longer killing deer but there is yet more to learn. This time, a deer steals the fire-starting tools of a brahmin who appeals to the Pandavas for help. This episode is commonly called *Yaksha-prashna*, or the “The Questions of the Crane Demi-god” (The Mahabharata, Book 3/44.295-299). The Pandavas chase the deer and fail to catch it. Exhausted they split up in search of water. One by one they come to the same forest lake. A yaksha in the form of a crane denies each Pandava access to the lake, claiming ownership. One by one, the younger Pandavas defy the yaksha and are killed, apparently by magic. When Yudhishtira comes upon his brothers lying dead by the lake and tries to drink from the lake, the yaksha demands that Yudhishtira answer some questions before he attempts to drink. Upon being challenged on his right to bar Yudhishtira from a common resource, the yaksha claims the lake as his creation and

his property. Thereupon, Yudhishtira agrees to answer his questions.

Four times a Pandava does not accept the yaksha's claim of ownership and dies as a result – the fifth time, Yudhishtira respects the claim. The rest of the episode does not matter for the point I wish to make – that Yudhishtira accepts that water and natural resources like lakes can be subject to somebody else's authority. The lake was not private property in the sense we understand it now – the yaksha did not bar other creatures from the water. But nor was it a “commons” shared by all. The Pandavas did not pay anything or barter anything to get access to the water, nor could they have. Instead the yaksha asked them some metaphysical and philosophical questions as a test of their fitness to share in the water. The lake was a “managed commons”, managed by the local forest dwellers and not by a king.

Yudhishtira's acceptance of the yaksha's rights are a far cry from the carnage that preceded the creation of Indraprastha. The lesson that the younger Pandavas did not learn engendered a crisis that, for the first time in the Mahabharata, was averted by Yudhishtira's judgment. Arjuna may be the warrior but Yudhishtira is the king and the crane-yaksha episode marks the transition of real power from the arrogant instrumentalism of the warrior to the judicious wisdom of the king.

### ***Consequences***

If every era has its Dharma, then, when a new era begins, a new Dharma would be needed. A society that does not recognize and adopt this new Dharma will fail. Such failure can manifest itself in many ways – settled communities become nomads, the quality of bricks deteriorates, monuments fall apart, roads and waterworks cease to function effectively, travel and trade become hazardous. Some of these processes were already underway before the Great War. But after the Great War was a Great Peace during which the Pandavas policies supported a great migration and subsequent expansion. Some of the problems caused by this expansion are hinted at in the Mahabharata – Janamejaya, Arjuna's grandson and heir of the Pandavas, conducts a fire sacrifice which kills all the “Nagas” (snakes, but more likely forest-dwellers and tribals who did not accept the new policies). The sacrifice is stopped short of completion, but significant damage has been done – many lands occupied by the Nagas are ready for settlement.

The culture and society that came about did not just contain Hastinapur. Over time, it extended to all of “India” (from Afghanistan to Assam and from Kashmir to Sri Lanka). These once-successful policies became religious practices. Their success meant that change was not countenanced. Over time, the practices could not be changed even as the environment changed and the problems changed. It would be simplistic to claim that

religious practices froze completely – changes did happen, but repeatedly, reactionary forces successfully returned to a core set that served the needs of the powerful. The Buddha, for instance, advocated a secular, rational, logical, and moderate system of morality, but after a brief period, Buddhism vanished from India but survived elsewhere as a religion with the Buddha as divine. The Jains advocated a radical atheism and they were dominant in some parts of the country; but then, they, too lost the battle to a resurgent orthodoxy. Sankara, a Hindu philosopher of the eighth century A.C.E., gave the orthodox religion a metaphysical framework and set up a system of monasteries that provided philosophical and emotional support to a very large and expanding population (estimated to be 180 million by his time).

So we need to understand how each of the policies described above evolved.

### Caste

The caste system evolved to an entrenched, monumentally unfair system for allocating resources. Multiple efforts to eliminate it failed, from Gautama (the Buddha) to Ramanujam to Ramakrishna and Gandhi in the modern era. To top it all, the way it worked over ninety percent of the people in some parts of India had no stake in the system of government – these people did not care who ruled or what that meant, for in the short run, all the rulers were equally oppressive. As long as the rulers delivered on their promises during times of hardship, they were acceptable.

Ultimately, the system failed when “outsiders”, not constrained by the rules of the system, exploited the system and impoverished rich and poor alike, converting a generally prosperous region to a poverty-stricken wasteland. Not all “outsiders” impoverished the economy – for instance, the Shakas (Scythians, in Greek) penetrated deep into India and ruled much of North India (from 100 B.C.E. to 300 B.C.E.). But they did not extract the resources of India to repatriate to their homeland, but settled down there. Later, the first onslaughts of the Arab explosion lead to Arabic/Muslim kingdoms in Sind and northern Afghanistan. Sind became home to a largely peaceful kingdom, but not so in Afghanistan. The rulers of Afghanistan frequently raided the prosperous temples and cities of Northwest India. But ultimately, even these Muslim adventurers settled down to become part of the community, adapting to the local customs while staying Muslim.

This model of invaders coming and settling and integrating into the community changed with the arrival of the British. Whether we attribute the British East India Company’s success to the English skill in muddling through, or to the scientific attitude cultivated by the Renaissance, or to the capitalism of the Industrial Revolution, or to learning from the errors of the Spanish in South America and the successes of the Dutch colonialists in the East Indies, the Company became the hegemony in the region.

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The Company instituted an economic regimen in which India became the source of raw materials for British manufacturers who sold their products back to Indians, while destroying local value-added manufacturing. The weavers of Dacca are said to have had their thumbs cut off – this may be metaphorical rather than real, but the effect of being denied raw materials was the same. This policy maximized the Company’s profit; back home, the British worker prospered and the British industrialist became rich and powerful, while the Indians were impoverished. The caste system, which for centuries had kept consumption in check during famine came into play to keep the vast population quiet – it is likely that the East India Company did not even appreciate this. It is one thing to moderate consumption to ride out a drought lasting a couple of years; it is quite another to moderate consumption year after year when a colonial power is ensuring that the good times will never return.

Impoverished India achieved independence with the caste divisions intact. Affirmative action policies have strengthened the divisions while at the same time eroding the rationale for the caste system – there are no longer promises made or kept, whether explicit or implicit.

#### The Rights of Forest-dwellers

Forest dwellers and tribes retained their rights until very recently but they were constantly under pressure and the forested areas of India continuously shrank. In 1947, at the time of Independence, forests covered a smaller portion of India than any other country in the world. Currently, at four percent, it is appallingly low. Corresponding to the decrease in forest extent, forest-dwellers rights have been lost or curtailed as city-dwellers and villagers encroach on forest lands.

That the forest dwellers would lose their rights is pre-figured in the story of the Snake-sacrifice. Clearly, not everybody brought into Yudhishtira’s vision, but many thousands of years later, the tribal peoples still exist in the millions. This may be compared to the position of the original inhabitants of Europe, the Celts who were herded into Ireland and Scotland by immigrating Germanic tribes, or of North American natives, starved into submission or pushed into reservations by immigrating Europeans.

#### Infanticide

Male infanticide doesn’t work. It may be superfluous to assert this as it appears that even in the Mahabharata the policy did not survive the war. However, as the culture changed from matriarchy to patriarchy, female infanticide becomes a preferred option. If the goal is population control, female infanticide works by limiting long-term fertility, but it requires that women be valued less than men. An intellectual framework had been constructed that provided this justification (“weaker”, “less in-

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telligent”, “less creative”, “less productive”, “unimportant work”, and so on). It has been claimed that “modernization” would change this, but this has not proved to be the case – some of the most advanced regions exhibit the greatest prejudice against women.

Infanticide in any of its forms is not a suitable candidate for a religious rule as too many exceptions need to exist as social conditions change. Religions tend towards absolute rules.

However, it is in the practice of the common people that we find evidence for use of female infanticide. This continues to the present day [Bumiller 1983].

### **Cow Worship**

The cow continued to be the savior of the Indian farmer. However, when people converted to a different religion (Islam, Christianity, Buddhism) they felt that they should also abandon religious practices peculiar to the old. “Cow worship” was seen as one of these. That is to say, formulating a practice as “religious” enables it to survive internal challenges but not external ones, especially if people forget the reason for the practice.

The spread of Islam into India through conquest and the subsequent conversion of over a quarter of the population of South Asia has meant that cow worship has been under attack by the rulers of kingdoms and states in India. Despite this it has survived to the present day because of its status in the religion. The growth of an aggressive Hindu fundamentalist movement has provided support for the practice while further obscuring its functionality and utility.

### **Hydraulic Empires**

How to manage the hydrologic environment continued to be a challenge in India. Long periods of imperial disorganization often resulted in loss of local organizational capabilities and essential systems were not maintained because resources were scarce or not available. For instance, prior to British rule, the Mughal Empire had started to disintegrate in the eighteenth century as a result of internal insurrection as well as external attacks from Afghanistan and Persia. During this period, water management systems in many parts of India began to deteriorate – drought-prone regions like Rajasthan were particularly badly hit.

When the British East India Company took over, they had only a marginal interest in keeping these going because there was no mechanism for collecting revenue from waterworks. In some parts of India, they auctioned the right to collect taxes on land without requiring the tax collectors to maintain the productivity of agricultural land. In other areas such as Rajasthan, they ruled through a large collection of native princes, many of whom paid little attention to administering their “princely state”. Luck

played a large role in whether a princely state managed its waterworks and other infrastructure or let it rot. The British, as a foreign occupying power, found it convenient to abandon some regional hydrological systems when the agricultural produce of that region competed with markets they were seeking to control. As against this, they invested in systems in regions that produced exportable products. Over time, significant knowledge needed to maintain or construct such systems has been lost.

After Independence, the lack of resources as well as the break in practical local knowledge has hampered effective management. There have been ambitious, if unrealistic, proposals for building a single unified water management structure for India.

### ***Discussion***

The modern world has created a world-wide environmental crisis, one aspect of which is man-made global warming. For what it's worth, we do not have the luxury of escaping this planet; for many of us, we would not even wish to do so given the alternatives (the moon, L6/L1, the asteroid belt, or Mars, all to be accomplished with a heavy dose of technology). Let me assume that we (i.e., the current generation, or the ones following) are able to come to agreement on resolving the crisis. How are we going to make this agreement stick for centuries, at the least, if not for millennia?

The answer to some people has been that we should codify the agreement as a religion. Religions, defined as cultural practices codified as moral imperatives and backed by social strictures, have a history of persisting over a long time. More emphatically, no other cultural entity has a proven history of long-term survival. Political organizations, such as Parliament or Congress or the Roman Senate, have persisted for hundreds of years, but not over a thousand. Secret societies have claimed thousand-year lives but none that I know of claims to have existed for two thousand years. Administrative bureaucracies, like the mandarins of China, have survived for two thousand years (or more), but no other such organization exists. But religions routinely persist for thousand-year terms. The multiply-centered, unorganized religion of the Greeks lasted over a thousand years and may have merged with that of Rome to last another five hundred. The organized Catholic Church has been in existence for almost two thousand years. The state-organized ancient Egyptian religion existed for over two thousand years despite changes in the ruling dynasties, changing conditions, and so on. The Jewish religion has existed for almost three thousand years despite almost disappearing in two diaspora and the relatively small number of adherents.

But none of these other religions appear to have evolved in response to environmental crises, though a claim has been made that the Jewish/Islamic taboo of pigs is environmentally based (Harris 1975). There is some evidence that nomadic settlements

that avoided pig farming survived the economic crash of the 11 century B.C.E. following the trade disruptions caused by the attack on Egypt by the “Boat People” (Finkelstein 2002), but there is no evidence that the pig taboo was expressed in religious terms before the crash.

However, I have argued that the Hindu religion, whether it evolved gradually or developed in response to crises (as I speculate in this essay) embodies practices that made for cultural survival for three to four thousand years and overcome many crises. For that reason, it is an example of a successful unorganized religion that was a response to an environmental crisis. I claim that the Mahabharata is evidence that the crises were environmental in nature. But there were failures as well. It is important to understand both the success and the failure.

I believe that the authoritarian and oppressive mechanisms at the core of the caste system were ultimately the source of failure. However much all of us love democracy, it is a flower that blooms rarely in the course of human history. The lack of democracy, generally political democracy, and specifically, democratic debate in the Indian system, lead to the increasing divorce of the Indian masses from the fate of the elite running the system. When the British came, the system was ripe for economic exploitation, and it was plucked.

Despite the extremes of poverty, the culture averted a crisis that would have made it another “failed society” (Diamond 2005). Was it worth it? Other aspects of the solution were eco-unfriendly (viz., the iron plough supported migrating to virgin lands). It may be argued that in the four-thousand year time-frame of the society, maybe the society should have been allowed to fail so that a more adapted culture could have arisen on the ashes of the old. This debate cannot be settled by argument.

An analogy can be made with supporters of space exploration who advocated settling space and abandoning the earth as a solution to our contemporary problems. This is an example of using a mix of internal social change with external technology to move into new niches. It may be argued that this is like developing a new kind of plough that allowed the Gangetic plain to be settled. However the complexity of developing a new kind of plough cannot seriously be compared to the complexity of settling space! Practically, we no longer have the luxury of discovering new lands to emigrate to.

It appears to me that whatever agreement comes about in response to the environmental crisis of our time, we need it to have the force of a religion. I also believe that the agreement must embody a radical change in the way we humans have conducted ourselves. In my opinion, this is where Deep Ecology comes in, for it proffers a collection of core principles, the “eight-tier platform” (Naess 1986), that are axiomatic in form. These principles would address the long-term problem and with appropriate sci-

ence could address the short-term urgency as well. That makes the success of the long Indian religious experience relevant to the Deep Ecology enterprise.

The core principles of Deep Ecology are not presented here for debate. However, implementing some of these principles would require the exercise of judgment (For instance, #5: "Present human interference with the nonhuman world is excessive..." would require judgment to determine that human interference had ceased to be excessive). Judgment implies the potential for disagreement and therefore the need for a process to arrive at agreement.

The proponents of Deep Ecology propose that the principles make for egalitarianism and that democracy will be natural. This belief in democracy being a natural state of being is held in common with other worldwide progressive or liberal movements. The experience of Bolshevism in the communist movement as well as the hijacking of socialist movements by authoritarian dictators should give us pause. There is nothing about the principles of Deep Ecology that requires or enforces democracy in making judgments. The experience of the Indian caste system tells us that there are hidden threats in these waters.

When there is only one unified Earth faithful to the concepts of Deep Ecology, it may seem like a science-fictional fantasy that the system could be exploited the way the British exploited India. The intent is not to say that the same thing could happen – after all there is nobody else out there.

A final look in historical perspective is instructive.

Whatever solutions we come up with for global warming or other man-made catastrophes, the long-term management of those solutions requires resources, the ability to deploy those resources effectively, and global and local knowledge about the conditions of deployment. Monitoring and following through is also a requirement. Deep Ecology points out certain things -- solutions are likely to be systemic; anthropocentric solutions will not work; growth is not the only value; diversity, both human and of other creatures is critical; other beings have rights, and so on. Some deep ecologists claim that the approach supports decentralized, non-authoritarian governments and non-industrial cultural organizations ranging over coherent ecological regions. If so, there is no evidence that a market-based approach, advocated by some, will converge on a Deep Ecology-compatible solution – all indications are that even if it does, it would be a long haul with many digressions.

The principles of Deep Ecology do not include one that requires that solutions should be democratic or fair, though proponents of Deep Ecology believe that this is implied. All the evidence from human history is that undemocratic solutions are not fair. The experience of "caste" in India tells us that an unfair solution will fail in the long run (whatever "long" might be in

this context). Deep Ecology does not give us any guidance on what the “long run” is, though, to be fair, no other approach does either.

Deep Ecologists support the concept of ecological regions that can be considered a single large niche. It is tempting in the context of the current crisis to consider the world a single ecological region, though that makes the concept meaningless. Though not discussed in this paper, the Mahabharata implies that empires can only occupy a certain extent before they fall apart – “Bharatavarsha”, the extent of Yudhishtira’s empire, spans most of the Indo-Gangetic plain but little else. That may have more to do with the need for managing a unified hydrological regime and not the concept of a coherent ecological region.

### **Conclusion**

This is a speculative exercise trying to make sense out of an ancient, much-modified epic that claims to be history. If this speculation is anything like what happened, there are lessons to be learned. Viable social policies, if defined and successful, must not calcify but must support change and evolution of these policies. Principles, however wisely formulated, must recognize their own limits of applicability. The people formulating and enforcing these principles must stay aware that such limits exist and that wisdom lies in recognizing them. Some of these concerns may be central to the paradigm of Deep Ecology, and should be explicitly recognized as such by its proponents.

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***End Notes***