**This is what Nature has become: Tracing climate and water narratives in India’s rainfed drylands**

**Abstract**

This article traces the evolution of water scarcity narratives in the Indian drylands.

In doing so, it shows how the politics of water scarcity has remained undergirded by a persistent and ubiquitous framing of climate-driven scarcity framings, which predates widespread recognition of anthropogenic climate change as a pressing concern. Using a combination of existing sources and analysis of key national and state level policy documents, I show how scarcity-focused narratives have remained stable over time and across the range of policies and sectors.

**Keywords**

Climate, Drylands, India, Rainfed Agriculture, Water

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**1. Introduction**

“*Water scarcity is the predominant feature of drylands”*

[United Nations 2011, p. 30]

“*These are the poorest, hungriest, least healthy and most marginalized people in the world”*

[Stringer *et al.* 2015, p. 1]

Hunger, poverty and land-degradation overlap in the world’s drylands, a diverse set of landscapes covering some 40% of the terrestrial surface (Millennium Ecosystem Assessment, 2005). Drylands are variously and inconsistently defined, but all definitions centre on relative water limitation constraining biological productivity. However, while some degree of water limitation is a basic biophysical marker of these environments, the more amorphous condition of water *scarcity* has come to be thought of as a core driver of the social-ecological challenges with which drylands are disproportionately burdened, as exemplified by the quote prefacing this section. Viewed thus, the drylands have been approached in terms of social-ecological vulnerability, crisis, and fragility. Going forward, it is assumed that climate change will multiply and deepen these challenges, because drylands around the world are broadly projected to become hotter and drier.

The rainfed drylands – where agriculture depends primarily on seasonal rainfall – are of tremendous social-ecological significance in India, which leads the world in the prevalence of rainfed dryland agriculture, measured by both area and value of produce (Rao *et al.* 2015). Rainfed systems stretch across parts of the states of Rajasthan, Gujarat, Maharashtra, Madhya Pradesh, Andhra Pradesh, Telangana, Karnataka, Haryana and Tamil Nadu. Smallholder farmers in these communities produce around 40% of India’s food (including just under 90% of coarse cereals and 90% of minor millets) and support two-thirds of India’s livestock (Srinivasrao *et al.* 2015). Yet, 30% of the population in degraded semi-arid watersheds in India live in poverty (Ryan and Spencer 2001), and are particularly vulnerable to climate shocks (Jain *et al.* 2015). This continued juxtaposition – despite decades of effort at increasing so-called ‘assured’ irrigation through infrastructure development and soil and water conservation – has generated a politically-charged narrative in which ‘natural’ water scarcity is widely seen as the heart of multiple rural crises – of poverty, land degradation, hunger, and ultimately, rural flight.

Finely drawn, qualitative case studies have illuminated how naturalized scarcity discourses in these landscapes eclipse sociopolitical and economic drivers of scarcity, thus perpetuating inequitable distribution of water and *creating* actual, physical scarcity for some, while allowing others to enjoy abundant water resources. Seminal work by Lyla Mehta in the Kutch region of Gujarat has illustrated, for example, how both state agencies and local actors have co-created a pervasive ‘drought industry’ on the basis of an all-pervasive preoccupation with scarcity. The perverse result has been that powerful elites such as industry and rich farmers can demand more and more water to be supplied through new infrastructures, to meet their “spiraling needs”, while others bear real and unmitigated physical scarcity (Mehta 1998, p. 259). Mehta concludes her exposition by calling for greater emphasis on decentralized systems: “if every drop of water… could be effectively harnessed in thousands of small, functioning reservoirs and tanks, there would be no need to be seduced by the obscure water wonder” [in this case, a large dam] (p. 263; see also Mehta 2001; 2003).

In this paper, I present a national level case study that supplements more context-specific accounts, but also goes beyond them in two important ways. First, it highlights the ubiquity of naturalized framings across scales and sectors, including public sector bodies, civil society actors and local communities and across both conventional as well as alternative resource management regimes. Existing scarcity analyses have tended to recommend alternative practices grounded in egalitarian, pro-poor, grassroots community interventions, but as I discuss within the final section of this paper, alternatives also situate themselves within the same paradigm of climate-driven scarcity (Bharucha *et al*. 2014). Second, I reflect on how climate change is influencing this long-standing discourse, and in doing so, bring the Indian case into dialogue with emerging critical scholarship on the perverse impacts of current framings of climate change.

To produce this national level overview, I draw on a combination of existing literature, contemporary policy documents (primarily on national and state level water and climate policy documents), and supplement these with indicative examples of discourse from academic papers, grey literature and media sources. A single paper cannot claim to provide a comprehensive account of water management discourse, policy and practice across the vast and varied rainfed drylands. Here, I have focused on a relatively limited number of key water and climate policy documents that provide a flavour of the discursive context within which water management proceeds. The result is a highly synthetic account that does not necessarily capture all of the nuance, debate or contestation that occurs around policy discourses (or subsequent action), particularly at local scale. Capturing this would require a much wider review that would, perhaps, explicitly focus on the ways in which private, public and third sectors dialogue with each other, and explicate the structuring of knowledge and information flows across formal and informal institutions. I also do not explicitly challenge the narratives I describe, for example by presenting an analysis of precipitation data.

Yet, the value of this exercise is twofold. First, it is quite clear that the multilayered social-ecological crises of the Indian rainfed drylands are not restricted to any particular region or state. These challenges are widespread, and present a significant impediment to India’s progress towards meeting human development goals. The ubiquity of the crisis thus calls on us to explore a broader terrain than is possible via a series of isolated and disconnected case studies informed by varying theoretical frameworks. Second, while India’s federal system assigns responsibility for water, agriculture and climate action to individual states (with central government taking responsibility for the 7 union territories, including the capital, Delhi), national level policy influences are hardly insignificant. National water policy, centralized planning and centrally-coordinated institutions discursively and materially influence what states do. Climate policy, similarly, is operationalized through both state action plans and national ‘missions’ – cross-institutional collaborations dealing with specific themes relevant to climate action. As with water policy, state climate action plans are informed by a central mandate and structured according to a nationally directed framework directed by national missions (Jogesh and Dubash, 2015).

**2. On natural water scarcity in the drylands**

The drylands are at the forefront of scholarly debates about the veracity and outcomes of scarcity-based narratives. The earliest works of critical political ecology focused on unpacking the political-economic drivers of land degradation and dismantling neo-Malthusian claims of natural fragility in tropical drylands (Blaikie 1985; Blaikie and Brookfield 1987). More recently, post-structuralist political ecologies of the drylands have unpacked the discursive mechanisms by which scarcity has been deployed as a form of political claim-making, to lubricate particular political agendas, or to enable the transfer of resources away from the most vulnerable. In this section, I briefly synthesize the core insights emerging from this body of literature as they relate to the naturalness – or otherwise – of water scarcity, and the place of climate in resource politics.

A basic contention within this body of scholarship is that over-simplistic attributions of water scarcity eclipse social, economic and political drivers by focusing intensively on the climate. In doing so, they actually generate new forms of physical scarcity (Ioris 2012; Mehta 2010; Lankford 2005; Swyngedouw 2004; Mehta 2003). In this formulation, scarcity is both an outcome of political processes of knowledge-creation as well as a political tool used by groups making claims for development aid, funding and inclusion. Instead of being climate-driven, then, water availability at any given time or place arises out of a variety of “socionatural interactions in time, space and scale” (Ioris 2012, p. 613), with nature and society inseparable (Norgaard 1994; Swyngedouw 2009; Linton 2010; Linton and Budds 2014). Explicating these politics of scarcity is thus a creative exercise in unveiling more equitable and effective solutions to multiple scarcities (Ioris 2012) and interlinked social-ecological crises (Lankford 2005; Kallis 2008).

The starting point of these critical interventions is that water and climate in the drylands are variable across space and time (Rijsberman 2004; Hesse 2011). In a 2015 volume on climate resilience in the drylands, Krätli begins by highlighting how “valuing variability” is the key to building resilience in these heterogeneous, dynamic environments. He describes how seasonal monsoons produce oscillations between precipitation and dryness, following well-defined cycles. Spatial variability means that in the drylands, “the rainy season can quite literally miss you by a few hundred meters” (Krätli 2015, p. 17). While averages of precipitation or growing season may be known, these are more likely to be “a large and flexible bandwidth, rather than a rigid threshold” (*Ibid*). Dryland landscapes are also characterized by “undulating topography, soil types ranging from shallow red soils to deep black clays, large areas of common and highly location-specific crops, crop varieties and livestock.” Evapotranspiration, too, varies according to a wide range of drivers, including soil type, soil health and vegetation, all of which vary across the landscape and (crucially) as a result of human management. Krätli goes on to argue that as global definitions of drylands emerged out of concerns about desertification, classifying landscapes according to their aridity, the overarching locus of concern in dryland water management became annual averages in temperature and precipitation, eclipsing wide seasonal and spatial variation. Valuing this variability, he argues, reveals unexpected opportunities for resilience and sustainable human development.

Yet, this has not been the dominant approach. Hesse (2011, *unpaginated*) describes how the conventional response to these highly variable environments has been “ to bring order and stability to what are otherwise seen as disorganized and unstable environments, societies and economies.” Key to this has been the deployment of *numbers narratives* – the framing of complex and variegated social-ecological issues in terms of singular numbers, aggregates, averages and indicators (Brooks 2017). In the drylands, numbers narratives have tended to occlude spatial and temporal variability in favour of a simplified picture pitting (limited) water supply against (seemingly inexorable) demand, at the expense of more nuanced discussions about equitable distribution, demand-management, or sustainability (Brooks 2017).

For example, as I highlight in the case study below, Indian national water policy is prefaced by the need to close the gap between ‘utilizable water resources’ (estimated at between 654 – 1,123 billion cubic metres (BCM) and rising water use (estimated at 1,093 BCM by 2025) (Government of India, Planning Commission, 2010). This level of abstraction eclipses differences in water use across different types of user, across sectors, and even between different farmers cultivating different crops within the same watershed.

Climate change adds a new (and urgent) set of broad-ranging aggregations and couples these easily with an overarching sense of impending and generalized crisis (Chaturvedi and Doyle 2015). Perhaps the most widely visible manifestation of this dynamic is in warnings of the need to limit warming to 2°C (Whitney and Kiechle 2017), wherein “mass media, pundits, and politicians have seized upon the 2 degrees formulation because it encapsulates the problem of climate change in a neat and tidy measurement” (p. 1).

What are the implications of this? Swyngedouw suggests “the fetishist disavowal of the multiple, complex and often contingent relations through which environmental changes unfold finds its completion in the double reductionism to (a) singular socio-chemical component” (2013, p. 4). Swyngedouw is talking here about carbon and the climate, but his framing is easily recognizable in the context of water in the rainfed drylands. Here too, a variable, “complex and often contingent” set of relationships that mediates social-ecological change in the drylands, between nature, technology, society, culture and the market, is reduced to a singular *point de capiton* – water – and it’s (non)-availability. As a result, water becomes either ‘generally’ available or ‘generally’ scarce, and thus amenable to a particular “technical register” (p. 45) that occludes the social, political and economic relations making water available to some but not others, for some purposes, but not others.

Key to this process is the positioning of nature as a source of perpetual crisis, enabling social consensus for the expansion of techno-centric management strategies. Indicative examples are to be found all over the world. In Greece, Kaika (2003) describes the unfolding of this dynamic in Athens, showing how “… the natural / scarce character of water resources was invoked in order to create public consensus around its increasing commodification, (while) the very process that actually makes water a commodity – that is, its *production process* – was silenced. The social relations of the production and consumption of water remained in the background as if they were not part of the equation of water’s availability, distribution and pricing” (p. 935). In India, Lyla Mehta’s seminal work on the essentially political nature of scarcity draws on the case of water narratives in the state of Gujarat, where “narratives connected with dwindling rainfall and increasing droughts… can also be manufactured in such a way to serve the interests of powerful actors” (p. 2029) – namely, those concerned with the construction of the controversial Sardar Sarovar Dam. In a similar vein, in Southern Rhodesia (now Zimbabwe), public demands by local elites (namely colonial settlers) to the state used “narratives about imagined and looming water crisis” to call for a more centralized water management authority (Musemwa 2017).

To summarize then, the politics of water scarcity has been shown to deploy a number of devices, including numbers narratives and a culture of fear (Glassner 1999) to occlude the social, ecological and technological bases of unequal distribution of water or its unsustainable use. It is to the task of tracing the evolution of these narratives in India that I now turn.

**3. ‘This is what Nature has become’: Climate and water narratives in dryland India**

Environmental histories of dryland water management and rainfed agriculture in India have shown that routine dependence on the monsoon has been known since the Vedic period. The *Rigveda* contains verses specifying techniques for harvesting and stewarding rainwater, as well as mentioning different types of ponds distinguished by their features and uses (Pandey 2000). These early sources indicate that the high inter- and intra-annual variability of the monsoon has not historically prevented the development of vibrant agricultural livelihoods (Falkenmark *et al.* 2001; Pretty and Shah 1997). Over both ancient (2500 BCE – around 10th century CE) and medieval (10th century CE – 17th century CE) periods, a number of different management regimes worked together to conserve surface water, boost soil moisture, diversify farm livelihoods, and allow cultivators to navigate seasonal differences in water availability (for a seminal overview of these, see Agarwal and Narain 1997).

The use of tanks[[1]](#footnote-1) has been documented documented as early as 4500 BC in the Thar Desert in the North and between 150-200 AD in the peninsular South (Pandey et al. 2003). In western India, an estimated three thousand step-wells and stepped-ponds were built between the seventh and mid-nineteeth centuries A.D. (Livingston 2002). Across South India, the period 937-1336 has been referred as a ‘golden age’ of tank construction, with successive dynasties undertaking large-scale programmes of tank construction as well as setting in place procedures for their maintenance. There is also evidence of a landscape-level approach. For example, the Kakatiya dynasty (which flourished during the 1000s in what is now Telengana state) undertook a largescale programme of tank construction with a view to addressing landscape-level imbalances in water availability through a series of distribution channels and bunds (Barah 2003). In central India, the Gond kingdoms of the 14th and 15th centuries drew on the skill of Kohli community to construct a large network of tanks and distributaries. In Dhule and Nashik districts, community-managed *Phad* irrigation (dating back to the 16th century) involved the distribution of river water via a check dam and network of canals to service blocks of fields (each known as a *phad*). Co-managing surface and groundwater (a practice notably absent in contemporary regimes), the *Ramtek* model involved a series of tanks connecting surface and ground canals, linking an upper and lower watershed. Land and water were often managed together, for example through agroforestry systems that provided farmers with shade crops and soil fertilization through nitrogen-fixing trees, and through the joint management of tanks and trees (Pandey 2000).

Together, these sociotechnical systems enabled relatively stable and productive dryland livelihoods. This is not to claim the absence of periodic scarcity – droughts during the 14th and 15th centuries coincided with famine (Sinha *et al.* 2007). However, for the purposes of this paper, it is simply useful to note that there existed an array of techniques, technologies and practices that enabled farmers to collectively manage water so that seasonal shortages could be mitigated. Crucially, they were broadly premised on the assumption that abundance and scarcity were cyclical; a recognition reflected in traditional ecological knowledge of the monsoon. In the Gujarati *kutch* for example, farmers traditionally classified years as *sookal* (good rainfall), *kurwara* (moderate, or sub-par rainfall) and *dookal* (lean years or drought); a vernacular reflecting the understanding of the monsoon as “regularly irregular” (Mehta 1998; 2001). In Maharashtra, colonial records show that in the semi-arid agroecosystems of Ahmednagar district (now classed as ‘drought-prone’), pockets of irrigated, high-value citrus orchards, plantations of banana and sugarcane were interspersed with dry cereals such as sorghum and millet (Campbell 1884). During ‘poor’ years, drinking water continued to remain available, and drought was considered both limited in time and space. It was accepted that in some years, certain villages would have rain while others would not, and that ‘drought’ did not imply a lack of drinking water (Bharucha *et al.* 2014).

Broadly, then, a key distinguishing feature of pre-colonial regimes of water management was the assumption that, given seasonal variations and cyclical scarcity, integrated land and water management were effective means by which to develop stable and productive land-based livelihoods. In what follows, I show how colonial, post-colonial and contemporary regimes have deviated substantially from this historical baseline.

3.1 *Colonial regimes*

The colonial political economy imposed important changes on the Indian countryside, and it is here that we can locate the beginnings of a marked shift towards discourses of naturalized scarcity.

The most substantial material change was a transformation of largely peasant-based, subsistence agriculture to more intensive systems growing commercial crops for export, along with dramatic changes to resource tenure and governance (Gadgil and Guha 1994). For instance, colonial water law placed new emphasis on the right of individual landowners to water. With groundwater, this extended to complete and unfettered rights of abstraction (Dellapenna 2001); an institution that survives to this day. Surface waters came under increasing state control: by the early 1930s for example, the Madhya Pradesh Irrigation Act provided that “all rights in the water of any river, natural stream or natural drainage channel, natural lake or other natural collection of water shall vest in the Government”. At the same time, new revenue systems and irrigation infrastructures (dams, canals and weirs), were designed specifically to enable perennial irrigation of high value, settled agriculture (D’Souza 2006a; Mosse 2003; Mosse 1999; Whitcombe 1972). These displaced older technologies and practices adapted to seasonality and cyclical scarcity. In Bihar, for example, traditional tank-based systems, crucial for tiding over dry spells, were dismantled by the imposition of colonial revenue systems (Sengupta 1980). Using barrages, weirs and canals, seasonally-variable flows could be *flattened*, transforming irrigation “from a seasonal to a perennial possibility”, without which agriculture was considered “a gamble with the rains” (Attwood 1992, p. 22).

The implication of these shifts, which underlie post-Independence water scarcity narratives and their contemporary variants, was that local communities in the drylands were no longer water stewards, nor were they able to perform the delicate, dynamic work of adapting to seasonal cycles and natural variations through community-managed systems. New state-run technologies and infrastructures transferred the locus of expertise and accountability away from local communities and towards centralized, bureaucratic control (D’Souza 2006a; 2006b; Adams 2003). Coupled with this loss of traditional knowledge, collective resource management practices were dismantled (Jodha 1995), allowing community-owned assets to fall into disrepair and replacing norms around water-sharing with irrigation regimes set by external experts (D’Souza 2014).

At the same time, the spread of the colonial administration led to important shifts in agrarian livelihoods. The dismantling of artisanal livelihoods meant that people returned to the land, but cultivators were subject to colonial measures on land tenure, taxation, and a lack of relief measures for intermittent crop failure (as well as being unable to collectively manage water and land). It was the combined effect of these *politically instituted* drivers that pushed dryland agroecosystems, hitherto relatively stable, into a regime marked by poverty and hunger (Bharucha *et al*. 2014). Over time, the peninsular drylands came to be known as ‘the Deccan famine zone’, though it is clear that it was prevailing political economies, rather than simply failure of the rains, that turned drought into famine (Davis 2000; 2002).

To summarize, then, it was during the colonial period that two important political drivers were set in motion that instituted scarcity-focused politics in the Indian rainfed drylands. The first was the substitution of seasonal water availability with permanent flows, designed to enable high-value commercial cultivation (rather than diversified and seasonally adaptable land-based livelihoods). These water management regimes were driven by a colonial emphasis on quantification, technical expertise, and ways of knowing that favoured “accuracy over intimacy [and] instruments over informants” (Mitchell 2009, p. 153). The second was the advent, following changes to agrarian political economy, of a pervasive crisis of hunger and poverty in the drylands.

3.2 *Post-Independence water rationalities:*

With Independence in 1947, India inherited a water management regime that emphasized permanent, ordered and centrally directed water flows to enable intensive irrigation. With a large population of poor, hungry people to feed, the dominant concern was to attain self-sufficiency in food production and alleviate poverty, at the time largely seen as a rural phenomenon (Gupta 2012). A key – and abiding – concern has been to increase the availability of cereals – mainly wheat and rice. The result has been that incentives and markets – as well as emerging dietary transitions – have ‘locked in’ the production of a relatively small number of relatively profitable crops, at the expense of a diverse array of crops (including coarse grains and leafy vegetables) important for nutritional security (Pingali 2012).

In the heavily irrigated Indo-Gangetic basin – the heartland of the Green Revolution – farmers received free electricity to pump groundwater, improved seeds, subsidized inputs and minimal support prices. Supporting these arrangements was an intensive programme of dam and canal building that drew in no small measure on the colonial imagination and as Mulvany (2014, p. 115) describes, the Nehruvian project of dam building “was rooted in the quantifiable: kilowatts of power generation, kilometers of rail, cubic meters of water flow-through. And this quantification of development was rooted very firmly in the colonial legacy of India” (p. 115).

In the short-term, intensively irrigated landscapes produced soaring grain outputs, and this was framed as a *victory over the climate*. For example, Frankel (1971, p. 8, emphasis added) cites commentators who lauded “the power of the new [irrigation] technology to liberate the fortunes of Indian agriculture *from the vagaries of the monsoon*.” In other words, there emerged a consensus that increased irrigation was justified purely in terms of the supposed endemic unreliability of the monsoon. The intermittency of seasonal scarcity and abundance were now regarded as threats to the stability and productivity of agriculture. At the same time, the rainfed drylands were systematically ignored in mainstream development planning. During the Green Revolution for example, non-irrigated zones received twenty-two times less investment than did irrigation and flood control (Vaidyanathan 1994; Chhotray 2011) and rainfed regions were “unrecognised in mainstream planning until as late as 1985 (Chhotray 2011, p. 56).

National level policy making that touches on water, the drylands and climate change encompasses initiatives from multiple ministries with overlapping but distinct remits. These include the Ministry of Environment, Forest and Climate Change, the Ministry of Water Resources, River Development and Ganga Rejuvenation, the Ministry of Agriculture and Farmers’ Welfare and the Ministry of Rural Development. In what follows, I briefly review water and climate discourses emerging from key policy documents produced by these agencies, aiming to provide an indicative overview of the major frames used to define the problems within rainfed landscapes, and policy makers’ attribution of these (Table 1).

A national water policy was first drafted by the central Ministry of Water Resources in 1987, updated in 2002 and then again in 2012. All three policy documents describe water as a scarce resource:

In view of the vital importance of water for human and animal life, for maintaining ecological balance and for economic and development activities of all kinds, and ***considering its increasing scarcity***, the planning and management of this resource and its optimal, economical and equitable use has been a matter of the utmost urgency” (National Water Policy 1987)

Demand for water for hydro and thermal power generation and for other industrial uses is also increasing substantially. As a result, ***water, which is already a scarce resource, will become even scarcer in future***” (National Water Policy 2002)

Low public consciousness about the overall scarcity and economic value of water results in its wastage and inefficient use (National Water Policy 2012).

An important recurring theme is the invocation of a numbers narrative (Brooks 2017) in which *country-wide* aggregates are used to make the case for widespread, generalised and deepening scarcity. These narratives compare total annual precipitation (across the whole country) with amounts of *utilizable resource* and levels of (increasing) demand. The implication is that while supplies are limited, increasing demand is a given, and therefore that through increased efficiency and infrastructure development, the maximum amount of utilizable water should be harnessed. In other words, scarcity is taken to be a matter of physical availability, ceilings on which are set by climate and geography.

The specifics of scarcity in the drylands, however are not touched in any detail across the three iterations of the policy. Indeed, none of the three documents mention the terms *dryland* or *rainfed* areas. Both the 1987 and 2002 iterations of the document mention the extent of ‘drought-prone’ areas, but do not explicitly detail the causes – natural or otherwise – of drought. Instead, they highlight how drought management should encompass both local land and water management as well as the transfer of water from ‘surplus’ areas.

The term *climate change* makes its first appearance in the 2012 iteration of the policy, where it is highlighted that climate change could cause an increased incidence of droughts and floods. A section on adaptation recommends “increasing water storage in its various forms…which provides a mechanism for dealing with increased variability because of climate change.”

A similar theme is evident in the National Action Plan on Climate Change, which states:

“India gets on average 1197 mm of rainfall every year. This amounts to a total precipitation of 4000 billion m3. However, 3000 billion m3 of this is lost due to run off, and only 1000 billion m3 is available as surface and ground water sources, amounting to c.1000m3 per year per capita water availability. This is about 1/5th – 1/10th of that of many industrialized countries. Many parts of India are water stressed today and India is likely to be water scarce by 2050. The problem may worsen due to climate change impacts.”

The National Action Plan on Climate Change (NAPCC) was published by the Prime Minister’s Council on Climate Change in 2010, and discusses the development of 8 cross-sectorial and cross-institutional ‘missions’ on key thematic issues that together form India’s strategy for responding to climate change. The National Water Mission nods to existing provisions within the National Water Policy, emphasizing the need to “to ensure basin level management strategies to deal with variability in rainfall and river flows due to climate change” (p. 4). It mentions improving efficiency of water use, but also increasing storage capacity above and below ground. Further detail on the National Water Mission within the NAPCC’s technical appendix begins by repeating the same calculation that prefaces each of the National Water Policy documents, comparing precipitation with available ground and surface water and using these comparisons to draw conclusions about water availability (see 4.1 in Table 1, above). What is evident then, is the yoking of the relatively new spectre of climate change to already-existing climate-centric concerns about generalised water scarcity, all of this used to rationalise the existing status quo in water management practice.

 A final set of overarching national level policy documents are the Five Year Plans, which, since 1950 have been produced by the Planning Commission (*NITI Aayog* from 2015 onwards). Agriculture and water management are dealt with in distinct sections within the Plans’ documents. Given their breadth and scope, it is difficult to illuminate a clear discursive ‘line’ on water and climate narratives across the Plans. However, it is possible to broadly discern a general framing in which, first, agricultural productivity is emphasized and irrigation is explicitly cited as a determinant of crop yields and the ‘stability’ of agricultural livelihoods, particularly in ‘drought-prone’ areas. At the same time, early Plan documents mention the need for development of ‘dry agriculture’ in regions where it is impractical to spread irrigation. By the 9th Plan (1997-2002), there is a subtle shift between earlier rhetoric on inherently low-yielding dry agriculture and a new emphasis on increasing productivity (Table 1), with an explicit acknowledgement that increased irrigation is needed to achieve this: “The increase in irrigation intensity has contributed to the growth in the overall cropping intensity (including rainfed crops).” The 11th Plan (2002-2012) highlights climatic drivers of pervasive distress in rainfed landscapes (Table 1), but does acknowledge that growth in rainfed systems has been compromised by “liberated trade policies in vegetable oils and ineffective domestic support prices of rainfed crops.”

**Table 1: Discourses around fragility, water scarcity and the climate in Five Year Plans,**

**1950-2018, Planning Commission, Government of India**

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| **Plan Document**  | **Indicative reference quotations**  |
| 1st Five Year Plan  | “In India nearly four-fifths of the cultivated area is dependent on rainfall which is seldom adequate and timely throughout the whole country. Annual failure of crops in different regions of India is, therefore, a common, feature of Indian Agriculture. The most effective way of increasing crop production in India is to provide through irrigation an additional source of water supply”  |
| 5th Five Year Plan  | “One of the major impediments to the full exploitation of the possibilities of intensive agriculture is the lack of assured and dependable water supply throughout the year. About four fifths of the country's cropped area depends exclusively on rainfall, most of it concentrated in a few months of the year. Even where the overall annual precipitation is high, the available moisture in the winter and summer months is not adequate to support multiple cropping. The rainfall in a large part of the cropped area is so low and uncertain in its distribution that it does not permit intensive cultivation even during the main crop season. The expansion of irrigation facilities in order to ensure timely and adequate water supply has thus, ever since the inception of planning, been an extremely important means of bringing about agricultural development. The area under irrigation has increased substantially during the past 18 years. Major, medium and minor irrigation projects have all contributed to this result. The droughts of 1965-66 and 1966-67 further heightened the awareness of the need for faster development of irrigation facilities.”  |
| 8th Five Year Plan | Watershed management principles also address themselves to the environmental concerns in the ecologically fragile areas like the undulating rainfed lands, the hilly terrains, etc” |
| 9th Five Year Plan  | “… a breakthrough in dryland farming is required with respect to the traditional cereal crop that can grow in these areas. Alternatively, there is a possibility of shifting to other high-value crops like fruits, vegetables, mulberry, etc. Other support systems would have to be appropriately developed to provide facilities for credit, marketing, storage and transportation of the perishable high-value crops. In fact, a change in the cropping pattern away from cereals to some high-value crops, would certainly make the small and marginal farmers viable.” |
| 10th Five Year Plan  | “The sustainable development of land and water resources becomes all the more important for the nation like India, which shares about 16 per cent of the global population but has only 2.4 per cent ofthe total land and 4 per cent of the total water resource. Scarcity of water in rainfed areas is causing serious hardships.”  |
| 11th Five Year Plan  | “These areas are characterized by high incidence of poverty, low education and health status, high distress in the farming sector, distress migration, low employment opportunities, and vulnerability to a variety of high risks. Apart from these conditions, the population in these areas also suffers from various exploitative social structures and practices, poor attention by government departments, poor quality of service delivery, and so on. Repeated water scarcities leading to large-scale droughts have severely affected livelihoods of these rural poor.”  |

Similar themes, emphasizing the productivity of rainfed agriculture and the dependence of this on water availability, are to be found in the discourses of agencies focussing on agriculture and rainfed landscapes. The National Mission for Sustainable Agriculture calls for “improving productivity of rainfed agriculture”, and in the accompanying technical appendix, briefly summarizes the projected impacts of climate change on agriculture. This is notably restricted to impacts on *rabi* crops (grown during the winter season, primarily by farmers who have access to irrigation). *Kharif* crops, of most relevance to farmers in the rainfed drylands, are not mentioned. The appendix goes on to list *existing* programmes for adaption, and includes here ‘drought proofing’ initiatives that have been a longstanding mainstay of rural development initiatives pre-dating the emergence of climate change. Reading across the NAPCC, other commentators have already highlighted a tendency to re-package existing initiatives as climate action, and a failure to strike out clear strategic pathways to a climate-resilient future that give adequate consideration to longstanding complex problems (particularly in the water sector) (e.g. Byravan and Rajan 2012; England 2018).

In 2011, the National Rainfed Authority of India, a central body tasked with designing guidelines for soil and water conservation in the rainfed drylands, saw in these landscapes “… a grim picture of poverty, water scarcity, rapid depletion of the ground water table and fragile ecosystems” (Government of India 2011, p. 4). In a later description, it describes the drylands as “characterised by poverty, malnutrition, water scarcity, severe land degradation, lower yields, low investments, and poor physical and social infrastructure… (and) more vulnerable to climatic variability and climate change implications” (National Rainfed Authority of India, 2013). A 2013 position paper convened by the Authority describes how: “*Rainfall and snowfall are the ultimate sources of water for meeting needs of drinking, irrigation, groundwater recharging* [sic]*, rainfed agriculture, and environmental flows, flood and farm income securities… The implications of abnormal monsoon were more devastating in dryland agriculture without ground water utilities*” (GoI 2013, p. 29).

Around the same time, academic assessments have also made an explicit correlation between these conditions and the climate:

*“Rainfed areas are confronted with the intrinsic problem of degradation or land and water. A vast proportion of rain-fed areas faces arid and semi-arid type of situations and receive scanty rains for nearly 50-55 days during monsoons, which is grossly insufficient to meet the year-round water requirement*.”

(Joshi *et al.* 2011)

And:

*“The fragile regions such as the Indian dry tropical areas have several nature-induced risks and vulnerabilities. Their specific features… such as a high degree of fragility, marginality, diversity and limited accessibility, (when compared to prime land areas of the country), generate the circumstances that keep them poor and contribute to their low productivity.”*

(Jodha *et al*. 2012, p. 3, parentheses in original).

Narratives of climate-induced scarcity are also replicated at finer scales. As with national level documents, discerning a strong discursive signal from state policy documents is complicated by their broad-ranging scope, and their tendency to list a broad array of initiatives, combining both existing and desirable future activities, without a tight strategic focus. It is also important to acknowledge that each dryland state has different social-ecological contexts, including political and economic histories shaping water resource management, decisions on infrastructure and agricultural political economy. These undoubtedly shape the lived experience of rainfed dryland farmers in different ways across different states, as well as the politics of scarcity, and accompanying claim-making, in each state. Yet, even a cursory glance across the state climate action plans (to select one example of a state-level policy document where comparisons are possible) shows similarities in framing and perspective across different states (Table 2). These repeat national level framings of climate-driven vulnerability, describing rainfall as ‘erratic’ and the rainfed drylands as ‘fragile’. Each calls for some degree of infrastructure development to ‘harness all available water’, and variability – that distinguishing feature of rainfed dryland landscapes – is framed as a source of vulnerability.

**Table 2: Narratives on climate, water scarcity and agriculture in four state climate action plans**

|  |  |
| --- | --- |
| **Document and date** | **Indicative reference quotations** **[Emphases added]**  |
| State Action Plan on Climate Change for Telangana State, 2013 | “The rainfall in the State is erratic, uncertain and distribution of the rain fall is uneven in various mandals, thus making agriculture a proverbial gamble in monsoon.”  |
| Madhya Pradesh State Action Plan on Climate Change. Integrating Concerns – Converging Possibilities, 2014 | “The rainfed nature of rivers of Madhya Pradesh has made them highly susceptible to the variations in the distribution and patterns of rainfall.” “The central part [of Madhya Pradesh] receives lesser rains and therefore proportionate decrease in runoff water and cropping patterns. Western part of Madhya Pradesh receives much less rain and hence the relative runoff is less. Most of the streams are almost dry for 4 to 6 months in the year (Jan to June). It is essential that this runoff water should be harnessed ...”  |
| Gujarat State Action Plan on Climate Change, 2014 | “The incidence and distribution of rainfall, particularly in Saurashtra and Kutch regions and in the northern part of Gujarat region, is highly erratic. As a result, these regions are often subject to drought. Hence non-availability of proper rainfall is a limiting factor for the growth of *kharif* crops in Gujarat. However, it can be inferred… that improvement of irrigation facilities in the State has helped to increase resilience of farming systems to climate variability.”  |
| Assessing Climate Change Vulnerability and Adaptation Strategies for Maharashtra: Maharashtra State Adaptation Action Plan on Climate Change, 2014. |  “Rainfed areas, in particular, have complex cropping systems operating under fragile ecological conditions.”  |

In contrast to the more broad-ranging narratives of policy documents, strong and consistent narratives of climate-induced scarcity can be found within statements tied to particular material initiatives and lived experiences at grassroots level. A good example is found in the 2015 announcement of a government scheme in Maharashtra (where state water policy declared, in its 2003 iteration: “The water resources available to the state shall be brought within the category of utilisable resources to the maximum possible extent” (Maharashtra State Water Policy, Government of Maharashtra, 2003). Announcing the roll-out of funds for farm ponds, the then Chief Minister stated:

“…*stopping farmers’ suicides is the biggest challenge before the government and to meet it, we have undertaken a flagship programme… which aims at making 5000 state villages permanently water-scarcity free. If this succeeds, it will mark an end to farmers’ woes. [Existing initiatives] cost crores [which] went down the drain as [they] did not try to go to the root of the problem, which was inadequacy of irrigation.”*

(Fadnavis 2015, in Deccan Herald, 2015)

Within this short statement we find almost every feature of the discursive dynamics of naturalized water scarcity explicated within political ecology analyses to date. These include an explicit causal link between water scarcity and (extreme) agrarian distress, an obliteration of temporal variations in water availability (“*permanently water-scarcity free*”) and a volumetric rationality presenting increased supply as the solution (“the root of the problem (is) inadequacy of irrigation”). In response to this set of concerns, the Chief Minister announced government schemes in which “anyone who demands a farm pond will get one” (Kale 2017, p. 21). In a similar vein, the Department of Public Health and Engineering in Patna has announced that “it will end water shortage in all rural areas before the Assembly elections in 2020” by increasing the number of water connections in villages and rural communities (Shahbaz 2018).

Bharucha *et al.* (2014) explore farmers’ narratives on dryland agriculture and the climate, finding strong evidence that even within decentralized alternatives such as soil and water conservation, climate-driven scarcity framings persist:

*“This is what Nature has become. Who knows why, but we can’t do anything except keep trying… In dry regions, there is no alternative except for it to rain. Suppose it was a place serviced by a canal. Even if it didn’t rain, they could release water from a dam, then people could carry on. There is nothing like this here”*

(Farmer interview, Ahmednagar district, Maharashtra, cited in Bharucha *et al.* 2014, p. 9).

Given these framings, it is unsurprising that farmers view water-conserving or water harvesting technologies in terms of increasing supply to meet rising (and unmanaged) demand. For example, Kale (2017) finds that “although rainwater harvesting is one of the main objectives behind the farm pond strategy, in practice it is almost impossible to find a functioning farm pond where rainwater is collected and stored. In fact, in direct contradiction to the purpose of building such ponds, most of the farm pond owners still extract groundwater from dug wells and borewells and then store it in the same farm ponds” (p. 17). Drip irrigation is another technology farmers are able to access, via subsidies, ostensibly to improve water use efficiency and thus implicitly acknowledging human agencies in conserving limited (rather than scarce) water resources. Yet, here too, drip irrigation has actually *increased* agricultural water use. In officially designated ‘drought prone’ districts, the spread of drip irrigation has been used to water new banana plantations and thus *increase* net water use (Author interview with agricultural sustainability and water management expert, January 2015).

At the same time, there is limited enthusiasm for on-going monitoring and management of these water-saving technologies, all of which find prominent mention in both long-standing water policy documents as well as more recent climate action plans. For example, the expert quoted above recounted how, during a visit to Maharashtra’s premier sugarcane research institute, she sought to ascertain how much of Maharashtra’s sugarcane was irrigated via drip systems. Finding that figures were unavailable, she concluded: “*We are really not serious… Because sugarcane has already appropriated all the water that it needs and more. There is no incentive to make any sort of additional effort on investment by the government for the farmers who are getting sugarcane under drip*.” In other words, the politics of provision, premised upon absolute, physical scarcity, and absent a balancing concern for demand-management, means that ongoing monitoring and management of these systems is weak at best.

**4. A new politics, or more of the same?**

In the preceding section, I have outlined how national, state and local level narratives draw causal links between agrarian distress, water scarcity and the climate in the Indian rainfed drylands. A key question for this special issue is: what’s new? In other words, how much have recent developments, such as climate change, or new movements, such as for equity and agrarian justice, changed or challenged these narratives? The reading of policy documents presented within this paper suggests: not much. Climate-centric scarcity narratives in the Indian rainfed drylands predate climate-change, and have remained remarkably stable over time. This is evident when conducting a simultaneous reading of National or State Climate Action Plans alongside longstanding Five-Year Plans and Water Policy documents. Climate Action Plans utilize the same broad framing as these older sets of policies, employing many of the same discursive tactics. For example, all sets of documents arrive at aggregates of ‘utilizable’ or ‘available water’ (in general or per capita) by pitting precipitation against surface and ground water (minus runoff). Many of the documents then project forward in the broadest terms, projecting *generalized* scarcity or adverse impacts for entire sectors, such as agriculture (without accompanying technical forecasts or, in the case of the State Action Plan for Gujarat, with the proviso that adequate studies are not available). Finally, in far stronger terms than is possible within broad-ranging policy documents, state-level water initiatives are often prefaced by unequivocal causal links between ‘the climate’, agrarian distress and the need to address this by increasing water supply.

That the *politics of provision* has resulted in a deepening – rather than an alleviation – of water scarcity has been highlighted in a number of context-specific case studies. Birkenholtz (2009; writing in semi-arid Rajasthan) and Bharucha *et al*. (2014; writing in Maharashtra’s Ahmednagar district) both find that the expansion of tubewell irrigation has driven increased agricultural intensification and deepened water scarcity. With new irrigation technologies comes both a spike in the availability of groundwater (lubricated in no small measure by subsidized electricity), as well as cost outlays that need to be made up. Once a transition has been made from rainfed cultivation to intensive, irrigated crops, it is effectively locked in (Bouma *et al*. 2007; Samuel *et al.* 2007).

There is thus little to indicate that climate change will bring about a new trajectory in how water scarcity problems in the rainfed drylands are framed or dealt with. Commentators concerned about the ‘non-political politics’ of climate change raise the spectre of climate action occurring within a populist political moment characterized by a bland, technocentric, managerialism (Swyngedouw 2013). In this moment, they see a closing off of “divergent, conflicting and alternative trajectories of future environmental possibilities and assemblages. There is no contestation over the givens of the situation… there is only debate [if any] over the technologies of management, the timing of their implementation, the arrangements of policing, and the interests of those whose stake is already acknowledged, whose voice is recognised as legitimate” (p. 5-6).

For observers of climate and water debates in the rainfed drylands, this dynamic is certainly familiar, and as evidenced by the narratives in the preceding section, it predates climate change. Powerful social movements have, of course, fought to redefine and re-vision dominant water narratives in India. These range from globally recognized *Narmada Bachao Andolan*, which brought international attention to the social-ecological implications of the Sardar Sarovar Dam, to movements seeking increased community control over land, water and forests, such as the *Bhoodan* movement of the 1950s. However, it is equally the case that there has emerged a resilient, cross-scale, consensus on ‘the problem of water’ that displays the very features of ‘non-political’ politics described by Swyngedouw (2013). The roots of this, too, go back decades, with Chhotray (2007) for example highlighting how decentralized soil and water conservation has, through its institutional structure and organisational form, displayed a form of anti-politics machine. She highlights how, for example, watershed development guidelines have set about creating new institutions that sit outside of democratically-elected village bodies, and which are based on visions of a highly simplified, homogeneous ‘community’ that is able to ‘self-govern’ and co-operate. In this (essentially apolitical) conception of ‘the community’, apolitical framings of social-ecological problems such as water scarcity can flourish, uncontested, and questions of complex causation, equity, and demand management are difficult to resolve. Contemporary climate policy nods *backwards* to these existing initiatives, re-packaging them as climate action. In doing so, I contend, it continues a tradition of land and water management that has not so far resulted in resilience.

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1. Traditional artificial reservoirs (with modern variants emerging from regeneration efforts) designed to harvest and store water. [↑](#footnote-ref-1)