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A River that Divides. Climate Change Perspectives and Historical Accounts in Southern India

1. Framework/s

Apparently the attempt to study water with an anthropological perspective always brings to identify situations of conflict. Water is a basic resource, a natural element, a survival need for all living species, a principal energy driver, a human right, a socially shared value (Mauser 2009, Hastrup 2016). Maybe too many meanings at the same time. Water management, water appropriation, water waste, or anyway use, reuse or recycle, rarely have been processes that could unfold and develop in smooth and peaceful ways. Multiple meanings coexist with new emerging concepts reshaped in a transforming world of Climate Changes.

Anthropology has been dealing with the issue of water adopting the micro-perspective proper of its research (Crate 2011), the size of its case studies and the dimensions of its analysis have traditionally focused on limited number of actors and implications (Orlove, Caton 2010). The goal of adopting a micro scale perspective was aimed at pointing out the specific characteristics and networks of heterogeneous meanings and values that the actors involved in the study attributed to 'their' water, intended as a natural+social resource, within their own specific geographic and historical context. But within the context of climate change the issue of managing water becomes a global matter. The reasons of conflict deriving from waters complex managing processes, the practices of general water usage and adaptation, the extra values that water rituals recall for the communities hit by droughts, all these micro cases must be re-signified in a global perspective of general water scarcity. All water discourses have to be reframed and projected on a larger scale that includes the issue of quantity as a primarily relevant element.

In front of the evidence of climate change, which is a global and a material framework, and even more within the picture of the Anthropocene, which is a global and a theoretical framework, local practices considered once to be effective and appropriate may reveal themselves to be limited, or even counterproductive; as well as new technolog-

ical approaches may emerge as being very creative, and potentially more sustainable than traditional ones. It is quite difficult to assess the complex network of relations linking locality with sustainability and technology, because the micro scale proper of the ethnographic analysis doesn't match with the large and comprehensive scale required to grasp the social implications of climate change processes. On the other hand, on the large scenario of world economy and world production, there is a severe lack of alternative visions to the dominating patterns provided by the paradigms of 'capitalistic', 'productive' and 'compulsory development' regimes. There is a lack of new competences, a lack of frames of mind and practical tools, on how to deal with repeated or sudden situations of crisis. Crisis in our times is mainly treated as an exceptional state of things, deserving exceptional measures to be handled. Instead, the crisis of climate change is a systemic one, and most likely it is going to be a permanent one, so that the measures to be adopted in order to deal with its effects must be profound and systemic as well. The frame of mind required to handle such task is just the opposite of anything exceptional, occasional and emergency-like.

The main question I will discuss in this paper is therefore whether the framework of climate change intended a permanent scenario of crisis casts a new or a different light on the possibility of relating micro and macro analyses. I will discuss if conflicts arise when resources are lacking, as it may emerge from the analyses of locality, or rather when analyses developed at different scales must be necessarily combined, as when ethnographic findings discuss and clashes with large scale scientific evidence, and the superposition of the two kinds of knowledge results as uneven and contradictory. I will discuss the issues of scarcity, conflict, and contradictory knowledge forms referring to the severe water conflict emerged in 2016 in Southern India, as a main consequence of a prolonged season of drought. In the context of those specific episodes of drought, water scarcity has shifted from a weather issue, to a political issue, to a climate change issue, contraposing two southern Indian states,

Karnataka and Tamil Nadu, equally struck by the lack of seasonal rains. New regulatory institutions, specific 'water authorities' and thematic tribunals, have been created with the aim and responsibility to find solutions both at technical and political levels to the material lack of water, insufficient to fulfil even basic needs. Actually, historical analyzes and archival documents show that disputes about water management and distribution have characterized the conflictual relations between the two states as early as colonial times and before. Some of these documents are reviewed in the paper: quantitative ever-changing criteria for the attribution of water to Karnataka or Tamil Nadu have been redrawn several times since Indian independence, becoming object of negotiations and political campaigns. But the extended and comprehensive frameworks of local development on one side, and that of climate change on the other, help to recast the entire issue of water (scarcity) in an urgent and up-to-date transformative scenario.

2. *The Southern India Drought in 2016*

According to NASA and NOAA, 2016 has been the hottest year since the Earth temperatures are recorded with reliable means (NASA/NOAA 2017)¹. The notion of rising global temperature is disquieting, despite this datum by itself represents just an average over a very large spatial scale, that needs to be interpreted with a careful and locally diffracted perspective. At a local level the effects of changing climate may become manifested through opposite events, such as floods and excesses of rain; while the rise in average temperature might be also observed indirectly, through processes that only apparently depend on a warmer climate (Hulme 2009). The case of indirect evidence is not the scenario of Southern India, where a steady trend of increasing temperature and decreasing rainfall has been directly observed in the last decade, with a peak of both effects in 2016. The case described in this paper is therefore fully centered on the consequences of water shortage due to the effects of climate change in its clearer definition.

At the end of 2016, the two Southern Indian states of Tamil Nadu and Karnataka have been declared drought-hit states by the local authorities. The two states that share a border of several hundred kilometers have been engaging in a severe conflict, both at a social and juridical level, about the new criteria to apply for the re-allocation and management of the scarce water resources they have to share. The river Cauvery in fact flows from the north of Karnataka through its semi-arid plains,

providing all the water needs to the metropolitan area of Bangalore, then it runs towards South-East marking the border with Tamil Nadu for almost one hundred kilometers. In Tamil Nadu the river represents the main water source for the flourishing agricultural economy, as it crosses the levelled state before pouring into the Bay of Bengal, after splitting in hundreds of smaller rivers and canals, intensely cultivated with rice and other watery crops. Tamil Nadu normally benefits from a long monsoon season, from July to September, that raises the water levels of the Cauvery, as well as filling up the many reservoirs and aquifers that surround the river basin. But in 2016 the South-West monsoon almost failed, rains fell for a total amount of 40% days less than the standard average, and the highest temperature in the last decade were recorded according to the data of the Indian Ministry of Water Resources (in particular, data can be obtained from the report of the Central Ground Water Board 2016²). Water quantities from wells and deep groundwater reservoirs were drained in larger shares, but even including the deployment of all available sources, less than half the average water quantity was available for everyday needs and for agricultural use in Tamil Nadu. On an average year, Tamil Nadu farmers can collect up to three crops, considering crop rotation, of rice, a kind of sorghum (*jowar*), a kind of millet (*samai*), mainly thanks to the irrigation system from the Cauvery river (called 'our river', in Tamil Nadu) and also thanks to the abundant water contribution of the South-West monsoon. In 2016 only one crop could be collected, provoking the extinction of extensive paddies and such a large economic crises to induce 162 farmers to suicide³. Tamil Nadu governor triggered the call for a direct intervention of the Indian Supreme Court, with the request of releasing extra quantity of water from the dams on the river Cauvery located north and east of Tamil Nadu, i.e. in the state of Karnataka.

During the same season 2015-16 the dams system over the river in Karnataka was also subjected to stress conditions, due to more arid weather than usual⁴. An important Karnataka tributary of the Cauvery, the river Arkavathy, has almost run dry due to lack of rains and severe extraction from aquifers in its basin. The extinction of the basin of the Arkavathy river and the probably permanent consequences of the extreme exploitation of its waters have been studied in detail, pointing out the role of the cities, more than that of agricultural uses, in producing unsustainable water catchments (Srinivasan *et al.* 2015).

The main water consumer in Karnataka is the large municipality of Greater Bangalore, which lies 100 km north of the river, at a higher altitude than

that of the river level. A dense network of canals and artificial lakes, most of which are colonial legacies, pumps the Cauvery water uphill from the river to the city (Nair 2005). When in 2009 the Bangalore municipality was transformed in Bangalore Greater Metropolitan Area, suddenly becoming an over ten-million citizen urban unity, a new metropolitan authority was created, the Bangalore Water Sewerage and Supply Board (BWSSB), entirely dedicated to the administration of the larger area water matters. The water local authority presently declares that almost 80% of the Bangalore metropolitan area water supply is provided by the Cauvery river⁵, which is therefore considered a unalienable source. But in late summer 2016, at the peak of the dry season, the same local Bangalore authority was appointed for the application of the decision taken by the Indian Supreme Court, that ordered the release of extra quantity of water from the dams in Karnataka downstream to the Tamil Nadu course of the Cauvery river.

In Bangalore the decision by the Indian Supreme Court was considered unacceptable; the local water authority, once popular and supposed to be citizen-friendly, was publicly distrusted, appealed as betrayer, while street water vendors, a usual urban presence in every dry season in Karnataka, sold 'private water' in the wealthier quarters of the city for prices higher than ever. Demonstrations contraposed angry citizens and the police for days, culminating in fires and aggressions, and five weeks curfew imposed in Bangalore and in the surrounding villages. Protesters were basically accusing the Bangalore Water Authority to have surrendered to the Supreme Court, giving up on the Karnataka rights on the Cauvery river ('our river', 'our water', in the protesters' speech). The decision of the Supreme Court was temporarily suspended.

The narration of the Karnataka clashes on water attribution gained a quite relevant position in the Indian federal media coverage, for two main opposite reasons: on one side, Bangalore rhetorically represents the future of India, the metropolis with the highest salary, where the standard of living are far better and well-established than in the rest of the country (Bougleux 2015). Here demonstrations are rare, and even rarer are the bursts of urban violence triggered by claims of basic needs, that instead are frequent events elsewhere in India. On the other side, Bangalore sits at the center of the arid plain of Deccan, a historically arid region, therefore well acquainted with recurring water scarcity, and organized with multiple networks of alternative water suppliers, ready to exploit temporary water sources.

The combined understanding of both sides of

the problem – the dismiss of a rhetoric of wealth, and the public charge of a condition of scarcity – necessarily transforms the perception and the meaning of Bangalore events, eventually highlighting how inappropriate it is to declassify them just as ordinary chronicle news. On the contrary, a broader and multisided perspective is required to frame the exceptionality of the burst of street clashes and the imposition of a curfew into a hyper-modern metropolis craving for water⁶. Finally, after several weeks of contraposition, after two appeals to the Supreme Court to enforce the application of the sentence, and after the corresponding refusals by the local authority, a comprehensive explanation is outlined. The new explanatory frameworks emerges as a third conceptual element beside the two pre-existing one: Bangalore high life (and water) standards and its familiarity with water scarcity are sided by the new issue of climate change, pinpointed as the ultimate responsible for weather unpredictability, and as the recognized cause for the failing of the South-West Monsoon with all its local and non local consequences.

But what has really happened? Has really the global theme of climate change acquired the direct capacity to trigger a thirsty farmers revolt in the villages of Tamil Nadu, as well as doubling up the prices of 'private water' sold to the westernized citizens of Bangalore? Is there a convincing direct connection between the global climate change scenario and the local revolts? Which intermediate understanding steps are necessary to mediate a large scale crisis in the terms of a small scale conflict? Which negotiations of meanings develop, as clashes continue and while the river Cauvery runs dry?

The explanatory framework adopted by the Indian national administration had to be provided with some specific Southern Indian issue in the context of the general water crisis that struck the entire country in 2016, affecting over 330 millions of Indians left in drought-hit conditions. The global framework of climate change, much larger than India, had to be scaled down and situated inside the narratives of local and recognizable patterns of crisis. So, on one side climate change could provide a good explanatory framework, connected to an emerging global danger; on the other it required some more localized interpretation to work successfully out.

The additional interpretative frame consists in the deeply rooted and traditional opposition existing between the two southern states, depending on the different social structures, on historically different paths of rule and domination, on the diverse economic models adopted throughout modernity for development. Essentially represented in the

media coverage of the 2016 drought, Tamil Nadu emerged as a traditional, mainly agricultural territory – in a word, unsustainable with respect of water policies – while Karnataka was depicted as technological and modern – unsustainable as well with respect to water policies, but in a different way –. The distance between the two economic development models is actually just one of the visible effects of decades of politically opposite administrations: on one side Karnataka, guided by the BJP, the nationalist Hindu party promoting extreme neoliberal economic policies, on the other Tamil Nadu, guided by the DMK, promoting Tamil independence in a more socially equal and responsible framework. These differences would deserve a much deeper analysis that cannot be developed in the present paper⁷. But even limiting the present discourse to an essential picture, the presence of political deeply heterogeneous elements clearly emerges between the two States, contributing to design and sharpen a rooted and historical juxtaposition (Wolpert 2009, Zigfeld 2016).

Despite such complex historical background, the Indian national and local media choose to describe the 2016 clashes just emphasizing the opposition of ‘thirsty (Tamil) farmers’ against angry and rich (Bangalore) city dwellers. Both categories chosen to represent the entire states population, both representing opposite and unreducible lifestyles. The scenario reported by the media describes also federal and local Water Authorities curiously playing on the same side, i.e. trying to act in a sort of neutral-technical-quantitative role that only takes figures into account and actually ignores the needs and queries of both territories. In both States, the local governments were praised for the initiatives aimed at diversifying lifestyles, promoting the advantages of urban life (in Tamil Nadu) and those of rural life (in Bangalore), and suggesting preventive measures to adopt in view of ‘next foreseen seasons of drought’. No public position or discourse was made with any reference to the feelings of anger, resentment and reciprocal distrust that were lingering in the demonstrations and animating the clashes.

The impression that can be drawn from these descriptions is that the background notion of climate change was used instrumentally, though very effectively, to dislocate the origin of an internal and enduring conflict towards a distant sphere of causes which lied outside the range of control of the Indian authorities. Climate change is entirely a non-local issue; but despite this within the Southern Indian context it has been attributed the role of representing all that cannot be solved, the major cause putting a limiting constraint on the very possibility of tackling the water conflict at a local

level. Climate change has been used as a new title to readdress an old narration.

3. *The need of Water Data*

In such a context, quantitative data become important. The micro scale typical of ethnographic analyses often avoids to discuss with quantitative data, because they are collected through large scale surveys, independently from people and regardless to their processes. But water flows, and by flowing it connects quantity with quality in a non-separable way. Data can be ambiguous, they are never ‘given’, but they remain accessible, and can be confronted with.

According to the UN World Water Report (UN Water 2012, 2014), up to 70% of world water consumes are due to agriculture; more than 20% are industrial consumes, a share that includes water for energy production; less than 10% is private and domestic use. These are summary global syntheses, that vary significantly according to world areas and according to strategies of data analysis. Anyway, just limiting the review to global and average data, an unfair distribution of usage and waste clearly emerges between the Western world and the so called ‘rest’: in low income countries, domestic and private water use drops below 7%, and the water consumes by industry do not reach 10%. All the remaining usage, up to 80%, is therefore agricultural use, which includes significant percentage of water waste due to non-sustainable irrigating techniques and poor water transfer infrastructures.

Focusing on India, data show that being Indian population over 16% of the world’s total, water resources at its disposal are only up to 4% of the world’s total. These data include lakes, rivers, and groundwater. The distribution of water consumptions reaches 89% for agricultural use, 7% for private and domestic use, only 4% for industry and energy production (Mekonnen, Hoekstra 2011). Several authors have adopted the concept of “virtual water”, introduced to deal with water related issues in quantitative terms: virtual water is the water needed for the production of each specific good, such as food, energy, any industrial product. By translating in terms of virtual water the economic items of a nation’s budget, it is possible to compare the import/export balance of very heterogeneous water-depending economies. A comparison between world virtual water quantities and fluxes, surprisingly shows that India appears to be the largest water exporter, together with the United States (Hoekstra, Mekonnen 2012). This means that despite India suffers a systemic water scarcity

ty, most of its water is invested for the productions of water-consuming goods, mainly rice and other watery crops, destined to exportation, therefore reproducing and worsening water scarcity conditions for the Indian population. So, the discourse about Indian water scarcity at international level becomes very complex, when India results also as a primary 'virtual water' exporter, and apparently not needing urgent water providing measures.

A specific discourse must be done for the water footprint of large cities and metropolis. Half of the world population lives in cities, and by 2050 two thirds of world population is expected to be living in cities (UN 2014). Fast urbanization is creating additional stress on water resources and on the ecosystems they support, including environmental degradation that can result from aging and/or inadequate water infrastructures. Cities impact is becoming increasingly more relevant in assessing biodiversity loss, including watery species like small fishes and reptiles, and engineered water contributes to total availabilities through virtual and material water contributions (Paterson *et al.* 2015). This is why it is overall difficult to evaluate the city real water footprint. Literature have explored in depth and in a comparative way major metropolitan cities as Dehli, Beijing, London, Berlin, Lagos and Milan (Paterson *et al.* 2015: 8469), and the emerging common trait consists in the extreme acceleration of city water consumes in the last few years. Despite the limited amount of land occupied by metropolitan areas with respect to the total available land, the role of cities in impacting climate change is huge. Metropolitan areas produce and release heat in the atmosphere, alter the carbon and nitrogen cycles, emit greenhouse gases at highest intensities (Biermann 2010). As we said, water urban consumes, i.e. mainly private and domestic, represent a small share of the total water consumes, but they are the most quickly expanding and increasing, altering the total equilibrium of the global water balance; they are the ones directly affecting individuals lifestyles, the most easily controllable, those with costs directly paid by individual consumers. So, the relation between fast urbanization and water issues is complex as well, and a more specific study must be conducted on case of the Bangalore metropolitan area.

4. Water Management in the City

Urbanization is a complex and multilayered process, affecting mobility of people and resources from rural and peripheral areas towards the center; similarly, the areas surrounding the city are intense-

ly linked to the urban conglomerates by continuous motions towards and backwards, as they approach proximity and gain new distances throughout the decades. The ingoing and outgoing fluxes of material and immaterial values involving the urban centers cannot be seen as separated nor independent entities: the city breathes in a synchronous way with its surrounding space, and co-develops with it through osmotic processes (Alberti 2010). Short-ages, scarcity, pollution, vulnerability of a city, but also its success, sustainability and prosperity, are the results of the two superposed movements of exchange, entering in and exiting out from the urban space through its flexible and permeable bordering zones.

Water is a major driver of these continuous processes of exchange: the city exchanges water with its environment through multiple channels, drawing cyclical ingoing and outgoing fluxes: it drains clean freshwater from skirting countryside, from nearby rivers and surrounding lakes, from groundwater and aquifers; and it mainly returns wastewaters in the down streams rivers and canals. Rapidly growing cities located in emerging countries, as Bangalore, have severer impact on the surrounding environment due to the poor quality of water released downstream, the so called greywater; their fast growing population and extension take mainly place without adequate urban planning, nor the resources and the policies to develop water treatment infrastructures and compensation systems (Grafakos *et al.* 2015). Water consumes per person in cities like Bangalore grow higher and higher⁸, while at the same time the cubic meters of water allocated per person per year in some virtuous European cities, like Nantes or Nijmegen, have been decreasing in last ten years⁹. In Bangalore instead, the increase in income has corresponded to an increase in water private demand, while water available per person is progressively diminishing. There is a clear contradiction between the decrease of available water and the narrated – but also very real – scenario of wealthy and modern city. Urban expansion, income increase and water crisis are therefore quite entangled issues.

The development of the Bangalore metropolitan area, known as Indian Silicon Valley, have been studied in detail, connecting economic growth to urban development (Bougleux 2012, 2014, 2016), and relating it with the conflicts emerged around the diverse concepts of development adopted in the last few decades in Karnataka. Basically, the strong expansion of employment in the technology sector, the increase of average salaries and the migration of millions of new citizens from rural areas to the city, have altogether contributed to modify the

urban equilibrium, unbalancing the relationship between available primary resources and citizens' demands, water above all. In the same years, the self-perception and the imaginaries of the new IT workers and professionals were projected towards a global scape made of standards and material commodities that could not be matched for everyone. The social and economic profile of Karnataka has been permanently transformed by the massive foreign investments, and the area around Bangalore has become the preferred site for the Indian branches of many multinational corporations. This implied a significant increase in foreign residents, mainly arriving from Europe and the United States, but also from other Asian nations. As I could verify after a prolonged fieldwork, the consumes and the standard of life have gone higher up: more electricity requirements, more water needs, more waste produced; many more transportation and housing problems, with their increased environmental footprint and their polluting consequences impacting on an already the stressed environment.

The same multinational corporations that have contributed directly and indirectly to deregulate the process of urban planning of the Bangalore metropolitan area, have been declaring with increasing frequency their commitment towards environmental issues, and publicly affirmed their will to the reduce the emissions of greenhouse gases, as a liming measure to the effects of climate change. Their initiatives towards sustainability at a corporate level are supported with large economic investments, and the studies on sustainability that inform their turn towards sustainable policies apparently rely on authoritative analyses. In principle, the policies adopted in favor of sustainability by a corporation could affect in positive ways a multiplicity of geographic contexts, and improve the concept of environmental protection in different assets. But in fact the interventions set up to reduce the corporate impact on prominent environmental issues like water consumption often respond only to internal corporate self-evaluations. Corporate data are used instrumentally, and often analyzed with poor methodological tools, for example without showing general trends nor long time comparisons (Kirsch 2014). They emphasize supposedly reduced impacts, but actually they are focused on the containment of peripheral aspects of consumption, such as water consumed by administrative buildings. On the other hand, the main water consuming processes, those related with industrial processes, for example cooling processes and energy production systems, are seldom topics of discussion, nor they are seriously tackled with to introduce innovative approaches. In most cases, sustainability oriented

initiatives aim at producing water saving devices for the private consumers' market, which represent only the smallest part of the global percentage of water consumers.

A fieldwork of over two years among the workers and corporate professionals in the Bangalore metropolitan area has revealed a shift in the meaning attributed to terms such 'water reuse', 'water saving', 'water recycle'. These terms acquire meanings which are progressively more distant from the issues they originally intend to represent. From a peculiar 'water' connected to industry and largely used in processes of production, 'water' progressively become a personal commodity, the familiar water of domestic uses, and its consumes (and the needs of reductions) become individual responsibility, perceived as a problem at an inner level. The corporation as a productive entity performs as if its activities didn't share any connection with the issues of reuse or recycle, while the civil society represented by its workers is warmly invited to be involved in taking care of the 'reuse' and 'recycle' problems in their private spheres. Eventually the virtuous workers bring their exemplary private practices back inside the corporation, which benefits from them through its public image: the corporations' workforce is exemplary.

As example of this meaning shift, buildings dedicated to the administration are redesigned to be more energy-efficient; water saving devices are installed in offices and canteens, and in the common spaces of Human Resources divisions (employing less than 10% of the corporation personnel). All good initiatives, undertaken by the corporation with high emphasis and advertises with communication campaigns, but having an impact only on the lower slot of consumption, while water highly consuming processes of production are not affected nor modified at all. Other observations in the Research divisions show that some water saving devices for private use are developed and launched on the private market: intelligent taps, sensible washing machines. Once more, these interventions aim at decreasing the water footprint of the lower segment of consumers, providing good profits for the corporation, since private consumers are generally willing to pay higher prices for devices with a smaller environmental impact. The private and domestic practices are eventually modified, with a fruitful return of image for the corporation, and a new sense of responsibility shared among the individuals; but without any real decrease by the real large scale water consumers. Clearly, at this stage, I can say that the initiatives taken at the corporate level to face water scarcity issues are not (yet) reliable, at least in the context of Bangalore and in

framework the conflict of the two bordering states that suffers from the intensive water consumption of the Bangalore metropolitan area.

5. *Water and Rights between Karnataka and Tamil Nadu*

Comparing the discourses about water with the use of possessive adjectives to address some specific rivers' water in the media speech (par. 2), the criteria of virtual water market (par. 3), and the shift on water saving meanings inside the corporation (par. 4), it clearly appears that the concept of scarcity is a flexible, dynamic, and transformative one. Despite the material urgency of water scarcity, the concept appears above all to be socially produced. Scarcity may be used as political tool, may become a social emergence, can be shaped as criteria for data analysis. The connection between water and the onset of situations of conflict, which is the issue pointed out the beginning of this paper, is therefore diffracted and articulated in the multiple ways in which scarcity is understood, perceived, actually suffered or historically narrated.

If scarcity arises also as consequence of processes of mis/appropriation, then the entire discussion is shifted towards a matter of rights and property, but even in the cases of contended property the concept of scarcity remains socially produced: who does water belong to? Who owns the right to own water? Or more explicitly, can water be owned by any proprietary at all? In contexts of water scarcity, who can assign the rights of possessing water? And who can claim priority of access to water? Is water a right? Is it a human right?

Such questions are quite up to date in the present Southern India water dispute. Historically the highest rights and priority of access to water were guaranteed to agricultural needs (Groenwall 2008). All distributive criteria were designed to ensure the best success of the crops, and when drier years than average occurred, specific fixing regulations were issued in order to save agricultural production at any cost. The owner of waters were simply the owner of the land where water was flowing; lakes, ponds, and wells belonged to the same few land owners. Since the land was entirely owned by the ruling authorities (the Kingdom of Mysore, later State of Mysore, present Karnataka, and the Madras Presidency (later State of Madras, present Tamil Nadu), so was for the water, whose fluxes and distribution were regulated accordingly (Nair 2005, Groenwall 2008).

The present scenario looks totally different: land is fractioned among hundreds of private proprie-

taries and a diffused lack of control allows basically unlimited groundwater exploitation at a private level. In principle, the rivers are still state-owned, but with the intensification of deep groundwater extraction from the wells, the level of the aquifers has lowered deeper and deeper, impacting on the water regimes of the rivers. The paradoxical situation depicts stately-owned rivers, while the actual water flowing in the rivers depends on the private initiatives of extraction from private wells, that do not respond to any coordinated planning or water overview. In many Tamil districts the extreme intensity of water extraction from deep wells led to the extinction of superficial lakes and ponds. At the same time, it is extremely difficult to assess the precise causes of extinction of any superficial water reservoirs, as lakes and ponds: it is virtually impossible to establish how relevant is the failure of the monsoon, how relevant is the lack of water due to subtraction from the surrounding wells, how relevant is the evaporation due to higher temperatures. Once more, we can't identify individual causes for water related complex effects.

In this scenario, the activity of groundwater extraction from deep wells is maybe the more directly depending on single individual specific actions, therefore it might appear as the most likely to be put under some kind of law control. But the groundwater extracted without regulations fulfils a relevant social function, which is providing 'emergency water' to the numerous private water vendors, who eventually sell it in the urban contexts as 'private water' as soon as needs arise. The social function of private water vendors is important and widely recognized, since private water is considered pure, arriving straight from underground, therefore being drinking water. In the Bangalore metropolitan area unofficial lists of water vendors, completed with their addresses, are published on self-managed websites, regularly updated in the dryer seasons. The prices of private water are also public, and may change significantly according to the different city quarters and to micro-economic criteria: the many more vendors in an area, the lower the price of water.

The city of Bangalore hosts over fifty temporary street locations for tanks selling private drinking water: a participative map of Bangalore showing the street locations where tanks sold water – at different prices, varying from 350 to 1550 rupees – was published in the web for public use during the arid season in 2015¹⁰. The service of water distribution is entirely self-organized and depends on the vendors' private water availability. The legal prosecution of such an informal network is an impossible task, but also the coordination of water vendors at a

higher level would be unthinkable of. The system of private water market appears as the self organized local answer to the unfulfilling institutional attempt of organizing the management of public water.

One more question arises as a consequence of this picture: how deep can be a private well? How deeply underground is the right of exploiting a well extended? How many meters under the ground level does the right of property arrive? More in general, who owns groundwater resources? The question bears a historical legacy that emerges from the peculiar terms used to address watery matters by the different actors of the Cauvery dispute: terms like “our river”, “our water” are used by Tamil actors, and they refer more to superficial, visible, running water; “our commodity water”, “our old water, our supply systems”, possessive and more technical by Karnataka actors, referring to water at large, no matter where it flows and how it is obtained. In both case, the right of exploitation seems to foresee no limitations.

6. *Cauvery River Waters and History*

The question of water rights in India is made even more unclear by the proliferation of legal water authorities established in the course of Indian history, invested with the same overlapping tasks, and never cancelled, rather superposed and conflicting about their respective decisional areas. The Indian constitution separates very clearly the legal matters competing to the individual States from those competing to the Union, and water enters in the list of State competences. State rivers ‘belong’ to the State they flow through, and the management of their waters falls entirely under the corresponding State legal system. But seventeen Indian rivers flow across more than one State, they are called ‘interstate rivers’, and their water issues are regulated by special laws established at national level. Five out of the seventeen Indian interstate rivers are at the centers of water attribution disputes; therefore the Indian Supreme Court has introduced the possibility of setting up interstate rivers’ Dispute Tribunals, entitled to deal with the specific instances of the two, or more, States contending their waters. The Cauvery is obviously a disputed river, in fact the specific Kavery River Dispute Tribunal was set up in 1990¹¹, after two formal requests presented to the Central Government by the government of Tamil Nadu in 1970 and 1986 (both ignored, at the times), and a last direct appeal to the Indian Supreme Court supported also by a powerful society of Tamil farmers.

It is useful to notice that both years 1969 and

1985, the years preceding the formal requests of setting up the Dispute Tribunal by Tamil Nadu, are recorded as drought years for Southern India, especially in Karnataka. So it can be easy to image that in 1969 and 1985 an increased water withdrawal from the Cauvery river occurred in Karnataka, and this resulted in a diminished water availability for Tamil Nadu in the following season, that therefore decided to present the request of a Kavery River Dispute Tribunal. The Dispute Tribunal set up in 1990 issued a detailed sentence in 1991, which assigned defined quantities of cubic meters of water per year to each State, including minor water shares to the bordering State of Kerala and to the Union Territory of Puducherry. It is important to highlight that droughts were also foreseen by the Dispute Tribunal sentence, that established a proportional reduction of allocated water for every contending states in consideration of the reduced total availability.

The 1991 sentence triggered immediate reactions in Karnataka, and that was the start of a series of major conflicts in both States at legal and social level, that continue still today. The reason why the Kavery River Dispute is so complex derives from its long historical background. The oldest written regulation on criteria of water attribution dates back to the British ruler had been defined in 1892, then renewed in 1924 and in 1974, without substantial changes, in particular leaving the amounts of allocated water unaltered¹². The most relevant aspect of this document lies in the language adopted under the colonial rule, and maintained without changes in the independent state: “British territories”, “Generals”, “Officials”, all matters are still referred to as in the 1892 version.

The State of Karnataka had actually rejected the 1974 renewal, considering that its water needs had dramatically increased since colonial times, and claiming that the first historical agreement had taken place between the (then) stronger Madras Presidency and the (then) weaker Kingdom of Mysore, therefore disadvantaging the Kingdom of Mysore, and therefore present State of Karnataka, from the very beginning.

Basically, according to the Government of Karnataka, the issue of the updated water needs of the developing State cannot be fulfilled by and rule based on a territory description dating before the beginning of its development. In practice, this meant the rejection of the colonial water management framework, and it implied the demand for the introduction of entirely new standards for the evaluation of water issues back from the start. Accordingly, provided that the Indian constitution declares that water is a State regulated matter, Karnataka

Water Authority autonomously decided to modify its criteria of management of the Cauvery river.

The Kavery River Dispute Tribunal was the only Water Tribunal in independent India delivering a sentence that challenged and substantially subvert some previous and well-established historical matter. The dispute that the Kavery River Tribunal had to settle was not simply a controversy about Karnataka rights of water *versus* Tamil rights of water; rather it was a dispute about an entangled conflict between historically acquired rights on water and newly established water rights needs and consumes' standards.

In fact, the State of Karnataka has never recognized the authority of the Kavery River Dispute Tribunal, nor the authority of the Indian Supreme Court that tried in several occasion to impose the application of the 1991 sentence, claiming that the Supreme Court, being a national authority did not have any competence on water issues (which is, strictly speaking, true). Immediately after the 1991 sentence of the Kavery River Dispute Tribunal, the Karnataka Water Authority released an "ordinance" with State validity, rejecting any possible agreement on water partition and even misrecognizing the legal basis of the Dispute Tribunal discourses. As a matter of fact the Kavery River Dispute Tribunal sentence has never been applied, until in 1998 one more Cauvery River Authority was created with a national decree, supported by a Monitoring Committee in charge of the urban hydrological matters of the contemporary, from 2002 onward. Finally, in 2007 "Final Order" was issued, allocating new and different water quantities to both States¹³. The Final Order was more in favor of Karnataka, but the most relevant aspect concerns the new criteria inspiring water management: drinking water represents a priority over any other use of water, including agriculture. Unfortunately, the Final Order also affirms that substantial shares of drinking water are correctly provided by groundwater sources, which are not debated by the Cauvery River Authority, therefore they are not discussed in the sentence in any detail. This ambiguity about who should provide drinking water imply a worse ambiguity about whom has lesser priorities than before, and casts quite a severe grey shadow on the concrete possibility of application of the new principle, including the new quantities allocated.

On the whole in terms of rights recognition the Final Order represents a big step forward, but despite this the Bangalore administration refused again to recognize its validity. In the meantime, in 2009, Bangalore has become Greater Bangalore Metropolitan Area, and its population and water needs have dramatically increased once more. Ac-

ording to numerous lawyers, Bangalore population was underestimated by the Final Order, and no projection about population growth has been taken into account¹⁴. Moreover for some unclear reasons, the western districts of Greater Bangalore were not considered depending on Cauvery river for their water needs. So the Final Order was recognized valid in terms of principle, but partially incomplete and again unfair in the quantity of allocated water.

The over protective attitude shown off by local authorities must be red in the larger framework of the transformations occurred in Karnataka since the Nineties. Lowering down the level of individual water consumes, suspending the supply commodities such as running water in working places, or even giving up to recently introduced watery amenities, like public fountains in the city center, is just unacceptable. Bangalore has grown for two decades, doubling up its population and raising up the standard of living of (some of) its citizens at the cost of incredible conflicts with its surrounding territories. Apparently, not even the juridical way is a resolving strategy nor an easy path to follow for managing ever more contended lacking waters.

7. *The Prices of Water*

Water scarcity is an increasing problem in the contemporary, but it is not a new element in the life of human communities. A variety of approaches and attitudes to deal with scarcity have been developed by communities living in historically arid regions, and in world areas where climate change have transformed the water cycles in unstable and unpredictable events. Some useful insights on possible approaches can be taken from the policies adopted in California to face the recent and enduring years of drought (droughts have officially recorded since 2011¹⁵) and the consequent severe lowering of the aquifers.

Californian waters have been traditionally traded as goods of consumption, provided with a price and subjected to market fluctuations of supply and demand. In California who owns the water decides the price: the attribution of a market price is considered an appropriate and also necessary strategy to seize the emergence of conditions of scarcity. If water were not associated with a price on the market, and therefore a measurable value in terms of money, it would be impossible to assess the onset or the worsening of situations of shortage (Convery 2013). Once more, the water question undergoes a meaning shift when passing from 'who makes the price' to 'who owns the water'. In California water belongs to the land owners, up to a depth of 7 me-

ters (Wang *et al.* 2014). But the level of the aquifers has fallen down dramatically in last twenty years, in some areas down to 35 meters underground. If water is pumped up from such a depth, the bottom layers of the aquifers are involved, and this changes the comprehensive underground flowing water system of the region. One more controversial topic in the picture of water management is introduced, i.e. the need of criteria for limiting water extraction, imposing maximum quantities of waters that individual owners can sell after extraction from their own land. This should be a way to discourage super-intensive extraction processes, at the high social and symbolic cost of limiting the principle of exploitation of private property, which is a founding principle in the American jurisdiction.

The Californian case has been compared to the Israeli water policies (Convery 2013: 157). In Israel water is entirely state owned, and the state sells it to the several stakeholders – private, agricultural and industrial users – at a price that is state-fixed. This picture must be read within the permanently controversial political relations on the area, considering that Arab farmers are generally poorer and cannot afford to buy the needed water quantities. Opposite case is that of Australia, where water is bought from the several private owners by the state, and then reallocated to the stakeholders according to recognized needs and demands. Water gone back to be a public good is taken care of in terms of a new stewardship (Steffen *et al.* 2011), and the positive effects can be seen with the production of oversupply, more efficiency, shared regulations of maximum and minimum river flows (Adamson, Loch 2015).

According to Clive Hamilton (Hamilton 1995, 1999) there is a main theoretical and non-eradicable mistake in trying to attribute a monetary value to natural elements, such as water, and to the environment as a whole, because different scales of value cannot be compared and related or simply added to each other. Monetary values change and depend on contingent regulations and facts, on feelings and desires, on occasional possibilities and enduring limitations. The attribution of a monetary value produces non realistic images of the entangled multiple values embedded in the natural, cultural elements they mean to represent.

8. Conclusions

The dispute around the attribution of the Cauvery river is actually as complex as it emerges from these descriptions. Social emergencies, legal controversies, hydrologic analysis and economic

evaluations, none of the attempted strategies of analysis, seem to be able to produce comprehensive accounts or productive solutions to a problem that is evidently both historically rooted and presently exacerbated. Each approach has displayed and attempted to put into action its best methodological tools and its disciplinary deep field of concepts, to try to let the issue of water management converge to a minimum set of shared common points of view. Such task appears, at the present state of things, unreachable.

Some more elements could have been described, that would have broadened and complicated the given picture: the first dam in India was inaugurated on the Cauvery river in 1902, with a power plant that provided with electricity the city of Bangalore, at the times a cantonment of the British troops. In 1906 Bangalore was the first city in Asia to be provided with electric street lights (Everard 2013). The symbolic relevance of water in Bangalore is therefore an ancient and a technological matter at the same time, related to early public use of hydroelectricity. The public statements of the State authority that invites to a change in lifestyle, as a measure to diminish the water footprint of the city, sounds unrealistic. On the Tamil Nadu side, public authority interventions have invited the farmers to relocate their agricultural activities on wetter territories, closer to the coast and less depending on the irrigation by the Cauvery waters. But territories suitable for watery agriculture are running out, no more land could be allocated without generating more crises and clashes among the already stressed associations of Tamil farmers.

The larger theoretical framework of the Anthropocene underlies the comprehension of this decomposed framework. The independent evaluation of separated aspects, divided in their quantitative and qualitative approaches, fragmented in narrations, statistics and symbolic values, just does not hold together. The concept of Anthropocene seems hard to grasp and difficult to apply in concrete terms in the unfolding of a research. This is exactly the point stressed by Hamilton in a short notice published in *Nature* (Hamilton 2016) that invites to consider the idea of the Earth as a whole, as a connected system, including its biosphere/s, hydrosphere/s, anthropogenic environments and habitats, as a unique assemblage that cannot be disaggregated. Our present patterns of knowledge are instead fragmented and disaggregated, specialized and detailed, super-focused and short sighted, therefore unsuitable to generate overarching and inclusive new images.

The case study of the Cauvery river dispute highlights the limits of non-integrated, single disci-

plinary approaches. The emergency posed on these regions by climate change highlights the possibility, or rather the necessity, to read the outcomes of micro and macro scale analyses in the same comprehensive picture. By adopting climate change as a material framework to test the patterns of dialogue between the methodologies, paradoxically we are pushed in the direction of adopting an even larger framework, that of the Anthropocene, that calls for a profound revision of our styles of looking and understanding.

Notes

¹ NOAA is the US National Oceanic And atmospheric Administration. The NOAA/NASA Report “Annual Global Analysis for 2016” by G. A. Schmidt and D. Arndt was released online on January 2017: https://www.nasa.gov/sites/default/files/atoms/files/noaa-nasa_global_analysis-2016.pdf, <https://www.nasa.gov/press-release/nasa-noaa-data-show-2016-warmest-year-on-record-globally>, <https://www.nasa.gov/feature/goddard/2016/climate-trends-continue-to-break-records>.

² The Agency of the Indian Government collects water data for the realization of a yearly survey on the water levels variations before and after every monsoon. The case for Karnataka is reported here: http://www.cgwb.gov.in/Ground-Water/GW/Monitoring/Report_January/2016.pdf.

³ News reported by The Times of India, consulted on 16/09/2016, The Hindustan Times, consulted on 14/09/2016, NDTV.com consulted on 9/09/2016. In the following days international media as BBC and The Guardian gave broad visibility to the clashes news: <http://www.bbc.com/news/world-asia-india-37437036>, <https://www.theguardian.com/global-development/2016/sep/15/india-angry-clashes-karnataka-water-wars-run-deep-tamil-nadu>.

⁴ <http://www.cgwb.gov.in/Regions/GW-year-Books/GWYB-2015-16/GWYB/SWR/2015-16.pdf>.

⁵ The Bangalore Water Sewerage and Supply Board: <https://bwssb.gov.in/content/about-bwssb-2>.

⁶ The degree of severity of the clashes became apparent to me from the way I came in touch with these news for the first time. Some informants (and also friends) of my research in Bangalore in the last few years, professionals and corporate employees, started sending me bits

of news and photos from demonstrations, to “show me a face of Bangalore that I could have never imagined” (email from S.K.K., August 2016).

⁷ The BJP, Bharatiya Janata Party is a right wing national party referring to Hindu superiority, promoting neoliberal policies in economics and strongly fostering foreigner investments in India and Karnataka in particular. The DMK, Dravida Munnetra Kazhagam, is a regional party of Tamil Nadu, that has historically claimed Tamil independence from India and promoted the use of Tamil as official language. A deeper account of Indian parties’ political profiles can be found in “Why Regional Parties? Clientelism, Elites, and the Indian Party System”, by Adam Ziegfeld, Cambridge University Press, 2016.

⁸ <https://law.resource.org/pub/in/bis/S03/is.1172.1993.pdf>.

⁹ <http://ec.europa.eu/environment/europeangreencapital/wp-content/uploads/2011/05/EGCNantesUK-Chap9-F.pdf>.

¹⁰ <http://bangalore.citizenmatters.in/articles/water-tanker-rates-jan-feb-2015>.

¹¹ Kavery is the local name of the Cauvery River in Kannada and Tamil languages. The Dispute Tribunal, being a local authority created by the Supreme Court to deal with local matters, uses the local topographic names.

¹² The colonial Cauvery River regulation issued in 1892 and adopted in 1924 and 1974 is accessible on the Ministry of Water Resources website: <http://wrmin.nic.in/writereaddata/InterStateWaterDisputes/Vo-III6365819269.pdf>

¹³ The Final Order is made available on line by a press agency specialized in water conflicts: http://www.circleofblue.org/wp-content/uploads/2012/10/FINAL_DECISION_OF_CAUVERY_WATER_TRIBUNAL.pdf

¹⁴ The main criticism was that the population of Karnataka was considered on the basis of the old 2001 Census, and that these data were provided to the Tribunal by Tamil Nadu (Groenwall 2008: 90).

¹⁵ The U.S. Drought Monitor have been set up by the University of Nebraska-Lincoln. Interactive state maps can be checked here, including California maps since 2014. <http://droughtmonitor.unl.edu/Home/StateDrought-Monitor.aspx?CA>

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