THE SOCIAL CONSTRUCTION OF WATER SCARCITY: AN EXPLORATORY STUDY ALONG THE "BHARATHAPUZHA" IN KERALA

DEVISHA SASIDEVAN
Centre for Livelihoods and Social Innovation
Tata Institute of Social Sciences (India)
devisha.sasidevan@tiss.edu

SUNIL D. SANTHA
Centre for Livelihoods and Social Innovation
Tata Institute of Social Sciences (India)
sunilds@tiss.edu

Abstract: Water scarcity is a very critical issue in the context of sustainability and global environmental change. However, the notion of scarcity also has its local roots that are constructed by diverse actors with specific values, knowledge and interests. This paper explores the socially constructed nature of water scarcity among diverse social actors along the river basin of Bharathapuzha in Kerala. It also examines the diverse contextual factors that have affected the traditional land and water management practices in the river basin. This paper is based on qualitative research carried out among two villages along the river basin. The findings of this paper show that the river basin is extremely prone to drought-like situations and multiple forms of water scarcity surfaces in the discourses and discursive practices of social actors associated with the socio-ecological system. Further, these discursive practices are guided by the instrumental rationality of technological modernisation and progress, which has not only disrupted the traditional water management systems in the region, but also have completely neglected the ecosystem linkages and carrying capacities of vulnerable resource systems. The state-induced and expert-driven images of modernity such as dams, concrete check dams and major irrigation projects have replaced the traditional imagery of the river as a vibrant and ever-flowing life source. Water scarcity and other related forms of scarcity mediate these transitions. These processes have long-term implications on the sustainability of the river itself.

Keywords: water scarcity, social construction, farming, sustainability, resources.

INTRODUCTION

Across the world, water scarcity is a very critical issue that humankind is facing in contemporary times. The "scarcity" dimension remains as a significant "risk" to our very survival in this planet. Nevertheless, conceptualizing scarcity has been a challenge; and both researchers and policy makers have often found it

ISSN 2283-7949
GLOCALISM: JOURNAL OF CULTURE, POLITICS AND INNOVATION
2018, 3, DOI: 10.12893/gjcpi.2018.3.6
Published online by "Globus et Locus" at www.glocalismjournal.net

difficult to capture the complex realities associated with scarcity at the local community level. The conceptualization and experiential aspects of water scarcity are varied and differ from one social actor to another, based on their social positions, spatial locations and temporal dimensions, as well as economic, political and cultural contexts. At the local community level, multiple social actors with diverse values, interests, knowledge and power are engaged in the process of "living with water scarcity". These actors include individuals, groups and organizations at the local community level and other formal actors such as officials representing government departments and scientific institutions. When multiple actors with diverse situated understanding of the situation attempt to resolve issues such as water scarcity, the consequence of such an interface is also reflected in the pluralistic and socially constructed nature of scarcity. It is in this context, this paper attempts to explore the socially constructed nature of water scarcity along the *Bharathapuzha*, a perennial river flowing across three central districts of Kerala in India.

BACKGROUND OF THE STUDY

This paper is based on our research conducted in two *panchayats* along the banks of the river Bharathapuzha[1]. These two panchayats are Vaniyamkulam and Lekeddi-Perur respectively. Bharathapuzha is a west-flowing perennial river in Kerala[2]. Originating from the Western Ghats, it is the second longest river in the state, traversing a distance of 209 kilometres before joining the Arabian Sea (Nair 2001; Sreedhar, Irfan 2016). In Kerala, the river flows through three districts namely, Palakkad, Malapuram and Thrissur respectively. The agro-ecology of the river basin is such that 52 percent of it is used for farming purpose, and remaining are characterised by the presence of forests (26 percent), fallow lands (8 percent) and barren and cultivable lands (5 percent) (Sreedhar, Irfan 2016)[3].

Historically, the river has its own socio-ecological, cultural and economic significance. Oral histories, folklore, novels and certain segment of the popular cinemas have portrayed the Bharathapuzha as a crucial lifeline of the society (Ravi et al. 2004). The river is always remembered in terms of its aesthetic beauty,

ISSN 2283-7949
GLOCALISM: JOURNAL OF CULTURE, POLITICS AND INNOVATION
2018, 3, DOI: 10.12893/gjcpi.2018.3.6
Published online by "Globus et Locus" at www.glocalismjournal.net

cultural ceremonies, myths and legends of life and death, wetland-based livelihoods and political organization. Nevertheless, a large portion of the river basin is located in the comparatively drier regions and therefore the water-flow is also considerably less compared to other long rivers in the state. Further, techno-centric interventions since independence have considerably altered the physical, hydrological and geomorphological characteristics of the river. There are more than six reservoirs in the river that were constructed mainly for irrigation and power generation. Almost equal number of minor irrigation structures built across the river have also contributed to the reduction in water-flow. Other transitions such as expansion of towns and cities, shift in land use patterns, sand mining and disruptions in traditional water management systems with the advent of modernised water management systems have also affected the characteristics of the river. Consequently, there is almost no water flow in most parts of the river during summer months. People in the surrounding areas face acute water shortage during summers. The river that was once a lifeline of the society is today ailing, as if it is in its death bed. It is in the above-mentioned context, this research explores the socially constructed nature of water scarcity. Specifically, this paper examines how diverse actors experience, perceive and interpret water scarcity and its relationship with water governance.

THEORETICAL FRAMEWORK

Scarcity was once believed to be an open ended, temporally bound and spatially differentiated phenomenon (Xenos 1989). Nevertheless, with changing global and local, socio-political and economic contexts, the conventional discourses on scarcity also underwent significant changes (Rosengrant et al. 2002; Shiklomanov 1998). Adding more nuances to the argument of "rivers running dry", the emergent discourses began to emphasise on aspects such as volume of water, physical availability of water, demand and supply concerns, and population growth (Mehta 2007). Gradually, these discourses on water scarcity were identified with the problem of non-availability of water to meet the needs of a rapidly increasing population. The solutions that were suggested include technocentric means such as the construction of dams and

ISSN 2283-7949
GLOCALISM: JOURNAL OF CULTURE, POLITICS AND INNOVATION
2018, 3, DOI: 10.12893/gjcpi.2018.3.6
Published online by "Globus et Locus" at www.glocalismjournal.net

reservoirs. Thus, the earlier discourses of water scarcity were part of an instrumental rationality that actually served the needs of those actors who believed in the supremacy of technological advancement, economic development and population control to solve societal and environmental problems. Such an approach, however neglected the historical specificities, socio-cultural and political contexts of water scarcity (Mehta 2004).

Such an understanding of scarcity was less critical to the economic and technocentric solutions that policy makers and experts prescribed, which subsequently contributed to new problems of water management and governance issues. For instance, conflicts in water management are reduced to problems of demand and supply concerns rather than looking at resource scarcity as an interaction between diverse socio-cultural and political contexts of actors involved (Saleth 2011). The ever increasing water needs along a river basin are largely constructed as a problem of supply, facilitated by the discourses and discursive practices of the industry, corporate and big farmers, and domestic users. Amidst these constructions, the subjugated voices of marginalised actors such as the small farmers, landless, women labourers and poor households are seldom heard and recognised. Thus, the scarcity faced by the resource dependent communities are both real and constructed in nature (Mehta 2011). However, one needs to recognise the clear distinction between socially generated scarcity and absolute scarcity (Ross 1996). Socially generated scarcity refers to insufficient resources for certain sections of the population, while absolute scarcity indicates insufficient resources even if it is equitably distributed. Thus, scarcity is not experienced by society at large, but instead by particular social groupings and is created by both discourse and practice (Mehta 2011; Ross 1996; Hussein 2016).

In a similar vein, common property theorists have emphasised that the physical characteristics namely, the stationarity of a resource and storage are fundamental to the appropriateness of common property regimes (Ostrom 1990; Ostrom et al. 1994). Such an understanding also results in the crafting of *a priori* institutional designs in terms of principles and rules of the game, but often missing on the point of how resources and scarcity are meaningful to people (Forsyth, Johnson 2014). Instead of perceiving water-based commons such as tanks and reservoirs as reposi-

ISSN 2283-7949
GLOCALISM: JOURNAL OF CULTURE, POLITICS AND INNOVATION
2018, 3, DOI: 10.12893/gjcpi.2018.3.6
Published online by "Globus et Locus" at www.glocalismjournal.net

tories of water for irrigation, these resources need to be recognised and situated in the contexts of social roles such as locations of social standing, caste and cultural interactions (Mosse 1997; Forsyth, Johnson 2014). The role of institutions is thus not to merely conserve resources, but also to mediate certain social roles (Mosse 1997; Forsyth, Johnson 2014).

Further, the discourses related to global environmental change have begun to associate scarcity with concerns of risks and uncertainties. Risk is often referred to uncertainty about a situation and the outcomes of an activity of human value (Aven, Renn 2009; IRGC 2005; Wilson, Crouch 1982; Kaplan, Garrick 1981). For instance, the *Bharathapuzha basin*, which is severely subjected to drought like conditions during most part of the year was severely devastated in the deluge that hit Kerala in August 2018. However, by October 2018 reports of severe drought, water scarcity and sun burns began to be featured as gripping headlines in regional newspapers and portals. The fluid and dynamic nature of scarcity (as risk) reinforces the need to analyse the socially constructed nature of scarcity. An analysis of the social construction of risk could also throw light on the illusory and ambiguous nature of scarcity (Adams 2014). Scarcity will be experienced and interpreted in a specific context and has relative significance when it comes to social influences (Adams 2014; Burgess 2014).

There is certainly value in focusing on the socio-cultural, technological and political factors affecting scarcity (Wolfe, Brooks 2003; Ohlsson, Turton 2000). However, rather than adhering to an expert-driven, top-down understanding of scarcity, these perspectives should also recognise the relevance of the socially constructed nature of local discourses on scarcity. Such an approach will help us to understand how socio-cultural, political and economic conditions mediate with institutional actors to co-create scarcity (Burgess 2004). Such pluralist and dynamic nature of discourses and discursive practices have considerable implications on the management and governance of water resources in a particular area (Mehta 2011; Sasidevan 2014).

The theoretical assumption of this paper is primarily that water scarcity need not always manifest itself as a direct consequence of a natural phenomena. Instead the discourses and discursive practices surrounding water scarcity, which are socially constructed in specific temporal and spatial contexts can shape the emer-

ISSN 2283-7949
GLOCALISM: JOURNAL OF CULTURE, POLITICS AND INNOVATION
2018, 3, DOI: 10.12893/gjcpi.2018.3.6
Published online by "Globus et Locus" at www.glocalismjournal.net

gence, prominence and disappearance of these practices. These discursive practices are thus socially influenced and constructed as a result of diverse social, policy and technological interfaces (Long 2001; Mehta 2007). In the context of the above-mentioned debates, this paper explores how water scarcity is identified and constructed as risk by various actors, and how different solutions to address this risk are framed. It aims to provide more understanding on how diverse actors experiences and perceives scarcity and adds to the constructed nature of scarcity.

METHODOLOGY

This research has adopted an exploratory qualitative research approach to understand the socially constructed nature of water scarcity. As mentioned earlier, this study is located around two panchayats namely Vaniyamkulam and Lekkidi-Perur in Palakkad district respectively. The district is often characterised by an average rainfall of 2362 mm, which is quite less when compared to average rainfall of 3588 mm at the state level (Chand 2013; Dinesan 2012). Around 75 percent of the district's population depends on the surface water from the Bharathapuzha for irrigation needs. The two panchayats were selected purposively. Lekkidi-Perur was selected as it represented the upper stretch of the Bharathapuzha basin, while Vaniyamkulam represented the lower river basin in the district. Such a strategy enabled us to capture the variations in the socially constructed nature of water scarcity based on the differences associated to the changes in the socio-ecological system. For instance, while the upper river basin was largely characterised by technological interventions to manage water, the lower stretches felt the consequences of the same.

The primary participants of the study were local resource users consisting of farmers, potters, labourers and sand miners. Snowball sampling was used to purposively identify the participants of the study. A total of 37 farmers, 16 labourers, 11 potters and 11 government officials were interviewed from both the panchayats. These included 58 men and 17 women. Data was collected using interviews and observations. A semis-structured interview schedule was used to collect data from households. Interview guides were used to interview key informants and government

ISSN 2283-7949
GLOCALISM: JOURNAL OF CULTURE, POLITICS AND INNOVATION
2018, 3, DOI: 10.12893/gjcpi.2018.3.6
Published online by "Globus et Locus" at www.glocalismjournal.net

officials. A checklist was used to facilitate focus group discussions with farmers and women members in the community. Some elements of participatory research techniques were also applied to understand the socio-ecological system, its locations and transitions. Techniques such as transect walk, resource mapping, and seasonal calendars were used for the same. Oral histories were conducted with the elderly men and women in the two panchayats. The sites of enquiry were very dynamic and did not always concentrate at the household level. Vertically, we had to navigate across different social worlds ranging from the households to the Gram Panchayat, Block and District offices respectively. More importantly, on a more horizontal level our data enquiry spread across the household to community halls, farm lands, river bank, check-dams, irrigations structures, motor pumps, canals, market and so on, where each actor shared a specific meaning according to their livelihood goals.

Our positionalities did influence the course of this research. Prior to the fieldwork, we, urban residents had an entirely different understanding of scarcity. Our imaginations were often shaped by the media propaganda and images of drought affected farmers, barren and cracked lands, women carrying water from far off places and so on. As supporters of environmental conservation movements, we also believed that big dams were bad. However, we also believed that small irrigation structures such as check-dams and canals are important for the sustenance of people's livelihoods and are not harmful to the environment. Thus, shaped by various contextual factors, we also constructed our own understanding of water scarcity. Nevertheless, as the study progressed, we realised the complexities inherent in the discourses and discursive practices surrounding scarcity, and we became self-critical of our own linear thinking on the issue. The diverse discourses surrounding water scarcity that emerged during our fieldwork are discussed below.

TRANSITIONS FROM SUSTAINABILITY TO SCARCITY

The oral history sessions with elders in the two panchayats provided in-depth understanding on how the earlier generation of farmers and labourers co-existed with the socio-ecological system

ISSN 2283-7949
GLOCALISM: JOURNAL OF CULTURE, POLITICS AND INNOVATION
2018, 3, DOI: 10.12893/gjcpi.2018.3.6
Published online by "Globus et Locus" at www.glocalismjournal.net

of the river basin. These elderly research participants were rich with memories of a very vibrant ecosystem and their verbal expressions hinted at the rick local knowledge they possessed on the behaviour of the riverine ecosystem. A key argument that was consistently reflected in their speech was the recognition of crucial interconnectedness between diverse sub-ecosystems along the river basin, which formed the pillar of life for both the river and other living beings. According to them, the river, ponds, streams, wells, paddy fields, soil layers, crops and the climate sub-systems were linked to one another, and had a crucial role in sustaining the traditional livelihoods of resource users. The resource maintenance practices associated with these traditional livelihoods also contributed to the resilience of the larger ecosystem. For instance, traditional practices such as constructing small mud bunds and spouts along the fields to regulate the speed and direction of water not only helped in conserving water and recharging the aquifers, but also in ensuring an equitable distribution of water to the adjoining fields. In a similar vein, traditional varieties of paddy were considered to be a natural recharger of ground water and also helped in conserving the biodiversity of the wetland. According to the elders, the subsurface flow of water also ensured the retention of water in the smaller water bodies such as ponds and wells along the river basin. During those days, 'water was available in these water bodies even during times of scarcity'. The transitions in the traditional forms of socio-ecological system and associated practices is evident in the words of an 80-year-old woman Neeli as given below,

> Earlier, with the commencement of the sowing season, immediately after the first spell of monsoon shower, labourers and farmers used to venture out to the fields and ponds to divert water for irrigating the land. Streams were maintained regularly and care was taken to even clear accumulated wastes from the small diversions in the fields. Today, the situation has changed. Now there are vast stretches of land that is left barren and has affected the farming as well. The fervour with which farming was done earlier is not seen now…even with machines and other technologies!

There have been considerable changes in the traditional forms of water management and governance in the region. Diverse

ISSN 2283-7949
GLOCALISM: JOURNAL OF CULTURE, POLITICS AND INNOVATION
2018, 3, DOI: 10.12893/gjcpi.2018.3.6
Published online by "Globus et Locus" at www.glocalismjournal.net

contextual factors have shaped these transitions. The nature of these contextual factors and related change are explained below.

Technological and regulatory interventions by the State

Two crucial contextual factors that have affected the land and water management practices in the study area are the technological and regulatory interventions made by institutions of the State. The state government enacted the Kerala Land Reform Act, 1963 with aims of ensuring social equity and justice to the marginalised landless population of the state. The Act vested the ownership of a stipulated acreage of land held by the tenants with themselves. An unintended consequence of this Act and its implementation was the fragmentation of land, where large farm lands were divided into smaller fragments, which were to be owned by individual tenant families. This change in ownership regimes and subsequent fragmentation of land disrupted the traditional water management practices in the study villages. Earlier water was distributed through shared networks of canals across paddy fields and the norms of allocation, distribution and maintenance happened through reciprocative social arrangements based on trust and social networks. Elderly farmers recollect that these water sharing arrangements collapsed after the land reforms. No one was ready to be accountable to the maintenance of water structures in the villages and it was attributed as an inevitable responsibility of the state.

In the meantime, the state also took up the responsibility of technological modernization in the domain of irrigation, water conservation, distribution and its management. The experiences from the previous irrigation projects such as the Malampuzha irrigation project helped the state to rationalise the need for scaling up further the modernization of water management in the region, so as to boost agricultural productivity[4]. For instance, the availability of Malampuzha dam's irrigation water through canal system at Lekkidi-Perur provided farmers a greater opportunity to irrigate their rain-fed lands. The images of modernization in the water sector included huge motor pumps, lift irrigation, bunds, and check-dams. Guided by the rationalization of boosting farm production and higher economic returns, these images of moderniza-

ISSN 2283-7949
GLOCALISM: JOURNAL OF CULTURE, POLITICS AND INNOVATION
2018, 3, DOI: 10.12893/gjcpi.2018.3.6
Published online by "Globus et Locus" at www.glocalismjournal.net

tion received widespread acceptance by the farming community. Pump sets and motors promised to carry water to distant water scarce lands. At the same time, it also had the potential to reduce labour required for water distribution.

Nevertheless, in the long run, these technological interventions are found to have affected the local water management practices in the study villages. Moreover, actors began to look at these images of modernity with scepticism as some of these interventions proved to be ineffective as well. For example, check-dams were constructed at Lekkidi Perur during the 1990s. However, these structures have neither enhanced the irrigation facilities nor improved water storage in the region. The lift-irrigation structures that was constructed to provide drinking water through pipe lines were also found to be dysfunctional during the fieldwork time owing to poor maintenance by the Irrigation Department. This also raises concern and scepticism over the state's accountability in water governance. Yet another symbol of modernity was the High Yielding Varieties of Seeds that were introduced by the State in the 1960s to boost farm production. It was also intended to create uniformity in crop produce in terms of its growth, texture and life cycle. According to the farmers, these seeds required more amount of water, fertilisers and pesticides. In the initial years, these crops were pest resistant. However, farmers observe that the soil fertility and the ability of crops to resist pests have declined over the years. These changes and manifested impacts can be traced in tab. 1.

A significant consequence of these interventions is that the resource users have become more dependent on the actions of the State. There has been a transition from a resilient resource-user governed water management system to a complex State-depended water management system. Subsequently, the responsibility and accountability to manage resources is now vested completely with the State. However, in the context of present circumstances of water scarcity, resource users are not motivated to revert back to the traditional systems of water governance and management. Instead, they depend on the State to provide them with additional check dams and bunds to store water.

Even after experiences of failure, resource users have faith in the power of technological modernization to address the problem of water shortage. They want subsidies for motor pumps, construction

ISSN 2283-7949
GLOCALISM: JOURNAL OF CULTURE, POLITICS AND INNOVATION
2018, 3, DOI: 10.12893/gjcpi.2018.3.6
Published online by "Globus et Locus" at www.glocalismjournal.net

Tab. 1. *Technological interventions towards water management in Lekkidi-Perur and Vaniyamkulam Panchayats*

Year/ Decade	*Panchayat*	*Department*	*Technological Intervention*	*Purpose*	*Actors' Perceptions on the Outcome*
1940s	Lekkidi-Perur	Irrigation Department	Malampuzha irrigation project	Better irrigation facility	- Irrigation of rain fed land - Could harvest two-three crops a year
1950s	Lekkidi-Perur, Vaniyamkulam	Agriculture Department	Fertilisers and pesticides Pump sets	Agricultural productivity and better irrigation facility	- Production increased - Affected soil fertility - Pest Control - Could harvest two-three crops a year
1960s	Lekkidi-Perur, Vaniyamkulam	Agriculture Department	High Yielding Varieties of Seeds (HYV seeds) Lift Irrigation at Vaniyamkulam Panchayat	Agricultural productivity, Improved irrigation facility Better irrigation facility	- Stimulated response to input of fertilisers and hence boost production - Greater uniformity in production - Disease prevention with the help of pesticides - Expansion on irrigated farming - Could harvest two crops a year
1970s	Lekkidi-Perur	Irrigation Department, Water Authority and Panchayat	Lift Irrigation	Better irrigation facility	- Increase in drinking water facility in Lekkidi-Perur - Expanding irrigated farming - Could harvest two crops a year

Source: Fieldwork conducted by the authors during 2014.

ISSN 2283-7949
GLOCALISM: JOURNAL OF CULTURE, POLITICS AND INNOVATION
2018, 3, DOI: 10.12893/gjcpi.2018.3.6
Published online by "Globus et Locus" at www.glocalismjournal.net

Tab. 1. *(Continued)*

Year/ Decade	*Panchayat*	*Department*	*Technological Intervention*	*Purpose*	*Actors' Perceptions on the Outcome*
1990s	Lekkidi-Perur, Vani-yamkulam	Panchayat	Mud bunds	Conserva-tion of water	- Improved access to irrigation water with which they could do two-three crops a year
2000s	Lekkidi-Perur, Vani-yamkulam	Panchayat, Water resource department	Rain water pits, Public taps being removed at Lekkidi Perur panchayat House water connections	- Conser-vation of water and ground-water recharge -Improved access to drinking water	- Helps in ground water recharge and slows the runoffs - Convenience to access water at a fee that is levied by the government.

Source: Fieldwork conducted by the authors during 2014.

of more check-dams and so on. Three small check dams worth an average of 25,000 rupees each that were constructed in Vani-yamkulam panchayat was washed away in the very first rains. Even then, people prefer the check-dams. They believe that the construction of "permanent" check-dams will only ultimately solve the issues of water scarcity. They also believe that the State is the only actor who has the power and expertise to introduce such technological structures. Nevertheless, as mentioned earlier, the easy access to irrigation water through these technological structures have resulted in the devaluation of traditional ecosystem units such as ponds, wells and canals. Other contextual factors that have affected the resource governance practices are explained below.

ISSN 2283-7949
GLOCALISM: JOURNAL OF CULTURE, POLITICS AND INNOVATION
2018, 3, DOI: 10.12893/gjcpi.2018.3.6
Published online by "Globus et Locus" at www.glocalismjournal.net

Changes in family structure of farming households

There has been a considerable shift in the structure of families along the river basin. More than 90 percent of joint families in the two panchayats are today reduced to nuclear families. This has affected both farming and land use practices. With a rise in nuclear families, there has been an increase in the needs for individual housing arrangements as well. Large stretches of ancestral land owned by a single joint family have become fragmented; and small pieces of land are being allocated to individual family members to build concrete houses. According to elders and key informants who were interviewed, such developments have disrupted the ecological balance of the river basin's ecosystem. With the fragmentation of land, people have stopped maintaining the sub-systems such as the ponds, streams and field bunds. No one is held accountable to the irresponsible management of these resources. The words of Komalavali, a 50-year-old research participant explains the concern of some sections of the affected population as follows.

> Earlier, in a joint family of five to six members, even if the children got married, the ownership of land was with the single joint household. Today, each family has split into numerous nuclear families… all separate houses! Unity is also not there! Earlier even if money was less, there was love and care for one another. Today that has changed! Everything is defined in monetary terms. This change has affected how we look at our resources… whether it is our land or food or water! For instance, the river is in its ruins now!

Land-use changes, labour scarcity and livelihood diversification

Simultaneous to the changes in family structure and state interventions, there has been changes in land-use patterns as well. A large extent of farmland was converted for housing purposes. Further, the changes in the valuation of land or its resource units as a commodity (rather than an ecosystem component) has led to considerable land use changes. For instance, as the demand for sand increased with the rise in construction work, sand mining became an important livelihood option for many. According to environ-

ISSN 2283-7949
GLOCALISM: JOURNAL OF CULTURE, POLITICS AND INNOVATION
2018, 3, DOI: 10.12893/gjcpi.2018.3.6
Published online by "Globus et Locus" at www.glocalismjournal.net

mentalists in the region, drastic sand minding has dried up the aquifers and has reduced the water recharging capacities of the river basin. However, with the new livelihood opportunities emerging such as sand mining, many farm labourers also shifted to sand mining as a means of employment. Sand mining ensured more wages and more autonomy for the labourers, when compared to working under the landlord as a farm labourer. This also resulted in severe scarcity of farm labour in the study villages.

The labour scarcity induced further land use changes in the river basin. For instance, there has been considerable disruptions in the farm maintenance practices. Paddy fields in the river basin are a networked socio-ecological system, where each individual paddy field is connected to the other through a vast network of small canals. These small canals provide water to these fields. To ensure the smooth supply of water, it required regular maintenance. Care had to be taken that the sides of the canal are not breached, waste is not accumulated, and sowing and transplanting are happening at the same period for all the networked paddy fields. All these required the consistent supply of labour. However, with labour scarcity, the wages also increased and many farmers were unable to hire labourers to carry out their farm operations. Labourers were also more interested to work in other spaces due to factors such as autonomy involved in other occupations. A consequence of these developments was the severe disruption of land and water management practices in the river basin. The regular maintenance of canals and field bunds seldom happen in some places. In many other places, farmers leave the land barren or sell it to real estate developers, as they find farming no more viable both in terms of economy and labour. These disruptions have also affected the carrying capacity and sustainability of both land and water bodies in the river basin.

Such changes have also affected the collective water sharing mechanisms that existed among farm owners earlier. For instance, the collective management of water bodies such as ponds are completely disrupted. Though, these ponds are private property in legal terms, in practice they had the characteristics of common pool resources. There were normative arrangements to allocate water to other users (apart from the owner). As a reciprocal measure, the users involved in the annual maintenance and cleaning of these water bodies. However, due to the above-mentioned factors

ISSN 2283-7949
GLOCALISM: JOURNAL OF CULTURE, POLITICS AND INNOVATION
2018, 3, DOI: 10.12893/gjcpi.2018.3.6
Published online by "Globus et Locus" at www.glocalismjournal.net

of changes in family structures, labour scarcity and emergence of new livelihood opportunities, these practices were disrupted. Moreover, with less availability of water, the pond owners also began to impose restrictions for other users to access the pond. Today, these ponds and canals are filled with silt and waste, affecting the flow of water or its conservation.

A counter practice that has emerged in the above-mentioned contexts is the ecological restoration initiatives of few actors such as the Agricultural Department, Gram Panchayat and Women's Self Help Groups. The State government also enacted The Kerala Conservation of Paddy land and Wetland Act of 2008 with the intent to prevent the conversion of paddy fields into any commercial lands. Nevertheless, elderly farmers and environmental experts are apprehensive about the effectiveness of ecological restoration as such. They believe that once converted, it is very difficult to ecologically reclaim paddy fields to their original status. The originally intended impact of the Kerala Conservation of Paddy land and Wetland Act, 2008 is yet to be seen.

Impact of ecosystem changes on secondary resource users

The above-mentioned ecosystem changes and regulatory arrangements have not only affected the farmers but also other resource dependent communities such as the potters. The potters today have very restricted access to resource units essential for their occupation such as clay, firewood and coconut husk. With the reduction in paddy farming and lack of moisture in the fields, the availability of clay from the fields and adjoining areas has also considerably reduced. This is very much evident in the upper river basin namely, Lekkidi-Perur. The scarcity of clay due to limited access has resulted in the over-exploitation of accessible resources. This is very evident in the lower river basin, namely Vaniyamkulam, where potters have no other option but to dig out more clay beyond the lands' carrying capacity. This has further resulted in the destruction of natural aquifers, and thereby severely constraining the water storing capacities of these fields. Therefore, these days many farm owners restrict potters from accessing their land. As the farm land is also diversified for other non-farm uses, land owners deny the potters to access their land or dig out

ISSN 2283-7949
GLOCALISM: JOURNAL OF CULTURE, POLITICS AND INNOVATION
2018, 3, DOI: 10.12893/gjcpi.2018.3.6
Published online by "Globus et Locus" at www.glocalismjournal.net

clay from it. This in turn has added to the livelihood uncertainties of the potter community.

Climate variability and drought-like situations

Other factors such as climate variability including irregular monsoons and drought-like situations have also affected the farming and water management practices in the two villages. Consequently, due to water scarcity, farmers have shifted from a two-crop cycle to a single crop cycle every year. In the words of a group of farmers,

> We used to harvest our first crop in April. The summer rains during April and May ensured that our seedlings are preserved well for the next transplanting season. By June, the Southwest monsoons ensured the adequate supply of water to the standing crops. However, these days the rains are irregular and rains come after the gestation period. This damages the crops and this is true for our second crop as well. The north-east monsoon used to support the second crop season. As the north-east monsoon used to bring less rain, we used to depend on water from the ponds and streams. However, today these ponds and streams have become dysfunctional.

In a similar vein, yet another group of farmers commented on the demand-supply uncertainties and its relationship to climate variability. According to them,

> We used to procure our seeds from the Krishi Bhavan, as we get them at subsidised prices[5]. The market price is quite high when compared to the price of seeds from the Krishi Bhavan. But most of the time, we do not get the seeds from the Krishi Bhavan on time. For instance, last year we bought these seeds from market for 70 rupees a kilo… on an average at least 50 kilos is required! However, due to the prevalence of a weak monsoon, we were unable to use the seeds. Neither could we use the seeds for the next crop. We incurred a loss of at least 3500 rupees per farmer.

The farmers believe that they have no control over climate variability and associated uncertainties. While some farmers cope by shifting to single crops, there are many others who are willing

ISSN 2283-7949
GLOCALISM: JOURNAL OF CULTURE, POLITICS AND INNOVATION
2018, 3, DOI: 10.12893/gjcpi.2018.3.6
Published online by "Globus et Locus" at www.glocalismjournal.net

to leave their land fallow without undertaking any cultivation. Or else they wait for opportunities to sell off their lands.

DISCUSSION: THE SOCIALLY CONSTRUCTED NATURE OF RISK

Bharathapuzha is a river that was given immense religious and cultural importance by the people dependent on it. Gradually, this significance and people's intimate relationship to the river is getting eroded. From a river that defined the life-world of people, today it has become both objectified and commodified in the name of progress and development. Today, the pipelines have more meaning to these people, more than the river itself! Environmental activists opine that rampant sand-mining has destroyed the womb of the river. And both the citizens and the State have failed to prevent it from happening.

Technological interventions over the last seven decades have redefined water governance and reshaped the discourses of water scarcity in the region. The new images of progress and development replaced the traditional water management systems. This also led to the gradual alienation of people from the basic socio-ecological systems such as the ponds, streams, wells, canals, flora and fauna and their interlinkages. The discourses of scarcity were not linked to ecological imbalances and human accountability. Instead, they were largely designed around the need for progress and development, boosting production, market linkage, labour shortage and more human comfort. "Instead of we going to the river, let the river come to us… via the check-dams, motor pumps, pipelines and so on. We can sit here and rest. The State and the engineering experts will take care of the rest… And when the State and the engineers do not give us more of these technological marvels, then we experience scarcity" has become a way of life for many resource users in both the villages. There also lies a utilitarian rationality to this way of life that shapes resource use and its ultimate exploitation through the lens of profit maximisation.

Risk as a social construction is used explicitly and its meaning varies from people to people (Adams 2014; Johansen, Rausand 2014). Scarcity as risk is co-constructed by a range of social actors, technological and policy interventions. Risk is thus socially brought

ISSN 2283-7949
GLOCALISM: JOURNAL OF CULTURE, POLITICS AND INNOVATION
2018, 3, DOI: 10.12893/gjcpi.2018.3.6
Published online by "Globus et Locus" at www.glocalismjournal.net

Tab. 2. *Multiple discourses surrounding water scarcity*

Discourses on Scarcity	*Village 1 - Vaniyamkulam*	*Village 2 - Lekkidi-Perur*
Existing Risks: Portrays how people define the nature of risk	- Water scarcity for irrigation and drinking water is a risk - Labour shortage as a risk - Barren land and the risk of fast run offs of rain water including soil erosion - Maintenance of water resources itself evolving as a risk	
Risk Prioritisation: Portrays how people prioritised one risk over another	Labour issue is more of an issue here than the problem of water scarcity. Maintenance of water resources is the next issue and the issue of barren lands is considered to be negligible	Both water scarcity and labour issue has been an issue of concern. Issue of barren lands and maintenance of water resource systems in the area is also a priority. There seems to be fluidity with respect to prioritization of issues
Solutions to the respective risks: Portrays the nature of solutions that are available to address the diverse risk	- Temporary check dams can arrest water run off - Construction of mud bunds can store water and recharge aquifers - Partial mechanization of agriculture to boost agricultural production / labour shortage - Pada Shekhara Samithi to check on the maintenance of water resource systems as alternate institutional arrangements	- Check dams, lift irrigation and canal water system to address water scarcity - Mechanization of agriculture to boost agricultural production / labour shortage - Check on barren lands by Panchayats - Pada Shekhara Samithi to check on the maintenance of water resource systems - De-silting and maintenance of ponds and streams with the help of NREGS workers undertaken by the panchayat

Source: Compiled from fieldwork conducted by the authors during 2014.

into being by relations of how and who defines it. This concept varies from multiple actors, situations, culture, socio-political and economic realities and builds into the local discourses of water scarcity. These discourses then become channels of regulation and control of resource use and access by a specific kind of knowledge and technological domination. The discourses of water scarcity are thus also a channel to design and articulate specific forms of power and control by few privileged actors. However, both these

ISSN 2283-7949
GLOCALISM: JOURNAL OF CULTURE, POLITICS AND INNOVATION
2018, 3, DOI: 10.12893/gjcpi.2018.3.6
Published online by "Globus et Locus" at www.glocalismjournal.net

Tab. 2. *(Continued)*

Discourses on Scarcity	*Village 1- Vaniyamkulam*	*Village 2- Lekkidi-Perur*
New Risks with existing solutions: Portrays the nature of new kinds of risk emerging out of existing technological solutions to address water scarcity	- Unsustainable and yearly dependence of the community towards the Panchayat for the construction of temporary check dams - Lack of funds in construction of these temporary check dams - Mechanisation cannot be fulfilled for agricultural fields that is located near the river due to railway line and hence the risk of labour shortage still exists - Lack of togetherness with respect to maintenance of water resource systems - Lack of accountability from the panchayat/ government level with respect to maintenance of water resources	- Failures with respect to implementation - Lack of accountability from government departments

Source: Compiled from fieldwork conducted by the authors during 2014.

processes of social construction of scarcity and the flow of power is fluid and often ambiguous (Adams 2014). More importantly, the discourse of water scarcity does not manifest alone. Instead, it is always weaved into other parallel discourses of risk and scarcity such as labour scarcity, seed scarcity, clay scarcity, fuel wood scarcity, fish scarcity, scarcity of rains, and fund scarcity too (tab. 2). The last form of scarcity implies the need for more funds to undertake major technological projects so as to feed into the other discourses of scarcity.

ISSN 2283-7949
GLOCALISM: JOURNAL OF CULTURE, POLITICS AND INNOVATION
2018, 3, DOI: 10.12893/gjcpi.2018.3.6
Published online by "Globus et Locus" at www.glocalismjournal.net

CONCLUSION

The social construction of scarcity is thus a complex phenomenon involving multiple actors across different spatial and temporal realms. The discourses are always dynamic and emergent in nature suiting the needs of actors with specific knowledge interests. Finding appropriate pathways to address scarcity requires deconstructing the real and attributed causes of scarcity. However, the effectiveness of such an exercise depends on who is involved in the deconstruction. When local resource users have become entirely dependent on the state for satisfying their specific interests, their deconstruction will offer only those solutions derived out of their relationships and interests with the state. On the other hand, the State believes in creating its own technologies of grandeur that signifies progress, strength and development. The language of deconstruction that the State uses will also be biased. Now, the question remains, "who will voice for the river Bharathapuzha and her children – the streams, canals, ponds, wells, fields, soil, clay, seeds, fish, crabs, snails and so on". The discourses continue, and future research could attempt to represent the river herself and address these complexities.

NOTES

[1] Panchayats are constitutional bodies of local self-governance in India. In Kerala, a three-tier system of local self-governance exists. With respect to rural areas, the Gram Panchayat forms the first tier, Block Panchayat are the second tier and Zilla Panchayat at the district level respectively.

[2] *Bharatha* refers to the region called Bharatha, which is synonymous to the Indian sub-continent, and *puzha* means river in the native language Malayalam.

[3] Please note that this statistical distribution would have changed after the deluge that hit Kerala in August 2018. The pertinent information on post-flood agro-ecological contexts are not yet updated. The findings of the paper are largely based on our research prior to the pre-flood scenario in Kerala.

[4] In the 1940s, the Malampuzha Irrigation Project was initiated in Palakkad district to provide better irrigation facilities. In Kerala, this was the first large scale irrigation project. The Malampuzha Irrigation project has a dam which is constructed across the river Malampuzha which is a tributary of Bharathapuzha and a network of canals were spread out which facilitated the irrigation of 21245 hectares of land (Department of Economics and Statistics, Government of Kerala 2017). It also targeted to irrigate rain fed lands that did not have access to enough water for irrigation and help the farmers to cultivate two to three crops a year. This helped many areas of land in the Lekkidi-Perur Panchayat to receive irrigation water.

ISSN 2283-7949
GLOCALISM: JOURNAL OF CULTURE, POLITICS AND INNOVATION
2018, 3, DOI: 10.12893/gjcpi.2018.3.6
Published online by "Globus et Locus" at www.glocalismjournal.net

[5] Krishi Bhavan is a government body hosted by the State Department of Agriculture. It helps the department in designing and implementing the state programs on agriculture and farmer welfare.

REFERENCES

J. Adams (2014), *Managing Risk: framing your problems*, in "BoeringerIngelheim Alumni Seminar", Schloss Gracht, Cologne, pp. 9-11.

T. Aven, O. Renn (2009), *On risk defined as an event where the outcome is uncertain*, in "Journal of Risk Research", 12, pp. 1-11.

A. Burgess (2004), *Cellular Phones, Public Fears and a Culture of Precaution* (Cambridge: Cambridge University Press).

A. Burgess (2014), *The Social Construction of Risk* (early, pre-publication version), in K. McComas (ed.), *Sage Handbook of Risk Communication* (London: Sage).

A. Chand (2013), *Groundwater Information booklet of Palakkad District, Kerala State*, Central Ground Water Board, Ministry of water resources, Government of India, Thiruvananthapuram.

V. Dinesan (2012), *Why Bharathapuzha Goes Dry*, in "Kerala Calling", March, pp. 28-33.

T. Forsyth, C. Johnson (2014), *Elinor Ostrom's legacy: Governing the commons, and the rational choice controversy*, in "Development and Change", 45, 5, pp. 1093-1110.

Government of Kerala (2017), *Report on Infrastructure Statistics 2014-15*, Department of Economics and Statistics, http://www.ecostat.kerala.gov.in/images/pdf/ publication s/GeneralPu blication/data/rep_infra_stat_1415.pdf.

IRGC (International Risk Governance Council), *2005, Risk Governance – Towards an Integrative Approach*, White Paper 1, Renn O. with an Annex by P. Graham (Geneva: IRGC).

H. Hussein (2016), *An analysis of the discourse of water scarcity and hydropolitical dynamics in the case of Jordan*, PhD Dissertation, School of International Development, University of East Anglia.

I.L. Johansen, M. Rausand (2014), *Foundations and choice of risk metrics*, in "Safety Science", 62, pp. 386-399.

S. Kaplan, B.J. Garrick (1981), *On the Quantitative Definition of Risk*, in "Risk Analysis", 1, 1.

N. Long (2001), *Development Sociology* (London, New York: Routledge).

L. Mehta (2004), *Financing water for all. Beyond border convergence in water management*, IDS, Working Paper 233, Brighton.

L. Mehta (2007), *Whose scarcity? Whose property? The case of water in western India*, in "Land Use Policy", 24, pp. 654-663.

L. Mehta (ed.) (2011), *The Limits to Scarcity: Contesting the Politics of Allocation* (London, New York: Routledge).

D. Mosse (1997), *The Symbolic Making of a Common Property Resource: History, Ecology and Locality in a Tank Irrigated Landscape in South India*, in "Development and Change", 28, 3, pp. 467-504.

K.K. Nair (2001), *Environmental problems on water resources of Bharathapuzha river-system* (Dubai: Oriental Research Center).

L. Ohlsson, A.R. Turton (2000), *The Turning of a Screw: Social Resource Scarcity as a bottleneck adaptation to water scarcity*, in "Stockholm WaterFront – Forum for Global Water Issue", 1, Stockholm International Water Institute (SIWI).

E. Ostrom (1990), *Governing the Commons: The Evolution of Institutions for Collective Action* (Cambridge: Cambridge University Press).

E. Ostrom, R. Gardner, J. Walker, A. Agrawal (1994), *Rules, Games, and Common-pool Resources* (Ann Arbor: University of Michigan Press).

ISSN 2283-7949
GLOCALISM: JOURNAL OF CULTURE, POLITICS AND INNOVATION
2018, 3, DOI: 10.12893/gjcpi.2018.3.6
Published online by "Globus et Locus" at www.glocalismjournal.net

S.P. Ravi, C.G. Madhusoodhanan, A. Latha, S. Unnikrishnan, A. Bachan (2004), *Tragedy of Commons: The KeralaExperience in River Linking* (Thrissur: River Research Center).

M.W. Rosengrant, X. Cai, S.A. Cline (2002), *World Water and Food to 2025: Dealing with Scarcity* (Washington: International Food Policy Research Institute).

A. Ross (1996), *The lonely hour of scarcity*, in "Capitalism, Nature, Socialism", 7, 3.

R.M. Saleth (2011), *Water scarcity and climatic change in India: the need for water demand and supply management*, in "Hydrol", 56, 4, pp. 671-686.

D. Sasidevan (2014), *The Social Construction of Scarcity: An Actor-oriented Study on Water Governance along the "Nila" river basin in Palakkad, Kerala* (MPhil Thesis Unpublished).

L.A. Shiklomanov (1998), *World Water Resources. A new appraisal and assessment for the 21-century*, UNESCO.

L. Sreedhar, Z.B. Irfan (2016), *Economic Incentives for the Conservation of Bharathapuzha River: Focus on Sand Mining*, MSE Working paper 140/2016, Madras School of Economics.

R. Wilson, E.A.C. Crouch (1982), *Risk-Benefit analysis* (Cambridge: Ballinger).

S. Wolfe, D.B. Brooks (2003), *Water scarcity: An alternative view and its implications for policy and for capacity building*, in "Natural Resouces Forum", 27, 2, pp. 99-107.

N. Xenos (1989), *Scarcity and Modernity* (London, New York: Routledge).

ISSN 2283-7949
GLOCALISM: JOURNAL OF CULTURE, POLITICS AND INNOVATION
2018, 3, DOI: 10.12893/gjcpi.2018.3.6
Published online by "Globus et Locus" at www.glocalismjournal.net