Buser, M.; Leeson, L.; MS Rathore; Roy, A. and Sabnani, N. 2020.
Interdisciplinary research in Rajasthan, India: Exploring the role of
culture and art to support rural development and water management.
Water Alternatives 13(3): 822-842

Interdisciplinary Research in Rajasthan, India: Exploring the Role of Culture and Art to Support Rural Development and Water Management

Michael Buser
University of the West of England, Centre for Sustainable Environments and Planning, Bristol, UK; michael.buser@uwe.ac.uk

Loraine Leeson
University of Middlesex, Department of Fine Arts, UK; l.leeson@mdx.ac.uk

M.S. Rathore
Centre for Environment and Development Studies (CEDSJ), Jaipur, India; msrorama@gmail.com

Anurupa Roy
The Katkatha Puppet Arts Trust, New Delhi, India; royanurupa@gmail.com

Nina Sabnani
Industrial Design Centre, IIT Bombay, Mumbai, India; nina.sabnani@gmail.com

ABSTRACT: This paper examines the role of art and culture in supporting rural development in the context of critical water challenges. It focuses on an interdisciplinary network and research programme conducted in 2018 with the village of Jhakhoda, in Rajasthan, India. The village has experienced years of declining water quality and has recently turned to rainwater harvesting and other conservation measures as a means to address water challenges. The research team sought to support local NGO and village efforts through creative, regionally specific forms of cultural activity. Through our project, we found that arts approaches can contribute to changes in the way people understand water and environmental challenges and can play a significant role in working towards sustainable water futures.

KEYWORDS: Water, interdisciplinarity, art, puppetry, mural, Phad painting, Rajasthan, India

INTRODUCTION

This paper examines the potential role of art and culture in rural development and water management; it focuses on an interdisciplinary research project that introduced painting, murals and puppetry to a rural semi-arid village in Rajasthan, India. In recent years, there has been widespread interest in the use of art in international development contexts (Stupples, 2016; Stupples and Teaiwa, 2016; Clammer, 2015). This reflects the posited ability of art-making processes to support a range of social and environmental benefits including capacity building and the empowerment of so-called marginalised, or at-risk, communities and individuals (Jiang et. al.; 2020). Within international development contexts, a great deal of interest and activity in participatory forms of working can be traced back to Robert Chambers (1994)

who sought to challenge outsider-led and top-down forms of development. Chambers' *Participatory Rural Appraisal*, was informed by Paulo Freire's *Pedagogy of the Oppressed* (Freire, 1970); it involved active listening and had the goal of engaging local communities in the decision-making processes that impacted their lives (Cooke and Soria-Donian, 2020). Alongside grassroots approaches to development, there has also been a recent increase in the use of participatory arts methods; most notably, participatory theatre has been influential in drawing together dialogical and grassroots forms of development practice and the arts. Participatory theatre is commonly associated with Augusto Boal who, as Sloman (2011) points out, "took Freire's theories and put them into practice" by enabling communities to make their own theatre through which they could explore opportunities for change. Boal's *Theatre of the Oppressed* (Boal, 1979) sought to make passive audiences into active agents or 'spect-actors' (ibid).

Today, participatory arts have a presence in a wide range of development initiatives (Cooke and Soria-Donian, 2020); examples of programmes include those that draw on the arts to understand and reduce the potential for violence in areas of conflict (Abah et al., 2009), programmes that support HIV prevention (Wood, 2012), those that support community development (Abah, 2007) and those that engender pro-environmental attitudes and behaviours for natural resource management (IIED, 2006; Morales and Harris, 2014). Globally, there has been a growing interest in using art and culture to help explore issues associated with the management of water (Buser et al., 2018). Even so, art and culture do not feature prominently in scholarship on water management and policy. Where art is present, it is often described as a communication tool which can aid in awareness raising and policy delivery (Selwood, 1995; Belfiore and Bennett, 2008); some argue, however, that this perception of art's role is in fact a limitation and that it disregards the more powerful potential for the arts to influence change (Clammer, 2015; Leeson, 2017). We agree with this perspective and have sought to identify and expand on embedded forms of arts – water environmental practice.

Methods and project outline

The paper describes the activities of a 12-month interdisciplinary project that brought together artists, social scientists, development experts, NGOs and water stakeholders in the village of Jhakhoda, in Rajasthan, India. Our central research goal was to examine and understand the role of the arts in the support of water security[1] in rural Rajasthan. In pursuing this goal, we developed an arts programme which ran for several months during the summer of 2018; our activities were informed by a socially engaged arts approach (Helguera, 2011; Leeson, 2017) through which collaborative and participatory art practices were brought to bear on the contemporary issue of environmental change and water management.

The paper draws together the views and contributions of key participants and co-investigators on the project. In addition, our analysis is based on 14 formal interviews as well as informal discussions with water stakeholders, research participants and artists. Interviews and discussions were qualitative and were generally conducted on-site during arts activities. Formal interviews, such as with NGO representatives, lasted well over an hour and took place over the course of several days. The data was transcribed and, where appropriate, translated into English; it was then analysed thematically, paying particular attention to expressions of water security and water policy and how these could be understood via the arts. Informal discussions occurred regularly throughout the project; these discussions were critical to our understanding of water issues and the local context. Much of the data was recorded by the

[1] By water security, we mean "(…) an acceptable level of water-related risks to humans and ecosystems, coupled with the availability of water of sufficient quantity and quality to support livelihoods, national security, human health, and ecosystem services" (Bakker, 2012: 914). It should be noted, however, that this paper does not critically engage with the wide-ranging debates, politics and complexities surrounding water security; its focus is on the potential role for arts-led approaches in the support of water management programmes and initiatives. For a further discussion of water security, particularly in relation to India and the Global South, see Anand (2017), Asthana and Shukla (2014), Bakker (2012), Bjorkman (2015), Cronin et al. (2014), Tiwari et al. (2015), UN Water (2013), and Vörösmarty et al. (2010).

research team in the form of field notes. Our research also took advantage of earlier work conducted by the Centre for Environment and Development Studies, Jaipur (CEDSJ, our project partners). This organisation provided detailed knowledge of the physical conditions of water resources in Rajasthan; their pre-existing links with NGOs and communities in rural Rajasthan also allowed the team to identify collaborations and set up workshop activities in relatively short timeframes.

In the next section, we review key literature on the relationships between art and development; we then introduce the prevailing environmental conditions in Rajasthan, India, and summarise trends in water provisioning and water management. After that we narrate an interdisciplinary art and development project and then discuss key findings from the work. The paper concludes with a summary and suggestions for future research.

CULTURE AND THE ARTS

In this article, we focus on two ways of understanding the concept of culture, particularly as it has been applied recently within international development and water research contexts. In the first framing, culture refers to 'what we do' (Clammer, 2015: 7); these are the shared, yet dynamic sets of practices that describe the way people conduct daily life. Culture, in this sense, provides a shared form of engaging in and understanding the world; this involves things such as language, social relations, social norms, and the built and natural environment. Zug and Graefe (2014), for example, detail the role of 'water gifts' in Khartoum, Sudan, where they are an everyday cultural practice embedded in social and religious codes and beliefs; water gifts contribute to water security and strengthen social bonds and relations on the peripheries of the city where access to potable water is a daily challenge.

Being attentive to cultural practices such as these enables a detailed critical understanding of the power dynamics that are associated with water policies. In India (and elsewhere), for example, many NGOs and development programmes specifically focus on the participation and involvement of women, aware of their key role in the household management and collection of water (O'Reilly, 2006). Such programmes draw on women's knowledge and labour and often seek to specifically empower women as decision makers in water management; while studying community water supply programmes in rural India, however, Singh et al. (2005) describe the way caste (in addition to gender) informs and regulates who has access to improved water systems, with the lower classes and most disadvantaged often being denied. They argue that "merely identifying women as a priority beneficiary group will not suffice. There is a need to pay attention to the various socio-cultural dynamics revolving around women, depending on their specific social niche and economic circumstances" (Singh et al., 2005: 221). In other words, water policies and infrastructures are entangled with culture and with the often unexplored or taken-for-granted social norms and practices found in particular places.

In the second framing, culture is the set of activities often described as 'the arts' such as dance, theatre, performance and music. These cultural forms are commonly celebrated for their intrinsic qualities such as their ability to support emotional and expressive fulfilment. While generally referring to 'high culture' such as classical music, the arts also refers to aspects of popular culture such as television, film and crafts, as well as other forms of often overlooked or disregarded creativity and creative expression.

Conventionally, bringing the arts into water policy and management is justified in pragmatic terms; the arts are valued in that context for their particular ability to facilitate community involvement, to reach new or hard-to-reach audiences, and to more effectively deliver policy implementation. While recognising these as worthy objectives, John Clammer (2015) argues that such instrumentalist positioning disregards the core values of the arts as being, for example, life enriching; there is thus a failure, he feels, to take full advantage of culturally informed development.

Indeed, the involvement of the arts can be justified in many other ways. It has been recognised for some time, for example, that the arts can offer a range of significant social benefits. In the UK, François Matarasso (1997) found that involvement in the arts led to benefits such as personal growth and enrichment, improvements in health, and social cohesion. Others have found that involvement in the arts can lead to both individual and community empowerment, which allows people to feel in control and more able to imagine alternative solutions and futures (Selwood, 1995; Duncombe, 2007; Clammer, 2015). Efforts to 'give voice' through artistic facilitation, furthermore, can move beyond awareness raising and education by offering a means of bringing local knowledge into the public domain (Fitzgerald, 2004; Leeson, 2017). Such an approach draws on the work of Freire (1970), Boal (1979) and Chambers (1994) and is situated in an epistemology that values knowledge, contribution and agency within engaged communities. In this context, Stupples (2014: 127) argues that the political value of the arts can be found in processes which "provide sites for critical collective reflection". Ware and Dunphy (2020: 154), moreover, point out that projects promoting local 'empowerment' through supporting active art making may fare better than passive arts initiatives "when [the former are] accompanied by genuine participant power to share in making, and then enacting, important decisions (…)".

Other research has identified how the arts (and creativity more broadly) can play an important role in addressing poverty and building sustainable forms of income generation (Raina, 2018). In this respect, engagement with the arts could lead to the enrichment of local economies and livelihoods through, for example, the development of new skills and new economic opportunities (Arts Council, 2014). Economic rationalisations, however, often struggle to account for the more subtle means through which the arts effect change by, for example, influencing emotions, creating meaning, and helping people see, understand or explain the world in a new way (Clammer, 2015: 75). Building on these insights and experiences, in recent years there has been a proliferation of arts activity and artists seeking to engage in the arena of global challenges (Kester, 2011; Clammer, 2015; Raina, 2018). These projects aim to make real change, if only on a small scale; they are seen, however, as changes that can be replicated or scaled up to achieve more far-reaching differences (Hamdi, 2004). They can also serve to celebrate and consolidate new ideas and draw public attention to urgent issues.

Critically, both framings described above posit culture as a dynamic and malleable form of sense-making. This is significant for the contexts of environmental crisis such as drought or climate change, as culture is the means through which people come to understand not only what is presently happening but also what makes up the domain of possible futures. In our work, we draw on these understandings of culture and the arts; we seek to explore their role in rural development and water management, not only as a mechanism for policy delivery but as a critical component of flourishing lives. Before examining our project, we turn to the existing water context and challenges in Rajasthan, India.

THE WATER CONTEXT IN RAJASTHAN

Rajasthan is the largest state in India, covering over 132,000 square miles; its population of 70 million is 75% rural (GoR, 2010a). The state's landscape and climate are varied and it is bisected by the Aravalli Range which runs southeast to northwest. West of the Aravalli Range conditions are generally arid to semi-arid, with the Luni as the only river in this part of the state (CGWB, 2014). The remainder of the area is described as 'outside river basin'; here streams and water bodies are seasonal and provide only internal drainage. Most of the state's water resources are found to the east of the Aravalli Range where there are 14 rivers and a generally wetter climate. According to the Water Resources Department, the average rainfall for the state in 2016 was just under 700 mm (CGWB, 2017a); this figure, however, represents a spread from the high of 1309 mm in Pratapgarh in southeast Rajasthan, to a low of 140 mm in Jaisalmer in western Rajasthan. Over 90% of the state's rain falls during the monsoon of late June to early September (CGWB, 2017a). These monsoon rains are critical to life in Rajasthan as agriculture and

households are heavily dependent on this rainwater for rainfed agriculture, aquifer recharge, and irrigation; these monsoons can, however, be erratic in terms of overall precipitation and timing.

In India, groundwater is managed and regulated at the state level. While national water policies (NWPs) guide and coordinate water policy across the country, it is up to individual states to adopt specific laws for water management (Katyainia and Baruaa, 2016). Within Rajasthan, the *Rajasthan State Water Policy 2010* and, more recently, the *Rajasthan River Basin and Water Resources Planning Act, 2015* are part of a "shift from predominantly engineering-based solutions to local community based water management solutions" (GoR, 2010b: 3). These policies are based on a recognition that conventional – that is to say, modern and exclusively state-provided – efforts and approaches have not adequately addressed the state's water challenges and that there is a need for a new, locally driven and managed system for water.

Rajasthan's water challenges have been well documented (Gupta, 2011; Hussain et al., 2012; O'Reilly and Dhanju, 2012; Everard, 2015). According to the CGWB, much of the state's groundwater resources are over-exploited, critical or semi-critical, as extraction has exceeded recharge (CGWB, 2019: 50-64; CGWB, 2017a, 2017b, 2017c). The *Rajasthan State Water Policy* (GoR, 2010b: 2) sets out the critical water issues as follows:

- Growing imbalance between demand and supply of water
- Uncertainty in the availability of water
- Inequality in access to water
- Low operational efficiency of water resources systems
- Depleting groundwater resources and deteriorating quality of water
- High cost of service, low cost recovery and low level of expenditure on operations and maintenance (O&M)
- Lack of ownership by stakeholders

These issues present a situation that the state regards as 'alarming' (GoR, 2010b: 1). Couched within the wider framework of Integrated Water Resources Management (IWRM), a response to these challenges has been the reinvigoration of traditional and local forms of water management (Radhakrishna, 2003; Machiwa et al., 2004; Gupta, 2011; Glendenning et al., 2012; Sharma et al., 2018). India is well known for its ancient and indigenous practices of water conservation and water architecture; there is archaeological evidence that rainwater harvesting – which involves capturing rainwater for purposes of aquifer recharge, agriculture and irrigation, or domestic use – dates back several hundred years (Jain-Neubauer, 2016). In Rajasthan, traditionally, rainwater harvesting structures, stepwells and other forms of water management were important parts of life; they allowed for management of the conditions in desert and semi-arid regions. Knowledge of rainwater harvesting, however, declined during the 19th century; this was due in part to the development of modern irrigation and state-led systems of water management and delivery (Mishra, 1995; Agarwal and Narain, 1997, 1999). Advocates of these traditional practices claim that their revival and restoration is critical to addressing water security in India; these arguments have taken hold in recent decades, as evidenced by renewed interest and investment in rainwater harvesting across Rajasthan and in other areas of India (Gupta, 2011; Glendenning et al., 2012; Sharma et al., 2018).

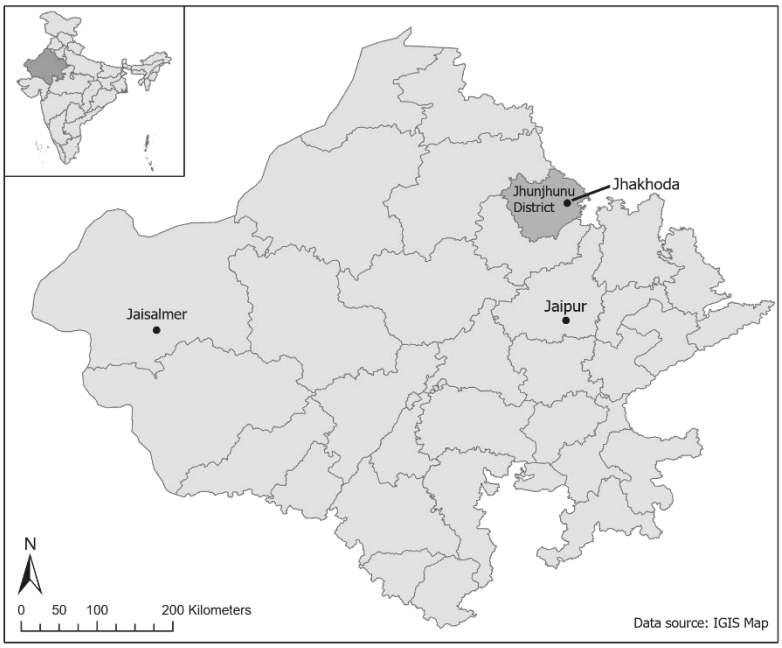
'WE ARE TRYING TO CATCH EACH AND EVERY DROP OF RAINWATER'[2]

The village of Jhakhoda is our case study site. It is located in Rajasthan's Jhunjhunu District, which is a semi-arid territory with a mostly rural population; the district is partly within the Shekhawati Basin (which

[2] Quote from interview with representative from RJDSS, May, 2018.

includes the Katli River) and has a sizeable area that is categorised as 'outside basin', meaning there is only inland drainage (CGWB, 2008; CEDSJ, 2015). Overall, the district receives an annual average of 386 mm of rain.

Figure 1. Map of Rajasthan highlighting Jhunjhunu District and the village of Jhakhoda, the location of our arts activities.



Source: IGIS map.

Groundwater is critical to life in the district as it provides 90% of drinking water and 60% of the water used in irrigation (CEDSJ, 2015). Water resource conditions, however, are deteriorating; in Jhunjhunu, exploitation has reached 228% of estimated supply and thus water levels are declining (CEDSJ, 2015), and there is also evidence of groundwater contamination with high levels of fluoride and nitrates (CGWB, 2008; CEDSJ, 2015). As detailed above, these challenges are not unusual in Rajasthan where water security is a significant social and environmental issue.

Our key project partner was Ramkrishan Jaidayal Dalmia Seva Sansthan (RJDSS), an NGO based in Jhunjhunu that seeks to ensure a "safe and sustainable supply of drinking water by adopting Integrated Water Resource Management Approaches" (RJDSS, 2019). Their work includes facilitating and building capacities for ground water resource management at the community and household level in order to limit over-exploitation and deterioration of water supplies. RJDSS has been working in the village of Jhakhoda since 2006 with the broad objective of improving water quality and availability. Their programme centres on raising awareness of the risks associated with the area's groundwater and on the need to carefully manage water resources through aquifer recharge and the construction of household rainwater harvesting systems (CEDSJ, 2015).

By the time of our project, RJDSS had supported the development and installation of rainwater harvesting systems (RHSs) in approximately 60% of the village households as well as the local school. Households in this area have access to publicly supplied groundwater that flows out of taps in their homes; studies, however, show that this water is contaminated with fluoride (CGWB, 2008; CEDSJ, 2015) and, for that reason, those with RHSs generally do not use public water for drinking purposes. In addition

to the household structures, there are currently three recharge wells in the village which are connected to the village's RHS system. Once individual household tanks (each with a 20,000-litre capacity) are filled, water is diverted to the recharge wells to help restore the water table.

RJDSS monitors the overall system in order to help understand the impact of rainwater harvesting (RWH) and to keep residents aware of the issues and involved in conservation. In each village where they work, RJDSS installs a map showing the rainwater conservation system as well as a large poster-sized data table documenting month by month changes in the water table. In Jhakhoda, the poster shows that the water table declined by 15 feet between June 2016 and April 2018.

Figure 2. The rainwater harvesting system in Jhakhoda. The map shows how each house is connected to a centralised system which diverts water to recharging the aquifer after individual tanks are full.

Source: authors.

Figure 3. Month by month account of Jhakhoda's water table. The poster shows a decline from 232.8 feet in June 2016 to 247.6 feet in April 2018.

Source: authors.

The project manager from RJDSS blamed this groundwater depletion on the 58 tube wells that are located in the village; his hope is that these will eventually be replaced by household RWH systems. Both the map and the poster are located in a prominent place in the village; this is in order to persuade residents and others to conserve water and encourage them to recognise the work of the NGO in helping to avert further water crises.

CULTURES OF WATER IN RURAL RAJASTHAN

Our arts and cultural involvement in Jhakhoda were supported by a small research grant[3] which helped us form an interdisciplinary network on issues of art and water management. Our key research objectives were, 1) to collaborate with individuals and organisations involved in water management in Rajasthan, and 2) to investigate the role that art practices could play in addressing the state's critical water resource issues, including the potential of the arts to produce tangible outputs that could contribute to welfare improvements even beyond the life of the project.

Our project was organised around a series of workshops, field visits and art activities in Rajasthan; this gave rise to a new network which aimed to bring together UK and Indian stakeholders from various disciplines and areas of interest. Our initial workshop was held in Jaipur in January 2018; its objectives were to exchange ideas, to learn about the water challenges facing Rajasthan, and to think through how we might deploy arts-led forms of inquiry in these contexts. Participants spanned the disciplines of history (Rajasthan), anthropology, gender studies, ecosystem services, rural development, natural resource management, puppetry, visual arts, socially engaged arts, and geography. Additional participants included representatives from regional NGOs who were experienced in dealing with water infrastructure challenges in rural Rajasthan. Following a day of team introductions and discussions, we spent a few days visiting areas of Rajasthan where NGO and rural development experts had been working to address drinking water challenges. During these visits the team met with local leaders, schoolteachers and children; we also spoke to individuals with whom we discussed some of the issues related to water in their villages and how 'traditional' water management techniques such as rainwater harvesting were being reintroduced.

During March, April and May of 2018, the arts team worked closely with rural development and natural resource experts to explore how a community oriented and socially engaged arts practice could add value to the ongoing water security work of both CEDSJ and RJDSS. Site visits were made to Jhunjhunu and the surrounding region where discussions were held with village leaders and school representatives; the cultural history of the area (in particular, the role of murals and painting) was also explored. After these activities, the team agreed to work with RJDSS to support their activities in the village of Jhakhoda. CEDSJ, the team partner based in Jaipur, had previously worked with RJDSS in Jhunjhunu and had extensive knowledge of the water security issues in the district. Through these connections and through follow-up discussions in the village, we were able to gain the support of the principal of the local school, who agreed to host some of our events and activities.

Two overlapping arts approaches were developed which were a good fit with the specific expertise of our team, with our available budget and timeframes, and with what we learned from discussions with institutional and community partners. The first centred on a community painting project entitled *Jal: Telling it Together*; this project brought two historical and regional art forms into the contemporary setting of water management. The second project, called *Water Detectives*, explored local stories and narratives of water by engaging with school children and their families through puppetry and the creation of a pop-up water museum. These programmes are discussed below.

[3] Arts and Humanities grant (AH/R003947/1) '*Investigating a role for the arts in supporting relations of care in Rajasthan's traditional water infrastructures*'.

Jal: Telling it Together

In May 2018, the team worked intensively over three weeks with regional artists and local residents to tell the village's water story through painting. The artists combined Shekhawati and Phad painting styles into the production of a mural and canvas scroll, which is called a *Phad*. The mural was painted on the 10 foot by 22 foot wall of a highly visible school building in the centre of Jhakhoda; it narrated the history of the village's water use, including its decline and conservation efforts. The region of Shekhawati is well known for its frescos and murals which are painted on many of the region's havelis. These mansions, constructed mainly in the 19th century, were the courtyard homes of wealthy merchants and traders. Typically, the inhabitants commissioned painted murals to express their status and wealth; the result was Shekhawati's famous 'painted towns' (Cooper, 2009) where representations of gods, myths and faraway lands filled the streets in an open air art gallery. While many of these mansions are deteriorating, they remain popular tourist sites and are well known throughout Rajasthan and India. Although there are no havelis or murals in the rural village of Jhakhoda, these are familiar forms of architecture and graphic storytelling.

Figure 4. Members of the arts team discussing plans for the mural while Jhakhoda village residents look on.

Source: authors.

Artists painted the same image on a mural and on a large scroll in the Phad tradition. In the cultural form of the Phad painting, which is at least 700 years old (Cooper, 2009) a narrator tells a story with the cloth scroll as a backdrop. Project artist Kalyan Joshi hails from Bhilwara, Rajasthan, one of the founding sites of this cultural practice; indeed, the Joshi family has a long history as Phad painters and can trace their lineage and connection to this art form back several generations. Their participation provided a special connection to Rajasthan's cultural history.

> Usually in our professional work, we do not portray such themes, in our usual work we portray elephants, horses, camels, and so on, this work is different (…) Lokesh Joshi, Project Artist.

> Usually, Phad paintings are historical paintings, but here we have modernised it for the theme (…). Rahul Pathak, Project Artist.

As the quotes above indicate, the work in Jhakhoda provided a means for the artists to move outside of conventional painting traditions; it also allowed them to bring their art form into new contexts.

Figure 5. Phad painters working on the scroll.

Source: authors

Development of the mural involved collaboration between the team's lead visual artist, the natural resource expert, and the partner NGO, RJDSS. It involved field visits to several of the region's havelis, workshops on the specific water challenges facing Jhakhoda, and the potential role of, and efforts to revive, traditional water management techniques such as rainwater harvesting. The artists created drafts and sketches of the mural which were discussed and critiqued by the development experts; they provided background on the village's history with water management, down to the details on the style of water pump typical to the area.

The painted image tells the story of Jhakhoda across four panels. In the first section there is a depiction of the village as it was before piped water was available; homes were simple and the villagers grew crops that did not require intensive irrigation, such as bajra, which is well suited to harsh climates; in this panel the village is calm and suggests being in balance with nature. The second panel coincides with the colonial era, industrialisation and the introduction of tubewells as a source of groundwater extraction; water intensive crops are being grown and a great deal of water is being wasted. In the third section, the village wells have dried up and people are receiving water from tankers; there is no local work and therefore there is a great deal of out-migration; for those who remain in the village, the yellowed teeth of some people and a woman walking with bowed legs suggest that they are afflicted with fluorosis; the 'tubewell monster' has a prominent and central position in the panel, signalling the damage done by over-extraction of the village's groundwater. The final panel depicts the Jhakhoda of the future; it has a village-wide rainwater harvesting system, new forms of agriculture which are less water intensive, and fruit trees

and Kharif crops; the village appears to be in harmony with nature and the climate. Peacocks have also returned, which, according to Indian folklore, signals the coming of monsoon rains and the replenishment of water.

Figure 6. The scroll depicting Jhakhoda's water history and possible future.

Source: authors.

The painting incorporated many aspects of the traditional Shekhawati fresco vernacular; it was based on a review of regional havelis, on a study of printed and online material, and on in-person site visits earlier in the project. The use of four painted arches was designed to echo the architectural style of typical haveli arches; some images were even inspired directly by the painted depictions of the haveli frescos. The overall narrative and many of the characters represented in the painting, however, came from local experience and knowledge; this was further facilitated by interactions and discussion between the artists and the individuals who were technical experts on the groundwater issues in Jhakhoda. In the mural, this interaction is particularly evident in the representation of the tube well as a 'monster' which is blamed for over-extraction and the eventual contamination of the village's water supply, and the depiction of inappropriate (water intensive) and appropriate (non-water intensive) forms of agriculture. These images use vernacular, graphic forms to depict particular policy frames that are aimed at limiting extraction and modifying agricultural practices.

As the project took place in full view of the village, residents regularly interacted with the artists as they worked on the painting. While the mural was conceptualised by Nina and the team, it was shaped by suggestions from the artists and from the residents who saw the painting evolve each day. Artists filled in the final product with characters and scenes that emerged through these dialogues. The intent was that the mural and scroll would represent the past, present and future of Jhakhoda and of the region in such a way that local people could recognise it as their own; it would speak of their culture and history and would tell the story of their daily struggles and aspirations. Depicting everyday life in a rural village is an unconventional use of the haveli mural style and this was interpreted as a point of pride. As one resident noted during an interview, "(…) we have seen such paintings in Jaipur and Mandawa but we never thought we would see it in our village Jhakhoda (…). [W]e are very grateful (…)" (resident interview, August 2018).

The painting is now part of Jhakhoda. It is used as a performance space, a place for debate and discussion, and a reminder of the water challenges facing the region. The scroll is held by CEDSJ and is being used to tell the story of water crisis and conservation in other villages. The RJDSS manager, describing its value to their outreach efforts, said that, "(…) usually we take technical drawings which are hard for people to understand but this will make it easier for us to explain it to them in their language using these pictures. Explaining the technical with a cultural tool (…)" (RJDSS representative interview, August 2018).

The water detectives: Puppetry and the pop-up water museum

The second arts component took place over a two-week period in August 2018. In this work, we applied puppetry in a project called *Water Detectives*; this was aimed at furthering our objective of integrating arts practices and water management in Jhakhoda. Puppetry is an historic art form in India which dates back thousands of years. There are several living traditions of puppet theatre in India; such as string, rod and shadow, and each has its distinct regional forms and practices (Sahapedia, 2018; WEPA, n.d.).

The *Water Detectives* project was led by Katkatha Puppet Arts Trust, which is an 'applied puppetry' collective based in New Delhi. Applied puppetry is an art form which uses puppets to explore critical social and political issues, to enable discussion, thought and critique, and to allow for the exploration of uncomfortable or difficult themes. In their other work, for example, Katkatha has used puppetry to explore issues such as those associated with sexual health and HIV, gender and inequality, and conflict and peacebuilding in Kashmir. In Jhakhoda, the puppet team worked with school-aged children to facilitate conversations about water conservation and management. The programme involved multiple overlapping components and engaged around 30 children from Grades 6, 7, 8, 9 and 11. The team sought to use puppetry to encourage students to reflect on their relationship with water; they invited young people to explore the relationship of their community to its water bodies through songs and folklore about water, water-related social practices and rituals, as well as water metaphors and phrases.

Following a set of introductory activities, children who participated worked as 'water detectives', gathering stories from elders (mostly their grandparents) about what life was like in the village before tap water was available. These stories were discussed and synthesised by the students and the artist team. Visual narratives and storyboards were created from some of the most powerful and resonant narratives, with the intent to translate them into a shadow puppet performance. It is worth noting that stories of water came mostly through the water detectives' discussions with an older generation of women; they often recalled intimate and often difficult engagements with water management, including traveling long distances for water collection. This brought out some of the changes in recent decades in the community's relationship to water and water management, as household pumps and a public water supply have become more common.

Figure 7. Students working on their storyboards for the puppet performance.

Source: authors.

One of the stories which became a central component of the performance was called Worshipping the Well; it was told to one of our water detectives by her grandmother. According to the story there are three sisters, one is kind and the other two are jealous of her; they hate how everyone likes her and they try to sabotage her life. When the kind sister marries, she faces many hardships in the home of her in-laws. She prays to the goddess, a local deity who is considered to be the goddess of the well or water source; the goddess is impressed with her kindness and reverses her fortunes while putting a curse on the other two sisters. Since then, the village's wells have been worshipped as symbols of the goddess that brings prosperity to families. There is also a ritual of worshipping the well when a child is born to ask for the baby's future health and prosperity; children involved in the project were fascinated by this story as it provided the context of a ritual they regularly practiced. Indeed, many people in Jhakhoda still 'worship the well' to this day, even if the ritual's original meaning and history is often forgotten.

Figure 8. Young participants practicing for the shadow puppetry performance.

Source: authors.

During the project, other student participants constructed cardboard models of the stories they had gathered; these were presented in a pop-up museum that was set up in the school's science lab. The miniature models told the village's water stories, including possible dystopian futures such as one depicting what Jhakhoda could be like without water; this model showed expensive bottled water, conflicts over water resources, etc. Throughout the programme, the students used the painted mural as a space for learning, discussion, and inspiration; older children, for example, were drawn to the tubewell demon and incorporated it into their puppetry and model-making activities.

We framed our arts research within a perspective that change is possible not only when people understand the issues and challenges, but also when people have meaningful, emotional connections, or a 'trigger'. Puppetry and the activities around the water detectives provided opportunities for this kind of emotive meaning to be expressed and reflected on, such that it became possible to make wider connections. During our outreach efforts, the principal of the school noted how children in Jhakhoda rarely had this kind of interface with the arts. In this project, the students were afforded the opportunity to create something on their own that was of critical importance, and to then display it to their classmates, parents and the general public in a final exhibition.

We found that through the water detectives programme, participants forged these connections in different ways without there being a unified message or singular means of involvement; some responded, for example, to shadow puppetry and the performances, others to model-making, and still others found a hook or trigger through drawing tubewell demons. What we witnessed, in the end, was a dialogue, or interface, between an art form (puppetry) and the technical issues associated with the village's groundwater resources. With the arts as an enabling device, the issues of water conservation and management began to take on new meanings.

DISCUSSION

The activities described above facilitated a wide-ranging discussion of water management in a village experiencing serious groundwater challenges. The mural became a focal point for debate and interaction over the three weeks; it remains a highly visible part of the village. The puppetry component centred on bringing water and the arts into the school curriculum; it caused lost or forgotten traditional stories of water to surface and gave rise to reflection on water's role in the village. In the discussion section below, we highlight key findings from the research. First, we detail what we have identified as the central outcomes of the project; second, we outline the specific potential for the integration of the arts and culture into the policy domain of water management; third, we provide reflections on interdisciplinarity in academic research. It is hoped that these reflections and discussions will provide a frame for debate and for further research and discussion.

Project outcomes

Our research has led to a range of findings and outcomes that were identified primarily via observations and discussions with participants, residents, the project team, and other involved water stakeholders. Four key points are developed in the section below.

First, we found that the art activities successfully increased discussion and engagement on issues of water management within the specific social and cultural context of the village and region. By this we mean that issues of groundwater, tubewells, water policy and so on began to move away from the domain of the purely technical and towards something that is part of the fabric of Jhakhoda. As the mural and painters were in plain sight of the entire village, many residents spoke with the team, making suggestions and giving opinions. Several residents suggested that the painting would inspire more careful use of water; others made direct connections to rainwater harvesting systems. During an interview, one young resident noted that, "(…) when it rains we should make tanks to collect with water and connect our homes to the tanks with pipes and the rain water collected will be available in our hour of need" (Resident interview, August 2018). The arts activities occurred over a period of four months, with highly visible activities taking place twice for two to three weeks at a time. We found that this kind of durational work facilitated extensive public discussion and reflection with ample time and opportunity for residents to engage.

Second, we found that our projects facilitated the development of new skills and interests, including an interest in Phad painting, muralling, havelis and puppetry. In the village of Jhakhoda, students had had little previous experience with hands-on arts activity; by introducing people to new art forms, we helped enable connections with areas of activity that may previously have been seen as frivolous. We further suggest that the arts and creativity are important components of rich and meaningful lives and should not be the exclusive domain of the wealthy.

Figure 9. Students, residents, artists, and NGO representatives discussing the completed mural in the village of Jhakhoda.

Source: authors.

Third, we know that the knowledge created in Jhakhoda has already moved beyond the village. At the end of the project, for example, team members presented the mural and scroll elements to the public at a meeting of the Mashi-Bandi River Basin Parliament which aimed to promote a participatory river basin model for water resource development and management. Several public and NGO representatives requested copies of the scroll to help explain water management and the associated social and environmental issues. As such, we are continuing with these efforts and are working to support further dissemination and sharing.

Fourth, we found that the project influenced participating artists; project painters, for example, noted how the project provided a new outlet for Phad painting and brought them into contact with critical environmental issues. As one of the project artists noted,

> [I]t is rare that somebody approaches us from this perspective that the art could contribute in this manner, mostly artists are invited (…) for aesthetic purposes, to beautify a place, but not to do this kind of communication. (…) I'm going to show pictures of this wall and show it in my village and in my city to see if we can do something like this there – it will motivate them to do it more, it is making the artists feel empowered (Artist interview, August 2018).

As such, this form of collaborative, interdisciplinary research provided an opportunity to both support the livelihoods of artists working in significant traditional cultural forms and contribute to the expansion of these practices and their integration into contemporary social and environmental debates.

Culture and the arts in water management: Making local connections

Our broad objective was to examine the role and potential for the arts in the context of rural development and water insecurity. We suggest that the arts can provide a mechanism for changing the way people understand water, including its relationship to their communities, homes and lives. We argue that the arts can help change the narrative in a way that helps people make sense of seemingly

entrenched and intractable challenges; we feel that art can support the discovery of new ways of identifying with what is normally presented as policy and technical information. This is not to imply that people cannot understand policies and technical presentations; rather, it suggests that through engaging in the arts an environment can be created which facilitates the recognition of the interrelationships between policy, technology (such as water infrastructure), and culture.

In Rajasthan, for example, a great deal of attention is being paid to IWRM approaches to water management; IWRM posits holistic and coordinated water management across territories, scales and sectors (Giordano and Shah, 2014; Foster and Ait-Kadi, 2012). IWRM approaches to water management are set out in Rajasthan's *State Water Policy* and in the *Rajasthan River Basin and Water Resources Planning Act, 2015*; they include the expectation of significant community level involvement, such as by water user groups. As Jensen (2013: 282), argues, however, "without adding politics and power as the dynamic and most often decisive factor in development choices and actions, the role of water in development cannot be fully grasped nor can it be realistically managed and governed". This recognises that purely rational appeals for harmony, coordination and integration are not likely to be sufficient; we argue that there is a need to also recognise the emotional commitments entrenched in water practices and the capacity for the arts to foreground, and work within, the politics of water.

Arun Agrawal (2005) develops the concept of 'environmentality' as a way to explore and think through the creation of environmentally concerned subjects. In his research, Agrawal studies how certain individuals can shift from attitudes of disinterest, or outright exploitation and harm, with regard to the environment, towards more caring attitudes and intimate involvement. In his study of Kumaon, India, Agrawal argues that the emergence of pro-environmental subjectivities was closely related to a shift in regulatory policy which facilitated community decision-making and local participation in environmental conservation efforts. The suggestion here is that "subject formation (…) is crucially connected to participation and practice" (ibid: 180); in other words, engaging people in meaningful ways through the devolution of power and responsibility can lead to beneficial environmental outcomes.

These findings resonate with our understanding of water management in Rajasthan, where recent water policies have posited a shift in the locus of water management towards the local level. Drawing on Agrawal's (2005) research, we can see that to be effective, people must forge new political subjectivities whereby they begin to perceive themselves as part of the change; this means understanding how water management affects them, their families and their communities, and how they can participate. New water policies, for example, could position people as water 'caretakers' rather than as 'users' or 'consumers'. Furthermore, if water is a resource to be managed collectively, the politics and social dynamics which make up community relations must be acknowledged and it must be recognised that local places are not uniform or static, but rather are malleable sites of contestation, exclusion and inequality. In our work, we recognised the critical importance of the local context of water security and took it for granted that much of the experience associated with traditional means of water harvesting was already held by the Rajasthani villagers and thus was not external to the village. In Jhakhoda, by working with artists who had specialised in creative facilitation, we found remarkable expressions of water knowledge. We suggest that these processes of giving voice through the arts go far beyond education and policy acceptance and 'buy-in'; we believe that creative artistic facilitation, rather, brings new knowledge, value and meaning into the sphere of public life (Fitzgerald, 2004; Leeson, 2017). Critically, such locally situated arts – environmental endeavours resonate with the political work of Freire, Boal and Chambers, whose work is grounded in the conviction that local people are active agents and should be valued for their ability to address significant challenges in their environment. While our research did not provide longitudinal evidence of the direct impact of arts activities on water security, we suggest that the arts can play a key role in larger forms of water management and policy-making. While further exploration and research is certainly warranted, we argue that development practitioners should consider involving artists at early stages of water and development interventions, not as a substitute for current practice but rather to complement more conventional activities.

Experiences of interdisciplinarity in academic research

In this final discussion section, we reflect briefly on our experiences with interdisciplinary academic research. In recent years, there has been an upsurge of interest in interdisciplinary scholarship; indeed, in the UK many sources of research funding advocate, or even require, interdisciplinary approaches. Bracken and Oughton (2006: 372) define interdisciplinarity as "forms of scientific collaboration where the field of a single discipline is transgressed". Bakker (2012) and others argue that interdisciplinary, collaborative research is particularly important for research on water security. As Walker et al. (2015: 486) explain, "managing water resource systems is often difficult (…) partly because no single academic discipline has all the answers so it requires inter-disciplinary approaches".

As noted above, we established our project as an arts- and humanities-led research endeavour with interdisciplinarity at its core; this meant bringing various forms of arts and humanities expertise into conversations and communications about sustainability, water scarcity and water inequality, and incorporating the arts into collaborations with development and water experts in India. As the lead visual artist stated, in explaining the value of working across disciplines in Rajasthan, "in this project there was a lot of partnership (…) and this has given a lot of depth to our project". The artist further noted the ways in which she benefitted from the collaboration with team partners at CEDSJ and RJDSS; having worked in the domain of rural development and water management for many years, members of these partner organisations brought crucial research and expertise to the collaboration. She went on to recount how the project influenced the artists' view of their own practice. She quoted them as saying that, "we are learning the potential of our work" which partly included the potential "to create a dialogue and debate". These reflections point to a role for artists in taking policy concepts and technical details around water management and translating them into something that has meaning within local culture.

We were specifically mindful of the tendency to limit the arts, and the involvement of artists, only to the engagement components of research or to ask for their contribution only after many of the key design decisions had been made; as such, we built a research team and programme that involved artists as co-investigators and equal collaborators. Artists were not expected to become 'water scientists' or development experts; rather, their role was to look at the water issues facing Rajasthan's rural communities and provide new perspectives, questions and approaches. In the same way, non-artists and policy-based partners were not expected to become artists but, rather, to respect the knowledge and expertise of arts researchers and to facilitate their integration into local contexts. Broadly speaking, this meant seeing the value of other disciplines and identifying ways of working with people who understand and work with the world in a different way. In our assessments, this approach facilitated a richer set of research contributions; it gave depth to the project and strengthened both the artistic and the technical components. The primary role of the team's natural resource expert, for example, was to give the background details and to provide data related to the water situation and trends in the area; this meant regular interaction and dialogue with the arts team. At the end of the project, when asked about key lessons related to art and global challenges, the natural resource expert said that he overcame initial trepidation and misgivings about working through the arts, and that he found that "art can help change the mentality and perspectives of people including policy-makers". These reflections draw attention to the value of small-scale pilot projects and interventions, suggesting that they are a way to carefully introduce arts activities to those unfamiliar with cultural approaches to development.

We also note how interdisciplinarity can occur within supposedly separate disciplinary regimes. 'The arts' is not a uniform discipline with a singular understanding of knowledge or method; rather, practices such as mural painting and puppetry entail different histories, traditions, approaches and forms engagement. Neither are individual artists interchangeable; they embody many different approaches to art production and facilitation. Some artists have developed expertise in working with communities or in practical ways with social issues, which requires a particular range of skills; other artists are simply not interested in doing this kind of outreach, or do not have the ability. Overall, by bringing these diverse

cultural forms and arts practitioners together, we were able to realise a richer set of experiences and contributions than if we had limited the project to a single arts approach or individual.

CONCLUSION

In this paper, we have detailed our experiences of working through culture and art to examine water management issues in the village of Jhakhoda. Our intent was to build an interdisciplinary research team to explore novel ways of discussing water issues in Rajasthan and to identify specific roles for the arts in rural development and water management. We found that the arts activities contributed to a change in the way water management was discussed in the village and that it inspired a shift beyond purely technical narratives and towards a deeper cultural understanding and expression of water.

Our project had certain limitations. Due to its relatively short timeframe and exploratory nature, it was not possible to do a longitudinal evaluation or to survey the direct impacts of an arts approach on local water management. We argue, however, that there is great potential for the arts in helping raise awareness and in supporting the delivery of sustainable water policy and practice. We received widespread support for arts-based engagements from NGO colleagues, water experts and other regional stakeholders, many of whom have begun to take these experiences and perspectives forward in other water management activities in Rajasthan. Further research is needed, however, to study the direct impacts of arts activities within the context of water security; a question that needs to be asked and answered is whether engagement in the arts enhances behaviour change such that people are more likely to take up such activities as rainwater harvesting. Yet, we express caution with regard to the tendency to over-instrumentalise the arts in ways which do not recognise the indirect ways they can influence and construct meaning over time.

We further suggest that interdisciplinary approaches can help blur the boundaries between 'culture' and water management. Drawing on the work of John Paul Lederach, John Clammer (2015: 35) notes how social change "is an aesthetic as well as a 'technical' process". This aesthetic turn recognises that conventional methods and attitudes have been unsuccessful in addressing many critical global challenges. In line with Clammer, we argue for a richer form of problem solving, one that sees culture as central to understanding the existing challenges and supporting the move towards alternative futures. We are not claiming that arts will 'save' Jhakhoda or provide an easy solution to water security in Rajasthan or elsewhere; rather, we believe that interdisciplinary and culturally informed approaches have significant value. We suggest to development practitioners and experts that the arts have a huge potential to contribute to change (Duncombe, 2007) and are likely to play an important role in holistic and locally situated approaches to water management.

REFERENCES

Abah, O.S. 2007. Vignettes of communities in action: An exploration of participatory methodologies in promoting community development in Nigeria. *Community Development Journal* 42(4): 435-448.

Abah, O.S.; Okwori, J.Z. and Alubo, O. 2009. Participatory Theatre and video: Acting against violence in northern Nigeria. *IDS Bulletin* 40(3): 19-26.

Agrawal, A. 2005. Environmentality: Community, intimate government and the making of environmental subjects in Kumaon, India. *Current Anthropology* 46(2): 161-190.

Agarwal, A. and Narain, S. 1997. *Dying wisdom: Rise, fall and potential of India's traditional water harvesting systems.* New Delhi: Centre for Science and Environment.

Agarwal, A. and Narain, S. 1999. *Making water management everybody's business: Water harvesting and rural development in India*. Gatekeeper Series.

Anand, N. 2017. *Hydraulic city: Water and the infrastructures of citizenship in Mumbai*. Durham, NC: Duke University Press.

Arts Council. 2014. *The value of arts and culture to people and society: An evidence review*. www.artscouncil.org.uk/sites/default/files/download-file/Value_arts_culture_evidence_review.pdf (accessed 25 January 2020)

Asthana, V. and Shukla A.C. 2014. *Water security in India: Hope, despair, and the challenges of human development.* New York: Bloomsbury.

Bakker, K. 2012. Water security: Research challenges and opportunities. *Science* 337(6097): 914-915.

Belfiore, E. and Bennett, O. 2008. *The social impact of the arts.* Basingstoke and New York: Palgrave and MacMillan.

Bjorkman, L. 2015. *Pipe politics, contested waters: Embedded infrastructures of millennial Mumbai*. Durham: Duke University Press.

Boal, A. 1979. *Theatre of the oppressed*. London: Pluto Press.

Bracken, L.J. and Oughton, E.A. 2006. 'What do you mean?' The importance of language in developing interdisciplinary research. *Transactions of the Institute of British Geographers* 31(3): 371-382.

Buser, M.; Payne, T.; Edizel, Ö. and Dudley, L. 2018. Blue space as caring space – Water and the cultivation of care in social and environmental practice. *Social & Cultural Geography* (online first).

CGWB (Central Ground Water Board). 2008. *Ground Water Brochure, Jhunjhunu District, Rajasthan.* http://cgwb.gov.in/District_Profile/Rajasthan/Junjhunu.pdf (Accessed 20 January 2020)

CGWB. 2014. *Ground Water Year Book 2012-2013: Rajasthan State*. http://cgwb.gov.in/Regions/GW-year-Books/GWYB-2013-14/Rajasthan%20Year_Book%202012_13.pdf (accessed 30 January 2020)

CGWB. 2017a. http://cgwb.gov.in/Regions/GW-year-Books/GWYB-%202016-17/Rajasthan.pdf (accessed 15 December 2019)

CGWB. 2017b. Categorisation of Assessment Unit. http://cgwb.gov.in/GW-Assessment/Categorization%20of%20AU.pdf (accessed 15 December 2019).

CGWB. 2017c. *National Compilation on Dynamic Ground Water Resources of India, 2017*. Faridabad: Department of Water Resources.

CGWB. 2019. http://cgwb.gov.in/GW-Assessment/GWRA-2017-National-Compilation.pdf (accessed 10 December 2019)

CEDSJ (Centre for Environmental and Development Studies). 2015. *Water resource planning and management in Chirawa, IWRM approach*. Jaipur: CEDSJ.

Chambers, R. 1994. The origins and practice of participatory rural appraisal. *World Development* 22(7): 953-969.

Clammer, J. 2015. *Art, culture and international development: Humanizing social transformation.* Abingdon: Routledge.

Cooke, P. and Soria-Donian, I. (Eds). 2020. *Participatory arts in international development*. Abingdon: Routledge.

Cooper, I. 2009. *The painted towns of Shekhawati*. New Delhi: Prakash Books India.

Cronin, A.A.; Prakash, A.; Priya, S. and Coates, S. 2014. Water in India: Situation and prospects. *Water Policy* 16(3): 425-441.

Duncombe, S. 2007 *Dream: Re-imagining progressive politics in an age of fantasy*. New York: New Press.

Everard, M. 2015. Community-based groundwater and ecosystem restoration in semi-arid north Rajasthan (1): Socio-economic progress and lessons for groundwater dependent areas. *Ecosystem Services*. 16 (C), 125-135.

Fitzgerald, S. (Ed). 2004. *An outburst of frankness: Community arts in Ireland*, Dublin: TASC, New Island.

Foster, S. and Ait-Kadi, M. 2012. Integrated water resources management (IWRM): How does groundwater fit in? *Hydrogeology Journal* 20(3): 415-418.

Freire, P. 1970. *Pedagogy of the oppressed.* Translated by M. B. Ramos. London: Penguin.

Giordano, M. and Shah, T. 2014. From IWRM back to integrated water resources management. *International Journal of Water Resources Development* 30(3): 364-376.

Glendenning, C.J.; van Ogtrop, F.F.; Mishra, S.K. and Vervoort, R.W. 2012. Balancing watershed and local scale impacts of rain water harvesting in India – A review. *Agricultural Water Management* 107: 1-13.

Government of Rajasthan (GoR). 2010a. *Demographics and statistics.*

http://rajasthan.gov.in/AboutRajasthan/DemographicsAndStatistics/Pages/default.aspx (accessed 15 December 2019)

GoR. 2010b. *State water policy.* Jaipur: State Water Resources Planning Department.

Gupta, S. 2011. Demystifying 'tradition': The politics of rainwater harvesting in rural Rajasthan, India. *Water Alternatives* 4(3): 347-364

Hamdi, N. 2004. *Small change.* London and Sterling, VA: Earthscan.

Helguera, P. 2011. *Education for Socially engaged art.* New York: Jorge Pinto Books.

Hussain, I.; Arif, M. and Hussain, J. 2012. Fluoride contamination in drinking water in rural habitations of Central Rajasthan, India. *Environmental Monitoring and Assessment* 184(8): 5151-5158.

IIED. 2006. *Participatory learning in action. No. 55: Practical tools for community conservation in Southern Africa*. International Institute for Environment and Development.

Jain-Neubauer, J. 2016. *Water design: Environment and histories*. The Marg Foundation.

Jensen, K.M. 2013. Viewpoint – Swimming against the current: Questioning development policy and practice. *Water Alternatives* 6(2): 276-283.

Jiang, Z.; Kobylinska, T. and The Voice of Domestic Workers. 2020. Art with marginalised communities. *City* 24(1-2): 348-363.

Katyainia, S. and Baruaa, A. 2016. Water policy at science-policy interface: Challenges and opportunities for India. *Water Policy* 18(2): 288-303.

Kester, G. 2011. *The one and the many: Contemporary collaborative art in a global context.* Durham and London: Duke University Press.

Leeson, L. 2017. *Art: Process: Change – Inside a socially situated practice.* Routledge Advances in Art and Visual Studies. New York and London: Routledge.

Machiwal, D.; Jha, M.K.; Singh, P.K.; Mahnot, S.C. and Gupta, A. 2004. Planning and design of cost-effective water harvesting structures for efficient utilization of scarce water resources in semi-arid regions of Rajasthan, India. *Water Resources Management* 18(3): 219-235.

Matarasso, F. 1997. *Use or ornament: The social impact of participation in the arts*. London: Comedia

Mishra, A. 1995 *The radiant raindrops of Rajasthan*. New Delhi: Gandhi Peace Foundation.

Morales, M. and Harris, L. 2014. Using subjectivity and emotion to reconsider participatory natural resource management. *World Development* 64. 703-712.

O'Reilly, K. 2006. "Traditional" women, "modern" water: Linking gender and commodification in Rajasthan, India. *Geoforum* 37(6): 958-972.

O'Reilly, K. and Dhanju, R. 2012. Hybrid drinking water governance: Community participation and ongoing neoliberal reforms in rural Rajasthan, India. *Geoforum* 43(3): 623-633.

Radhakrishna, B.P. 2003. Rainwater harvesting, a time-honoured practice: Need for revival. *Current Science* 85(9): 1259-1261.

RJDSS (Ramkrishna Jaidayal Dalmia Seva Sansthan). 2019. *RJDSS: An introduction*. http://rkjdss.dalmiatrusts.in/rjds/web/site/about (accessed 20 January 2020)

Rajasthan River Basin and Water Resources Planning Act, 2015. www.lawsofindia.org/pdf/rajasthan/2015/2015Rajasthan15.pdf (accessed 26 November 2019)

Raina, N. 2018. 'The value of culture in conflict'. Presentation at: *Addressing global challenges through the arts and creative practices*. 5 October 2018. Bristol.

Sahapedia. 2018. *An introduction to Indian Puppetry*. www.sahapedia.org/introduction-indian-puppetry (accessed 13 December 2019)

Selwood, S. 1995. *The benefits of public art.* London: Policy Studies Institute.

Sharma, O.P.; Everard, M. and Pandey, D.N. 2018. *Wise water solutions in Rajasthan*. Rajasthan, India: WaterHarvest.

Singh, N.; Jacks, G. and Bhattacharya, P. 2005. Women and community water supply programmes: An analysis from a socio-cultural perspective. *Natural Resources Forum* 29(3): 213-223.

Sloman, A. 2011. Using participatory theatre in international community development. *Community Development Journal* 47(1): 42-57.

Stupples, P. 2014. Creative contributions: The role of the arts and the cultural sector in development. *Progress in Development Studies* 14(2): 115-130.

Stupples, P. 2016. Breaking the frame: The agency of art's liminal relationship to development. In Stupples, P. and Teaiwa, K. (Eds), *Contemporary perspectives in art and international development,* pp. 91-103. New York: Routledge.

Stupples, P. and Teaiwa, K.M. (Eds). 2016. *Contemporary perspectives on art and international development*. New York: Routledge.

Tiwari, K.; Goyal, R.; Sarkar, A. and Munoth, P. 2015. Integrated water resources management with special reference to water security in Rajasthan, India. *Discovery* 41(188): 93-101.

UN Water. 2013. *Water security and the global water agenda: A UN-water analytical brief.* Hamilton, ON: UN University

Vörösmarty, C.; McIntyre, P.; Gessner, M.; Dudgeon, D.; Prusevich, A.; Green, P.; Glidden, S.; Bunn, S.E.; Sullivan, C.A.; Reidy Liermann, C. and Davies, P.M. 2010. Global threats to human water security and river biodiversity. *Nature* 467: 555-561.

Walker, W.E.; Loucks, D.P. and Carr, G. 2015. Social responses to water management decisions. *Environmental Processes* 2(3): 485-509.

Ware, V.-A. and Dunphy, K. 2020. How do arts programmes contribute in international development? A systematic review of outcomes and associated processes. *Progress in Development Studies* 20(2): 140-162.

Wood, L. 2012. How youth picture gender injustice: Building skills for HIV prevention through a participatory, arts-based approach. *South African Journal of Education* 32(4): 349-366.

WEPA (World Encyclopedia of Puppetry Arts) no date. *India*. https://wepa.unima.org/en/india/ (accessed 15 December 2019)

Zug, S. and Graefe, O. 2014. The gift of water. Social redistribution of water among neighbours in Khartoum. *Water Alternatives* 7(1): 140-159.