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Situating the Environment: Settlement, Irrigation and Agriculture in Pre-colonial Rajasthan

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The complexities associated with interactions of various components of environment have not been examined in historical narratives of pre-colonial India. An important consideration for any agrarian society has been the availability of water for irrigation, and in arid and semi-arid regions—with unequal annual distribution of rains and low water table—often saline water is used even for the potable purposes. This article elucidates various systems of water management developed and maintained by the local/individual initiatives as well as those developed by the state at a larger scale for irrigation and potable purposes. It is argued here that the pre-colonial states in Rajasthan had to ensure continuity of habitation by offering concessions and support to protect the revenue base. It was a difficult act of balance in a society where political and social orders were integrated into a single complex web. The article argues that the same complex web endowed the state with an all-pervasive administrative apparatus. It questions the dominant assumption(s) centring on the relative apathy of the state towards agricultural production and resultant immunity enjoyed by the local magnates of socio-political power and even cultivators. The article also examines the nature of intricate interventions of the above-mentioned socio-political web to underline the prominent considerations enjoyed by the environment-related uncertainties.

Introduction

There can be multiple histories of a given time or place. These import to the given subject a certain richness. At times these histories converge, which, in turn, enable us to construct very different perspectives of the same temporal and spatial zones. Traditionally, studies of the medieval history of Rajasthan have focused largely

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on the glory of royalty on the one hand and the feudal culture on the other.\textsuperscript{1} With the growing access of historians to administrative documentation maintained by various principalities, the little-explored aspects have come within the ambit of research. These documents have given deeper insights into the political, economic and social aspects of the period. Literary evidence has further enriched these histories.\textsuperscript{2} In these accounts, the dynamics of environment in the day-to-day functioning of the society has been at the margins. These works merely provide descriptions of the environmental features and support a tacit acceptance of the stereotype images of pre-colonial societies. Some of the writings have questioned the view wherein the state was attributed primarily the function of appropriator of agricultural surplus, being virtually unconcerned with the process of agricultural production.

An important concern for any agrarian society has been the availability of water in arid and semi-arid regions having unequal annual distribution of rainfall, and low water table that was often saline. Continuous availability of water was a primary concern, which requires a closer examination at the social and political levels. This will bring out the role and responses of social elites in the politics of water. It is all the more important as the requirements of subalterns translated into questions of survival even for the influential sections of society.\textsuperscript{3} In the semi-arid and arid parts of Rajasthan, management of water available during the three months of monsoon was, and still is, crucial for sustenance. Therefore, we witness several initiatives undertaken at the community level, alongside efforts made by the political functionaries in this regard.

This article examines the multiple dimensions associated with the management of the meagre water available in the region. The first section of the article highlights various systems of water management developed and maintained at the local and individual levels alongside state initiatives on a larger scale for irrigation and potable purposes. Pre-colonial polities of Rajasthan were flexible in extracting revenue from a highly erratic, monsoon-dependent agricultural society. The next

\textsuperscript{1} Ojha (1938); Tod (1971).
\textsuperscript{2} Along with archival records, these accounts have relied on khyat literature as well. Chandra (1982) began examination of the inner dynamics of village social structure with respect to revenue appropriation and distribution. Gupta (1986) and Singh (1990) further developed it. They have examined the agrarian structure with reference to the state and social stratification, namely, the caste system. Scholars, such as Sharma (1977), Devra (1981), Sharma (1966) and Bhadani (1999) have examined the issue of agrarian relations to investigate the nature of medieval Rajput polity. Their focus has been on revenue utilization and related issues. Recently, Sahai (2006) has examined another very important but often neglected component of social structure, that is, artisans.
\textsuperscript{3} Mosse (2003) has examined extensively the functioning of the tank system of irrigation as practised in the coastal regions of Tamil Nadu. It was an extensive network of tanks entertaining inter-village regulations and management. The management also required that due importance be accorded to caste considerations. However, we do not have such references for our region, perhaps due to the meagre rains.

section details the administrative mechanisms evolved by states to address these concerns. It is argued here that the state had to ensure continuity of habitation by offering concessions and support to protect the revenue base. This was not an easy task for a state, which had to rely on the support of the local ruling groups which in turn had their own interests to protect. Still, it can be argued that the state did have an active role in promoting agriculture and influencing agrarian relations. The nature of these interventions reveals that environmental factors, especially uncertainties, were important considerations.

Physical Settings and Vagaries of Monsoon

To examine the linkages between the environment, social structure, cultural values and the necessity for the state to monitor the various issues related to the appropriation and uses of water, it is necessary to delineate the physical features of the area of study. Geographically, Rajasthan is highly heterogeneous and, thus, difficult to classify as a single environmental entity. The Aravalli hills, running diagonally from the south-west to north-east, divides the region broadly into two natural divisions, namely, the north-western and the south-eastern, the former being arid and the latter being semi-arid. About three-fifths of Rajputana lies to the north-west of this range of mountains and two-fifths to the south-east. Even these two regions are not homogeneous.4

As far as the general weather system is concerned, heat dominates5 in the whole of Rajasthan except for some hilly parts. In the summer, the temperature rises above 40°C—the maximum occasionally reaching 50°C at several places in the desert areas.6 As such, large parts of India may be termed as semi-arid, but the relative absence of perennial rivers further worsened the conditions in Rajasthan. Rivers like Looni, Chambal and Betwa are seasonal; no snow-fed rivers exist unlike in Punjab, North India or Assam. Rainfall also varies greatly depending upon the route of monsoons and other related factors. In the western section, that is, Jaisalmer, Bikaner and most of Marwar, the annual rainfall seldom averages more than 12 cm. Since the clouds have to pass extensive and heated tracts of sand before reaching these plains they lose much of their moisture upon the high ranges in Kathiawar and the nearer slopes of the Aravallis.7 However, in south-west Rajasthan, which directly receives the monsoon with less intermediate evaporation, rainfall is much more abundant. In fact, at Mount Abu, it sometimes exceeds the level of 250 cm. Except in the south-west highlands of the Aravallis,

4 The Rajputana Gazetteer (1879: 20).
5 On his way, Babur realized that north-east Rajasthan was extremely hot (Babur 1970: 577); Abul Fazl and Jahangir placed it in the second of the seven categories in which the whole world was traditionally divided. The second category implied equitive heat and winter. See Fazl (1978: 273); Jahangir (1968: 340–41); Badauni (1986: 239).
6 The Rajputana Gazetteer (1879: 20).
7 Ibid.
rain is most abundant in south-east Rajasthan. Here, if the south-western rains fail, the south-eastern rains usually come to the rescue later in the season. Consequently, the region rarely faces extreme droughts as in the case of the north-western tracts.\footnote{The Imperial Gazetteer of India (1908: 92).} If the eastern winds are strong, they bring heavy rains from the Bay of Bengal, whereas if the south-west monsoon prevails, the rains are comparatively late and light. Sometimes a good bout of rainfall comes from both the seas, but this is rare. Rainfall varies substantially from year to year and even within a year.\footnote{Arzdasht (Asad Vadi 1, 1695 vs./AD 1638); (Bhadva Sudi 6, 1695 vs./AD 1638). Historical Section, Jaipur Records, Rajasthan State Archives, Bikaner. Henceforth, HS, JR, RSAB respectively.} Similar variations are visible in the natural vegetation as well. North-western Rajasthan is virtually devoid of any forest cover, with grass and bushes dominating the landscape;\footnote{Habib (1992: Sheet No. 6, A & B); Habib (1982: 1–13).} the south-eastern part has good forest cover. In fact there are references of several shikargahs of the Mughal period.\footnote{Arzdasht (Migsar Vadi 13, 1697 vs./AD 1640); Devra (1999: 97–107).} Also, this semi-arid biogeographic zone was home to four large cats, namely, lions, tigers, cheetahs and leopards.\footnote{Some of the famous protected areas here are Ranthambore, Sariska, Mount Abu and Sitamata (Divyabhanusinh 2001).}

**Social Canvas**

In medieval Rajasthan, ‘the political and social orders were closely intertwined, integral parts of a continuum, webbed together through intricate ties’\footnote{Sahai (2006: 235).} Society was characterized by the hierarchical order based on birth and hereditary duties and privileges.\footnote{Gupta (1991: 141).} This socio-political stratification determined, among other things, access to natural resources of the different sections of society. It is important to note that pre-colonial polities had a strong element of kinship.\footnote{Sharma (1977: 1–58).} At the top in the hierarchy was the head of the clan, who had acquired territorial rights and established the principality; then came the thikanadars (nobles) who were his saga (blood relatives) brothers, sons, etc. The dominant sections of the village society comprised of jagirdars, bhomias and bohras (assignment holders, right holders and merchant moneylenders respectively) who owed their status partly to hereditary superior proprietary rights in land and partly to their position in the revenue administration.\footnote{Gupta (1986: 134–43); Singh (1990: 42–50).} Bohras were the providers of borrowed capital for the ordinary peasantry. The rulers offered a certain amount of patronage and protection to bohras, as the political powers recognized their importance.\footnote{Singh (1974: 20–31).}

The political apparatus ensured privileges not only for the wealthy and influential sections, but for the weaker sections of society as well. Ritual prescriptions were also at times bypassed because of the need for sufficient supply of labour to work the cultivable land available in abundance. This was not a condition peculiar to Rajasthan as James C. Scott has argued. The key to successful statecraft was typically the ability to attract and hold a substantial productive population within a reasonable radius of the court. Given the relative sparseness of the population and the ease of physical flight, the control of arable land was pointless unless there was a population to work it.

Political power cannot be measured solely in terms of geographical expanse. The argument that ‘a growing, productive population settled in the ambit of a monarch’s capital was a more reliable indicator of a kingdom’s power than its physical extent’ seems to be closer to reality. There was a continuous attempt on the part of the ruling classes to increase the number of settlements in their territory. For the same reason migrations during the years of environmental distress were actively contained by offering monetary assistance and fiscal concessions along with material support. Even those who migrated were brought back with promises of concessions and remittances in revenue demand.

Tracks of Evidence

Most of the evidence for this article is based upon the seventeenth- and eighteenth–centuries’ archival and literary records of the Rajasthan states. The documents preserved at the state archives in Bikaner are significant as they provide an insight into the functioning of the state systems. At the same time, these documents also record the hardships faced by the peasants engaged in the process of agrarian production in pre-colonial times. Amongst the rich archival collection available for this region, we have used particularly the arzdashts (correspondence between pargana officials and the central administration of Jaipur) and sanad parwana bahi (royal directives issued to pargana officials in response to various complaints)

18 Sahai (2006: 127, also refer to Footnote 12 on the same page).
19 Scott (1985: 185). Sumit Guha has argued that Southeast Asia has always seen greater density since ancient times (Guha 2001).
20 Locating the relative strength of a state between Occidental and Oriental regions, Scott has stressed that Southeast Asia has traditionally witnessed low population density and, therefore, the state actively guarded its human wealth (Scott 1998: 185).
21 Arzdasht (Jeth Sudi 4, 1742 vs./1685 AD); (Falgun Sudi 2, 1743 vs./1686 AD).
22 The pre-colonial kingdom thus rode a narrow path between a high level of taxes and coercive exactions that would precipitate wholesale flight (Scott 1998: 185).
23 Arzdasht (Magh Vadi 9, 1765 vs./1708 AD); (Asad Sudi 2, 1762 vs./1705 AD); (Jeth Vadi 7, 1752 vs./1695 AD); (Chait Vadi 3, 1752 vs./1695 AD).
24 The subject matter of these documents (seventeenth–nineteenth centuries) ranges from routine complaints of undue collection of revenue by the state officials to the mutual disputes related even to the amount of water of a well to be shared among them.

and representations received by the court at Marwar, Jodhpur). Along with these, a seventeenth-century administrative treatise, *Marwar ra Pargana ri Vigat*, written by Diwan Munhot Nainsi (1610–70) is used in this study. These documents provide details of administrative mechanisms from the *pargana* to the village level and throw light on the various environmental concerns of the medieval polities in the region. A careful reading helps us understand the relationship between the state, agricultural production and the peasantry. This rich documentation enables us to reconstruct various indigenous methods of water management practised by cultivators to negotiate the vagaries of nature.

**Water Systems, Habitation and Irrigation**

The general geophysical features of the region suggest that there were inadequate water resources, thus, leading to limited possibilities of human settlement and agriculture. References in official documents of such settlements which perhaps did not contribute significantly to the state exchequer and their methods of water appropriation are, on the one hand, testimony to the concerns of the state and, on the other, point out how the land was put to constructive use. Beginning from village to the highest level, an intricate web of socio-political intermediaries characterized the nature of administrative apparatus. Therefore, it was possible for the political authorities to understand landscape at the very local level. The decentralized nature of political authority facilitated prompt responses to ecological needs. The selection of sites for the construction of water systems and the methods of distribution and utilization suggest that the administration had fairly good idea about the landscape.

Various indigenous methods of water conservation were prevalent in the pre-colonial period, some of these are still in use today. Mostly practised at the individual level, some methods required larger community participation along with political support. Wherever feasible, the most important method to secure water was through wells. With the variations in the depth of the water table, the structures and functioning of the wells also changed. A lower water table necessitated deployment of water-lifting devices.

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25 It is basically an administrative manual providing detailed description (seventeenth–nineteenth centuries) of the territory, soils, nature of habitation, agricultural types, nature and number of wells, other sources of water, caste and class composition of population, etc. Details of villages, which were deserted and later rehabilitated, also find mention here.

26 However, these documents seem to be of limited use with respect to the examination of role of lower classes/castes. It demands further research to examine such aspects.


28 ‘The alternative route through Rajputana was in general sparsely inhabited ...’ Moreland (1962: 11).

29 These devices differed according to the topography and the depth of the water table. The selection of a water-lifting device differed according to the nature of requirement, that is, potable or irrigation.
Nainsi, the seventeenth-century court chronicler of Marwar, has described several types of wells, such as *chanch*, *kosita*, *dhimra* or *dhibra*, *kohar*, *kuwa* and *bera*.

These could be distinguished on the basis of their function and utility for irrigation and potable purposes. The character of the sub-soil, especially in the desert and mountainous parts of Rajasthan, renders the construction of wells or tanks labour intensive and, therefore, expensive. Limited prevalence of brick-lined wells suggests a high cost of construction. Enumeration of earthen and brick-lined wells separately also testifies to the difference in their feasibility and, therefore, significance. Detailed mapping of the wells in the Marwar region by the finance official (diwan) of the kingdom showed that the state was aware of the necessity of the sources of potable water for human settlements and for irrigation to ensure good agricultural production. There is evidence that political agencies also extended support for the maintenance of wells. In village Dhadahanriyo in *pargana* Jodhpur, a well which had became non-functional because it was covered with sand was restored with state support.

Apart from digging wells, which was the most common method of rainwater harvesting, several other methods were used. One such method of water harvesting was variously known as *kuin* or *par* or *teen*. In appearance, it was similar to a well, but used a different mechanism to extract water which evolved to adapt to the particular environmental condition. A *kuin* was not meant for round-the-clock availability of water and was, therefore, relevant only for potable purposes. It was constructed in a few parts of Rajasthan, namely, Churu, Bikaner, Jaisalmer and Barmer. These regions had an underground layer of chalk or limestone which checked the percolating rainwater deep into the brackish water. The region being sandy, it was difficult to construct tanks because sand does not retain water. Geologically, the layer of limestone underneath ensured that rainwater remained potable and could be harnessed. It was more so because sand does not bind like soil and could retain water in it with restricted evaporation. Due to the low clay content and the dominance of sand content, it was difficult to construct conventional wells in the region as these could collapse. The *kuin* was a different kind of well in the sense that it did not depend upon underground water. In these *kuin*, water accumulated very slowly. The rainwater so retained by sand gradually percolated to the bed of the well and was usually not more than three earthen pots a day.
well took time to recharge and hence was used for drinking purposes only. The reference to these wells by Nainsi suggests the significance of these devices in continuance of human settlement.  

Similarly, the *bera* or *beri* is a variation of a well. *Beras* were constructed near a water body or on the dry bed of a water body.  

It is extensively used till date in western Rajasthan as the rate of evaporation in the open ponds is high, but only nominal in the case of *beras*.  

Similarly, another important manoeuvring of the environmental niche was practised to manufacture salt in the region. In most parts of this region of Rajasthan, groundwater was brackish, thereby providing the option to produce salt. In *pargana* Pokaran, there was a *rin*, a salt land. There is ample evidence that the water procured through *beras* was spread in the fields to dry up and after several stages salt was obtained.  

An important method of water conservation was the *kund* or *kundi*. It was a mechanism based on the direct accumulation of rainwater in an underground brick-lined tank. It was primarily constructed for potable purposes in the north-western Rajasthan, where groundwater was either brackish or available at great depths or both. *Kundis* were constructed to cater both for domestic and public use.  

It seems that the cost of construction of a *kundi*, even using the locally available material, was beyond the means of the common man. Numerous epigraphs testify that usually these were constructed as a benevolent act by the wealthier section of society. The religious merit attached to the construction of water storage systems was commonly considered beneficial to the donor.

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36 Village Bhojavas of *pargana* Jodhpur had a *teen*, which could supply water only twice in a single day (Nainsi 1968: 313).  
37 Boileau (1837: 33–34, 37, 49, 105).  
38 Village Godhali of *pargana* Phalodi had *beri* near seasonal streams (Nainsi 1969: 21). Village Naberi of *pargana* Phalodi sustained itself on the dry bed of a seasonal stream, which flows only during the rains (Nainsi 1969: 25). In village Bhabhelai of *pargana* Jodhpur, the groundwater was brackish. The village was without any source of potable water, but a *beri* constructed on a nearby tank sustained the habitation (Nainsi 1968: 263). Similarly, village Mahev in *pargana* Sohat had a *bera* in the *talab* of the village and provided water when the *talab* dried up during the summers (Nainsi 1968: 457). In Jaisalmer the bed of a water tank, Amarsagar, sustained several *beris*. Amarsagar tends to retain water for only six to eight months and for the remaining part of the year these *beris* were the only source of water (Misra 1995: 56–57).  
40 The bigger form of the *kundi* is known as *tanka*. ‘Occasionally where the wells were brackish, drinking water was supplied from *kundis* or *tanka* in which rainwater was collected and preserved, but in such small quantities as to be used only in an emergency’ (Boileau 1837: 13–14).  
41 Ibid.: 13.  
42 The most important example of this mechanism is the Karor Pati Tanka of Jaigarh fort near Amber constructed in the fifteenth century. The parapet of the fort was used to collect rainwater and channellized to the tank located in the fort (Sharma and Rezavi 1993: 129–31).  
43 Details of materials used for construction of *kundis* are described in Misra (1995).
for the public seems to be one reason for the greater proliferation.\textsuperscript{44} Followers of Islam too shared the notion of religious merit\textsuperscript{45} associated with construction of water storage structures. Tanks were built to harness rainwater, particularly in regions which had clay soils or hard ground surface that allowed limited percolation. We have a long list of tanks constructed by individuals, communities and rulers.\textsuperscript{46} The 521 villages in the kingdom of Marwar had as many as 659 tanks. The highest number of tanks was in \textit{pargana} Sojhat, followed by \textit{pargana} Jaitaran and \textit{pargana} Siwana.\textsuperscript{47} Pokaran and Phalodi were also prominent for having a number of tanks. The environmental features of the region were suitable for tank irrigation. Lakes and dams were important sources of irrigation in the Mewat region.\textsuperscript{48} However, of singular significance were the constructions of Garsisar in the fourteenth century and Jaitsar, a few generations later, in the vicinity of the city of Jaisalmer.\textsuperscript{49} Selection of the site exemplifies a thorough knowledge of the local topography. The tank of Garsisar was constructed by erecting a \textit{bund} (which means an embankment) to block the drainage of the catchment area created by the slopes of the hill on which the fort of Jaisalmer is located.\textsuperscript{50}

\textit{Environment and Local Techniques of Water Conservation}

In the absence of any snow-fed river and low water table on the one hand and the erratic nature of rainfall on the other, the only viable alternative to irrigation was to tap rainwater through artificial methods. People maximized the use of rainwater by evolving several indigenous methods of water harvesting for irrigation purposes

\textsuperscript{44} Sharma (1995). For example, Pratapgarh stone inscription (AD 946), eulogy at the Lahar stepwell, Basangarh (Sirohi) (AD 1042), Indragarh Inscription ‘A’ (AD 1683), Bhuvana village stepwell inscription (AD 1600), eulogy at Trimukhi stepwell (AD 1675), eulogy at Gujar stepwell (AD 1715), Surtan stepwell inscription at Bedla village (AD 1717), Sagdogra stepwell inscription (AD 1801), Udaipur inscription at Dungarpur (AD 1880).

\textsuperscript{45} Sharma (1995). Sambhar stepwell inscription (AD 1363), Gaurishankar Tal, Narayana inscription (AD 1437), Makrana stepwell inscription (AD 1651), Bakalia inscription Dist. Nagore (AD 1670), etc.

\textsuperscript{46} A few prominent tanks include the Udaisagar (Nainsi 1960: 30). Rajsummand constructed between 1605 and 1618 Vikram Samavat. in Mewar (Das 1886a: 401–49,1886b 2204). Maharana Raj Singh, the Sisodia Rajput ruler of the former princely state of Mewar (AD 1662–80), is credited with the construction of the Rajsummand, as engraved on the eulogy pasted on the embankment (Vashishtha 1993: 111). Manasagar erected near Amber in the early eighteenth century (Khan and Kumar 1986: 25–40).

\textsuperscript{47} Bhadani (1999: 52).

\textsuperscript{48} Babur (1970: 580) extensively described the Kotla lake and noticed its utility for irrigation. It lies partly in district Nuh, partly in Gurgaon, where the two tracts join at the foot of the Alwar hills.

\textsuperscript{49} Chand (1999: 49–51).

\textsuperscript{50} Chand (1899, 1999: 41); \textit{Jaisalmer ri Khyat} (n.d.: 46–47, 58).
like *khareen, rela, sewanj* and *bahla*. These systems were essentially adapted to manage the run-off rainwater by directing it to the cultivation fields.

The practice of diverting rainwater to the fields for irrigational purposes (and diversion, in case of surplus, to neighbouring fields) is termed *bahla*. This was practised in regions with a clay soil and located usually in the vicinity of hills. The land thus inundated was also used for the cultivation of crops. In village Sanwarla, in *pargana* Seewano, the drainage caused by rains on the nearby hill was stored in the field and used for irrigation.51 Village Motisaro in *pargana* Seewano could produce 200 mun of Sewanj wheat with the help of the *bahla* in the village.52 In village Mahawan, in *pargana* Pokaran, the overflow of a *talab* was stored in a small tank nearby.53 In Kharia Neeba Ro, in *pargana* Sojhat, the land was fertile due to the availability of run-off rainwater from the nearby hill.54 Similarly, in the village of Peepaliyo Kapadiya Ro, in *pargana* Jaitaran, the overflow was used both for agricultural purposes and to irrigate the *jor*—the village pastureland.55 On these lands crops could be sown, especially the ones which needed limited water.

The water conservation and canalizing method, called *rela*, was a regional variation of the *bahla* and functioned on the same principle.56 The *bahla* method essentially utilized rainwater, whereas *rela* used overflow from seasonal streams. This method, however, could not be used for irrigating fields other than those inundated by the flood water of the seasonal streams. Lands irrigated by the *rela* method were generally located along the banks of rivers.57 These are generally natural depressions which were put into productive use by the village communities. The *rela* sustained *rabi/unali* crops. The village Peepaliyo Kapadiya Ro utilized the *rela* method of irrigation to generate revenue amounting to Rs 1,091 for the year 1658, Rs 2,250 for the year 1659, Rs 817 for the year 1662 and so on.58 Villages Anandpur Khas and Lambia, in *pargana* Merta, produced a good quantity of wheat and gram due to the availability of *rela*-irrigated land.59 It should be kept in mind that *rela* was the overflowed water spread over fields and the crop grown on this field was known as *sewanj*,60 and these were *rabi* crops. Usually, wheat

54 Nainsi (1968: 427).
57 Nainsi (1968: 353).
58 Ibid.: 516.
60 See also Bhadani (1999:78–79) and Habib (1992: Sheet No. 6, A & B); Habib (1982: 1–13).
could be grown due to low requirement of moisture and necessity of limited watering. Generally, winter showers provided the requisite irrigation for the better growth of these crops.

Another method of rainwater harvesting for irrigational purposes practised in the Jaisalmer region was known as *khareen*. It is generally believed that Paliwal Brahmins who settled in Jaisalmer during the early medieval times developed *khareen*. The land irrigated through *khareens* supported a rich harvest of wheat.

*Khareens* were basically *bunds* created in the path of *nullah* or seasonal streams. The height of the *bund* was kept low so as to retain only limited water which could dry up in two to three months. The *bund* also led to the deposition of silt, which ultimately formed the bed of the tank. This dried tank bed was used to produce *rabi* or *unali* crops. Another advantage of keeping the height of the *bund* low was that the overflowed water could be utilized to create another *khareen* downstream, which would enhance land available for cultivation.

A thorough and insightful understanding of the landscape on the part of the locals is visible in the conceptualization of these water systems and their efforts to harness the given potential were amply supported by the contemporary socio-political agencies. The ruling elites actively supported the development of such systems at local levels due to economic exigencies as it claimed a share in the enhanced agrarian production. The following section examines these interventions as manifestations of socio-political concerns pertaining to the environment.

**Coping with Water Scarcity: State, Society and Agriculture**

We have enough evidence to conclusively argue that the state extended financial and material support for the construction and maintenance of these water systems. Most of the investment was made to retain cultivators and thus to ensure the continuance of the settlements and its agricultural production. The ruling elite extended support for the construction of water bodies to encourage habitation in the region so as to enlarge the revenue for the principalities. The system of mapping the physical environment clearly manifested in the nature of interventions made by the political agencies to mitigate the vagaries of nature in general, and monsoons in particular, is very perceptive. The administrative apparatus kept a strict vigil over human settlements and continuously explored the favourable landscape to

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61 Chand (1899, 1999: 92).
63 Unlike the coastal regions of Tamil Nadu, except for continuous water tanks and their catchments in the Jaisalmer region and in the city of Jodhpur, the author is not aware of any such system in this region perhaps due to meagre rains (Mosse 2003).
develop new possibilities for expanding habitation. The ruling elites continuously aspired to make landscape more congenial and cultivable, and with the emergence and consolidation of Mughal power in North India, we witness a definite step forward. The *Ain-i-Akbari*, the administrative manual compiled during the reign of Akbar by Abul Fazl, made a beginning in this direction. It was soon imitated by Munhot Nainsi in his *Marwar ra Pargana ri Vigat* for Marwar, which seems to have been replicated in the *arshatta* documents maintained by the Amber state.  

These documents represent a kind of politico-administrative mechanism that laid ever-increasing stress on both physical and social mapping of the realm. The administrative reorganization of territory under Mughal rule, that is, the creation of *subah*, *sarkar* and *pargana* boundaries consolidated the administrative set-up of the principalities in this region.

Though apparently similar, administrative structures developed in Rajasthan differed broadly from their Mughal counterpart. In Rajasthan, the administrative apparatus was an extension of the larger social structure where, historically, power was shared among clan members. However, the efforts directed at strengthening

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64 This trend received unprecedented impetus with the beginning of colonial rule, which started collection of census data, compilation of gazetteers and conducted anthropological studies, from the nineteenth century.

65 At another level, this kind of documentation was seen in European societies as part of their process of modernization which was visible at the level of abstract as well as realpolitik. It was the product of two processes working in synchrony. First, as Scott puts it:

... the process of documentation is best conceived as a strong, one might even say muscle bound, version of the self-confidence about scientific and technical progress, the expansion of production, the growing satisfaction of human needs, the mastery of nature (including the human nature), and above all, the rational design of social order commensurate with the scientific understanding of natural laws. It originated, of course, in the west, as a bye product of unprecedented progress in science and industry’. (Scott 1998: 4–13)

second, in terms of:

... utilitarian discourse which replaces the term ‘nature’ with the term ‘natural resources’, focusing on those aspects of nature that can be appropriated for human use. A comparable logic extracts from a more generalised natural world those flora and fauna that are of utilitarian value (usually marketable commodities) and, in turn, reclassifies those species that compete with prey on, or otherwise diminish the yields of the valued species. Thus, plants that are valued become ‘crops’, the species that compete with them are stigmatised as ‘weeds’, and the insects that ingest them are stigmatised as ‘pests’. Thus, trees that are valued become ‘timber’, while species that compete with them become ‘trash’ trees or ‘underbush’. The same logic applies to fauna. Highly valued animals become ‘game’ or ‘livestock’, while those animals that compete with or prey upon them become ‘predators’ or ‘varmints’. (Scott 1998: 4–13)

However, we do not find any similarity of purpose between these two distinct experiences.

the administrative structure may be seen as a political strategy to negotiate the diverse social and ecological factors.

At the hub of the revenue administrative set-up was a diwan, who supervised the assessment and collection of land revenue from the parganas, each of which had its own officials. He had to keep himself well acquainted with the affairs of the principality, particularly with the activities of pargana officials such as the amil, amin, chaudhari, quanungo and potadar. They were his medium of contact with village officials such as the patel, muqaddam and patwari. The diwan also ensured that none of these officials exacted illegal or forbidden cesses or such as had been remitted by the king. The records maintained at the office of the diwan provided the administrative map and social profile, along with a synopsis of the seasonal variations pertaining to the ecological conditions.

The appointments of pargana officials such as the amil, amin, potadar, chaudhari and quanungo were made by the diwan. The revenue collectors (amilis) and assessors (amins) worked under the direct supervision and control of the diwan. He was required to see that all papers such as the rolls of jama, awarija and yaddashi were sent to him regularly. He issued instructions to the pargana officials for special measures regarding cultivation during the famine period. Through such mechanisms, the polities of the region were able to read the variations in the ecological conditions and offered remedial measures.

As pargana was a fiscal as well as a territorial unit, amil and the amin, the land-revenue officers, were responsible for implementation of royal decrees and initiatives. The amil was entrusted with the task of ensuring cultivation on all arable land and the collection of the assessed revenue from the cultivated lands. He had to take the help of the tappadar, chaudhari, quanungo, shahana and other village officials. All letters of receipt and disbursement such as arshattas had to be duly signed by the amil and the amin. The amil was also enjoined to expand the areas under cultivation by getting more land, especially ujar land (waste land), brought under the plough. He was authorized to issue new pattas of vat-vih (share in the cultivation) at concessional rates, ranging from one-third to one-fourth, to

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66 The nobles were being gradually but systematically converted into mere revenue assignees. See Singh (2003: 69–86).
67 Water was the most determining factor for crop production. The supply of water by natural precipitation was meagre and sporadic, even while the climatically-induced requirement for water was very incessant. Irrigation thus, by necessity, becomes the primary concern for crop production in the whole region. Means of irrigation have always been very important yet very limited. The availability of irrigation facility made a difference in agricultural productivity. The long as well as short-term variations in the climate and rainfall ruined crops and dried up fodder, thus making living conditions difficult. In the absence of any snow-fed river on the one hand and the erratic nature of rainfall on the other, the only viable alternative for irrigation was to tap water through artificial methods of irrigation. Singh (1990: 51–53) and Bhadani (1999: 41–42).
69 The amount of revenue assessed on an individual or a village or larger area.

those cultivators who brought parat (fallow) lands under the plough. He regularly communicated information regarding famines and other natural calamities that affected the cultivation, and implemented the measures prescribed by the diwan, such as making provisions for hal (plough), bij (seed) and bail (oxen), for the palti (cultivators).

Instructions were also issued by the amil to the chaudharis, quanungos, patels and patwaris to search for and rehabilitate the raiyat, who had abandoned cultivation due to famine, among other reasons, and to provide them with the facilities for cultivation. The amil and the amin were both responsible for the collection of baqaya (arrears) in their pargana; the diwan demanded muchalka (paper of agreement) from the amil and the amin of each pargana owning responsibility for realization of the arrears. The amin’s main duty was to verify the area of land under cultivation and to assess it according to the existing rules and regulations. He was required to send the assessment and other papers maintained in his office to the revenue department. He was required to inform higher authorities about the condition of rains in his pargana. The complex web of administrative functionaries ensured greater and deeper intervention by the state into the rural landscape.

Two other important pargana officials concerned with the land revenue administration were the chaudhari and quanungo. The offices of the chaudhari and quanungo, though hereditary, were subject to renewal by the king. The hereditary nature of these offices further strengthens the contention that the political apparatus was an extension of kin relations. The chaudhari was supposed to render all help to the amin and the amil in the collection of revenue. He also served as a counter check against the quanungo. As regards the duties of the quanungo, he was required to collect detailed information about the land revenue and enter the same in the records under different heads. Both the chaudhari and the quanungo were required to prepare the taqsim73 of different villages. These records were very significant for the political agencies as they contained all the relevant details with respect to the socio-ecological settings of villages. They provided an insight into the agrarian potential of a village, taking into consideration the role of environmental factors.

The shahana was perhaps the lowest official in the hierarchy of the revenue administration. The main duty of a shahana was to keep a watch on the crops

70 Literally, awarija is a diary, a daybook, a ledger, a rough notebook, an abstract of receipt and disbursement.

71 A kind of patta granted to the jagirdars at the time of grant of jagirs by the rulers or at time of restoration of it. Some of these have also recorded the number of ploughs and bullocks per cultivator along with their castes.


73 Taqsim records carried the summary account of revenue in the pargana including its villages; the total area of a pargana, area of uncultivated land especially the area under sir, kalar, hill, nullah, etc. It also included area under cultivation, the area under punya-udik (charitable land) along with harvest-wise revenue realization (Gupta 1986: 322).
when they were ready, or when they were taken to the *kotha* (where the grain was stored for the purpose of sale) or to the *ganj* (grain market where it was brought for sale).\(^{74}\)

Apart from the many officials appointed by the state, there were several others who were part of the political apparatus on account of their hereditary rights. Most of them were part of the local elite or the influential sections of society. Prominent among them was the *patel* who was normally a peasant (*raiyat*) and sometimes a petty *zamindar*. On the one hand, he was the natural leader of the villagers, and on the other he was the official headmen (*mukhia*). He represented the *raiyat* and forwarded their grievances to the *pargana* officials. The *patel* was not paid directly from the treasury, but was entitled to some customary sources of income, such as the *inam muqaddami*, *bisondh* (one-twentieth part) and *dagli* (Rs 14 at the time of foundation of new village). He was given a *parwana* for *nankar*, a cash allowance or land in lieu of his services. Along with the *patwari* and the *shahana*, he would receive a coconut at the time of *batai* (sharing of the harvest).\(^{75}\)

The *patwari* was the village accountant who prepared the *khasra* papers as well as accounts of revenue collections. His papers were all in the local language. In the *khasra* papers, he was required to record the name of *asami* (cultivator), the area of his holding (*arz* and *tul*), the cultivable area, the name of the crops sown in *sayallu* (*kharif*) and *unhalu* (*rabi*) and the share of the *raiyat* and the *diwan* (state) in both the categories (*khalisa* and *jagiri*) of land.\(^{76}\) Thus, it can be safely argued that the state concerned itself with various types of ecological facets and had penetrated deep into the intricacies of environmental landscape for its politico-administrative needs.

To maintain a regular supply of revenue, it was necessary to ensure continuous settlements and, therefore, availability of water. With the assistance of the administrative set-up, state not only appropriated greater revenue but it could also locate and promote water harvesting methods. In *pargana* Pahari, the failure of *rabi* crops was attributed to the lack of well irrigation in most of the villages in 1727.\(^{77}\) Construction of wells was promoted in regions with a relatively high water table.\(^{78}\) The state extended loans to the peasantry to dig new wells.\(^{79}\) Regions with deep

\(^{74}\) Gupta (1986: 166–79).

\(^{75}\) A great deal of responsibility devolved upon the *patel* in times of famine. Together with the *quanungo* it was his duty to rehabilitate the village, to bring *paltis* (cultivators) back to their fields and to make provisions for seeds, bullocks and ploughs through loans either from the local *bohra* or from the *raj*. He was required to recommend grants of agricultural loans (*takai-taqavi*) by the state in times of distress (Gupta 1986: 183–84).

\(^{76}\) Ibid.

\(^{77}\) Yaddashti (*Pargana Pahari Mauza-Darobastki*, 1784 vs./1727 AD).

\(^{78}\) Sanad *Parwana Bahi* (No. 1, 1764 vs./AD 1707); Bhadani (1999: 49). Wherever wells occurred more frequently in c. 1660, the water table was nearer the surface.

\(^{79}\) Arzdasht (*Kartik Sudi* 13, 1743 vs./AD 1686); (*Bhadva Sudi* 11, 1743 vs./AD 1686); (*Asad Sudi* 15, 1743 vs./AD 1686); (*Sawan Sudi* 13, 1740 vs./AD 1683); (*Asoj Vadi* 12, 1752 vs./AD 1695).
water tables opted for tanks,\textsuperscript{80} which were also state financed.\textsuperscript{81} Rulers also offered financial support for the repair of wells.\textsuperscript{82} Those peasants who dug up new wells were also offered concessions in land revenue.\textsuperscript{83} Similarly, the ruler was urged by the local revenue officials to provide loans to peasants in order to enable them to buy lao-charas (rope and leather) so that they could operate wells to irrigate crops.\textsuperscript{84}

The governing class extended assistance by providing tagavi loans. Peasants could obtain a loan from a mahajan either against the mortgage of property or against malzamini (surety) furnished by the state representatives, that is, the zamindar, patel or jagirdar.\textsuperscript{85} To protect the peasantry, the authorities imposed several restrictions on the functioning of the bohras. The general principle with regard to all loans—tagai,\textsuperscript{86} as well as loans advanced by the bohras—was that debt incurred in the current harvest period should be recovered immediately after the harvest or within the fiscal year. Usually, arrears on old loans could only be demanded if the output of the current harvest was considered adequate. The ruling powers’ attempt to discourage recovery of old loans by the bohras suggests that such loans were generally unrecoverable because peasants were left with very little surplus and consequently had to be written off.\textsuperscript{87} In fact, the state actively discouraged the recovery of the older loans to curb emigration by the peasantry.

Moreover, the practice of the state standing surety for the loan sanctioned to the peasantry clearly indicates that rulers took an active part in the agricultural production. It is interesting to note that most of the evidence for such practices comes from locations that were agriculturally favourable and where water was the only limiting factor. It also strengthens Scott’s argument that in Southeast Asia, retention of labour, in the form of human population, was the prime concern of the political powers.\textsuperscript{88} A closer examination of the pre-colonial landscape amply substantiates our contention that large tracts of land were completely uncultivated and under forest cover. A cursory look at the contemporary evidence makes it clear that there was sparse habitation in the region. Similarly, extensive pervasiveness of diverse wildlife, as has been corroborated in numerous contemporary accounts, suggests a sparse agricultural landscape.\textsuperscript{89}

\textsuperscript{80} Nainsi (1962: 25); Das (1886a: 117–18).
\textsuperscript{81} Sanad Parwana Bahi (No. 2, 1765 vs./AD 1708).
\textsuperscript{82} Ibid. (No. 8, 1768 vs./AD 1711).
\textsuperscript{83} Arzdasht (Kartik Vadi 3, 1742 vs./AD 1685).
\textsuperscript{84} Arzdasht (Asoj Vadi 12, 1752 vs./AD 1695); (Asoj Vadi 1, 1751 vs./AD 1684); (Kartik Vadi 3, 1751 vs./AD 1684).
\textsuperscript{85} Singh (1974: 22).
\textsuperscript{86} Habib (2002: 295).
\textsuperscript{87} Singh (1974: 22).
\textsuperscript{88} Scott (1998: 185).
\textsuperscript{89} Habib (1992: Sheet No. 6-B and 16–20).

Sparse agrarian landscape does not necessarily stem from a sparse population. Mere availability of land and peasantry was not sufficient to ensure growth of an agrarian economy and, for our region, possibilities of irrigation played a very significant role. A brief explanation of the agricultural pattern in Rajasthan will place us in a better position to appreciate the dependence on irrigation. In India, the production of two crops per annum has been a general norm, but in Rajasthan, due to the scarcity of water, at times it was difficult to raise even one crop in a year.\textsuperscript{90} The long-term and short-term variations in the rainfall could ruin crops and dry up pasturage, thereby making sustenance difficult. For instance, in AD 1659, it was reported to the authorities that in \textit{qasba} Aaveri, rain measuring ten fingers fell on \textit{Sawan Sudi} ‘11’, so ploughing could be done only for four or five days.\textsuperscript{91} Similarly, for \textit{pargana} Amber in 1647 AD, it was reported by \textit{purohit} Harsram that from \textit{Sawan Vadi} ‘7’ to \textit{Sawan Sudi} ‘1’, there was little rainfall in the \textit{pargana} and because of strong winds ploughing was not done and production fell sharply.\textsuperscript{92} Such conditions often led to the migration of the peasantry to other favourable locations.\textsuperscript{93}

The choice of the crops that were planted varied according to the changes in climatic patterns and flexibility in agricultural practices. If rains were delayed, peasants shifted to cultivation of \textit{moth}, which had the shortest maturity period. In the year AD 1660 Amar Chand and Sahib Ram, \textit{vakils} of the Amber court, noted that due to meagre and delayed rains till the month of \textit{Bhadva},\textsuperscript{94} only \textit{moth} could be sown.\textsuperscript{95} Similarly, in the year AD 1638, two other \textit{vakils}, Ajitdas and Man Ram, noted that due to drought, not even \textit{moth} could be sown.\textsuperscript{96} The statement that ‘not even \textit{moth} could be grown’ testifies to the fact that \textit{moth} was the last crop that could be sown in case rains got delayed. In situations of delayed or insufficient rainfall, land would be ploughed extensively to make it soft and then seeds were sown. During the monsoon of 1641, Kanwar Pal and Bhopat Ram had informed the \textit{Sarcar} that some parts of \textit{pargana} Averi had received insufficient rain and that land was being worked upon to make that soft for sowing seeds.\textsuperscript{97} In the next year (1642), Kanwar Pal and Hari Valabh Das supplied information that in \textit{pargana} Averi, wherever the soil was hard, it needed at least one more shower.

\textsuperscript{90} Nainsi (1969 : 12, 36, 258–59, etc.).
\textsuperscript{91} 
\textsuperscript{92} 
\textsuperscript{93} An \textit{arzdasht} written by Mouji Ram (\textit{Kati Sudi} 15, 1831 vs./AD 1774) informs the state about meagre rainfall leading to drought. This resulted in the migration of the peasantry. In his \textit{Arzdasht} (\textit{Jeth Sudi} 1, 1819 vs./AD 1762), Lal Chand Dala Ram informs about migration of peasantry due to drought and the resultant decline in revenue collection. Similarly another \textit{arzdasht} by Ajit Das, Man Ram (\textit{Chait Vadi} 3, 1809 vs./AD 1752), informs that villages were deserted.
\textsuperscript{94} Traditionally \textit{Bhadva} is the third month of rainy season and usually the last one also.
\textsuperscript{95} 
\textsuperscript{96} 
\textsuperscript{97} Arzdasht (Kartik Sudi 9, 1698 vs./AD 1641).
and wherever the rains had been insufficient, artificial irrigation by wells was arranged as well.98

A close look at the land revenue collection process and a reflection on agrarian production and output clearly establishes the correlation between investments made by the ruling elite in irrigation facilities to improve the agricultural potential.99 The differences in land revenue rates also reflect the same phenomenon. Irrigated land was taxed at a higher rate compared to the non-irrigated land, which is a good indicator of states’ concern to improve irrigation facilities. Local ecological as well as socio-political conditions provided ample opportunities to the political agencies to promote their agenda. While negotiating disputes over the use of water for irrigation purposes in the semi-arid climate, political powers promoted their own interests. Rulers not only arbitrated on the issue of ownership of means of irrigation, but also issued directives on the amount of water to be distributed.100 At times, the state had to arbitrate between claimants over the use of irrigational devices.101 It is interesting to note that the political authorities ensured an increase in the land to be cultivated by digging new wells in the villages.102 The state’s concern for optimal use of irrigation facilities is also evident from an important document pertaining to pargana Sojhat of Marwar state. Similar evidence is also available from eastern Rajasthan. An arzdasht written by Fateh Chand Ramji from pargana Malarna dated Paus Vadi 5, 1716 vs. (AD 1659) informs Raja Sawai Jaisingh that water from wells was being used for irrigation purposes as directed by the state.103 Clearly, the state was aware of the ecological realities and, therefore, almost always attempted to maximize the utilization of available water.

Concerns for potable water forced the state to punish any attempt at inappropriate or negative utilization of scarce resources. In the year 1744, it was reported from village Dhamorki, pargana Khori, that the patel had diverted water from the river without permission. He was punished with a fine of Rs 20.104 In 1768, another complaint recorded that Rupa Patel of village Raitoli breached the embankment of river to divert water for his use.105 In another incident, the state punished a Gujar for diversion of water from other person’s field in qasba Baswa in pargana Bahatri in 1717.106 A similar dispute is reported in the same year from village Neembla in pargana Bahatri where Goverdhan Brahman fought with Tulani Brahman over the issue of diversion of water and hit him with an axe. Subsequently,

98 Arzdasht (Asoj Vadi 7, 1699 vs./AD 1642).
99 Bhadani (1999: 34–80). Dominance of kharif crops also reflects greater dependence on source of irrigation for the crops grown during non-monsoon/ rabi season.
100 Sanad Parwana Bahi (No. 2, 1765 vs./AD 1708).
101 Sanad Parwana Bahi (No. 8, 1768 vs./AD 1711).
102 Sanad Parwana Bahi (No. 8, 1768 vs./AD 1711).
103 Arzdasht (Paus Vadi 5, 1716 vs./AD 1659).
104 Arshatta (Pargana Khori, 1801 vs./AD 1744).
105 Arshatta (Pargana Dausa, 1825 vs./AD 1768).
106 Arshatta (Pargana Bahatri, 1774 vs./AD 1717).
he had to pay Rs 11 as fine.\(^{107}\) The village pond was used not only for washing clothes and ancillary activities, but also by cattle for drinking purposes. Thus, any act of polluting it was punishable. We have evidence from \textit{qasba} Malpura in \textit{pargana} Malpura that in the year 1734, Lona, who was a dyer, was fined Rs 5.50 for washing dyed cloth in the pond, and thereby polluting the water.\(^{108}\)

In the agrarian economy of this semi-arid and arid region, failure of the monsoon very often led to drought. Excessive dependence on the rain and the relative absence of perennial rivers further compounded the problem in Rajasthan. Cultivation of a single crop per year in most of the arid parts of the region further reduced the possibilities of accumulation of grains and thereby squeezed the capacity of the peasantry to cope with the vagaries of the monsoon. These droughts could easily assume the form of a famine. Famines crucially hit the material base of the peasantry. The high cost of seed and manure and the drying up of wells restricted the ability to irrigate the land. In such conditions, ploughing could not be done,\(^{109}\) thus affecting agricultural production in the region. Drought or infliction of crops, scarcity of fodder and drying of ponds also made the cattle vulnerable to adverse conditions\(^{110}\) and affected the pastoral communities of the region. To mitigate these conditions of hardship, migration towards more favourable places such as Mathura, Gujarat and Malwa was extensively practised. However, the state made all possible efforts to stop the migration and often, attempted to persuade the peasantry to return by offering remissions in land revenue demand.

The vagaries of nature and related uncertainties about the quantum of agricultural production necessitated flexibility in the methods of governance. Under such conditions, a kind of flexibility was necessary whereby revenue collection was not calculated in rigid terms, rather, it was revised to correspond to the actual production generated. Possibility of cultivation of a particular crop in a season was determined by the timely onset of the rains; the choice of crop could vary according to the variations in the climatic patterns. Thus, flexibility had to be inbuilt in an agricultural economy where income or revenue differed from season to season due to cultivation of different crops with variance in yields.\(^{111}\) Considerable leeway was granted by the state to the local elite in the assessment of revenue. Revenue was collected on the actual agricultural production on the verification issued by the important elements and by consensus in local society.\(^{112}\) On the testimonies of the local elite about the actual environmental conditions in both the agricultural seasons, various remissions were granted. It also strengthened the superior status of intermediaries. Intermediaries were as such a part of the administrative apparatus.

\(^{107}\) \textit{Arshatta} (Pargana Bahatri, 1774 vs./\textit{AD} 1717).
\(^{108}\) \textit{Arshatta} (Pargana Malpura, 1791 vs./\textit{AD} 1734).
\(^{109}\) \textit{Arzdasht} (\textit{Paus Sudi} 4, 1704 vs./\textit{AD} 1647).
\(^{110}\) \textit{Sanad Parwana Bahi} (\textit{Falgun Vadi} 10, 1786 vs./\textit{AD} 1729).
\(^{112}\) Ibid.: 164.
and ensured two-way communication between the state and the peasantry. These intermediaries safeguarded the interests of the state on the one hand and were the guardian of the peasantry on the other. Intermediaries were dependent on the state for the continuance of pattas while they needed the peasantry to cultivate the land, thereby ascertaining the smooth process of agrarian and ancillary production. From the central authority to the cultivator, inherent flexibility can be observed with respect to agricultural production.

**Concluding Remarks**

The list of issues associated with water management and its use is elaborate and can be traced at several levels. This article has examined the availability and utility of various indigenous water systems and their somewhat complex role in the societies’ efforts at mitigating the vagaries of nature. None of these operated in isolation and it is incorrect to attribute apathy to the political formations in pre-colonial times. Certain level of flexibility is also evident in their approach to make optimum use of the erratic nature of the monsoon. The socio-political apparatus showed a continued capacity to accommodate the irregularity of rains and consequent fluctuations in the agricultural production. This adaptability was also seen within the structure of revenue administration which would allow space to accommodate the rights, privileges and demands of different sections of society in the wake of an almost regularly erratic monsoon and agriculture contingent on it.

Unfortunately, we do not have sufficient evidence to comment on the use of water bodies by different castes given the nature of the prevalent caste system in pre-colonial Rajasthan. An issue of significance is the role of Turkish rulers with respect to the caste system in general, and access to common water sources in particular. An inscription found at the stepwell at Makrana carries an official

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113 Arzdasht (Magh Vadi 9, 1765 vs./AD 1708); (Asad Sadi 2, 1762 vs./AD 1705); (Jeth Vadi 7, 1752 vs./AD 1695); (Chait Vadi 3, 1752 vs./AD 1695). Habib (2002: 295).

114 D’Souza (2004: 255). To demonstrate their superior social status and economic position, ruling elite practised the euphemization of economic resources. ‘... what the wealthy did was to transmute a portion of their disproportionate economic means into forms of status, prestige and social control by means of acts they passed off as voluntary acts of generosity or charity. This social control was, of course, again convertible into labour services and hence again into material wealth’ (Scott 1998: 306–07).


116 Both of them have argued that pre-colonial states functioned in the larger domain of traditions and in a social order which was defined exclusively by birth (Sahai 2006: 237–72). D’Souza (2004: 255) has suggested that in pre-colonial socio-political formations euphemization played an important role.

117 Any description of Indian society is not without distinct references to the caste system. Fazl (1978), Nainsi (1968, 1969, 1974) and Chand (1899, 1999) while providing the administrative classification have based their descriptions on caste categories.
order by Mirza Ali Beg prohibiting the lower castes from collecting water from the well alongside the higher castes. Did notions of purity and pollution attached with the sharing the water bodies concern believers of other religions as well, especially Islam, is a question difficult to address at present. Moreover, water rights and related issues, such as who was the owner of the water, primarily groundwater, was it more important with respect to irrigation, did the state enjoy any kind of proprietary right over the water, are matters that have not been answered yet.

Equally important is the issue of the maintenance and upkeep of irrigation mechanisms. Without the active participation of various sections of society, it would have been a difficult task and more so in a ‘caste-ridden’ society. I would like to be slightly unconventional and raise the question as to what extent can we term these systems as ‘common’ in the sense of ‘common property resources’? It has already been pointed that the caste system dominated social realities, yet the premium on human labour may have necessitated deviations from the normative prescriptions of purity and pollution. Ecological settings of the region must have diluted strict adherence to caste segregation, and the notions of ‘common property resources’ therefore need reconsideration. Were they influenced by the peculiarity of the ecological niche? At another level, it also raises questions about the nature of regional polities of the period. Growing monetization and commercialization of economy, initially during the Mughal rule and later with the greater and deeper penetration of European commercial interests, may have forced modifications in the methods of governance. The beginning of this process can be traced in the nature and purpose of documentation of and negotiations between social and natural resources. Surely these are larger issues and only further exploration will provide insights into related socio-political realities.

References

Published Sources

Babur, Zahirud Din Muhammad (1970), Babur-Nama, A.S. Beveridge, trans., Delhi.
Boileau, A.H.E. (1837), Personal Narrative Tour through the Western States of Rajwara in 1835 Comprising Beekaner, Jesulmer and Jodhpur, Calcutta.
Chand, L. (1899), Tawarikh Jaisalmer, Jodhpur.
——— (1999), Tawarikh Jaisalmer, Jodhpur.


Jahangir (1968), Tuzuk-i-Jahangiri, H. Beveridge, ed. and trans., Delhi.
Ojha, G.H. (1938), Rajasthan ka Itihas (Hindi), Ajmer.
Sharma, Dashratha (1966), Rajasthan through the Ages, Vol. I, Bikaner.
——— (1990), State, Landlords and Peasants, Delhi.


Tod, Colonel James (1971), *Annals and Antiquities of Rajasthan or the Central and Western Rajput States of India*, 2 vols, Reprint, Delhi.


**Unpublished Papers**


*Arshatta*, AD 1644–1806, *paraganas* Pahari, Jalalpur, Pirahgpur, Sawai Jaipur, Bahtri, Malpura, Gazi ka Thana, Chatsu, etc. Historical Section, Jaipur Records, Rajasthan State Archives, Bikaner.


*Sanad Parwana Bahi*, No. 1, 2 and 8 (AD 1707, 1708, 1729), Jodhpur Records, Rajasthan State Archives, Bikaner.

*Yaddashti* (1784 vs./AD 1727), *paragna* Pahari Mauza-Darobastki, 1784 vs. Historical Section, Jaipur Records, Rajasthan State Archives, Bikaner.