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**Resisting change?  
Adaptations by traditional pastoralists  
to the Rajasthan Canal Project**

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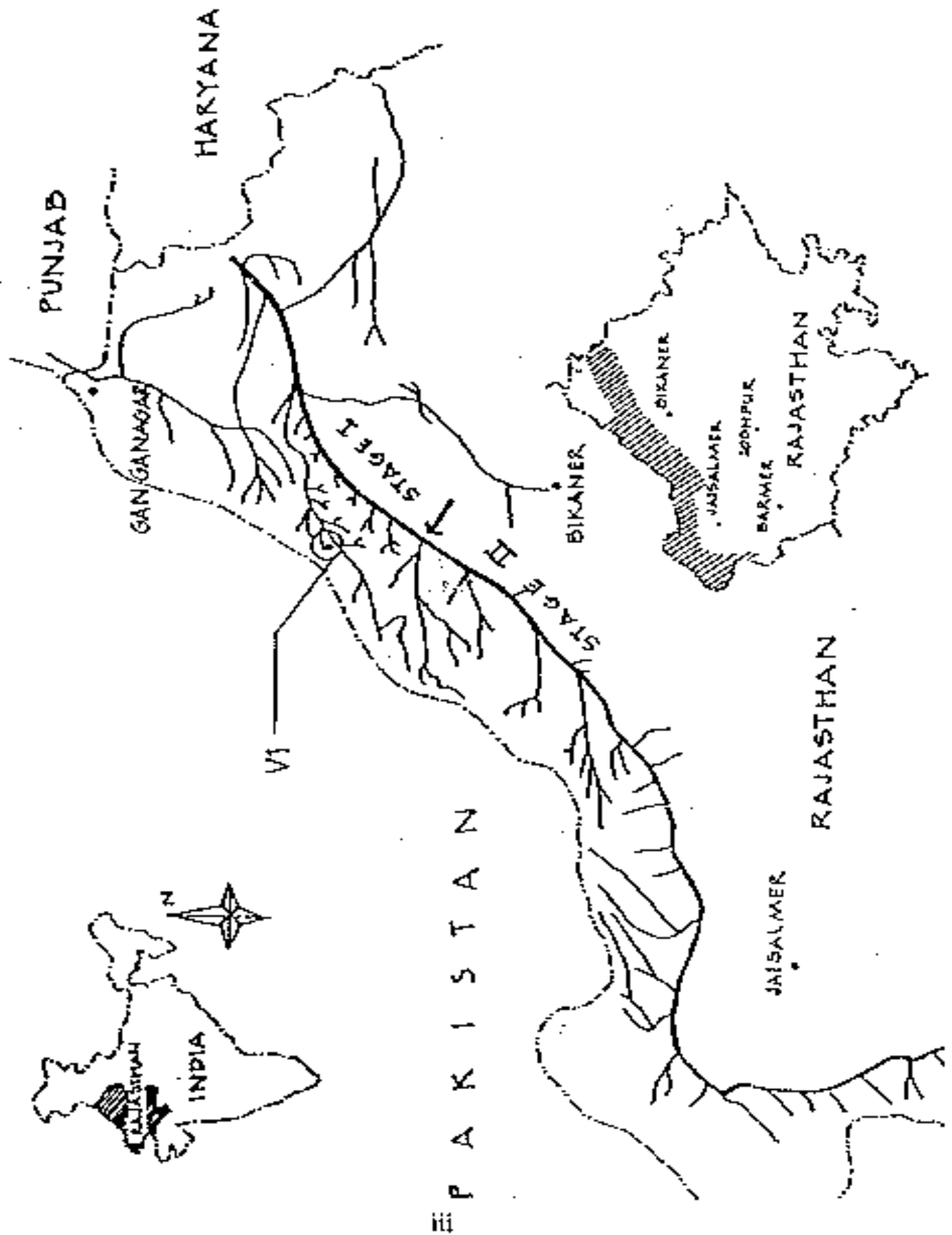
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Map 1 Rajasthan Canal Project



# RESISTING CHANGE? ADAPTATIONS BY TRADITIONAL PASTORALISTS TO THE RAJASTHAN CANAL PROJECT

## INTRODUCTION

Promotion of irrigated agriculture in the Thar Desert of India through the Rajasthan Canal Project, has brought about new structures and institutional arrangements hitherto non-existent in the region. The organisational requirements for canal irrigation are highly complex and require co-operation and community-level decision-making to decide on operation and maintenance of the canal network. In contrast, in this part of India, pastoral decision-making is usually carried out by the individual herd owner (Agrawal 1992). Co-operation with others for watering and herding activities varies from year to year, and herding coalitions are highly unstable. Unlike irrigation farming, however, pastoral strategies favour the maintenance of social relations over a wide area, to permit flexible and mobile patterns of herd management (Little 1988).

This paper examines change in labour institutions for Johya pastoral nomads in response to the Rajasthan Canal Project. And it asks how the Johya have adapted their pattern of labour use to the introduction of canal irrigation in the desert.

## THE RAJASTHAN CANAL PROJECT<sup>1</sup>

First conceived in 1948, inaugurated in 1958, and only now almost complete, the Rajasthan Canal Project (RCP) is an ambitious effort at state-induced development of the arid, drought-prone, and economically backward region of the Thar Desert in western Rajasthan<sup>2</sup>. The basic objective of the Rs. 46,000 million<sup>3</sup> (approx. US\$ 1.5 billion) project was to utilise Rajasthan's share of the Ravi-Beas waters which became available as a consequence of the 1960 Indus Water Treaty between India and Pakistan. The project aimed to grow food to

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<sup>1</sup> Although the Rajasthan Canal was renamed Indira Gandhi Nahr in 1984, the original name is preferred by the author for its location-specificity.

<sup>2</sup> Western Rajasthan stretches over 12 administrative districts - Barmer, Bikaner, Churu, Gangunagar, Hanumangadh (since 1994), Jaisalmer, Jalore, Jhunjhunun, Jodhpur, Nagaur, Pali and Sikar.

<sup>3</sup> This is the most recent estimate of expenditure on the project. There has been a continuous upward revision of the estimated expenditure. In 1957 the project was likely to cost Rs 610 million or approx. US\$ 90 million (at the then current prices). In 1957 US\$ 1 = Rs. 7; in 1994 US\$ 1 = Rs. 30 approx.

make up for the irrigated areas lost due to partition of the countries (Urmul Trust 1992), to create employment opportunities, raise living standards of the local inhabitants, sedentarise nomads, provide drinking water and transform the desert into a granary. An unstated objective was to develop a defence line against a possible attack by Pakistan (Sinha 1996).

On completion, the 649 km of canals will irrigate a cultivable area of about 1.5 million ha<sup>4</sup> to support a population of more than 2 million in over 350 completely new villages and towns. The main canal is supplied by a feeder canal from the Harike dam at the confluence of Sutlej and Beas rivers in the Punjab. The canal system consists of the main canal, nine branches, seven lift schemes and twenty-one direct distributaries besides a large number of smaller channels (Map 1). Construction was planned in two stages. Stage I is complete and consists of 204 km of feeder canal and 189 km of main canal with a cultivable area of 0.54 million ha. Stage II will extend the main canal to 445 km and add a further 0.76 million ha to the cultivable area (CADA 1993).

## AGRICULTURE AND SETTLEMENT PATTERN

The Thar is one of the most hospitable deserts in the world as it has a great diversity of vegetation and a long history of human settlement. In 1901 western Rajasthan as a whole had a density of 14-16 persons per km<sup>2</sup>. By the 1991 census it had increased to 83 per km<sup>2</sup>, in comparison to an average of 3 per km<sup>2</sup> in other hot deserts of the world. As many as 700 plant species are found, of which 107 are grasses alone. These plants must be deep-rooted and tenacious enough to withstand extended droughts and yet efficient enough to grow rapidly during a favourable season. The grasses are generally prolific seeders. Most of the species are palatable, fairly nutritious and rich in mineral matter, including trace elements. *Dichanthium-Cenchrus-Lasirus* are the main species found in western Rajasthan, northern parts of Gujarat and south-western parts of Haryana and Punjab contiguous to Rajasthan. Several drought-resistant fodder bushes and trees are also found in the region (CSE 1988).

Nevertheless, agriculture in most of the region has been extremely precarious, dependent almost solely upon rainfall. Four out of every 10 years are estimated to be bad or drought years. And even in years of average rainfall, crop productivity is much below the national average. Except in a few places where water can be stored, only the kharif (summer crop) is possible. This can be

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<sup>4</sup> This is approximately twice the area of the Gezira Scheme in the Sudan, regarded as the world's largest irrigation system to date.



achieved because of the peculiar climatic conditions under which the limited rainfall is received within a short span of 70-90 days when humidity conditions are also high. Bajra (*Pennisetum typhoideum* L.), jowar (*Sorghum vulgare* P.), moth (*Phaseolus aconitifolius* Jacq.), moong (*Phaseolus aureus* Roxb.), and til (*Sesamum indicum* L.) are the principal crops. Bajra is sown as early as possible, even in May if there is rain, and takes about 3 months to ripen. Jowar requires a stiffer soil and more rain, and is sown later. Til, an important oilseed, is usually grown by itself, but is sometimes mixed with jowar. The cultivation of winter crops such as wheat (rabí), barley and grams, is confined to only a few pockets.

Immediately prior to the construction of the canal, the area to be developed was sparsely populated with an average density of 13 persons per km<sup>2</sup> (Rajasthan Canal Board 1961). To ensure optimum use of the newly created potential, people were encouraged to settle in the area and allotted square parcels<sup>5</sup> each of 25 bigha (6.32 ha) of agricultural land per household, and land for construction of living quarters. Initial proposals envisaged allotment of land by auction on the grounds it would result in a more rapid settlement by experienced farmers with capital for investment. But official policy emphasised the twin goals of social welfare and equity, and the poor and other disadvantaged sections were accorded priority in land allotment. Certain other categories of household were also eligible for allotment though the emphasis was always on providing land to the landless. However, the rate of land settlement, particularly in Stage II, remained slow<sup>6</sup> till 1988-89, and it was decided to allocate 50% of land for special allotment by sale or public auction to people domiciled in Rajasthan for at least 10 years (IDS 1991).

As a result of government policy, a heterogeneous mix of households of different origins, farming backgrounds and economic strata has settled in the canal development area. There are now three land-owning groups in the development area, traditional desert dwellers (the pastoral nomads), 'selectees'<sup>7</sup> (the landless residents of Rajasthan who were allotted land by the government at a subsidised price), and purchasers (those who purchased land at the market

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<sup>5</sup> Each square parcel is known locally as a *murahhu*.

<sup>6</sup> The slow rate of settlement has been attributed to the uneven terrain and the presence of high sand dunes. These physical problems imply an increase in cost of land development and construction of water courses. Since most of the allottees were the landless or special allottees with limited access to capital, rate of settlement remained low.

<sup>7</sup> This term is borrowed from Stanbury (1987).

price) (Table 1).

**Table 1** Typology of household categories on the Rajasthan Canal Project

Feature	Original	Selectee	Purchaser
Origin	Natives of the area	Mostly domiciled in Rajasthan	Mostly from outside the state
Traditional occupation	Pastoralism and intermittent farming	Variety of caste-based occupations	Agriculture
Caste background	A mixture of castes	Lower castes	Dominant caste groups
Land ownership prior to the canal	Dry land with usufructory rights; almost no private property	Landless	Landowners
Experience of irrigated agriculture and farm management	None	A few with experience of agricultural labour and tenancy	Experienced farmers

Source: Sinha (1996, op. cit.).

It is estimated that even after all the irrigation projects under construction, including the Rajasthan Canal, are completed, only 11% of the total area will be under irrigation (Mann and Singh 1977). The local economy will, thus, continue to depend heavily upon rainfed farming with production risks distributed between agriculture and animal husbandry.

Livestock rearing is an important aspect of the subsistence economy in Rajasthan's arid zone, and the main occupation in the most drought-prone areas. During a drought year, agricultural production may fall to less than 10% of the production of a favourable year, but the production of milk and wool is much less severely affected (Malhotra and Mann 1982). Some of the best cattle breeds in the country such as Rathi, Sahiwal and Tharparkar (dairy) and Nagauri (draught) are found in the Thar desert. Hardy breeds of sheep have adapted to survive on the very poor vegetation available.

Pastoral nomadism is one of the oldest ecological adaptations in western Rajasthan but here it has been successfully combined with rainfed agriculture

(Kavoori 1990). However, unlike those in Africa and the Middle East, the nomads of Rajasthan's arid zone are not ethnically different from the sedentary population (Kohler-Rollefson 1992) and do not have a separate territory with exclusive rights (Malhotra 1977). They are transhumant rather than purely nomadic, having permanent dwellings in villages. When migrating, they do not stay in camps, but sleep in the open (Agrawal 1992, *op. cit.*). Most practise cultivation for about 4 months, with some members of the household regularly leaving home with livestock during periods of water and fodder shortage.

## **TRADITIONAL LABOUR INSTITUTIONS OF THE JOHYA**

This section discusses the natural resource use patterns of the Johya in particular, and the labour strategies which have given this tribe the necessary flexibility to adapt to the desert environment.

### **Pre-settlement history**

The Johya (or Joiya) was the chief Muslim pastoral tribe of a group collectively known as **Rath**, or ruthless (Fagan 1893), originally a Rajput tribe which later converted to Islam. By the 16th century they extended into the northern edge of the Thar Desert in India around Bikaner. By the early 1900s, the **Rath** numbered some 17,000. They were regarded as troublesome, great marauders, as having 'somewhat predatory habits', and their occupation was 'pasturing their own and stealing other people's cattle'. They were mainly pastoral, cultivated little or no land, and their wealth consisted of cattle, of which they reared a great number. They traded in **ghi** (clarified butter) and wool.

The present generation of Johya, traces its descent to Jaluke village, 20 km west of the town of Ganganagar. An apocryphal story about their migration to the study village is that they intended migrating to Pakistan at the time of partition of India in 1947. Not knowing where the boundary would be placed, they travelled southwards instead of west, reaching Chakshera (a village about 130 km from Jaluke) and, thinking they had crossed into Pakistan, settled in two adjoining hamlets. It was some months before they realised that they were still in India, though close to the border which had been determined in the meantime.

### **Resource use pattern**

The existing records and published literature agree that at the time of formation of the Rajasthan state and even until 1955, Chakshera was part of Chatargarh

in the Anupgarh Estate. There were no recognised individual rights in land and all cultivators were tenants without occupancy rights. Disputes over the right to water cattle at particular natural sources of water were more common than disputes over grazing, and disputes over ownership of cultivable land were probably inconceivable. This is not because there were no cultural notions of individual land rights, but because land was abundant and had no perceived value. Singh (1964) records that while there was head tax on cattle<sup>8</sup>, and a house tax on people<sup>9</sup>, there was no specific tax on cultivated land or crops. This is not surprising considering that little regular cultivation was practised.

In 1960 (the earliest year for which land records are available), 10 households in the village of Chakshera each had 50 bighas of land for cultivation. Most agriculture was rainfed, a risky proposition given the low and uncertain rainfall. Up to 1968 only rainfed millet, sesame, sorghum and pulses were cultivated with millet covering 75-90% of the total sown area.

The inhabitants of Chakshera depended primarily upon their cattle. Agriculture was at best a secondary activity. A socio-economic survey of the region (CAZRI 1965) recorded that animal husbandry was the primary occupation for nearly 98% of the Muslim households and 45% of the Hindu households. Table 2 gives the size and composition of the herds kept by the Johya. In spite of the importance of cattle, the size of the herd per household seems rather small. People recollected, however, the number of cows per household being three to four times higher than the recorded figure. There could be two possible reasons for the under-estimation: animals on seasonal migration are rarely recorded in government records, and given an inherent suspicion of the government's intentions, assets are usually under-reported.

It is clear from Table 2 that the Johya had a strong preference for cows and sheep. Except in the drought year of 1959 when the size of herds was reduced drastically, the number of cows per household was always greater than twenty. The preference for cows has continued to the present day. Bullocks were also popular and seem to have been kept for draught power. On average, each household had one camel, commonly used for transportation. Adult female camels also added substantially to the milk supply of pastoral households.

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<sup>8</sup> Khuntahandi was realised on pack camels and varied between Rs. 2-4 per camel. *Panchatari* or grazing fee on sheep and goats, was at the rate of 2 annas (1 anna = 1/16th of a rupee). In addition, there was *Slughanti*, a tax on sheep and goats at the rate of Rs. 1 for every 14 head (Singh 1964).

<sup>9</sup> *Dham* or *Nalhandi*, a hearth or house tax, was realised at the rate of Rs. 2-5 per house (Singh *ibid.*).

**Table 2 Livestock population in Chakshera**

Year	Number of households	Bullocks	Cows	Sheep	Goats	Camels	SLU*	SLU per household
1956	7	79	289			9	194	28
1959	15	80	199	200	0	9	169	11
1962	21	176	420	334	12	13	346	16

\*Standard Livestock Unit; 1 SLU = 1 camel, or 2 cattle, or 10 sheep/goats.

Source: Mal Guzari Register of Chakshera village (various issues).

Seasonal migration was a common strategy of the Johya in their search for water and pasture. Before setting out for the grazing area, the Johya would offer a sweetmeat (*phirni* or *gur*) and milk at the mosque. Some would even have a big feast. People moving would carry only essential articles like a grinding wheel, milk churner, some grain and other items for daily use.

Depending upon the fodder-animal balance in the village, the period of migration could vary from 3 to 9 months and take one of three forms: (i) movement of livestock to ponds (*toba*) in the pasture between the dunes and near the village; (ii) movement within the arid zone but further from the village, and (iii) movement of herds outside the arid region during lean periods and sale of animals and animal products (CAZRI 1965).

Succulent grasses were available in these inter-dunal areas with the start of the rains which lasted for a couple of months, and the pastoralists would shift their residence to these places from July to September. Some parts of the arid zone would receive sufficient rainfall whereas nearby places remained dry. Under these conditions, the Johya would take their animals to the villages where water and pasture were available. It was regarded as a normal courtesy for people from the better endowed villages to extend these facilities to the not so fortunate. Normally the former would accommodate their visitors, but they were never willing to deepen their *toba* as that would be an invitation to the guests to stay longer and exhaust the grasses and other fodder around the *toba* much more quickly. There were numerous water bodies around Chakshera which used to attract cattle from nearby villages in times of scarcity. Such movements would generally take place between November and early April.

In low rainfall years, especially during the month of April, when most of the water and grazing resources in and around Chakshera would be depleted, livestock usually moved northwards. They would reach the irrigated tracts of Ganganagar district and Punjab in time for the animals to feed on the stubble of

the recently harvested rabi crop. The Johya divided their herds into two groups; the dry cows and sheep were taken to villages in the interior where there was ample grazing and water. The milch cows were stall-fed in and around the large towns such as Abohar and Fazilka where, in addition to water and cattle-feed, there was a good demand for milk. This period of nomadism would last for about 4 months and the Johya would return to Chakshera with onset of the monsoon rains in July and August.

### Social organisation of labour

The adaptation of the Johya to the desert can be described in ecological terms, for they have adopted a set of survival strategies by exploiting a wide range of resources. More important, however, are the social relations of production expressed in the allocation of labour, the exchange of livestock through marriage, inheritance, friendship ties, ritual ceremonies, and other social transactions, and the use of elaborate social contracts and kinship networks to increase their productive capacity.

Pastoral households have to balance their herds continuously with available labour. It has been suggested that pastoral societies have an in-built demographic mechanism to keep the size of the human population small and slow growing relative to the available livestock (Swift 1977). While there is no historical demographic data for the Johya to confirm this generalisation<sup>10</sup>, there is evidence that different social institutions helped to regulate demographic processes.

The selection of a spouse provided the opportunity to adjust labour and livestock. Cross-cousin marriages were encouraged. Among the Johya studied here, more than 50% of the marriages were between first cousins and another 40% between second cousins<sup>11</sup>. Marriage between cousins is common in many Muslim communities but among the Johya it was closely related to a unique form of exchange by which women's labour was retained within the household. Women's labour was highly valued and women were usually married to men with sisters. Those without sisters found it difficult to get married within the community and had to pay bride-price (*muklava*) to the father-in-law as compensation. Marriages were delayed since many men were unable to pay

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<sup>10</sup> According to a rather crude estimation of number of live children per woman, Johya women have 3.6 children.

<sup>11</sup> Here first cousins are those whose fathers are brothers, and second cousins are those whose paternal grandfathers were brothers.

**muklava** at a young age and this acted as a mechanism for adjusting population to resources. Marriages were followed by a delay as the wife did not come to stay with her husband until he had moved out from his father's house to live separately. This institution acted as a brake on fertility, adjusted labour to livestock and retained the girl's labour in the household of her birth.

With few exceptions, the supply of household labour for various pastoral activities is organised along sex and age lines. The mixed composition of the Johya herds while it served to protect from risk also increased labour requirements and demanded a flexible internal division of labour that could respond to varying conditions in differing herding environments.

### **Herd management**

Married men were primarily managers and herd supervisors. Their responsibilities included gathering information on pasturage and water availability. They took the initial decisions, in consultation with the family elders, on migratory routes and herd movement. This role assumed particular importance when they had to move to other villages within or outside the arid zone. Men would also be responsible for decisions on where to camp and negotiations with farmers for letting the animals graze stubble on their land. They also decided on the watering location, the daily orbit of grazing, and the allocation of herding tasks. But given their extensive kinship networks, most decisions on herd management were taken collectively rather than by individual heads of households.

The labour requirements for herding were drawn almost equally from young unmarried boys and girls and would depend upon the type of animal being herded. Adolescent boys would be responsible for herding cattle, and occasionally camels, whereas younger boys and girls (8-12 years old) would herd goats and sheep. The labour of adolescent girls, however, was foregone to protect family honour. They usually assisted the older women in various domestic activities including cooking, fetching water and caring for children. The household head (i.e. the herd manager) could retain this stock of labour for a period of 10-15 years because various institutional mechanisms helped postpone both marriage and cohabitation.

### **Watering**

Labour for watering was usually concentrated in the dry season, the amount depending upon the type of watering facility. The **toba** and the **johad**, the most common sources of water in and around Chakshera, were no more than natural depressions which collected rain water. Labour requirements for these were low

and the entire operation could be supervised by two (or a maximum of three) herders, even for very large herds. The diverse livestock holding of a household did not increase the labour requirement for watering since both cows and sheep (the two most preferred animals) needed to be watered every third day, whereas camels only required water every 5 or 6 days in the summer season. During and soon after the monsoon most animals met their moisture requirement from surface pools or by eating fresh grass. Herders were generally responsible for watering their own animals, although the decision about which water source to use, and for how long, was taken by herd managers.

### **Milking**

Animals were normally milked twice a day although this would be reduced to once a day near the end of lactation. Labour for milking cows tended to peak in the winter season, but for sheep it was more evenly distributed throughout the year.

The seasonal dimension of this pastoral labour requirement was complementary to that required for dryland cultivation. The summer months from April to June were the period of peak pastoral labour demand for herding and watering, but had almost zero crop labour demand. The wet season from July to September would see a reduction in demand for herding and watering labour and a shift to crop sowing. Crops were harvested from October to December when labour requirement for herding and watering would still be low. When the rains failed, as happened frequently, no sowing was undertaken and the available labour would migrate with the animals in search of pasture and water.

The balance between labour and livestock in subsistence-oriented pastoral systems is inherently unstable (Sikana and Kerven 1991), but the Johya had developed various mechanisms for attaining temporary equilibrium. Growth of irrigated agriculture in and around Chakshera introduced a new source of instability to which the Johya had to adjust. The next section describes adaptations of their labour allocation strategies to the Rajasthan Canal Project.



## ADAPTATION OF THE JOHYA TO THE RAJASTHAN CANAL PROJECT

The process of colonisation created a more settled village community, and was accompanied by the expansion of privately owned land. Together with rapid population growth and the expansion of cultivation, this led to the reduction of land available for grazing. The Johya, traditional pastoralists of the region, soon became owners of agricultural land with the advent of the Rajasthan Canal Project, but faced the dilemma of what to do with their livestock.

Anupgarh Estate, of which Chakshera was part, was transferred by the Revenue Department to the Colonisation Department for initiating the process of land rectification<sup>12</sup> and allotment. After this, the village was divided and soon lost its identity, being replaced in the new administrative records by its constituent, and newly formed, *chak*<sup>13</sup> units. V1 is one such *chak* which emerged as an independent entity after the land rectification process by combining several settlements. The Johya were allotted two *murabba* (12.5 ha) of private agricultural land, soon to be irrigated. But the neighbouring wastelands were parcelled out for new irrigation plots, thus severely restricting access to pasture for their cattle. And, people were encouraged to settle there to make maximum use of the newly created potential. Such changes have forced the Johya to adapt their strategies.

### Changes in land ownership and use

There are 25 Johya households in V1. On average they own nearly 5.5 ha and are the largest landowners, but their plots are rented out and the Jolyas cultivate very little land.

Prior to the construction of the canal, the Johya used to migrate within the arid zone and occasionally to Punjab for short periods. But that was not for lack of land for grazing, since until 1962, almost the entire area of Chakshera was available for rough grazing. However, the process of land allotment and settlement led to a sharp decline in herders' access to local grazing lands. In

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<sup>12</sup> Land rectification refers to the process by which land (previously different shapes and sizes) is divided, after survey, into regular shapes (usually square) of standard sizes (6.25ha in this case) for facilitating canal irrigation.

<sup>13</sup> A *chak* is the smallest area irrigated by a common water outlet.

the former Chakshera village (Table 3) there has been a steady decline in the area of communal grazing ('cultivable wasteland') from around 10% in 1987 to 6% of the total area in 1992. The net irrigated area has increased marginally from 52-54% in the same period.

**Table 3 Land use in part of the former Chakshera village (ha)**

Land Use	1987-89	1988-90	1989-91	1990-92
Total	711	711	711	711
Unsuitable for agriculture	77	77	77	77
Current fallow	58	66	40	80
Other than current fallow	39	51	55	92
Cultivable wasteland	74	73	72	46
Irrigated area	577	549	624	599
Unirrigated area	109	100	97	28
Sown more than once	210	201	250	217
Net sown area: irrigated	367	348	374	382
Net sown area: unirrigated	109	100	97	28

Source: Compiled from Girdauri Register and Milan Khasra of Chakshera village (various issues).

This contraction in land available for grazing around Chakshera was critical in lengthening the Johya stay in Punjab, a trend which began in 1965-70 (approximately the time of first land allotment in V1). Initially, they used to go there briefly in summer and return at the time of the rains in July-August. The longest period of uninterrupted drought in western Rajasthan during 1974-82 (Henderson 1994) prevented them from returning and many settled down permanently with their livestock in Abohar, Bhatinda, Fazilka, Malot, Mandi Dabwali, and Muktsar. All these towns are within 35-40 km of each other in the south-western Punjab, north of Ganganagar. Once these early migrants established a base there, others from V1 and nearby chaks followed. In 1994 around 200 pastoralist households were settled in these towns (Table 4). Most were Johya but there were also some Bhatti households. Fazilka has attracted the largest number of pastoralist migrants.

Usually, the pastoralists have settled on land belonging either to a local trader or to the town municipality. So far they have been able to survive without

difficulty, but recent attempts (in Fazilka, for example) to reclaim these lands may lead to problems for the settlers in the future.

A number of small ramshackle huts made of straw and wood, in a large open area, dot the landscape at each location. The huts consist of a single, medium-sized living 'room'. Outside the 'room', on one side, is a small corner area (open on three sides) for cooking. An enclosure for animals, adjacent to the 'room' on the other side, fenced by bamboo sticks and bushes, completes the semi-permanent dwelling. There is a large open space in front of each hut where the animals are watered and fed. Each household has a large tub for feeding animals which is placed next to a hand pump. The pumps are used for drawing water and were provided by local traders who also supply cattle feed to the pastoralists.

**Table 4 Extent of migration of pastoralists to urban centres**

Location	Number of Households
Abohar	30-35
Bhatinda	20
Dabwali	15
Fazilka	100
Malot	12
Muksar	8
Total	185-190

Source: Field survey, 1993-94

#### Division of herd, household and labour

As was seen in Table 2, on the eve of the construction of the canal, a typical Johya household had a large and diverse livestock herd. To facilitate the process of urban settlement, the Johya had to split their herds (Table 5). Sheep, goats, and camels stayed behind in VI. Cows were moved to the towns in Punjab and Haryana with easy access to water<sup>14</sup>, cattle-feed and market infrastructure. At any one time only about 40-50% of the cows give milk and these are stall-fed. Dry animals are grazed on farmlands and wastelands in nearby villages. The change in herd management strategy of the Johya is shown

<sup>14</sup> Each animal can drink up to 30 l of water and need to be watered twice a day during the dry season.

in Figure 1. Cattle are given the opportunity to graze stubble after the rabi harvest, and milch cows consume green feed acquired on contract from farmers who are saved labour costs for cutting.

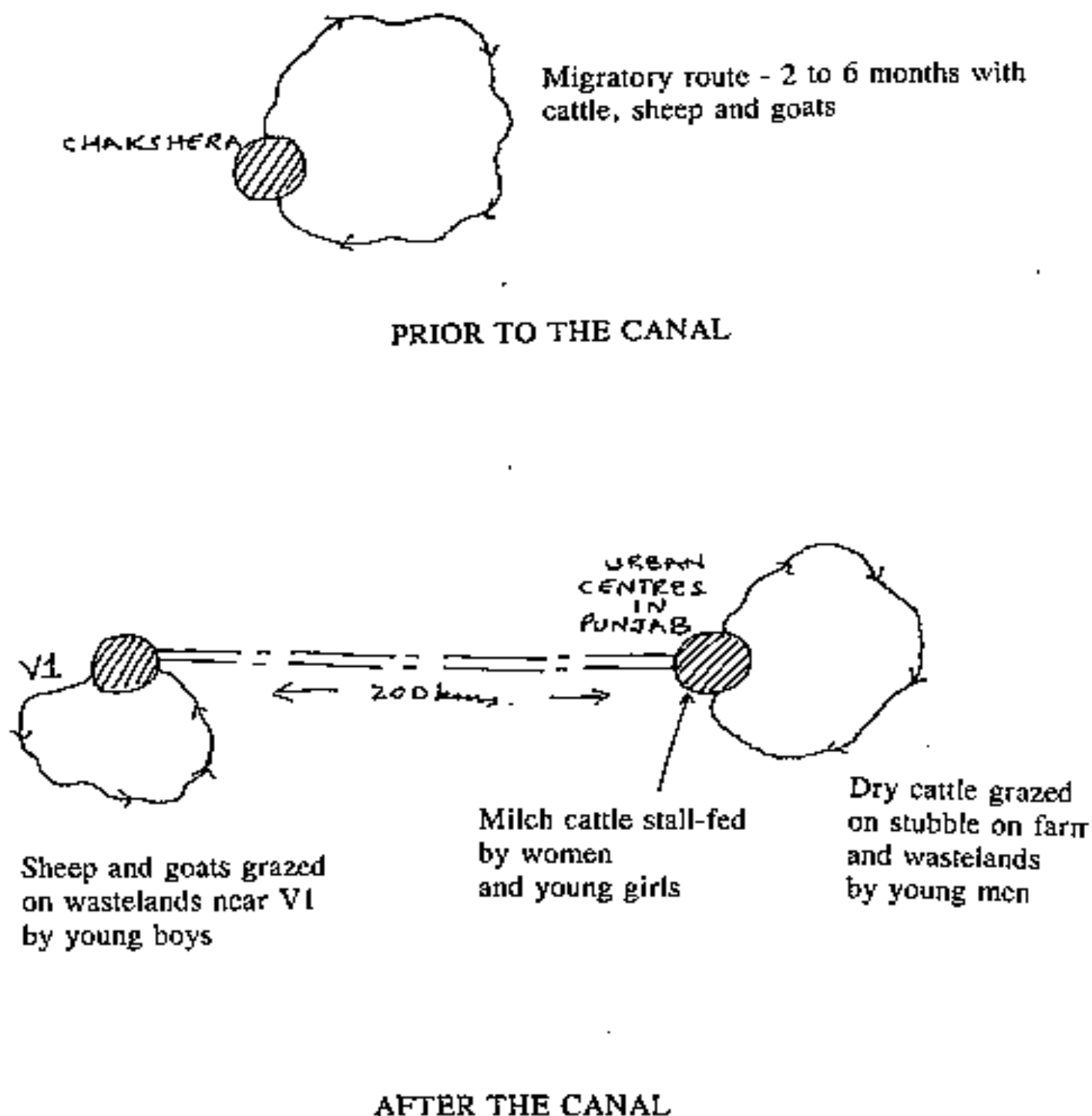
A pastoral household's ability to split its herd depends heavily upon its labour force and herding arrangements (Moris 1986). For the Johya, their particular institutional arrangements make a multi-niche adaptation possible. The household is divided as with the division of the herd, with adult married women, young adolescent girls and children assigned to the cows in urban settlements, whereas adolescent boys manage the sheep and goats in VI chak. Aged parents and older relatives stay with the boys. Adult men have a managerial role and frequently move between the two places.

**Table 5 Herd division in Johya households**

Animal	Location	Range of herd size per household	Grazing
Cows	Urban settlements of Punjab and Haryana	40-100	About 40-50% are lactating at any time; they are stall-fed. Dry cattle grazed on farmlands and wastelands in nearby villages.
Bullocks	Urban settlements of Punjab and Haryana	2-3	Almost entirely stall-fed.
Sheep	VI	80-100	Grazed on nearby wastelands
Goats	VI	30-60	Grazed on nearby wastelands
Camels	VI	1-2	

Source: Field survey, 1993-94.

**Figure 1** Changes in herd management strategy by the Johyas



The multi-niche adaptation of the Johya has had a critical impact on the division of labour for other activities. Married men retain their primary role as herd managers, but the setting up of semi-permanent dwellings in Punjab for stall-feeding of cattle has increased the work burden of women. Previously, the cows were herded and watered by adolescent boys, and the women were responsible only for milking. But now, in addition to domestic work, women have had to assume primary responsibility for all cattle-related tasks (cleaning, feeding, milking, watering, and collection of green fodder). In the absence of men during migration, women also have to deal with traders for purchase of inputs and sale of milk. Thus the daily animal-related tasks in the urban centres are managed almost entirely by women.

The economic status of a Johya household is critically dependent upon women's labour and has strengthened the traditional institutions by which loss of the woman's labour when she marries and moves to her husband was compensated by the groom through payment of muklava to the father-in-law. A woman has primary responsibility for care and upkeep of the household's livestock; if unmarried, for her father's livestock, and if married, for her husband's. In a typical household, women work from 5:00 a.m. to nearly 11:00 p.m. Many livestock-related activities are organised collectively in which women, related through marriage, participate together. So while milking, feeding and watering are individually organised, dung management and green fodder collection are usually shared among the women.

## CONCLUSIONS

Public policy first altered existing property rights to provide individual land rights in western Rajasthan. Subsequently, development of irrigation expanded the range of opportunities open to people living in this arid and drought-prone region. The Johya acquired private ownership rights over land with access to irrigation. But in spite of secure property rights, and incentives for practising intensive cultivation<sup>15</sup>, livestock has remained their most important asset, and animal husbandry the primary occupation. There have been some changes in their herd management practices, migratory patterns, and labour allocation, but it seems that mere ownership of irrigated agricultural land was not a sufficient condition for the Johya to shift completely from pastoralism to cultivation.

What accounts for the survival of the pastoral way of life despite the numerous constraints?

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<sup>15</sup> Such as irrigation, agricultural inputs, remunerative prices and markets.

There are two possible answers to this question. The first uses the concept of path-dependence to argue that the returns to pastoralism in the region prior to the Rajasthan Canal Project created interest groups with a stake in the existing conditions. This group shaped social institutions (i.e. labour allocation and control of women's labour) in their own interests, and maintained control by discouraging the adoption of new ways of life. And it is likely that through a combination of socio-cultural influences, the Johya evolved an ideology<sup>16</sup> that not only rationalised their livelihood strategies but also accounted for its limitations.

The other explanation for the Johya's adaptive strategy is provided by the economic theory of information<sup>17</sup>. Prior to the Rajasthan Canal Project and the accompanying changes in institutional structures, information on decision-making (that is, of animal husbandry, migratory routes, water availability, etc.) was passed down the generations in the form of traditional knowledge. In a risk prone and hazardous environment, this information was established as 'rules-of-thumb' which could be relied upon for decision-making<sup>18</sup>.

Changes in institutional structures were introduced by the state with the development of the Rajasthan Canal, and the existing 'rules-of-thumb' were no guide to the Johya for making decisions under a new set of constraints. Even though they were not true nomads and cultivated 'dry' crops, their primary occupation was animal husbandry and their knowledge of cattle diseases and migratory routes, for example, was of little help in deciding on fertiliser use, crop rotation or irrigation scheduling. It seems probable that the costs of acquiring information relevant to these new activities were high enough to act as a disincentive. Agricultural extension in the region was (and remains) poor and not targeted towards the special needs of the Johya, while the Johya also invest little in their children's education.

We should not assume the Johya are subject to a 'cattle-complex' just because they persist with their traditional occupation. Johya risk-aversion is rational under the new constraints: reduction of grazing area and water shortage on the

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<sup>16</sup> A tale often recounted to the author was that a Johya on his death-bed remembers not his family, but his cows. His last wish is that his children should look after the stock, 'and not let it diminish'.

<sup>17</sup> The central tenet of this theory is that optimal resource allocation by 'rational' agents is dependent upon their knowledge of decision-making processes. It is also referred to as the information-theoretic approach to economics, or the information paradigm by its most active proponent, Stiglitz (1985).

<sup>18</sup> This is akin to the discrete 'survival algorithms' of Lipton (1968).

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one hand, and lack of information on the other. They rely upon 'rules-of-thumb' as guides for practical action and rent out their plots of agricultural land to more experienced tenant-farmers. While seeking new niches for their animals, they benefit from their traditional strategy of labour allocation within the household, enabling them to adapt to new circumstances without requiring any significant changes in their information base.

However, the Johya are unlikely to continue to survive within a livestock-based economy alone. There are already complaints from younger people who do not want to 'run after animals' when there are 'easier ways of making money'. But the most significant impetus to economic change will be provided by changes in the management of labour. Parents are facing increased difficulties in delaying their daughters' marriage and subsequent departure to live with her husband, with the loss of labour that this represents to the household. The major disputes among the Johya in recent years have been not over cattle, but over couples eloping, and a much earlier establishment of sexual relations after marriage which were formerly postponed for a considerable period.

Thus, instead of resisting change, the Johya will have to evolve new strategies to cope with new challenges to their livelihood strategies.



## REFERENCES

- Agrawal, Arun 1992. The grass is greener on the other side: A study of Raikas, migrant pastoralists of Rajasthan, Dryland Networks Programme Issues Paper No. 36, International Institute for Environment and Development, London.
- CADA 1993. Indira Gandhi Nahar Project. Annual Report of Integrated Development 1992-93. Command Area Development Authority, Bikaner.
- CAZRI 1965. Socio-economic survey of livestock breeders in Anupgarh-Pugal Region of Western Rajasthan, Jodhpur; Divisional Report No. 65/2, Human Factor Studies Division, Central Arid Zone Research Institute.
- CSE 1988. Report of the Workshop on Drought, Desertification and Wasteland Development Processes in the Thar Desert, New Delhi: Centre for Science and Environment, (mimeo).
- Fagan, P.J. 1893. Report of the settlement of the Khalsa villages of the Bikaner State, mimeo.
- Henderson, Carol 1994. Famines and droughts in western Rajasthan: desert cultivators and periodic resource stress. In: K. Schomer et al. (Editors), The Idea of Rajasthan: Explorations in Regional Identity, Vol. II (Institutions), Manohar Publications for American Institute of Indian Studies, Jaipur.
- IDS 1991. Equity and productivity issues in IGNP, a review of literature. Unpublished Report. Institute of Development Studies, Jaipur.
- Kavoori, P.S. 1990. Pastoral transhumance in western Rajasthan: a report on the migratory system of sheep. Institute of Development Studies, Jaipur.
- Kohler-Rollefson, I. 1992. The Raika dromedary breeders of Rajasthan: A pastoral system in crisis, *Nomadic Peoples*, 30: 74-83.
- Lipton, M. 1968. The theory of the optimising peasant. *J. Dev. Stud.*, 4: 327-351.
- Little, Peter D. 1988. Irrigation associations among pastoralists: some organizational and theoretical considerations from northern Kenya. In: D.W. Attwood and B.S. Baviskar (Editors), *Who Shares? Cooperatives and Rural*

Development. Oxford University Press, New Delhi.

Malhotra, S.P. 1977. Socio-demographic factors and nomadism in the arid zone. In: *Desertification and its Control*. Indian Council of Agricultural Research, New Delhi.

Malhotra, S.P. and Mann, H.S. 1982. Desertification and the organization of society. In: B. Spooner and H.S. Mann (Editors), *Desertification and Development: Dryland Ecology in Social Perspective*. Academic Press, London.

Mann, H.S. and Singh, R.P. 1977. Crop production in the Indian arid zone. In: *Desertification and Its Control*. Indian Council of Agricultural Research, New Delhi.

Moris, Jon 1986. Directions in contemporary pastoral development. Pastoral Development Network Paper 22a, Overseas Development Institute, London.

Rajasthan Canal Board 1961. Rajasthan Canal Project: Master Plan of Development. Government of Rajasthan, Jaipur.

Sikana, Patrick M. and Carol K. Kerven 1991. The impact of commercialisation on the role of labour in African pastoral societies. Pastoral Development Network Paper 31c, Overseas Development Institute, London.

Singh, Dool 1964. Land Reforms in Rajasthan. Research Programmes Committee, Planning Commission, New Delhi.

Sinha, Saurabh 1996. The conditions for collective action: land tenure and farmers' groups in the Rajasthan Canal Project. Gatekeeper Series 57, International Institute for Environment and Development, London.

Stanbury, Pamela C. 1987. Agricultural land settlement along the Indira Gandhi (Rajasthan) Canal. In: Barry L. Isaac (Editor), *Research in Economic Anthropology*, Volume 9, Jai Press, Connecticut and London.

Stiglitz, Joseph E. 1985. Information and economic analysis: a perspective. *Econ. J. Suppl.*, 95: 21-41.

Swift, Jeremy, J. 1977. Sahelian pastoralists: underdevelopment, desertification, and famine. In: *Annu. Rev. Anthropol.*, 6: 457-78.

Urmul Trust 1992. The Nahar Yatra: a report on the Indira Gandhi Canal.  
Urmul Trust, Lunkaransar.



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