

# Implication of Agrarian Contracts for Irrigation Management Transfer: Prospects of Farmer Group Formation on the Rajasthan Canal Project

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RECENT YEARS HAVE been marked by an increased concern, amongst both governments and multilateral donor agencies, about the poor performance of large, canal irrigation projects in developing countries. One common perception of the cause of this problem is that the farmers are not sufficiently involved. Hence, the upsurge of enthusiasm for officially sponsored water users' organizations. Recent research also emphasizes participative planning; delegation of greater responsibility to local communities for day-to-day management and creation of water users' organizations for better cooperation and conflict resolution. Complete or partial transfer of irrigation management to water users has come to be regarded as a panacea.

Existing research has often considered farmers or water users as undifferentiated entities. The water user is continually referred to in the literature but without specification or analysis. The assumption is that the owner of the land is also the owner of the water, the farm operator and the person who physically transfers water from the system canals to his own fields (Hunt, 1989). Such a perception tends to ignore differences among farmers' efforts as a consequence of different tenurial arrangements. For, agriculture in developing countries is typically characterized by the existence of a variety of agrarian contracts. A landowner may lease his land to another party, a tenant, or he may become an employer by hiring workers to farm his land. In this way, a land tenancy contract and a labor employment contract are alternative ways of exploiting resource endowments in an agrarian economy. Limiting itself to only owner-cultivators, the large body of irrigation management literature is silent on the impact of agrarian contracts on farmer group formation. The latter is an important precondition for irrigation management transfer.

## Argument

This paper presents primary house hold-level data along with case studies from two clusters each of three chaks (a chak is the smallest area irrigated by a water outlet) on the large-scale, bureaucratically managed Rajasthan Canal Project in India to examine whether insecurity of land tenure precludes the formation of effective water users' associations. It is hypothesized that farmers cultivating land under short-term share tenancy or fixed-rent tenancy have serious limitations in evolving a social organization that can increase their control over water allocation and distribution in the long term. Landowners may participate with tenants in undertaking simple irrigation tasks (such as maintenance of field channels) in an informal arrangement but tenants' membership of formally structured water users' associations (with a clear delineation of tasks and authority) is problematic under conditions where land tenancy contracts are institutionally restricted. It is suggested that the prospects of formation of farmers' groups on large settlement projects can be enhanced by reduced restrictions on tenancy and encouraging local non-governmental organizations (NGOs) to work in partnership with farmers for institution building. Till the formation of representative water users' associations, Irrigation Departments should reorient their policies to partially transfer the management of the public irrigation systems to the NGO-farmer combine.

## Structure

The paper is divided into four sections. The next section reviews briefly the existing research on irrigation management and agrarian organization to highlight a 'no-man's land' between the two fields which prevent a complete understanding of issues. The subsequent section contains the background of the Rajasthan Canal Project, the settlement policy and existing tenurial arrangements. Household-level data and case studies from two clusters are presented and analyzed in the third section. Prospects of formation of farmers' groups on the Rajasthan Canal Project are discussed in the concluding section.

## EXISTING RESEARCH

There is little integration of the irrigation literature with the conventional agriculture development literature. The former is largely concerned with illustrating the poor water management practices in effect around the world, and with suggesting organizational solutions to these problems. The agricultural development literature generally treats irrigation water as just another input along with labor and fertilizer. There is rarely any recognition of the special nature of irrigated agriculture.

The irrigation management debate has attempted to locate the causes of poor utilization of irrigation potential in flawed management practices above or below the outlet and lately, to poor user participation. Hart (1961) and Reidinger (1974) spearheaded the demand for the creation of water users' associations at the watercourse level. More recently, Uphoff (1984 and 1986), Freeman and Lowdermilk (1985), Coward and Uphoff (1986), and [Lowdermilk (1986)] have argued for increased participation of water users in the management of large-scale systems. Harriss (1977), Chambers (1977) and Wade (1979) have presented case studies from the Indian subcontinent to highlight the key issues. Bottrall (1981), in his review of irrigation project performance, has emphasized that farmers' representatives should participate in the development of each season's water allocation plan and monitor the irrigation agency's day-to-day performance, wherever possible through a farmers' organization, on which tail enders and small farmers should be predominantly represented. Quite clearly, participation of farmers in irrigation management through appropriate social organizations is regarded as a panacea for poor utilization of potential. Differential abilities of farmers to participate as a consequence of insecure tenurial arrangements is usually ignored.

To be fair, exclusion of farmers' land tenurial arrangements from the mainstream debate has arisen because the successful cases of farmers' organizations cited are drawn usually from one, or a combination, of the following:

1. Small, indigenous and traditional irrigation systems Mostly known from the anthropological literature, these systems run, and have run for centuries, without centralized bureaucracies, without engineers, and most important, with farmers doing all the work (Hunt, 1989). It is no wonder then that they are attractive.
2. Small-sized projects Social scientists have exhibited a marked preference for studying small irrigation projects (Vander Meer, 1980; Coward, 1976; Maass and Anderson, 1978) which tends to create an exaggerated impression of the organizational virtues of small systems. It is generally agreed that a successful water users' association has to be small in size. Size is referred to by both Coward (1977) and Bottrall (1981). Uphoff (1986) mentions of small-unit areas of about 20 hectares, with populations of around 20.
3. Owner cultivated, socially homogenous villages The evidence in Wade's classic study (Wade, 1979) comes from a district in which agricultural land "is mostly managed by the owner; there is little absentee ownership or tenancy" and where "it is common for a village to have two or three large landlord families, each of whom may hold over 100 acres". Kottapalle (Wade, 1988) has been a settled village for several generations. None of these conditions hold in large settlement projects.

A common debate in agricultural development relates to the relative efficiencies of resource allocation under owner cultivation, share tenancy and fixed-rent tenancy. In order to test the significance of the Marshallian thesis that share tenancy, adopted for the sake of risk sharing, results in less efficient resource allocation than fixed-rent tenancy and owner cultivation, a large number of case studies have been conducted, mostly in South and Southeast Asia. They compare average output and inputs per unit of land between share tenancy and owner cultivation or fixed-rent tenancy, mostly in the production of rice and wheat (Otsuka, et al. 1992). The results of these empirical studies are somewhat mixed: while the majority of studies did not find significant inefficiency of share tenancy, there are some reporting significant inefficiency. In Palanpur (Bliss and Stern, 1982) for instance, tenancy did not seem to make much difference to output per acre or to levels of input.

This debate, which has engaged the attention of a large number of economic theorists, regards irrigation water as just another input like fertilizer or seeds. The impact on agricultural productivity and resource allocation of the peculiar problems of access to water (the issues of top-end versus tail-end); increase in water supply (through improved maintenance of field channels); reduced uncertainty in water availability (by strict enforcement of rotational schedules), and conflict among water users seem to have been bypassed by the vast economic literature on agrarian organization.

It is this apparent 'no-man's land' between irrigation and agriculture which this paper attempts to cover.

## THE PHYSICAL SETTING

### The Thar Desert

The command area of the Rajasthan Canal<sup>1</sup> falls within the Thar Desert that is classified agro-climatically as the arid western plain. The Thar Desert covers a total area of 44.6 million hectares (mha). Of this, 27.8 mha lie in India and the rest in Pakistan. In India, most of the area under the Thar Desert lies in the western part of the state of Rajasthan covering more than 55 per cent of its total geographical area and spread over 12 administrative districts. The region is covered by desert soils and sand dunes. Strong winds and dust storms during the summer months are a common feature. The annual rainfall varies from 100-250 millimeters (mm) with wide yearly variations. With the prevailing high temperatures, winds cause soil erosion and heavy moisture losses through evapotranspiration. The area has no sizeable rivers. The presence of underground water does not compensate for the absence of rivers; almost everywhere the water-table is at great depth varying from 60-100 meters (m) below ground level. The sub-soil water is not only deep but generally brackish and unfit for human consumption.

### The Rajasthan Canal Project

Conceived in 1948, inaugurated in 1958, now almost complete, the Rajasthan Canal Project constitutes the most ambitious effort at state-induced development of an economically backward, arid and drought-prone region. On completion, the 649 kilometers (km) long Rajasthan Canal will irrigate a culturable command area<sup>2</sup> of about 1.5 mha<sup>3</sup> to support a population of more than 2 million in over 350 completely new villages and towns. The basic objective of the Rs 12,000 million (approximately US\$ 400 million)<sup>4</sup> project was to utilize Rajasthan's share of the Ravi-Beas waters that became available as a consequence of the Indus Waters Treaty of 1960 between India and Pakistan. Additionally, the project also aimed to increase food production, create employment opportunities, raise living standards of 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 probable attack by Pakistan.

The Main Canal is 445 km long and is fed by a 204 km long feeder canal from the Harike Barrage at the confluence of the Sutlej and Beas rivers in the Punjab. After entering Rajasthan the canal traverses through Sri Ganganagar, Bikaner and Jaisalmer districts running almost parallel to the international boundary with Pakistan at an average distance of 40 km. 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 (Figure 1). Construction was planned in two stages. Stage I which is complete, consists of 204 km of the feeder canal and 189 km of the Main Canal with a culturable command area of 0.54 mha. Stage II comprises the remaining 256 km of the Main Canal with a culturable command area of 0.76 mha (CADA, 1993).

### Settlement Pattern in the Canal Command Area

Prior to the construction of the canal, the command area was sparsely populated with an average density of 13 persons per square kilometer (Rajasthan Canal Board, n.d.). To ensure an optimum utilization of the newly created potential, people were encouraged to settle on the command area and allotted square parcels of 25 *bighas* (equivalent to 6.32 hectares) of agricultural land per household. In addition to agricultural land, the settlers were allotted a piece of land for construction of living quarters in the *abadi* (residential area) of the *chak*. Initial proposals envisaged allotment of land by auction on the grounds that auction would result in a more rapid settlement by experienced farmers with capital to invest. But with official policy emphasizing the twin goals of social welfare and equity, the poor and other

<sup>1</sup>Rajasthan Canal was renamed Indira Gandhi Nahar in 1984. Thus, the Rajasthan Canal Project (RCP) is now known as the Indira Gandhi Nahar Pariyojana (IGNP). Both names are used synonymously in the text though the original is preferred for its location-specificity.

<sup>2</sup> Culturable Command Area (CCA) is the area of culturable land in a command area.

<sup>3</sup> This is approximately twice the area of the Gezira Scheme in the Sudan so far regarded as the world's largest irrigation system.

<sup>4</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 1993 US\$ 1 = Rs. 30.

disadvantaged sections were accorded priority in land allotment<sup>5</sup>. Certain other categories of households were also eligible for allotment though the emphasis was always on providing land to the landless. When the rate of land settlement, particularly in Stage II, remained poor<sup>6</sup> till 1988-89, it was decided to demarcate 50 percent of land for special allotment by sale or public auction to people who had been domiciled in Rajasthan for at least ten years (IDS, 1991). Broadly there are three land-owning groups in the command area now - the traditional desert dwellers; the 'selectees' (those who were allotted land by the government) and, the purchasers (those who have purchased land) (Table 1).

Thus, consequent to government policy, a heterogeneous mix of households of different origins, farming backgrounds and experiences from different regions, communities and economic strata have settled on the canal command area.

### **Land Tenurial Arrangements**

Initially land allotments to different household categories were made on a temporary basis. These were renewable annually. Permanent allotments were granted only after amendment of the existing colonization laws in 1975. After payment of the full price of land in annual installments, the permanent allottee can become a *khatedar* (legal landholder). *Khatedari* rights are permanent, heritable and transferable. Till the conferment of *khatedari* rights, a permanent allottee is a leaseholder with usufructuary rights but not the right to transfer it except to legitimate heirs. But illegal land transactions are common. Stage I is fully colonized and many of the traditional desert dwellers and 'selectees' have acquired *khatedari* rights. In Stage II, colonization is still underway and most of the settler households are permanent allottees.

### **CASE STUDIES**

Two clusters, one each in the two stages of the Rajasthan Canal command area, were selected for a comparative study. Each cluster consists of three chaks. Their selection was governed by two main criteria:

1. temporal difference in the availability of canal water for irrigation, and
2. land allotment to households of the three different categories.

[V1] V1 is a cluster of three contiguous chaks located on the Gharsana Minor (GM) in Sri Ganganagar district. The Gharsana minor takes off from the Gharsana distributary which is a part of the Anupgarh Shakha System - one of the branches in Stage I of the Rajasthan Canal. V1 lies about 15 km from the new mandi (market) town of Gharsana tucked away in the south-west corner of Sri Ganganagar district and only 12 km from the Indo-Pak border. The topography is remarkably flat, soils sandy loam, groundwater scarce and brackish, and average annual rainfall about 250 mm. The three chaks of V1 have a total of 624 ha of agricultural land and double-cropping is common. Canal water for irrigation first became available in 1967-68 and the *warabandi* (water turn) rotational schedule for water distribution is utilized to ration water among farmers.

Wheat is the predominant rabi crop while *narma* (American cotton) is commonly taken in the kharif season<sup>7</sup>. Average yield of wheat is in the range of 20-24 quintals<sup>8</sup> per ha and that of *narma* around 15-17 quintals per ha. Agriculture in these chaks, as in most of Stage I, is characterized by intensive use of the HYV package reflecting a strong market-orientation. Most of the owner-cultivators own tractors though there is a high level of indebtedness to local grain merchants and traders. There is no electricity but it is believed widely that V1 will get electricity before the forthcoming *panchayat* (statutory elected village council) elections later this year especially since the present *sarpanch* (head of the panchayat), seeking re-election, is the nephew of the state power minister.

A total of 113 households own almost equal parcels of land in V1. Land parcels of 14 households lie uncultivated. The remaining 99 households have been grouped under the three household categories (original, selectee and

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<sup>5</sup>The Rajasthan Colonization Act, No. XXVII of 1954.

<sup>6</sup>Poor settlement rate 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>The kharif season lasts from May to November, the rabi season from November to April/early May.

<sup>8</sup> 1 quintal = 100 kg

purchaser) and classified according to their agrarian organization (i.e., whether under personal cultivation, mixed tenancy or pure tenancy) (Table 2). The average landholding is 23.6 bighas (5.97 ha) and as evident, there is considerable uniformity in landholding size among different household categories. However, the extent of tenancy is unusually high with nearly two-third of the households (66%) renting out land to tenants. Insecurity of tenure is high as most of the operational holdings cultivated by tenants (52%) are single-year tenancies. Despite an ostensible diversity of traditional caste occupations, all the landowning households now depend upon irrigated agriculture. Though the *Jat Sikhs* (the traditional agricultural caste of north-west India, particularly Punjab) constitute 42 percent of the total landowners, a large proportion (69%) rent out their land to tenants.

[V2] V2 is also a cluster of three contiguous chaks but located further downstream on the Katak Minor (KM) in Bikaner district. The Katak minor takes off from Bhuttowali distributary which is off the 820 RD<sup>9</sup> point on the Main Canal in Stage II of the project. In many ways it is in the middle of the desert. Located 45 km from Bajju - a small growth centre - and about 100 km from the district headquarters of Bikaner, V2 is a picture of isolation commonly associated with the desert. Though the canal has initiated some economic activity in the region, people from V2 have to travel to either Bajju or Bikaner for even basic necessities. The village abadi is as yet unrecognized by the Command Area Development Authority (CADA) and hence is not eligible for infrastructural facilities<sup>10</sup>. There is no electricity, no primary school, no primary health centre and no roads. A *diggi* (open-air tank for storage) has been constructed for drinking water which gets water only when there is water in the distributary. The chaks are surrounded by undulating terrain. Intensive sand movement and sand storms in summer seriously limit the kharif season output as the (open) watercourses are often covered with sand.

Agriculture is subsistence-oriented in the V2 chaks. Most of the foodgrain output (in rabi) is for domestic consumption and, with natural hazards affecting water supply during the kharif season, dependence on the market is minimal. A total of 87 households own almost equal parcels of land. Fifteen plots lie uncultivated. The rest of the 72 households have been grouped under the three household categories and classified according to their agrarian organization (Table 3). The average landholding is 23.67 bigha (5.98 ha) - almost equal to the average landholding in the V1 chaks. But unlike V1, the level of tenancy in V2 is only about 13 percent. Rajputs dominate the social structure constituting 65 percent of the total number of households.

### **Irrigation Organization**

As evident from the above discussion, the widespread prevalence of short-term land contracts, dependence on hired labor and a heterogeneous social structure are distinctive features of the three V1 chaks. The V2 cluster, on the other hand, is characterized by owner-cultivation, use of family labor and a well-knit extended kinship social structure. Five key 'irrigation tasks', mandatory in any local irrigation organization, will be examined to assess how farmers in the two clusters organize and manage these tasks. The aim is to explore whether there is a causal linkage between agrarian contracts and collective action.

### **Water Allocation/Distribution**

The irrigation system in V1 is bureaucratically managed. The tasks of water allocation and distribution are centralized with the Irrigation Department and a *pakki warabandi* (formal water turn) schedule is in operation. The duration of the turns is determined by the *nahar patwari* (the lowest level canal official) in proportion to each farmer's irrigable (or command) area and the farmers have minimal role in allocation or distribution of water. In accordance with the warabandi system prevalent in most of northwest India, the day of the week on which the turn occurs depends primarily on the location of the farm on the watercourse. The quantity of water received by a farmer during his turn depends on the level of supply in the main channel serving his watercourse (Reidinger, 1974). Once fixed, the turn remains relatively immutable. In that sense a *pakki warabandi* schedule is self-regulatory to be carried out with little outside interference.

The V2 chaks are an example of a jointly managed system. Water is allocated by the Irrigation Department to Katak minor according to a pre-determined priority status. But once water is available in the channel, its further distribution

<sup>9</sup>Distances along the canal are measured in RD - reduced distance. 1 RD = 1000 feet and 3.3 RD = 1 km. Thus, 820 RD is roughly 248 km downstream from the head reach of the canal.

<sup>10</sup> After settlement, the households have to inform the CADA in writing. Once more than 80 per cent of the allotted households have settled in the abadi, it becomes eligible to receive provision of infrastructural facilities.

amongst each other is managed by the farmers themselves and the nahar patwari has no role<sup>11</sup>. There is an informally constituted farmers' organization in each of the three chaks which decides the duration and turn of each farmer. All farmers in a chak are members of this group and from them a respected senior farmer is appointed as a mehrab (common irrigator) to oversee water distribution. The same person has continued as a *mehrab* for the last 6-7 years (i.e., since the start of canal irrigation). He receives additional water for his services.

Unlike the pakki warabandi of V1, the duration is determined on the basis of each farmer's command area as well as his labor contribution towards maintenance of field channels and structures. The farmer can increase his duration (upto a maximum of 12 hours) by increasing his labor contribution. Failure to contribute labor elicits a fine of Rs 50 (= US\$ 1.60). The clearing of field channels is thus ensured by this informal system of water distribution. As in pakki warabandi, the turn depends primarily on the location of the farm on the watercourse. But each time water distribution begins with the farmer succeeding the one who had it last irrespective of the day of the week. The turn when the farmer is to receive water is more important than the day of the week. In the long run this ensures a more equitable distribution of water.

### **Observance of the Warabandi Schedule**

The warabandi schedule for V1, determined by the Irrigation Department, is strictly adhered to by the farmers. All the same, there are occasional instances of conflict especially during times of water scarcity and often at night. Individual farmers (almost always owner-cultivators) have tended to capitalise on the mismatch between the 8-day channel rotation schedule and the 7-day warabandi rotation<sup>12</sup>. By lobbying with the Irrigation Department to ensure that, when their channel has first priority, the warabandi schedule begins from the day of the week they have their turn, the rich and powerful farmers can get water twice in the same turn - on the first day (albeit with unpredictable flow) and the eighth day (with full flow).

The warabandi schedule in V2 is characterized by an air of informality all along. Though farmers adhere to their respective schedules, the latter are not immutable. There have been numerous cases when one farmer has allowed his turn to be utilized by another if the latter had a more pressing requirement.

### **Maintenance of Field Channels and Structures**

The minor is desilted once at the start of every season by the farmers in V1. The watercourses are desilted more often (at least twice a season). Most of the farmers do contribute labor though there were numerous examples of free-riding by powerful land-owners. After considerable pressure, they reluctantly send their agricultural laborers for channel maintenance.

As mentioned above, the informal farmer groups in the V2 chaks have made water distribution contingent upon field channel maintenance. Periodic clearing of sand from the watercourse is a major problem during the summer season and is organized by the farmers' collective. No cases of free riding have been reported.

### **Liaison with the Irrigation Department**

Information is a major lacuna in both V1 and V2. There is a dearth of information about irrigation schedules. Farmers rarely have prior information of the number of waterings they will receive in a particular season, their channel's priority status or when they will receive water next. While permitting the survival of irrigated agriculture in an arid region, this uncertainty in water supply makes precise crop and water management difficult, if not impossible. The 1993-94 rabi season was a particularly bad year with regard to water supply. The number of waterings during this season were reduced to 4 (from 7 in the previous rabi season). None of the farmers had any advance information and as such they could not plan their cropping strategies. All of them sowed wheat extensively (which requires 6 irrigations) on the basis of previous year's water supply. When interviewed, the farmers acknowledged the lack of information about water supply and mentioned that had they known about it, they would have preferred less water-intensive crops such as gram or mustard.

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<sup>11</sup>This system is known as a kuchchi warabandi in local parlance.

<sup>12</sup>The channel-rotation schedule allows 1 extra day for filling in addition to the 7-day warabandi rotation. This results in a total of 8 days for each channel rotation.

The V1 chaks have the benefit at least of being located near (12-15 km) the office of the Assistant Engineer of the Irrigation Department. Some of the enterprising farmers occasionally undertake a trip to the Irrigation office (or to the nahar patwari's residence nearby), on their way to the Gharsana mandi, to enquire about their channel's turn. They remain the only source of information for the entire chak. The Irrigation Department claims to give wide publicity to the channel priority status through newspaper advertisements and posters. Quite obviously, the department's efforts have had little impact in an area with low adult male literacy. The V2 chaks, on the other hand, are further disadvantaged in comparison to V1 by their remoteness. The Irrigation Department makes no special efforts to spread information about the watering schedule and V2 is nearly 100 km from Bikaner for the farmers to make any effort to seek information from the concerned officials. Naturally, they rely on informal village networks to get the required information.

### **Conflict Resolution**

All canal irrigation systems experience occasional scarcities of water, a condition which virtually ensures conflict. There is no local organization in V1 to mediate such conflicts. The striking aspect of V1 is that the absence of a local organization deprives the tenants of a forum for grievance redressal while their insecurity of tenure (and a largely illegitimate status<sup>13</sup>) prevents them from taking recourse to official mechanisms of conflict resolution (the Irrigation Department and the local courts in that order). They continue to subsist in an exploitative situation thankful of being allowed to exist as tenants. A recent case illustrates the precarious existence of tenants.

A weir was constructed just below the outlet in 1975 after farmers had protested to the Irrigation Department against low pressure in their watercourses. Recently (circa 1990), farmers from chaks further downstream got together to arbitrarily reduce the weir's height so as to increase the flow in their watercourses. There was considerable noise in V1 but little action. As a tenant farmer revealingly said, "Obviously, they (the downstream farmers) did it in collusion with the Irrigation Department after paying them hefty bribes. So one can't expect any justice from the Department. We neither have money nor 'status' to file a case in court. We do not own the land and official records do not carry our name. We will have to ask the landowner, who does not stay here, to file the case on our behalf. But he won't be interested .. he does not want to get involved. Whom does one go to?"

A similar situation but with a different outcome highlights the difference between V1 and V2. Nearly 5-6 years ago (c. 1988) the V2 chaks were not getting full flow of water in their watercourses. They got together and decided to construct an additional 8-inch diameter outlet at the mouth of the Katak minor to increase water flow. The local canal officials protested and reported the illegal construction to their officers at Bikaner. The matter went right up to the Canal Minister who intervened and ordered his department to regularize the construction. The additional outlet stands and provides increased flow to V2<sup>14</sup>. The Minister may have decided in the favor of the farmers with an eye on votes but the fact is that the farmers cooperated to achieve a common good. This case is recounted with pride and contributes towards ensuring future collective behavior.

### **PROSPECTS OF FARMER GROUP FORMATION**

What precisely is the link between insecurity of tenure and formation of farmers' collectives? This paper corroborates Wade's hypothesis (Wade, 1979) that a corporate approach to irrigation is a response to water scarcity. Clearly, the conditions in V2 indicate a high degree of uncertainty in water supply and to that extent a 'corporate' organization (albeit a loose and informally constituted one) seems a justifiable response. But what about V1? There is considerable scarcity and uncertainty of water but there is no local organization to articulate farmers' concerns. While there have been numerous discussions in V1 in the past about forming a *chak samiti* (a hydrologically-based association), the issue of membership is an impediment. Who should be eligible for the samiti's membership? Nearly 85 per cent of the landowners operating their farms through tenants are non-resident in V1. Should the landowner or the cultivator be the member of the chak samiti? For a non-resident landowner without khatedari rights who has rented out his plot of land, the tenant's membership of the organization will be a tacit acknowledgement of an illegal situation which no landowner is willing to risk. All attempts to constitute a formal water users' association have failed and the tenant farmers are reconciled to a limited participation in local management of irrigation.

The prospects of formation of farmers' groups for local management of irrigation tasks on large settlement projects seem to be rather bleak. While scarcity and riskiness of the resource is a necessary condition for the formation of

<sup>13</sup> Landowners without khatedari rights cannot rent out their land. But this rule is easily flouted by bribing the revenue officials.

<sup>14</sup> This is not very helpful in periods of full flow. However, under reduced flow conditions it greatly augments water supply.

farmers' groups, it is not a sufficient one. What needs to be asked is: given the scarcity and uncertainty of a resource, what conditions will enable farmers to act collectively? As the above evidence shows, under conditions where land tenancy contracts are institutionally restricted, formation of effective farmers' collectives is problematic.

Five key tasks were identified in a previous section. A distinction between simple and complex tasks is revealing. Simple tasks can be categorized as those from which immediate (i.e. short-term) and tangible benefits accrue. These include maintenance of field channels and structures; liaison with the Irrigation Department for information and water extension, and ensuring a strict adherence of the warabandi schedule. Almost every farmer understands the linkage between the simple tasks and increased crop productivity and is willing to cooperate. A comparison between V1 and V2 along these lines indicates that the simple tasks are performed by farmers in both the clusters irrespective of different initial conditions. Complex tasks are those which require greater effort to get the group together, and those whose benefits are in the long-term. Water allocation and distribution and conflict resolution are in a sense 'political' tasks which require a charter of authority, an accountable leadership and a formal organization. The complex tasks may be more difficult to perform in V1 till the fundamental issue of membership is sorted out.

Land tenancy is a dominant reality in most large settlement projects. Efforts to constitute water users' associations require a pragmatic approach. A two-pronged approach is suggested. One, there should be a reduced institutional restriction on tenancy. While resource allocation may be equally efficient under owner cultivation and tenancy, there is clear evidence of reduced or non-participation of tenants in water users' associations. This adversely affects irrigation performance and utilization of potential.

All large settlement projects are characterized by diversity of origins, farming backgrounds, experiences of settlers belonging to different regions, communities and economic strata. Most of these settlements are only a generation old (if not less). It is ambitious to expect the settlers to overcome these differences and to constitute stable and active associations on their own. Local NGOs can help by working in partnership with cultivators towards institution building. The Irrigation Department should consider a partial transfer of irrigation management to an NGO-farmer association in which the organizational support is provided by the NGO.

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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
Landownership prior to the Canal	Dryland 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

Table 2. Cultivation Status of Different Household Categories in VI.

	Personal cultivation (1)	Mixed Tenancy (2)	Pure Tenancy (3)	Total	Average Landholding (bigha)(4)
Original	0	0	5	5	24.40
Selectee	15	2	41	58	22.68
Purchaser	6	8	12	26	25.47
Others (5)	3	0	7	10	24.20
Total	24	10	65	99	23.64
Average Landholding (bigha)	23.66	36.60	21.64	23.64	

- Note:
- (1) Personal cultivation is defined as cultivation either by family or hired labour.
  - (2) Mixed tenancy is when a landowner either rents out a part of his land or rents in land in addition to his holding.
  - (3) Pure tenancy is a condition when the entire piece of land is rented out and is cultivated by a tenant - either by family or hired labour.
  - (4) Approx. 4 bigha = 1 ha.
  - (5) Others include plots with disputed ownership as well as those for which no information is available.

Table 3. Cultivation Status of Different Household Categories in V2.

	Personal cultivation (1)	Mixed Tenancy (2)	Pure Tenancy (3)	Total	Average Landholding (bigha) (4)
Original	16	13	3	32	
Selectee	14	11	5	30	
Purchaser	1	6	1	8	
Others (5)	1	0	1	2	
Total	32	30	10	72	23.67
Average Landholding (bigha)	24.16	30.53			

Note: (1) - (5) Refer Table 2.

Figure 1. Map of Rajasthan Canal Project.

