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A second category of independent variables, treated as intervening variables because they are viewed as conditioning the impact of the independent variable on the three dependent variables, are social organizational factors of villages such as: 1) number of agricultural castes; 2) presence or absence of factions; 3) land tenancy type; and 4) residence pattern--locals vs. refugees.

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IN PAKISTAN

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ABSTRACT

A STUDY OF VILLAGE ORGANIZATIONAL FACTORS AFFECTING WATER MANAGEMENT DECISION MAKING IN PAKISTAN

The purpose of this study is to examine the social factors which affect the water management decision-making of Punjabi farmers in a sample of fifteen Pakistani villages. In essence, the study design is as follows:

The focus of inquiry is on three dependent variables--

1) decisions of farmers to clean watercourses; 2) decisions to change from *kacha* to *pacca warabandi* systems of water allocation; and 3) decision to interact with lower level irrigation department employees.

The major independent variable, taken for explanatory purposes, is that of presence/absence of public tubewells to augment the supply of water to watercourses.

A second category of independent variables, treated as intervening variables because they are viewed as conditioning the impact of the independent variable on the three dependent variables, are social organizational factors of villages such as: 1) number of agricultural castes; 2) presence or absence of factions; 3) land tenancy type; and 4) residence pattern--locals *vs.* refugees.

One central finding is that farmers in villages with watercourses augmented by public tubewell supplies mobilize distinctly less effort to improve water management than their counterparts in augmented villages even though the former are advantaged by the fact that 3.5

times fewer farmers, on the average, must share water from a single *mogha* in augmented villages. It appears that the presence of public tubewells is a disincentive to willingness to improve on-farm water management.

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CHAPTER I
THE PROBLEM

The farmers of Pakistan are served by the world's largest irrigation system. About forty thousand miles of canals deliver water to approximately twenty-five million acres. The overall pattern of water flow is from one of the major rivers--Jhelum, Chenab, Ravi, Sutlej and Indus--to major and minor canals, through outlets (*moghas*) to watercourses (*khaals*) to farmers' fields. Of eighty million acre feet annually diverted into the canal system, it has been estimated that approximately one-third is lost in the canals before reaching the fields. The percentage of water lost in watercourses has been estimated to range from five to sixty-five per cent per mile (Corey and Clyma, 1973).

The network of canals in Punjab province is under the control of the provincial department of irrigation. This department is responsible for maintenance of canals, their major and minor branches, throughout the province. Each village has one or more outlets or *moghas*. Irrigation officials prescribe the size of, and construct, each *mogha*. It is the farmers' business to construct a watercourse from the *mogha* to their fields through prescribed routes for water distribution. The farmers are, therefore, supposed to make collective decisions to achieve optimum use of irrigation water. This research focuses on three aspects of such decision making:

- 1) Cleaning and Maintenance of Watercourses;
- 2) Changing of *Warabundi*;
- 3) Interaction with Irrigation Authorities.

Cleaning and Maintenance of Watercourses

Most watercourses from the *mogha* to the tail of the village agricultural area were dug before national independence. New ones come into being on allocation of new *moghas*. Farmers repair and clean them to facilitate flow of water. The quality of watercourses differs from village to village and loss of water is borne by the farmers accordingly. Watercourse cleaning involves collective decisions on the part of all farmers taking water from a given channel. Village farmers understand that there is significant water loss in poorly maintained watercourses, but they differentially mobilize themselves to cope with the problem. Therefore, the first focus of this study is to examine the social influences which operate on the collective decisions to clean and maintain watercourses.

Change of *Warabundi*

Canal water is divided among farmers on a watercourse according to the acreage of each. Generally a cultivator has a weekly turn expressed in hours and minutes. There are two ways of allocating the number of turns to farmers during each irrigation period:

- 1) The *kacha warabundi* system (*warabundi* is an Urdu word meaning agreement about the water schedule)--a system of rotation arranged by the cultivators themselves. This system of distribution is highly flexible, for it can be

changed according to individual farmers' needs and the availability of water. Small farmers, in this system of allocation, are vulnerable to manipulations on the part of more powerful larger farmers.

- 2) The *pacca warabundi* system--each turn is fixed for every farmer by the Department of Irrigation. This system possesses the advantage of protecting each farmer's right to the water but flexibility of water allocation is lost as water trading becomes illegal.

The second focus of this study, therefore, is to examine the farmer's decision to switch from *kacha* to *pacca warabundi*.

Interaction with Irrigation Authorities

Village farmers are highly interdependent with officials of the Irrigation Department. In particular, there are three lower level officials who are in contact with farmers--*Patwaris* who assess crop revenue, Overseers who repair and allocate *moghas*, and *Pansals Nawees* who send daily reports about the flow of water. Where there are public tubewells, there is a fourth official, the Tubewell Operator. These officials have nothing to do with cleaning watercourses or implementation of *warabundi* system. Nevertheless, they can provide favors or create problems for villagers. The third focus of this study is on the interaction between village farmers and these irrigation authorities.

These three dimensions of water management decision making are highly interdependent. Each centrally affects the flow of water to the fields. Therefore, this study explores village organizational factors associated with each dimension in two sets of villages:

- a) Those having a water supply only from canals; and
- b) Those receiving the regular canal supply augmented by tube-wells.

The primary objective is to develop some testable propositions for future sociological research in the domain of water management. In summary, this study examines the following three broad questions regarding water management decision making at village level:

- a) What are the social factors influencing farmers' decisions to clean and maintain their watercourses?
- b) What makes farmers switch from *kacha* to *pacca* systems of *warabundi*?
- c) What are the relationships between lower level officials of irrigation bureaucracy and village farmers?

A review of several village studies is presented in the next chapter. This review will clarify issues relevant to the problem of village life and will undergird the methodological approach and the instrumentation employed to gather field data.

CHAPTER II

REVIEW OF LITERATURE

This chapter presents a review of the literature of village studies, particularly those with a focus on India and Pakistan, with the purpose of organizing key findings about four domains:

- 1) Structural attributes of village organization;
- 2) Intra- and Inter-village interpersonal relations;
- 3) Interaction between villagers and bureaucracy.

The literature of village studies in India and Pakistan suggests three essential foundations for village social structure: (a) *biradari* ties, (b) the caste system, and (c) land tenancy statuses.

Biradari

The term is of Persian origin and a derivative of the word *biradar* meaning brother. *Biradari* literally means a brotherhood. For our purpose, *biradari* is generally an endogamous group of individuals who consider themselves related to each other through blood or marriage. The English synonyms are "kinship" or "extended family." Two other local terms used are *kunmba* and *khandaan*. Eglar (1960:75) defined it as a patrilineage, whereas Korson (1969:153) included in it the blood relatives only and Blunt (1931:Ch.1) maintained that it is a specifically located ecological or geographical group. *Biradari* groups serve important economic and social functions.

Because of the *biradari* endogamy, resulting in a multiplicity of relations, the break-up of the family due to death, especially that of the husband, minimizes the personal, social,

and financial hardships for the surviving spouse and children --in a society where female literacy rate is extremely low, outside economic opportunities are almost non-existent, and there are no public welfare or social security programs. In case of such tragedies, the whole *biradari* consider it an obligation to care for the well-being of the bereaved family (Wakil, 1970:12-13).

Wakil (1970:13-14) further observes that the closely knit personal relations that prevail in Punjabi *biradari* system supersede all other loyalties.

The formal rules and regulations of the official and non-official institutions and organizations are frequently ignored or violated. The claims on personal *biradari* relationships, whether real or 'synthetic', as mentioned above, supersede the observance of formal rules. The rules then are circumvented and result in confusion and erratic or unpredictable functioning of the elements of the various social structures. The situation is often fluid and uncrystallized and means a severe blow to efficiency so desirable in the emerging bureaucracies.

Due to these reasons it seems likely that the emergence of a 'secondary' system of relationships based on rational orientations would be slow to emerge in the Punjab.

Castes

Caste usually connotes some notion of different occupation. It also has religious significance. In Punjab, simple division of labor divides rural people into military, agricultural, and artisan castes. The concern of the present study is with agricultural castes only--the *Rajputs*, *Jats*, and *Araïns*. Each possesses traditional characteristics which provide criteria for delineating in- from out-group members. Each one has an associated sense of prestige and dignity which upholds the traditional behavioral patterns.

1. The *Rajput*: The *Rajput* (literally 'son of a *Raja*') is the aristocrat of the countryside, and that is his undoing. Proud of his birth and traditions, more accustomed to fight than to till, loving the bravura of life and scorning its drudgery, he is by common consent the worst cultivator in Punjab... If he is of pure descent, he is forbidden to touch the plough; and even if he is not bound by this rule,

where the *Jat* ploughs deep, he will only scratch the surface of the soil (Darling, 1947:33).

2. The *Jat*: No tribe is in stronger contrast to the *Rajput* than the *Jat*. If the former represents the gentry of the province, the latter is the marrow and soul of the peasantry. 'Unremitting in toil, thrifty to the verge of parsimony, self reliant in adversity, and enterprising in prosperity, the *Jat*... is the ideal cultivator and revenue-payer.

Assisted by his wife, the *Jat* will generally do better on a small holding than the *Rajput* on a large (Raza, 1969: 29).

3. The *Arain*: Though often a farmer, he is by tradition and instinct a market gardener, and alone among cultivators rivals the *Jat*. 'For cattle,' says the proverb, 'give me the cow, and for a cultivator give me the *Arain*'... He produces more to the acre than any other tribe, but at a cost that most would consider prohibitive. To this life of unceasing toil he is driven by his prolific nature. Content with a low standard of living, he multiplies faster than any other important tribe, and his land is consequently split up into the minutest holdings (Darling, 1947:45).

Land Tenancy

This study will adopt the following classifications of farmers employed by Gibb, *et al.* (1966:16).

1. Owner cultivator: a farmer cultivating his own land for which he paid neither cash rent nor crop share. He might also rent out some part of his land to other farmers.
2. Owner cum tenant: besides farming his own land, this farmer also rents and farms land for cash, crop share or free. He might also farm mortgaged land for which he provides the money. Depending on the proportions of his owned and rented land this type of farmer at the extremes, of course, is indistinguishable from 'owner' or 'tenant.'
3. Tenant: This farmer pays rent for all the land he farms either in cash (cash renter) or crop share (share cropper).
4. Absentee Landlords: These are non-farming owners who may not necessarily be living in the village.

Caste and Kinship--Core of Village Social Organization

The literature of village studies reveals that village conflicts are based upon inter-kin and inter-caste hostilities and not upon differences in land tenancy status because of the great interdependence among the latter.

Caste and kinship form the core of village social organization and this splits village into separate communities which have their close affiliations across village lines (Lewis, 1958:148).

Adams and Waltmade (1970:49-56) employed numerous field studies of Indian villages in constructing a model of village economy in traditional India. They have described joint or extended family as the basic unit of the village system:

Families are grouped into endogamous castes that prescribe social rank, circumscribe social interaction, and define occupational categories.

The Hindu religious writings account for the division of society into four *varnas*, or castes: Brahmans, or Priests; Kshatriyas, or Warriors; Vaisyas, or Merchants; and Sudras, or Laborers. A fifth 'caste' is made up of the casteless untouchables.

Social alignments are seen by participants as being largely drawn within the framework of caste and kinship. The village community is spoken of as 'belonging' to the *Zamindars* (landlords) or the land owning peasant caste or castes, with others present to serve them. Alignments are spoken of as being based on *biradari* kin ties... In some contexts there is cohesion among kin, particularly close kin, though they frequently also oppose one another in factional disputes (Raulet and Uppal, 1970:344).

Sirivins (1955:29) observed that landowner-tenant relationships occasionally cuts across caste barriers, and this is more common when the landowners are permanently absent from the village. The relationship between landowner and tenant is also an intimate one. Like all intimate relationships, it is frequently marked by conflict. Tenants

are heard complaining about the exploitation of the resident landowners; many feel that absentee landowners have no right to receive income from the land.

Dube (1967:34) considers the joint family as the basic and primary unit of the society in the social structure of an Indian village. Every family belongs to an exogamous division of a caste and several such divisions constitute an endogamous caste or an endogamous section of a large caste.

In describing the social structure of village Shamirpet in Telangana, Dube (1967:39-40,49,135) has pointed out that:

1. All the castes are endogamous.
2. Most of the castes are further subdivided into endogamous division which for all practical purposes are themselves independent castes.
3. The type of family organization is patrilineal and patrilocal. The eldest male is generally regarded as the chief of the household and, according to tradition, he must benevolently dominate the scene... The head of the family is answerable to the caste and the village councils for the members of his household.
4. Importance of the solidarity within the allied families (extended family) is emphasized, and it is expected that any major decision will not be taken by any branch without consultation with the senior members of these allied families.

Kumbapettai, studied by Gough (1955:36), is a Brahman village. "They have no elected leaders... Within each patrilineal extended family all submit to the oldest man."

In the past the village has also acted as political units in battles with neighboring villages. Sometimes battles arose as a result of boundary disputes between landlords of adjacent villages; in that case Brahmans themselves did not fight, but bands of non-Brahmans leasees and *Pallan* laborers of the two villages were assembled by their respective landlords and fought on the boundary.

But today Brahmans complain that with the gradual loss of their economic power over the lower castes the loyalty of tenants and laborers is no longer what it was, and the unity of the village is declining (Gough, 1955:46).

Factionalism:

In the literature, there are two primary views of factions. One is suggested by Oscar Lewis (1958:Ch. 4). Lewis views factions as:

Those small cohesive groups within castes which are the locus of power and decision making and contribute to the compartmentalized segmented nature of village social organization. The term faction used here, however, does not denote only opposition or hostile relations between groups, nor is discord and dissension necessarily the predominant quality in interfaction relations. The small groups which we have delineated are held together primarily by cooperative economic, social and ceremonial relations.

He further observes that the factions are generally referred to by the names of their leaders or in some instances by the nickname of a lineage, that is, when the faction and the lineage are synonymous.

Factions follow caste lines.

For a faction to operate successfully over an extended period of time it must meet three conditions: (1) It must be sufficiently cohesive to act as a unit; (2) it must be large enough to act as a self-sufficient ceremonial group--for example, it must be able to summon an impressive number of relatives for a marriage party; (3) it must have sufficient economic resources to be independent of other groups. This means that it must have some well-to-do families that can rent out land or act as money-lenders for its poor members.

Factions which enjoy the reputation of being relatively neutral and of having friendly relations with all other groups are the most influential in the village.

There are some occasions, though these are relatively few and far between, when members of different factions come together despite their differences and unite for some common action. The major occasions are funerals, the building of village wells, the cleaning of the village pond (twice in the past forty years), the repair of subcanals for irrigation, and certain holidays such as *Holi* and *Tij*. Moreover, there is

a tradition of presenting an appearance of unity to the outside.

The role of kinship in the composition of factions is extremely important. In questioning informants about the membership of their particular faction they tend to equate their faction with their kinship group, even when they are aware that the two may not entirely coincide. There is not a single case of brothers belonging to separate factions, only one case of first and second cousins, and only four cases (out of fourteen) of third cousins.

The varying degree of cohesiveness of the factions appears to be a function of the size of the group, geographical compactness, closeness of kinship ties, the degree of economic self-sufficiency, the past history of factionalism, and the age of the group.

Lewis (1958:147) notes that contrary to a common misconception, factions are not political groupings, or temporary alliances of individuals to fight court cases, although some of them do take on political functions and become involved in power politics. Rather, they are primarily kinship groupings which carry on important social, economic, and ceremonial functions in addition to their factional struggles against each other.

The second view of factions is forwarded by Boissevian (1964:1275-1287) in his study of "Factions, Parties, and Politics in a Maltese Village." The author followed the lead of Harold Lasswell who defined a faction as "any constituent group of a large unit which works for the advancement of particular persons or policies." He also noted that "the term itself drops out of useage when certain lines of cleavage have become rather permanent features of the political life of a group, these divisions are accepted as parties" (Lasswell, 1931:49).

For Boissevian a faction is based on some temporary issue, whereas Lewis thought that there are permanent factions in Rampur based on caste and kinship affiliations. For Boissevian the two permanent

divisions are not factions--e.g., one religious division between the followers of St. Mogue and those of St. Martin, and the political cleavage between Malta Labor Party and opponent supporters of the Archbishop. People were divided into factions only when there was a temporarily controversial issue over some decision taken by a church minister.

Leadership Characteristics

The Wisers (1965:22) provide an account of the importance of leaders for farmers' decisions to change their traditional techniques of agriculture:

The average farmer in our village listens with interest to an explanation of the advantages of a new variety of seed. But he would not risk trying it unless his leader had first tried it, or at least sanctioned it. He might be an enthusiastic observer of the demonstration of a Persian Wheel--a large wheel for raising water, fixed vertically with a number of buckets at its circumference--but he could not afford to buy one without a loan from his leader. And he would not think of asking for a loan until his leader had himself installed a wheel. He knows that if he should presume to outshine his leader in any detail, social or economic, he would be brought down forcibly to his station. It is his lot to wait for the signal to advance.

The Wisers (1965:14-15) further elaborate on how the villagers are dependent on the leaders:

The ordinary villager looks to them for their wells. The waterways to his field must pass through their land. His animals graze on areas under their control. He borrows their bullocks in times of need. He has the privilege of collecting fuel from their land... Money for weddings is borrowed from them. Employment in slack times for some, and full-time employment for others, is supplied by them.

Any program of village change, therefore, cannot be initiated or sustained without knowledge of leaders. Certain attributes of village leadership have been explored by Singh (1968:72-75) in his case study of Village Mohali in Punjab, Delhi:

1. Leadership in the village is still regulated by caste.
2. The major leadership roles in the village are filled by the dominant caste. The important elements of dominance in the village are numerical strength, economic and political power, ritual status, and occupations.
3. If for some reason such as reservation of a seat, some person from lower caste is taken in the *Panchayat*, the upper class members on its body so manipulate the things that the former has to side with the latter in all affairs.
4. Leadership from one situation flows to other situations also. Almost the same persons occupy leadership positions in all spheres.
5. All the village leaders including leaders in different caste groups happen to be household heads.
6. Informal leadership is more potent force. The functions of village *Panchayat* are more specific in nature.
7. Generally, those who occupy more formal leadership positions in the village have more chances to be recognized as leaders in all other spheres which are not formally organized.
8. Advanced age is not necessary for village leadership provided other qualifications are present.
9. Education is being recognized as an important factor for leadership in the village.
10. Land ownership is another important factor for village leadership. Therefore, persons who are big land owners in the community happen to be village leaders.
11. The bases of leadership have widened with the rise of general consciousness, the village people now recognize their leaders on different grounds. The common bases are free time, good economic conditions, honesty, popularity, effective outlook, ability to settle disputes, speaking ability, military service, reputed family, and contacts with officials and others.
12. Power now tends to be more diffused rather than centralized. Formerly a single person discharged many functions, and he was invested with wide powers. Now there are numbers of such persons to discharge these functions.

Oommen (1969:515-525), while comparing the attributes of an ideal leader and actual leadership, came up with the conclusion that among the qualities found in the present leaders the membership in dominant caste and kin group is the single most important attribute, the status of family following close behind. These two qualities scored nearly 50% of the total points.

The community image of an ideal leader was highly ethically loaded in Oommen's study. The attributes of truthfulness, disposition to help others, impartiality and education scored 45-68 percent of the total score. The striking differences between the ideal and actual leadership is that the attributes which scored heavily in one were relegated to the background in the other.

Panchayat (Village Council)

Although many of the leadership attributes described in the preceding pages are associated with the leadership role of *Panchayat* members, *Panchayats* are sufficiently important for routine village decision making as to deserve a separate subheading. Lewis (1958:29) in his study of village life in Northern India pointed out that "the establishment of a new school, problems concerning land consolidation, the sending of a delegation to the revenue department--in all these matters the village *Panchayat* played the dominant role in recent years."

Somjee (1962:13-18) studied the politics of an Indian village and discovered that a shift from a purely nominated *Panchayat* by a government representative to one elected by the people of the village according to a mutually agreed formula changed the concept of *Panchayat* as an institution for "important" people. "From the purely caste basis

of the first elected *Panchayat*, the governing factors of choice became a complex amalgam of caste, lineage, patronage, and security."

Panchayats are mostly at village level. Yet, Oscar Lewis (1958) found *Panchayats* for different castes in his village in Northern India and Dube (1967:55-66) discovered that there may be inter-village *Panchayats*. "They function as *ad hoc* arbitration committees. Conflicts between two villages, or between two parties belonging to different villages (and not drawn from one particular caste), often necessitates an inter-village *Panchayat*. In this situation the elders of the two villages which are parties to the dispute, as well as the elders from the neighborhood sit together, hear the dispute and give their verdict. Of course, they have no authority to enforce their decisions, and these days cases often go to the courts of law established by the government."

INTRA- AND INTER-PERSONAL RELATIONS

Because of their strong caste and kinship ties villagers are often divided into hostile camps. Numerous authors have noted that villagers tend to be suspicious, envious, and uncooperative.

Suspicion, Envy, and Uncooperativeness

Lewis (1951:428), in his study of life in Tepoztlan, emphasizes the underlying individualism of Tepoztlan institutions and character, the lack of cooperation, tension between villages within the municipio, the schism within the village, and the pervading quality of fear, envy, and distrust in interpersonal relations.

Gossip is unrelenting and harsh in Tepoztlan...facts about people are unconsciously or maliciously distorted...

Relatives and neighbors are quick to believe the worst, and motives are always under question... Successful persons are popular targets of criticism, envy, and malicious gossip (Lewis, 1951:294).

Banfield (1958:121) finds, in the south Italian village of Montenegro, that:

Friends are luxuries that the Montenegrini feel they cannot afford...friends and neighbors are not only potentially costly but potentially dangerous as well. No family, they think, can stand to see another prosper without feeling envy and wishing the other harm.

Dube (1955:181-184), describing a village in the state of Hyderabad (India), writes that:

In their interpersonal relations the people are hypercritical and very sensitive... [they] do not easily let go an opportunity of commenting on and criticizing their neighbors, their relations are never very smooth and certain... It is common to suspect others' motives, and not unusual to be always on the alert to read hidden meanings into the seemingly innocent utterances of others.

Again,

People attaining conspicuous success are invariably the subject of malicious criticism [and]...people...indulge in malicious gossip and backbiting. Mutual suspicion characterizes the general nature of interpersonal relations.

Foster (1960:174-178) while writing on interpersonal relations, in peasant society, emphasized the uncooperative nature of villagers:

It is difficult for me to understand why, in the face of visible evidence to the contrary, so much work in community development and related programs is based on the starry-eyed assumption that there is something "naturally" cooperative about peasants... It is worth noting that in many ways a peasant family can function with less outside cooperation than any other social form... One reason, then, that peasants are not very cooperative is that they do not have to be. Paradoxical as it may sound, their technology permits them a degree of independence denied members of more primitive and more advanced societies.

Two implications for work in developmental programs are suggested by Foster (1960:174-178):

A village must be approached with the assumption that most of its people are naturally uncooperative, not that they are cooperative.

- b. A major educational effort must be made to break the traditional image of a static economy in the minds of villagers. More effort must be devoted to help them see, through demonstration and continual explanation, how it is possible for some to have more without others having less. I suspect that, to the degree people can come to appreciate this fact, it will be easier and easier to obtain real cooperation.

Why do these negative qualities of interpersonal relations prevail? Foster (1960:174-178) stresses the importance of population size, whereas Spielberg (1968:205-211) negates it. Simmons (1959:104-105), Silone (1934:ix), and Adamic (1934:97) look at material goods like land, tools, etc., as the sources of quarrels and criticism.

Foster:

If the population is too large to permit extensive face-to-face contacts, the individuals become more suspicious, hostile, and distrustful because they cannot personally keep track of the activities and interaction of others. Imagination then acts as a negative supplement to what is actually seen and heard.

The maximum community size for effective face-to-face interaction is between 1,000 and 1,500 persons.

Speilberg:

That mistrust and suspicion are apparent not only in relations between neighbors and between spouses but in parent/child and inter-sibling relations.

There are certain principles, readily expressed by the villagers, that are operative in almost all social relationships, both institutional and non-institutional. The principal are: (1) all villagers, outside the family, should be treated alike; (2) obligations must be clearly defined and understood, made as explicit as possible, limited (in number and kind), and restricted to a definite period of time; (3) one must, at all times, command respect and have it understood by others that no intrusions on persons or property will go unnoticed.

The San Miguelenos (population of 406 persons) recognize that their community is poor and offers few opportunities to make a living. They give as one of the reasons for their poverty the insufficiency of the land, both in the quantity and the

quality. The villagers also cite the outside world and its attributes toward them as a reason for their poverty. They feel that the outside world, as represented by government agents and urban dwellers, cares little about them and their hardships.

In conclusion, Speilberg questions the importance which Foster assigns the demographic variable in determining the "quality" of interpersonal relations. Two alternative hypotheses are suggested by Speilberg:

1. If population size is related to the quality of interpersonal relations, the optimum size for effective face-to-face interaction is much lower than the 1,000 to 1,500 which Foster postulates.
2. The important demographic variable may not be population size, but rather the rate of population growth in association with a fixed economic base.

Simmons holds that:

Sibling relations, after the abdication or death of parents, are characterized by disputes and feuds arising from conflicts over the division of land and the other goods of inheritance.

The Italian novelist, Ignazio Silone, described village life in Fontamara in this fashion:

In bad weather months they arranged family affairs. That is, they quarreled about them... In little villages usually all the families quarrel with each other. Always the same squabbles, endless squabbles, passed down from generation to generation in endless law suits, in endless paying of fees, all to decide who own some thorn bush or other.

Adamic writes of the Slovenes that their

...seemingly perfect village life [periodically is] shaken by fierce quarrels among peasants over the possession of a few feet of ground or a tool or beast, or some such facts as that one's pig or chicken crossed the road to another's vegetable patch.

Inter-village Network

Marriott (1955:191) comments about the need for understanding village systems as part of larger system in traditional societies:

The villages which are little communities of India today may be conceived as relative structural nexuses, as subsystems within greater systems, and as foci of individual identification within greater fields. They cannot be conceived as things in themselves in their organization of marriage and kinship, residence patterns, modes of conflict, or caste organizations. Nor are they ever likely to have been conceivable as isolates since Indian civilization began. The traditional social structure of the greater community of India similarly cannot be understood as apart from its continuing existence in relation to hundreds of thousands of little communities. Both little communities and greater communities are mutually necessary conditions of each other's existence in their present forms. One must consider both in order thoroughly to understand either.

Raulet and Uppel (1970:336-367) observe that realities of life in the rural Punjab have undergone change so that the classical model of village society, bound by a closed caste system, is not fully relevant to their understanding. We can gather from their observation that the changes brought about in the traditional society by the land revenue system, the intensification of the market economy, and various legal and administrative measures under British rule have made intervillage connections possible.

There are some occasions, though these are relatively few, when members of different villages either cooperate with others or turn hostile against others. Beals (1964:99-113) observed in Yadgiris Tahsil, in South India, many villages stage annual fairs or festivals in honor of local deities. These festivals, known as "Jatras," meet certain requirements.

There must be inter-village participation. The host village must be sufficiently reunited so that its members may contribute financially and work together to make the "Jatra" a

success. Relatives must be invited and entertained... The ritual must be adopted from the general "Jatra" model in such a way as to allow virtually all local castes and religious sects to participate... There must be hand wrestling, dramatic performances and commercial activities if they can be arranged.

The researcher, on the basis of personal observation of Punjabi villages in Pakistan, has observed several instances of cooperation and conflict among villages at the occasion of national and provincial parliament elections.

VILLAGERS AND THE BUREAUCRACY

Janowitz (1958) attempted to conceptualize the citizen administrator relationship in democratic terms in his empirical study of public attitudes towards administration in Detroit, Michigan. He specified four types of requirements for the achievement of a democratic balance:

1. Knowledge: The public must have an adequate knowledge about the operations of the public bureaucracy.
2. Self-interest: The public must consider that its self-interest is being served by the public bureaucracy. As a check on the disruptive consequences of self-interested demands on the bureaucracy, the public must be aware simultaneously of the bureaucracy's capacity to act as a neutral and impartial agent in resolving social conflicts.
3. Principle-mindedness: The public must be of the general opinion that the public bureaucracy is guided in its actions by a set of principles guaranteeing equal and impersonal treatment. Administrative routines, however, must be sufficiently flexible to cope with individual differences in order to ensure adequate dealings with clients.
4. Prestige: Public perspective toward public bureaucracy must include adequate prestige value toward public employment as compared with other types of careers. Very low and very high prestige values would interfere with the bureaucracy's ability to operate on the basis of democratic consent.

What Eldersveld (1968:6-8) in his study of the Citizen and the Administrator in a Developing Country shows is strikingly different from what Janowitz proposes:

The Indian public in Delhi state is inclined to feel that officials are doing a good job and supports developmental programs as worthwhile. On the other hand, there is evidence that this public is not convinced that officials treat citizens equally, nor is a majority certain that action can be taken against officials who do not perform their job properly. There are cynical overtones to responses about the integrity of officials. Yet, the great majority look on governmental positions as highly valued.

Wisers (1965:101,107) in their discussion of Agents of Authority (Ch. VIII) observed that these agents were there simply to serve as links between the village and officials or landowners. The picture drawn by them is one of exploitation of villagers by their government officials. These are Headman, and *Patwari* of the Revenue Department:

Headman: The office of the village headman is honorary. He is a resident of the village, appointed by the government to represent the village in all matters pertaining to authority. He knows the village and the history of every person in it better than any official could hope to, and is in a position to give useful information regarding offenders against the law.

Patwari: The village *Patwari* and his one assistant are the only full-time agents of government in the village. With the *Patwari* is a record of every plot of land within the revenue area...what is grown on it, the names of its holders, and their individual rights in it. He enters in his volumes any changes brought about by death, with a statement of the rights of each heir. He notes transfers of holdings and any alterations in legal rights. Also he keeps a record of all rents paid to each landlord, and arrears. He must appear in court to give evidence in all cases dealing with land rights in his area. If more of our farmers could read, and if each of them would keep his own authorized copy of the record of his holdings made out by the Settlement Officer every thirty years, along with legal records of current transaction, our accountant (*Patwari*) would serve as an inoffensive employer. But as long as they do not do this and depend entirely on his annual recordings of their rights, they vest him with powers which he, a low grade agent, could hardly be expected to disregard.

CONCLUDING REMARKS

The essential points raised by the review of literature can be summed up as follows:

1. Caste, kinship and different land tenancy statuses are central parts of village social structure.
2. Often caste, kinship, and land tenancy differentials solidify groups into contending factions, becoming potential sources of a network of hostility.
3. Village leadership exists either in the form of a *Panchayat* or some key individuals who perform the leadership role in the village. But traditionally the leadership is dependent on dominance of caste or kinship or ownership of land.
4. The suspicious and envious nature of the villagers creates tendencies towards inter-group conflicts.
5. Government bureaucracy occupies a crucial position in the village social structure, government officials are seen by the villagers as having prestige and honour. People attach high value to being a civil servant. However, they do not see officials as effective agents of change. They perceive them as favoring certain segments of society while depriving others of the benefits of new development programs.

These points help mark the conceptual boundaries regarding the factors potentially relevant to explaining water management behavior. This study will employ them in an effort to ferret out social factors associated with differential willingness to clean watercourses, to

change *warabundi* systems, and to involve irrigation officials in water management decisions.

CHAPTER III

METHODOLOGY

Given the objectives of this study to examine village organizational factors affecting decisions to clean watercourses, to convert from *kacha* to *pacca warabundi* systems of allocation, and to involve Irrigation Authorities in decision making, the following design for the research was employed:

Dependent Variables--Decisions to:

Clean and maintain watercourses

Change from *kacha* to *pacca warabundi*

Involve lower level irrigation authorities in decision making

Intervening Variables--Village Social Organizational Attributes:

Number of castes--single, double, multiple

Factions--presence/absence

Leadership structure--key individuals/organized
Panshayat

Land Tenancy Type--Presence/absence of big landlords

Biradari--Presence/absence of recognized groups within caste or sub-caste

Pattern of Residence--Locals/*Muhajirs*

Independent Variable--presence/absence of public tubewells to augment canal water supplies.

Control Variables:

There were no public tubewells in either set of villages--augmented or unaugmented.

The accessibility to the nearest city--Jaranwala or Lyallpur in case of augmented and unaugmented water villages respectively--was controlled to the extent that the villages were accessible to these cities by bus or *tonga* in the sense that a round trip in one day was possible.

Operationalization of Key Concepts

The following terms and concepts used in this study are operationalized below:

1. Caste, subcastes, and kinship or *biradari*
2. Land tenancy status
3. Leadership structure
4. Network of relationships
5. Faction and factionalism
6. Augmented and unaugmented water
7. Settlement pattern
8. Household
9. Watercourse

Caste

These are names of occupational categories in Punjabi villages. The primary agricultural castes are *Jats*, *Rajputs*, and *Arains*. There are others such as *Gujjars*, *Dougars*, *Baluchs*, and *Pathans* scattered in Lyallpur and Jaranwala Tehsils. Subcastes are groups within a caste which are differentiated from each other by virtue of different hereditary caste titles--usually subcastes are endogamous sub-sections of castes. For purposes of assigning villages to the categories of single, double, or multiple caste type, only agricultural castes were counted. In fact, if non-agricultural castes are counted, there are no truly single caste villages in Pakistan.

Kinship or *Biradari*

Biradari is a patrilineage where members forming the group can recognize themselves for a few preceding generations. The term *biradari* sometimes has connotations extending to a caste or a subcaste group.

Land Tenancy Status

There are four such statuses:

- a) Owner cultivators: A farmer cultivating his own land for which he pays neither cash rent nor crop share. He might rent out some part of his land to other farmers.
- b) Owner cum tenants: This farmer, besides farming his own land, also rents and farms land for cash, or a crop share. He might also farm mortgaged land for which he had provided the money. Depending on the proportions of his owned and rented land, this type of farmer at the extremes, of course, is indistinguishable from 'owner' or 'tenant.'
- c) Tenant: This farmer pays rent for all the land he farms either in cash or crop shares.
- d) Big Landlord: This is a farmer with a size of land holding more than fifty acres.

Leadership Structure

Decision making may be conducted through an organized *panchayat* or by individual farmers. If *panchayats* are active, the question is as to how they function. Where there is no active *panchayat*, this study is interested in the characteristics of the individual decision makers in terms of their affiliations to caste, *biradari*, and land tenancy status.

Factions and Factionalism

These are groups recognized by the villagers as united. They are based on criteria of kinship, caste affiliation, or some common interest, economic or political in nature, old or new. On basis of information provided by informants during the course of this study, the researcher chose to use the term as 'factions' only when overt hostility is present between two groups. This hostility is manifested at least in the sense that some villagers were "not on speaking terms," and in the most serious sense "danger of armed combat any time." The two factions will be called permanent if there is no specific issue at hand and the affiliations are hereditary in nature such as caste, religious sects, and settlement patterns. When there is a clearly defined issue such as found during political elections or when the individual personalities of village leaders are in conflict over some vested interest, the factionalism is called temporary.

Network of Intra-Village Relationships

The village network of relationships is indicated by participation in ceremonial activities--marriage, child birth, circumcision, and funerals. Economic indicators are activities involving renting land, lending money, or working jointly in plowing, sowing, and harvesting.

Unaugmented Watercourses

Those which are served only by canal water.

Augmented Watercourses

Those which are served by public tubewells installed by the Water and Power Development Authority of Pakistan. These watercourses also receive normal amounts of canal irrigation water.

Settlement Patterns

There are two such patterns: "Locals" and "*Muhajirs*." "Locals" are those villagers who have been settled in the area since colonial times, the end of nineteenth century when the canal irrigation system was developed by the British rulers. "*Muhajirs*" are the migrants who came to Pakistan from East Punjab (India) at the time of partition in 1947. The terms "Local" and "*Muhajir*" are in vogue only locally and do not have official sanction.

Household

The members of a family who cook and eat together. The term is locally called a "*Choola*" which literally denotes a common "fireplace."

Watercourse

This is the water channel starting from the *mogha* down to the last irrigated fields. This is commonly shared by all farmers for purposes of cleaning and maintenance but the space and direction is provided by the department of irrigation. The local term is a "*Khal*" or "*Sarkari Khal*," the latter meaning "government watercourse."

The Interviewing Schedules and the Informants

Schedule One

This schedule was intended to measure the village structure and the network of intra-village relationships. The information was mainly gathered from the village *lumbardar*. Where he lacked full information he referred to somebody else in the village such as a village *chowkidar* (Watchman) or a revenue *Patwari* (the government revenue assessor). The *lumbardar* and the *chowkidar* are village residents, and, therefore, know the background of factions and disputes. The revenue *Patwari*

records information about the number of households, size of land holdings, and caste membership. Where necessary the questions on factionalism and disputes were directed towards other key individuals such as school teachers or shopkeepers.

Schedule Two

There were three informants, one each from different locations on the watercourse--the head, middle, and tail. Because of the earthen nature of watercourses, the flow could not be uniform throughout the channel, so farmers in different locations could give varying assessments of their requirements. Although there was no random selection of the informants, the researcher took care to insure that he secured informants from each of the three locations on the watercourse.

Selection of Villages

There are no public tubewells in Lyallpur Tehsil, whereas in a large part of Jaranwala Tehsil public tubewells have been installed by the Water and Power Development Authority of Pakistan. This area, known as SCARP I (Salinity Control and Reclamation Project), extends to parts of Lahore and Sheikhpura Districts. The villages in Lyallpur Tehsil have watercourses receiving only the normal canal water supply, whereas village watercourses in the Jaranwala area have an augmented supply of water from public tubewells.

The list of villages in each category of unaugmented and augmented water was prepared with the help of a Police Inspector known to the researcher. The list, in each case, contained 50 villages which were approachable either by bus or a *tonga* or a couple of miles walking from the nearest bus station. Ten villages were randomly selected from each

category. In the augmented water areas, one multicasite village was purposely replaced by a single-caste village. This single-caste village was inhabited by Baluchs and was randomly selected from amongst the only four single caste villages--all of which were Baluch. Selection of villages to meet caste criteria also provided the two residence patterns--locals and *muhajirs* for both unaugmented and augmented watercourses. There were, however, no big landlords (with a holding of more than fifty acres or above) in unaugmented watercourses. No replacement could be made as there were no such landlords available in Lyallpur Tehsil.

Data gathering was terminated when the villages in the sample were flooded in mid August, 1973. The data, therefore, pertains to eight villages with unaugmented watercourses and seven with augmented water. The caste, settlement pattern, and presence or absence of big landlord in each augmented and unaugmented watercourses is given in Table 1.

TABLE 1
VILLAGES BY CRITERIA OF SELECTION

	<u>Unaugmented Watercourses</u>	<u>Augmented Watercourses</u>
Multi-caste	3	5
Double-caste	1	1
Single-caste	4	1
Locals	3	5
<i>Muhajirs</i>	5	1
Local (in majority)	-	1
Big landlords	-	5
No big landlords	8	2

Upon actual contact with the villages, the researcher found one village with *kacha warabundi* in each watercourse category.

Analysis of Data

The approach of this study is that of a descriptive case study primarily utilizing qualitative analysis of data. Chapter four will proceed to compare and contrast the impacts of public tubewell augmentation of water *versus* watercourses not augmented by public tubewell supplies on three aspects of water management decision making--decisions to clean watercourses; decisions to switch *warabundi*; and decisions to involve officials of the irrigation bureaucracy. Variables having to do with village organization, such as caste, land tenancy, and leadership will be investigated as intervening factors conditioning the effects of the independent variable (augmentation of water) on the dependent decision variables.

CHAPTER IV
PRESENTATION AND ANALYSIS OF DATA

This chapter now proceeds with the presentation and analysis of data. Focus will first be on village organization and then the analysis will shift to the decisions to clean watercourses, decisions to switch *warabundi*, and lastly, a brief discussion of the inter-relationships between farmers and irrigation bureaucracy. For each of these topical areas, with the exception of the last, there will be comparison of villages augmented by tubewell water with those not augmented.

PART I: VILLAGE ORGANIZATION AND NETWORK OF RELATIONSHIPS--UNAugmented
WATER

Village Setting

The nearest city to all villages studied having unaugmented water is Lyallpur, one of the District Headquarters of Punjab Province. Lyallpur is a city of 900,000 population scattered over an area of about 50 square miles. Eight highways link the city with other provincial cities. Railroad links exist, but they are few as compared to the hundreds of daily inter-city bus arrivals and departures.

The names of eight unaugmented villages under study and the distance of each from Lyallpur are given in Table 2.

(Table 2 about here)

The villages are at a distance of 5 to 14 miles from Lyallpur. All except one are linked with the city by road. One, Chandan Talawan,

TABLE 2
UNAugmented Villages--ACCESSIBILITY TO LYALLPUR CITY

Name of the village	Distance from Lyallpur to nearest bus stop	Distance of village from the nearest bus stop	Total distance from Lyallpur
Chandan Talawan	5½	2½	8
Khurianwala	14	0	14
Sabuana	8	1	9
Bismillapur	10	2	12
Mullanpur	3	3	6
Gokhuwal	5	0	5
Jhabal	14	0	14
Jhangir Kalan	10	2	12

has linkage by bus as well as by train. To reach this village and two others, Bismillapur and Janangir Kalan, this researcher took a horse-driven cart known as a *tonga*. To reach Sabuana and Mullanpur it was necessary to walk from the nearest bus stop. This distance ranged from one to three miles on either side. The connecting road between the bus stop and the village in every case is earthen in nature.

All villages except Khurianwala have no institutional items other than a post office and a primary school either for boys or for both boys and girls. However, everywhere people feel that the other institutions are not too far to reach. The distance varies from five to eight miles and the villagers can go by *tonga*, bus or bicycle. In Khurianwala there are all the institutional items in the list, e.g., a post office, a telegraph office, a high school (up to 10th grade) for boys and a middle school (up to 8th grade) for girls, a rural dispensary, a veterinary center and a family planning clinic. In addition, there is a police station.

Total agricultural land and the size of holdings differ from village to village (Table 3). The overall size of holdings is small in Lyallpur Tehsil. The largest ranges from twelve and one-half acres to thirty-seven and one-half acres, the smallest from one-fourth acre to two acres and the average is from one and one-fourth acre to four acres. The average size of holding was calculated by dividing the total agricultural area of the village by the total number of agricultural households.

TABLE 3
UNAugmented Villages--Size of Landholdings

Name of the Village	Largest Holding (acres)	Smallest Holding (acres)	Average Holding (acres)
Chandan Talawan	18	1/4	2 1/2
Khurianwala	12 1/2	2	3
Sabuana	25	2	4
Bismillapur	37 1/2	1	3
Mullanpur	22	1	1 3/4
Gokhuwal	37 1/2	1	1 3/4
Jhabal	37 1/2	2	3 1/2
Jahangir Kalan	18	1/4	3 3/4

Table 3 reveals that the average size of landholdings is close to the smallest holdings, which of course means that the majority of land holdings are below the subsistence level--which is roughly six acres.* The families with holdings of more than 25 acres as is the case in Bismillapur, Gokhuwal and Jhabal are economically well off with earnings of more than Rs. 12,000 per year. The smallest holding is one-fourth acre in two villages, one acre in three and two acres in another three villages. This fragmentation is largely due to the Islamic hereditary law of land distribution. A family cannot live on such holdings so the members in most cases work as tenants for big

*The six acres figure was consistently used by informants as they discussed the problem of defining subsistence farms.

owners or leave the village to work in cities. In the latter case they typically leave their land with close relatives.

Moghas (canal outlets) are not allocated in any definite proportion to the total irrigated area in the village (see Table 4). The maximum area being irrigated by one *mogha* is 40 squares (1000 acres) and the minimum on one watercourse is seven squares (175 acres).

Where there is more than one *mogha* per village, the allocation of agricultural land on each is not in equal proportion. Irrigation Officials related that the allocation is determined by three factors: (a) A group of farmers who do not want to share water with others might have a separate *mogha*; (b) the scheduling of water under *pacca warabandi* might not be adjusted to include every farmer on particular *moghas*; (c) the particular position of a *mogha* might create problems with regard to capturing an adequate flow of water to serve an entire watercourse. In all cases, however, the allocation of water for each farmer is based on his land holdings. The more land a farmer possesses the longer time he is granted for his turn. The information regarding total agricultural area, number of *moghas* and area irrigated by each is given in Table 4.

(Table 4 about here)

Four villages--Chandan Talawan, Bismillapur, Jhabal and Jhangir Kalan--are each at least double the size of the other four villages in terms of total irrigated area. The area irrigated by each *mogha* is not uniformly distributed. The *moghas* under study irrigate a minimum of seven squares and a maximum of forty squares.

TABLE 4

UNAugmented Villages--NUMBER OF *MOGHAS* AND AREA IRRIGATED

Name of the village	Total irrigated area	No. of <i>moghas</i>	Average irrigated area per <i>mogha</i>	Area with the <i>mogha</i> under study	Area with other <i>moghas</i>
Chandan Talawan	75 Sqs.	4	18.75 Sqs.	16 Sqs.	20,20,19 Sqs.
Khurianwala	40 Sqs.	1	40 Sqs.	40 Sqs.	---
Sabuana	40 Sqs.	1	40 Sqs.	40 Sqs.	---
Bismillapur	85 Sqs.	3	28.33 Sqs.	25 Sqs.	30,30 Sqs.
Mullanpur	48 Sqs.	3	16 Sqs.	18 Sqs.	18,12 Sqs.
Gokhuwal	35 Sqs.	3	11.67 Sqs.	7 Sqs.	11,17 Sqs.
Jhabal	80 Sqs.	3	26.67 Sqs.	20 Sqs.	30,30 Sqs.
Jhangir Kalan	90 Sqs.	4	30 Sqs.	18 Sqs.	23,22,27 Sqs.

Caste Distribution

Caste is one of the intervening variables. It is noteworthy that no village is exclusively inhabited by one or more of agricultural castes. Non-agricultural castes which are numerically significant in a village are included in Table 5. Taking into consideration agricultural castes only, there are four single caste, one double-caste and three multi-caste villages in the sample of unaugmented villages.

(Table 5 about here)

Table 5 reveals that in all the villages, except Khurianwala, the number of agricultural households are the greatest portion of the total number of households--more than two thirds the total number of households. In Khurianwala, one-third of households belong to agricultural castes and one-fourth to the major non-agricultural caste. This leaves more than 400 households unaccounted. They belong to Government officials and shopkeepers as there are all the institutional organizations present in the village which also provide shopping centers for surrounding villages.

Overall, three castes are most prevalent in these villages--*Jat*, *Arain* and *Rajput*. There are *Syeds* in two villages but they are in the majority only in Chandan Talawan. In two villages there are a small number of *Gujjars*--25 households in Khurianwala and 15 in Jhabal. *Dogars* are one of the majority castes in Jhabal only. There are a few *Kamboh* in Jahangir Kalan.

In Mullanpur, the *Jats* recognize themselves as divided into two sub-castes, *Randhawa* and *Sindhoo*. In Sabuana two recognized *Rajput* sub-castes are the *Manj* and *Kotlas*. *Arains*, *Gujjars*, *Dogars* and *Syeds*

TABLE 5
UNAugmented Villages--HOUSEHOLD DISTRIBUTION OF AGRICULTURAL CASTES VS. NON-AGRICULTURAL CASTES

Name of Village	Total No. of households	No. of agricultural castes households	Name of the castes with number of households	Any recognized sub-castes	Number of major non-agricultural households
Chandan Talawan	1,000	700	<i>Jat:</i> 350 <i>Syad:</i> 350	None	200 (<i>Easi:</i> Agri. labor & sweeper)
Khurianwala	1,000	336	<i>Rajput:</i> 300 <i>Gujjar:</i> 25 <i>Arain:</i> 10 <i>Syed:</i> 1	None	250 (<i>Changar:</i> Agri. labor)
Sabuana	300	250	<i>Rajput:</i> 250	<i>Manj:</i> 80 <i>Kotlas:</i> 170	30 (<i>Teli:</i> oil seed presser)
Bismillapur	1,000	700	<i>Arain:</i> 700	None	None
Mullanpur	1,000	707	<i>Jat:</i> 707	<i>Randhawa:</i> 700 <i>Sindhoo:</i> 7	None
Gokhuwal	750	500	<i>Arain:</i> 500	None	250 (<i>Easi:</i> Agri. labor & sweeper)
Jhabal	700	550	<i>Jat:</i> 300 <i>Dogar:</i> 200 <i>Arain:</i> 20 <i>Rajput:</i> 15 <i>Gujjar:</i> 15	None	100 (<i>Jolaha:</i> weaver)
Jahangir Kalan	800	615	<i>Jat:</i> 200 <i>Arain:</i> 200 <i>Rajput:</i> 200 <i>Kamboh:</i> 15	None	35 (<i>Teli:</i> oilseed presser)

do not have any recognized sub-castes in any of the villages mentioned in Table 5.

In five of the villages, i.e., Chandan Talawan, Khurianwala, Mullanpur, Sabuana and Jahangir Kalan, all agricultural households are *Muhajirs*--persons who migrated from India in 1947. In the other three, Bismillapur, Gokhuwal and Jhabal they are all locals who have settled there since colonial times.

Dominance Characteristics and Leadership Structure

When the researcher inquired about who dominates village decision making, certain individuals were pointed out. In all cases the source of their dominant behavior is their economic position. An added qualification in one village, Gokhuwal, is the influence of an individual in the police and irrigation bureaucracies. It is again because the person is economically well off, for without money he cannot host visiting government officials.

Lumbardars dominate everywhere because they are intimately known to the public servants such as Police Inspectors, *Tehsildars*, Irrigation Overseers and *Patwaris*. In three of the villages--Bismillapur, Gokhuwal and Jhabal--the *Lumbardars* are among the largest landowners, each with holdings of about one and a half squares.

Panchayats generally play an important part in the village structure, but not all villages have organized them. In three villages, Bismillapur, Sabuana and Jhabal there is one inter-caste *panchayat*. Again, *panchayat* members are influentials as individuals, too. In all other cases, except Jahangir Kalan, there are said to be a couple of persons who are informally influencing decision making at their own initiative. In Jahangir Kalan, there is not a single person fully

dominating the whole village or any recognized caste or sub-caste group within it.

There are two ways in which a *panchayat* can come into being. In Bismillapur, members are dominated by the *lumbardar*. In Sabuana and Jhabal, members are elected. The election procedure works as follows. All households belonging to each caste send one person to a common place in the village such as the *lumbardar's dera*. Each caste group elects one person by asking members to propose and then to vote by raising hands. There is said to be no competition, which means that one of the candidates must volunteer to withdraw before voting. If one of a pair does not withdraw, a third nominee is elected.

The number of *panchayat* members varies. In Sabuana, there are ten members, two from *Manj Rajputs*, four from *Katlas Rajputs*, and the remaining four from non-agricultural castes. In Bismillapur, all three members are *Arains*. Five members constitute Jhabal's *panchayat*--two are *Jats*, two are *Dogars* and one is from another caste--generally a *Gujjar*. Wherever there are *panchayats*, they are inter-caste and have power over minor disputes of all types. Intracaste disputes tend to be settled by influential individuals. The particular arrangement about water management decision making differs from village to village. Whether the village *panchayat* attends to water problems or whether there is a separate committee or individual is a topic to be discussed later in this chapter.

Panchayat members or other village influentials all possess two qualities. First, they have recognized ability to represent their group. Some of the informants explained the meaning they attached to group representation. This, they said, is the "ability to help the

group or any individual in the group through unfair means." Secondly, *panchayat* members and influentials are thought to act "honestly and justly." Education is not one of the desired attributes. The common opinion is that age does not matter either except that the person should be a male adult not handicapped mentally or physically. In practice, however, the individuals dominating the decision making are between 35 and 60 years old.

Factionalism

In two villages, Bismillapur and Jhabal, there are no factions, whereas in the other six there are two factions in each. The sources of factionalism are not uniform. Each of the primary sources is described in the following paragraphs.

Two Individuals Trying to Dominate Village Decision Making

There are two such cases, Khurianwala and Mullanpur. In one of these, Mullanpur, there are two *lumbarbars* each having influence in Police and Irrigation Department. Each is trying to convince the village people that he is the real leader and the one to help them. In Khurianwala, one is a *lumbarbar* and the other a landlord who owns land in district Jhang and is also a Peoples Party Chairman in the village. The *lumbarbar* is an old person and has always served police and revenue officers. Older people in the village believe he is the leader. The landlord has recently gained influence with the police because of his affiliation with the Government Party. He enjoys support from younger generation. Both villages are single caste.

Religious Affiliation

In Gokhuwal there are two religious sects: *Ahmadis* and *Sunnis*. Each is led by an influential person of their own sect. *Ahmadis* are led by a *Lumbardar* and *Sunnis* by one of their religious leaders.

Previous Residence

There are two factions based on the previous residence of the inhabitants in Sabuana. One is from Lubhiana (East Punjab) and the other from Jullundar (East Punjab). Both migrated to Pakistan in 1947.

Caste Affiliation

Caste is a source of factionalism in Chandan Talawan and Jahangir Kalan. In the first case, it is between two major castes: *Jats* and *Syeds*. In the second, factionalism is not between two specific castes. There is no recognized leadership in any caste. Factions simply are traditionally prejudiced against each other.

Some of the factions were said to be permanent whereas the others are temporary. Factions based on caste affiliation, religious sects, and previous residence are hereditary and hence permanent. Where two individuals are organizing factions, their success depends on personality, and people frequently change their loyalties from one to the other.

Network of Relationships

The network of village relationships, reflected in ceremonial and economic activities, is variously dependent on the existing factionalism depending on the strength of hostilities among opposing faction

members. Everywhere only close relatives take part in the ceremonies of child birth. Friends and other members of a particular caste or a recognized sub-caste participate in a marriage ceremony. It may be noted that marriage is the only ceremony which is celebrated by all, and people are asked to join by invitation. Childbirth is celebrated by distributing sweetmeats in the case of the first male child only. The number of persons joining a marriage ceremony depends on the financial position of the bride and the bridegroom. The money to be expended determines whether only close relatives or both close and distant relatives participate. In the villages under study, all adults are expected to go for sympathy and prayers on burial. This is avoided only in case of strong hostility and there is no such case in the sample.

Renting land and borrowing money is expected of those who are poor. Such persons do not become heavily attached to any one faction. So everywhere responses are the same. Land is rented to those who are hard working, honest, and who pay more. Similarly, money is lent to the one who is dependable and can guarantee quickest return. It is, however, a common practice that one who needs to rent land or borrow money would first go to his close relatives and if refused, then to other members of his caste or sub-caste. Only as a last resort do hopeful borrowers go outside their factional group.

With regard to helping each other on occasions like plowing, hoeing, and harvesting, the typical pattern of response was that agricultural labor was easily available. Where there are small owner cultivators, as in Lyallpur Tehsil, every household has enough adult males to handle such jobs for themselves.

PART I: VILLAGE ORGANIZATION AND NETWORK OF RELATIONSHIPS--AUGMENTED WATER

Seven villages were studied in Jaranwala Tehsil--each is served by public tubewells, the water from which augments canal water. The patterns of description will be the same as employed in the discussions of villages without augmented tubewell water. Sharp variations between the two categories of villages will be highlighted.

Village Setting

Jaranwala, the nearest city, is one of the four Tehsil Headquarters of Lyallpur District. It is 22 miles to the south-east of Lyallpur and has a population of 50,000. Most farmers go to Lyallpur for marketing their goods and those entangled in court cases go there to seek legal advice.

TABLE 6
AUGMENTED VILLAGES--ACCESSIBILITY TO JARANWALA

Name of the Village	Distance from Jaranwala to the nearest bus stop	Distance of the village from the nearest bus stop	Total distance Total distance from Jaranwala
Gullar	0 miles	2 miles	2 miles
Kang Meraj	12 miles	2 miles	14 miles
Muharanwala	0 miles	4 miles	4 miles
Rodi	10 miles	1 mile	11 miles
Deen Pur	0 miles	6 miles	6 miles
Sheroowala	0 miles	2½ miles	2½ miles
Jhok Shadoo	0 miles	5 miles	5 miles

In order to get to the villages the researcher first travelled from Lyallpur to Jaranwala by bus. The villages as shown in Table 6 are located at a distance of 2-14 miles from Jaranwala city center. For the five nearest villages, Gullar, Sherowala, Muharanwala, Jhok Shadoo, and Deen pur which are at a distance of 2, 2½, 4, 5, and 6 miles respectively, a *tonga* was taken from Jaranwala city center because the buses going on that route did not take short distance passengers. For the other two, Rodi and Kang Meraj, a bus was available to the nearest stop and from there the researcher travelled by foot.

There are none of the basic institutional items in Sherowala. There is only a primary school in two: Jhok Shadoo and Gullar, a primary school and a post office in another two--Muharanwala, and Deen pur--and a middle school and a post office in Rodi and Kang Meraj.

The size of landholdings is bigger in these augmented villages as compared to the villages with no augmented water. Table 7 shows, by village, the size of the biggest, smallest, and average holdings.

TABLE 7
AUGMENTED VILLAGES--SIZE OF LANDHOLDINGS

Name of the Village	Largest Holding (acres)	Smallest Holding (acres)	Average Holding (acres)
Gullar	100	1	21
Kang Meraj	25	1	4
Muharanwala	37½	3	8
Rodi	225	6	20½
Deen pur	125	3½	10
Sharoonwala	100	6	15
Jhok Shadoo	75	5	7

The upper and lower limits of largest, smallest, and average holdings are two to five times more in Jaranwala as compared to those in Lyallpur.

In this category, also, *moghas* are not allocated in any definite proportion to the total village irrigated area (see Table 8). The overall irrigated area in augmented villages is less than the area in unaugmented villages. There are two *moghas* in five villages and three in the other two. Farmers on augmented watercourses receive three times more water than those in the unaugmented villages of Lyallpur District. The water is, however, allocated in definite proportion to size of holding.

(Table 8 about here)

Caste Distribution

The total number of households belonging to agricultural castes and one other major caste are given in Table 9.

(Table 9 about here)

Two villages, Rodi and Deen pur, are only about half the size of each of the others. Gullar and Sheroowala have proportionately the smallest number of agricultural caste households. The major non-agricultural caste, the landless laborers, are in large majority in Gullar and Sheroowala--the reason being that these two villages are closely adjacent to Jaranwala. Laborers who work in factories of Jaranwala have chosen to stay in a nearby village because of availability of less expensive housing.

The main castes in this area as in other parts of Punjab are *Jats*, *Rajputs*, and *Arains*. In one of the villages, Kang Meraj,

TABLE 8

AUGMENTED VILLAGES--NUMBER OF *MOGHAS* AND AREA IRRIGATED

Name of the village	Total irrigated area	Number of <i>moghas</i>	Average area per <i>mogha</i>	Area with the <i>mogha</i> under study	Area with other <i>moghas</i>
Gullar	45 squares	2	22.50 squares	24 squares	21 squares
Kang Meraj	50 squares	2	25 squares	24 squares	26 squares
Muharanwala	64 squares	3	21.33 squares	30 squares	15,16 squares
Rodi	57 squares	2	28.50 squares	27 squares	30 squares
Deen pur	40 squares	2	20 squares	18½ squares	21½ squares
Sharoovala	39 squares	3	13 squares	17 squares	16,6 squares
Jhok Shadoo	55 squares	2	27.50 squares	27 squares	28 squares

TABLE 9
AUGMENTED VILLAGES--HOUSEHOLD DISTRIBUTION OF AGRICULTURAL CASTES VS. NON-AGRICULTURAL CASTES

Name of Village	Total No. of households	No. of agricultural caste households	Name of the castes with number of households	Any recognized sub-caste	Number of major non-agricultural households
Gullar	350	52	<i>Syed:</i> 2 <i>Kharl:</i> 19 <i>Arain:</i> 15 <i>Gujjar:</i> 16	None	150 (landless laborers)
Kang Meraj	350	300	<i>Rajput:</i> 75 <i>Arain:</i> 120 <i>Jat:</i> 75 <i>Khokhar:</i> 30	None	40 (<i>Jolaha:</i> weaver)
Muharanwala	300	192	<i>Rajput:</i> 42 <i>Jat:</i> 50 <i>Arain:</i> 100	None	75 (<i>Jolaha:</i> weaver)
Rodi	150	69	<i>Rajput:</i> 7 <i>Jat:</i> 23 <i>Arain:</i> 34 <i>Pathan:</i> 5	None	40 (<i>Easi:</i> Agri. labor & sweeper)
Deen pur	150	90	<i>Jat:</i> 70 <i>Pathan:</i> 20	<i>Lodhi,</i> <i>Afridi,</i> <i>Saidu-Zar</i>	25 (<i>Easi:</i> Agri. labor & sweeper)
Sheroowala	250	65	<i>Rajput:</i> 35 <i>Arain:</i> 30	<i>Minhas,</i> <i>Janjua</i>	100 (landless laborers)
Jhok Shadoo	300	200	<i>Baluch:</i> 200	None	None

residents are all *muhajirs*. In Gullar thirty-one percent of the *muhajirs* are among the agricultural castes.

Inspection reveals that the proportion of agricultural households to the total number of households in the villages depends on the size of landholdings. The greater the size of landholdings, the smaller the proportionate number of agricultural households.

Dominance Characteristics and Leadership Structure

Leadership dominance is typically based on caste affiliation in the sample of augmented villages. In each caste group, there are one or more individuals who possess more land than others. They occupy pivotal positions in decision making as they traditionally have had influence in police, revenue, and irrigation bureaucracies. By virtue of the fact that they get things done for others, they continue to be influential.

There is no *panchayat* in any of the augmented villages, except one, and this village is dominated by a *Rajput* with an ownership of 225 acres. There are "*Islahi* (Development) Committees" in two other villages, namely Muharanwala and Sherowala but they are less than three months old and hence have not yet effectively engaged in village decision making.

In Gullar, the head of the only Syed household is the village leader. He owns 100 acres of land. There is a *lumbardar* with 62 acres of land but he does not live in that village and hence is disinterested beyond official duties. Government officials coming to the village are hosted by the Syed. In Kang Meraj, the researcher was informed that there are ten persons who are individually influential but they also

operate in a manner similar to a *panchayat*. For common decisions they would easily work together. The only reason the group was not called a *panchayat* is that these individuals are neither nominated nor elected. There is not a hereditary position, either. In Muharanwala there is no individual who can be called representative of the village or any group in it. An "*Islahi* (Development) Committee" there has been established. The ten members of the committee were elected on a caste basis. Two each are *Rajputs*, *Jats*, and *Arains* and four are from non-agricultural castes. The committee recently decided to approach education authorities for a middle boys school. According to the informants, the committee members enjoy cooperation from all groups in the village. In Rodi, *Rajputs* rank highest in land ownership. Three of them have 225, 50, and 50 acres respectively. Three *Jats* also were big landlords as they have 56 acres of land each. *Rajputs* and *Jats* have power over their respective caste groups, but *Arains*, being tenants, are dependent upon *Rajput* landowners.

Pathans are dominant in Deen pur. Three of them, first or second cousins, own 75, 100, and 125 acres. They belong to the sub-caste, *Saidu-Zai-Pathan*.

The *Islahi* committee in Sheroowala had not started functioning. There are two party leaders, one among the *Rajputs* and one among the *Arains*. Both have been active in politics, the *Rajput* in the Pakistan People's party and the *Arain* in the Muslim League. Both are big landlords, each possessing about 100 acres of land.

In Jhok Shadoo, there are two leaders with 75 and 62 acres of land, respectively. It is a one caste village but divided into two *pattis*; *Shadoo-Kes* and *Inait-Kes*. Each *patti* has its own *Lumbardar*.

When questioned about the personal attributes of the dominant individuals in all villages it was said that they had respect and prestige. Menials could get wheat and fodder from them in emergencies and small farmers could borrow seed and fertilizer. Therefore, smaller cultivators who are so dependent can be counted upon to obey dictates of the landlords. Police officials or other civil servants coming to the village are always hosted by the landlords. None of the explanation of dominance was attributed to qualifications of age, education, representative views, or personal honesty. The only criterion for leadership is their land, and the financial status that comes from land ownership.

Factionalism

In four villages: Gullar, Kang Meraj, Muharanwala, and Deen pur, there is said to be no factionalism. In the other three villages there are two factions in each. The informants described three different sources of factionalism.

Two Individuals Seeking Dominance

In Rodi, the biggest land owner in the village, who is an aged *Rajput*, successfully maintained a *panchayat* until 1971, when factionalism disrupted it. He personally chose *panchayat* members from all castes in the village. A *Jat*, previously in the government service, settled in the village and posed a leadership challenge for the *Rajput* elder. The challenger successfully began to host officials from the bureaucracy and hence gained influence as he was able to get things done for members of his own caste. The *Jats* now take him as their

leader. Caste factionalism between *Jats* and *Rajputs* has crept in but it has been due to the leadership struggle between the two individuals.

Political

Factionalism has developed between two caste groups, the *Rajputs* and *Arains*, in Sherowala. It is based on the fact that each caste supported different political parties in the 1970 elections. One group supported the Pakistan People's Party while the other endorsed the Muslim League.

Patti Factions

Jhok Shadoo is a one caste *Baluch* village, all members of which belong to one sub-caste: *Jatoi Baluch*. The basis for factionalism is different ancestral affiliation. One is called *Shadoo-Ke* and the other *Inait-Ke* after the names of their respective forefathers, *Shadoo* and *Inait*. The hostility started forty years ago as a consequence of a murder. Most households in each faction have now become less mutually hostile. There are only twenty households in each party out of a total of 200 agricultural households who are still not on speaking terms with each other.

Two pairs of factions can be called temporary. These are found in Rodi and Sharowala because they are built around a specific issue or personality. The one in Jhok Shadoo has become hereditary in nature and is permanent. In temporary factionalism, too, we find that caste is important. Everywhere the factions are known after the names of their respective castes--*Rajput* and *Jat* factions in Rodi; *Rajput* and *Arain* factions in Sherowala.

Network of Relationships

The network of relationships in augmented villages are the same as in unaugmented villages. The ceremony of circumcision is attended by close relatives and only the birth of the first child is celebrated. Marriage ceremonies are celebrated according to the financial resources of an individual family; friends and relatives are invited accordingly. The burial ceremony is not by invitation but is attended by at least one adult male member from every household in the village.

There are exceptions in Jhok Shadoo. The hostility between the two parties has been reduced considerably with the lapse of time. But still there are 20 households on either side who do not go to burials for sympathy or prayer. Although there is no physical violence between the two groups, friendships by boys and girls are not sought outside their own *patti* group. People are suspicious of other party's motives and do not remain unarmed when they go to the city or to irrigate their fields at night.

Similarly, for renting land and borrowing money, the members of one *patti* would never go to a member of the other *patti* in Jhok Shadoo. Farm laborers who come to work at the time of harvesting would not be hired interchangeably by two *pattis*.

Discussion

A comparison of the total irrigated area of the augmented and unaugmented size of villages reveals that there is no significant difference as shown in Table 10. The value of 't' reveals a nonsignificant difference at a level of .10 (See Appendix C).

(Table 10 about here)

TABLE 10
RELATIONSHIP BETWEEN SIZE OF VILLAGE (TOTAL IRRIGATED AREA)
AND AUGMENTATION OF WATER

Unaugmented Water		Augmented Water	
Name of the Village	Total Irrigated Area	Name of the Village	Total Irrigated Area
Jahangir Kalan	90 squares	Muharanwala	64 squares
Bisnillapur	85 squares	Todi	57 squares
Jhabal	80 squares	Jhok Shadoo	55 squares
Chandan Talawan	75 squares	Kang Meraj	50 squares
Mullanpur	48 squares	Gullar	45 squares
Khurianwala	40 squares	Deen pur	40 squares
Sabuana	40 squares	Sharoovala	39 squares
$S = 1.3. (P > .10)$		$df = 13$	

Augmentations of watercourses, through public tubewells, seems to be inversely related to the pressure on land. Data on average size of landholdings reveal that there is significant difference (at .02 level) between the two sets of villages: unaugmented and augmented. (See Table 11) This implies that less water is made available where there is more pressure on land.

(Table 11 about here)

On the average there are 25½ squares of land irrigated by one *mogha* in unaugmented areas, whereas 22 squares of land is irrigated on the average in augmented watercourses. Not much difference is accounted for by differences in the size of irrigated areas. The difference appears to be more due to the size of holdings because an average of 199 agricultural households with unaugmented water share one *mogha* as compared to 61 sharing a *mogha* with augmented water.

In unaugmented villages the length of the watercourses on the average is comparatively greater--1.55 miles as against an average of 1.30 miles in unaugmented water. The ratio between the two lengths is 10:12. This is much less than the ratio between the number of households (10:33) in the two sets of villages. This implies problems of coordination and cooperation in decision making among members of an unaugmented watercourse. There is involved more diversions of water, and greater likelihood of more water loss.

The augmented areas, as compared to those without tubewell supplies, possess more *mogha* per square of land, they tend to have smaller amounts of land under irrigation per *mogha*, and there are fewer households sharing in the available water. It is clear that

TABLE 11

RELATIONSHIP BETWEEN AVERAGE SIZE OF LANDHOLDINGS
AND AUGMENTATION OF WATER

Unaugmented Water		Augmented Water	
Name of the Village	Average Irrigated Area	Name of the Village	Average Irrigated Area
Sabuana	4 acres	Gullar	21 1/2 acres
Jahangir Kalan	3 3/4 acres	Rodi	20 1/2 acres
Jhabal	3 1/2 acres	Sheroowala	15 acres
Bismillapur	3 acres	Deen pur	10 acres
Khurianwala	3 acres	Muharanwala	8 acres
Chandan Talawan	2 1/2 acres	Jhok Shadoo	7 acres
Mullanpur	1 3/4 acres	Kang Meraj	4 acres
Gokhuwal	1 3/4 acres		
5 = 2.858 (P < .02)		df = 13	

farms on the augmented watercourses in the sample villages are substantially larger, on the average, than their counterparts on unaugmented watercourses. The highest average landholding in unaugmented villages is four acres whereas that figure is twenty-one and one-half acres in the augmented villages. The presence of larger landlords on augmented watercourse may be a positive force to attract the irrigation bureaucracy to be more attentive to the problems in their villages--a fact which may explain the greater proportion of *mogha*.

The plain fact that there are 3.5 times more persons sharing water from one *mogha* in unaugmented villages than in those with public tubewells must make for greater difficulties of water management decision making when as many as 199 farmers share one watercourse. The researcher must confront the fact that substantially different farm sizes enters as a variable that confounds any comparison between augmented and unaugmented villages. Influence of this variable should be in the following direction--the fewer the farms the easier to mobilize watercourse cleaning effort (Olson, 1971). However, observations show that the augmented villages with fewer farmers and greater average farm size in fact do not mobilize more than their counterparts in the unaugmented villages. It is suggested that the relative absence of more mobilization of effort is due to the presence of additional amounts of water made available by the tubewells.

On unaugmented watercourses, people with holdings smaller than four to six acres prefer not to stay in the villages. They do not produce enough from their land for subsistence and many seek employment in Lyallpur. In so far as they secure outside employment, they may not

be so much concerned to pursue allocation of new *moghas*, although this is a subject for research in itself.

Leadership

Informants in some villages referred to having a *panchayat*, and they have, in all cases, jurisdiction over minor disputes. Upon further investigation it became clear that in both unaugmented and augmented villages, there are key individuals who exercise all leadership in decision making. Where *panchayats* exist, the decisions are actually those of the individual "influentials." These leaders are identified by the villagers according to two interdependent criteria: a) they are financially well off with a land ownership of 50 acres or more in lieu of which they earn an income of Rs. 20,000 or above per annum; b) they have influence at least in the lower echelons of the police, revenue, and/or irrigation departments.

Factionalism

Caste is a strong source of factionalism only in two double caste villages, one each on unaugmented and augmented watercourses, and one multicaste village in the unaugmented water area. Of four single caste villages with no augmented water and one single caste village with tubewell water, four of the total (including the one augmented village) experienced significant factionalism. It may be concluded that caste is not a sufficient condition for factionalism. There must be groups with conflicting interests--social, economic, religious, or political. Further, a leadership must emerge before such groups organize themselves into factions. Reasons for factionalism in the sample villages include those having to do with two individuals trying to dominate in

one, two religious sects in another, and two different pre-independence places of residence in the third.

PART II: DECISION TO CLEAN WATERCOURSES

Watercourses are cleaned from twice a year to twice a month (See Table 12).

TABLE 12
FREQUENCY OF WATERCOURSE CLEANING BY VILLAGE

	Name of the Village	Number of times cleaned in a year
Unaugmented	Chandan Talawan	2
	Khurianwala	12
	Sabuana	12
	Bismillapur	2
	Mullanpur	24
	Gokhuwal	24
	Jhabal	8
	Jhangir Kalan	3
Augmented	Gullar	2
	Kang Meraj	6
	Muharanwala	9
	Rodi	2
	Deen Pur	8
	Sheroowala	9
	Jhok Shadoo	2

In two of the villages, Chandan Talawan and Bismillapur the watercourse is cleaned twice a year. Cleaning is rigidly scheduled for the time the canal is empty. In Jhangir Kalan, farmers clean thrice a year. This includes an additional time in winter when the water flow

is very low and only parts of the watercourse are cleaned. In Jhabal, cleaning actually occurs eight times per year but people think it needs to be done regularly once every month.

Watercourses with supplemental supplies of public tubewell water show less variation in the number of times they are cleaned annually. In three cases: Gullar, Rodi, and Jhok Shadoo, cleaning is rigidly scheduled for the time the major canal is closed.

There is considerable variation in the length of a watercourse from village to village. It is also noteworthy (see Table 13) that watercourse length does not depend on the area irrigated, in either unaugmented and augmented villages.

TABLE 13
LENGTH AND AREA IRRIGATED BY EACH WATERCOURSE

	Name of the Village	Length of the Watercourse	Area Irrigated by This Watercourse
Unaugmented	Chandan Talawan	1.0 miles	16 squares
	Khurianwala	3.0 miles	40 squares
	Sabuana	1.4 miles	40 squares
	Bismillapur	3.0 miles	25 squares
	Mullanpur	1.0 miles	18 squares
	Gokhuwal	1.0 miles	7 squares
	Jhabal	1.0 miles	20 squares
	Jhangir Kalan	1.0 miles	18 squares
Augmented	Gullar	2.0 miles	24 squares
	Kang Meraj	1.4 miles	24 squares
	Muharanwala	0.6 miles	30 squares
	Rodi	1.6 miles	27 squares
	Deen Pur	1.4 miles	18½ squares
	Sharoovala	1.2 miles	17 squares
	Jhok Shadoo	1.0 miles	27 squares

The number of persons participating in cleaning is determined by the area irrigated, not by watercourse length. In unaugmented villages, generally two persons per square of irrigated land are employed (Table 14). Cleaning lasts for one day except in Khurianwala and Bismillapur where villagers work for two days each time. It is noteworthy that these two villages contain the longest of all the watercourses--each being more than twice as long as the others. Khurianwala is exceptional in that, rather than two workers per square, persons participating in each land owning household provides one worker for watercourse cleaning.

TABLE 14

NUMBER OF MEN AND NUMBER OF DAYS TAKEN TO CLEAN WATERCOURSE BY VILLAGE

	Name of the village	Length of the watercourse	Total No. of men working each time	Workers per square	No. of days
Unaugmented	Chandan Talawan	1.0 miles	32	2	1
	Khurianwala	3.0 miles	200	5	2
	Sabuana	1.4 miles	80	2	1
	Bismillapur	3.0 miles	50	2	2
	Mullanpur	1.0 miles	36	2	1
	Gokhuwal	1.0 miles	14	2	1
	Jhabal	1.0 miles	40	2	1
	Jahangir Kalan	0.6 miles	36	2	1
Augmented	Gullar	2.0 miles	48	2	1
	Kang Meraj	1.4 miles	96	4	1
	Muharanwala	0.6 miles	120	4	1
	Rodi	1.6 miles	27	1	1
	Deen Pur	1.4 miles	18	1	1
	Sherowala	1.2 miles	17	1	1
	Jhok Shadoo	1.0 miles	54	2	2

Table 14 reveals that in all augmented villages, except Jhok Shadoo, cleaning is completed in one day. The number of persons employed is one per square of irrigated area in Rodi, Deen Pur, and Jhok Shadoo. In Gullar, two persons per square participate; in the rest of the three villages four persons are mobilized per square of irrigated land. In Jhok Shadoo, two persons per square work for two days. This is counted as four persons working one day.

Table 14 further reveals that in augmented villages, the highest number of persons (120) work to clean the shortest of all the watercourses--0.6 miles. The next highest number of men (54) working for two days (i.e., 108 man days) are on the next shortest watercourse, one mile. Seventeen persons clean a watercourse double in length of the watercourse cleaned by 120 men.

Everywhere we were informed that cleaning was the collective responsibility of all who cultivate land on a particular watercourse. But it was further noticed that only in two villages, Khurianwala and Bismillapur, where the cleaning was completed in two days would all workers participate from head to tail. In all other cases, workers would clean only up to the place one's individual ditches branch off. The portion belonging to no single farmer, which must be jointly cleaned, is one-fifth to one-fourth of a mile in length. People drop out as they finish with the portion on their own land leaving those persons further downstream to work more. The same pattern of cleaning is found in augmented villages with a single exception of Jhok Shadoo, where cleaning from *mogha* to the tail of the watercourse is deemed a collective responsibility of all members.

What about the problem of initiating watercourse cleaning in unaugmented villages served by major canals which have rigid schedules for drying out and cleaning? In Chandan Talawan, the *lumbardar* announces that the canal is empty. In Bismillapur, the village *panchayat* makes the announcement and supervises all cleaning. The reason why only 100 persons, 50 on each day, clean a five mile long watercourse, is because villagers said that it does not contain much silt. In fact, the water flow has no impediments. There are only thirty places where the silt settles or buffaloes bathe and all these comprise together a mile of the watercourse which needs cleaning.

In Khurianwala there is one person who serves as *khala chowkidar*. In Sabuana, there is a committee of five persons representing the two sub-castes of *Rajputs*, i.e., *Kotlas* and *Manj*, in the ratio of 3:2. Anybody who notices that water flow is inadequate can report to committee members who then mobilize workers and supervise the work to be done. In two villages, Gokhuwal and Jhabal, a person who is near the head of the watercourse initiates cleaning. He discusses the matter with a couple of other farmers, most likely his neighbors immediately downstream. In Jhabal, informants say that there is one definite person at the head of the watercourse with a land holding 12½ acres who initiates and announces the time to clean.

Among villages augmented through tubewell supplies in three villages where cleaning is rigidly scheduled for the bi-annual draining of the major canal there is a single individual in each village who holds responsibility for initiating and supervising the cleaning of watercourse. In Rodi, the village *panchayat* headed by a *Rajput lumbardar* works on regular maintenance of watercourses. But the *Rajput*

lumbardar is said to so dominate the *panchayat* that its decisions are those of the *lumbardar*. In all other cases anybody can suggest watercourse cleaning, regardless of one's position along it.

The discussions about cleaning the watercourse are nowhere systematic and regular. People may be found discussing the matter in mosques or in their fields. Discussions intensify when cleaning has been delayed.

In two villages, where cleaning is done twice a month, the persons turning up are not adequate in number and also do not work full days. The result is that the work done frequently is incomplete and people are asked to return to the job after only two weeks. The informants in these villages pointed out that there ought to be double the number of persons actually cleaning and that they should all be punctual. Informants noted a lack of solid leadership to induce people to cooperate in collective endeavors.

Village Jahangir Kalan, which also lacks united leadership, is unique in several respects. People think that the watercourse should be cleaned six times a year but it is not more than three times that people can be mobilized for the task. There is no leadership to initiate the work and it is hard for the villagers to arrive at a consensus on the exact time and dates for cleaning. A couple of farmers would pick up their spades and rush through the streets saying, "We need to clean the watercourse." If some other persons follow them, some one would ask the "*Musalli*" for drum beating. This happens only when the flow is extremely inadequate.

There are three ways of informing people about the time and day of cleaning the watercourse: (a) announcements are made on a

loudspeaker where there is one at the mosque; (b) drum beating by the village *musalli* and (c) the village *chowkidar* may go from door to door telling all that their watercourse needs cleaning.

In most villages there exists some punishment mechanism to enforce cooperation. Two types of punishments prevail. First, a fine may be levied of Rs. 5/- per person not participating in cleaning. This amount is usually spent on sweetmeats. In two villages this money is kept safe by the village *panchayat* or *khala chowkidar* and used to repair *nakkas* or for hiring labor to replace absentees. The second sanction is to leave the absentee's portion undone. If the absentee farmer does not clean his share by the next day, his neighbor will do it and obtain a share of the delinquent's water.

In a majority of cases, except Chandan Talawan and Jahangir Kalan, people are satisfied with the system of cleaning their watercourses. However, in some cases they qualified their statement of "satisfied" as "very" or "very much." They suggest only one improvement--that the watercourses should be lined. Regarding the cleaning system itself, some informants pointed out that all members should work jointly all the way from the *mogha* down to the tail. The people at the tail have to work more. If the water flow is blocked near the middle, those upstream typically do not assist, whereas if there is an impediment upstream, all have to go and do the needful. All this, according to villagers, demonstrates selfish attitudes.

Informants in Khurianwala and Sabuana expressed a desire to change the *mogha* position because of problems with silting--and hence cleaning. Only in the one case of Bismillapur was it suggested that the route of the watercourse needs to be cut shorter. Dissatisfied

farmers in Chandan Talawan and Jahangir Kalan, stressed the problem of inadequate leadership. It is noteworthy that of the sample villages these two villages are the only ones in which major agricultural castes are double and multiple respectively and which are of equal size. It is possible to speculate that this factor is related directly to the problem of developing adequate village leadership for collective decision making.

It is interesting that the common watercourse is called "*Sarkari khala*" by the village people which literally means "government watercourse." The reason is that the government provides a sixteen feet wide space for the watercourse to run from the *mogha*. Digging and maintenance is villagers' responsibility, but they cannot change its route. Because of small holdings, the irrigation department cannot shorten the length of watercourses.

Once the decision to clean is reached in augmented villages, members are informed by the same techniques as in the unaugmented villages. For those who do not turn up, as has happened, in three villages (Muharanwala, Deen Pur, and Sheroowala) there is no punishment. In Deen Pur informants claim there is no incidence of absentees, anyone who cannot work will provide someone in his place. In another three (Gullar, Rodi, and Jhok Shadoo) a fine of Rs.5/- is imposed on the one who abstains from doing his duty. This amount is spent differently in each village. In Gullar, those who work bought sweetmeats with the money. In Rodi, the fine is deposited with the village *panchayat* who uses it for building or repairing *nakkas*. In Jhok Shadoo, the money is used to hire labor in place of the absentees. In Kang Meraj, an absentee's portion is left undone until later. If he

fails to do it by the next day, he can be deprived of his next turn of water which then goes to those who clean the undone portion.

Everywhere people on augmented watercourse are satisfied with the system of cleaning. Lining of watercourses is the only improvement suggested.

Discussion--Unaugmented Villages

In the two villages where people are dissatisfied with the system of cleaning, there is factionalism in each case. Of these, one village is double-caste and the other multicaste. The dissatisfaction is not merely due to factionalism because there is factionalism in other villages, too. Neither village has commonly recognized leadership. In villages where there is no factionalism or only the temporary variety, people have been able to cooperate in cleaning their watercourses. Informants expressed satisfaction with punishment mechanisms--fines and loss of turns.

The highest number of cleanings (twice a month or 24 times a year) in two of the villages cannot be related to villagers' greater concern for watercourse quality. Neither is it due to any more silt or to an inadequate location of the *mogha* as compared to the villages doing cleaning jobs once a month. Informants in these villages made it clear that the work done was usually incomplete and therefore had to be frequently repeated. Therefore, frequency of cleaning is not necessarily associated with watercourse quality. In each of the two villages where cleaning is particularly frequent there is a situation of strong hostility between factions--based on two individuals seeking dominance and two groups having different religious affiliations respectively.

Neither village has a *panchayat*, nor is there any other informal mechanism for collective decision making. However, the members of these watercourses are thought to be satisfied with the quality of cleaning as the flow of water is never completely obstructed. The minimum is done in some way, which is all right for the villagers as they thought that they cannot do anything about village social life. "After all, the necessary cleaning is done," one of the informants remarked. Therefore, it should be emphasized that frequency of cleaning is not necessarily associated with improved quality of watercourses. That is to say, more frequently cleaned watercourses may be leaky, crooked, retain excessive water in dead storage, and provide inadequate head.

Factionalism hinders the cleaning of watercourses but its mere absence is not meaningful unless one looks at who is responsible to make actual cleaning assignments and resolve any issues emerging from lack of consensus. Such a responsibility, it was noticed, was effectively channelled through a *panchayat* in three villages. Trust in any single individual for decisions to clean the watercourses was found only in one unique case where the village still practised *kacha samahadi*. Dissatisfaction among villagers with watercourse cleaning appears to be the greatest under conditions where there is factionalism and no organized *panchayat*.

Discussion--Augmented Villages

The presence of large landlords appears to be a significant factor in decisions to clean augmented watercourses.* Of the seven

*Note: There are no large landlords with holdings above 50 acres on the unaugmented watercourses.

augmented villages in Table 15, five have large landlords. Of those five, three employ only one person per square of irrigated land for cleaning. In two villages with no large landlords dominating, each employs four persons per square of irrigated land for cleaning. Such a difference suggests that augmented villages mobilize substantially less efforts for watercourse cleaning and maintenance.

TABLE 15

**AUGMENTED VILLAGES--LANDLORDS, FACTIONALISM,
AND WATERCOURSE CLEANING**

Cleaning by Number of Persons Per Square					
	Factionalism		No Factionalism		Total Villages
	Persons/ square	No. of villages	Persons/ square	No. of villages	
Large Landlords	1)	2)	1)	1)	5
	4)	1)	2)	1)	
No Large Landlords	-	-	4	2	2
Total		3		4	7

Everywhere the number of persons cleaning a watercourse is associated with the area irrigated. If we look at the number of agricultural households, there is evidence that the number of persons getting together for cleaning increased (although not in any definite proportion) with the increase in the number of agricultural households in augmented villages.

With regard to the question as to initiation of cleaning, it is invariably an "influential" (a *zambardar* or some other individual among the largest land owners) in three villages, none of whom has land near the tail of the watercourse. In four other villages anybody can

suggest cleaning dates and procedures and this is, it can be argued, an indication that nobody has responsibility specific enough to systematize watercourse cleaning, nowhere is there any sense of dissatisfaction regarding the system of watercourse cleaning, and no shortage of water is reported in any of the augmented villages.

Comparison

In each case of watercourse cleaning a man day/mile/year was computed. It came out to be 515 man days/mile/year on the average in unaugmented villages and 391 man days/mile/year on the average in augmented villages. The value of 't' in Table 16 indicates that there is no significant difference between the two sets of villages: unaugmented and augmented with regard to the man days/mile/year (see Appendix C).

TABLE 16

MAN DAYS PER MILE PER YEAR BY UNAUGMENTED AND AUGMENTED VILLAGES

Unaugmented Water		Augmented Water	
Name of the village	Man days/mile/year	Name of the village	Man days/mile/year
Khurianwala	1600	Muharanwala	1800
Mullanpur	864	Kang Meraj	411
Sabuana	686	Jhok Shadoo	216
Gokhuwal	336	Sheroowala	128
Jhabal	320	Deen Pur	103
Jahangir Kalan	180	Gullar	48
Bismillapur	67	Rodi	34
Chandan Talawan	64		
$\bar{X}_1 = 515$		$\bar{X}_2 = 391$	
$t = .407 (p > .10) \quad df = 13$			

This non-significant difference might be because of large variance within each set of villages. This variance can be attributed to the plain fact that only in two unaugmented villages and in one augmented village all the members taking up the task of cleaning go as far as the total length of the watercourse. In all other villages the watercourse is cleaned only up to the first *nakka* which is in most cases one-fifth to one-fourth of a mile.

Based on information made available through the informants an argument can be suggested that the difference between man days/mile/year on unaugmented and augmented watercourses is substantively significant. Informants in the augmented villages attributed their lower level of effort to availability of additional tubewell water. After installation of tubewell, there is no instance of farmer missing a water turn. Much water might be lost close to fields of large landlords but their personal ditches are still filled according to their needs. This loss of water might seriously affect farmers at the tail, but such villagers typically cannot initiate any cleaning or maintenance work on the common watercourse because of lack of personal influence resulting from their smaller size of holdings. The very small number of persons cleaning watercourses in most of the landlord dominant villages with tubewells most likely consist of farmers located at the tail.

Man days per mile per year, if taken as indicative of mobilization of effort to clean watercourses in both unaugmented and augmented villages is related to several intervening variable such as caste structure, pattern of residence, pattern of leaderships, presence/absence of any large landlord in the village (See Appendix D, Tables 1-5):

1. There is nothing conclusive about single and multiple castes but the double caste villages in each category of unaugmented and augmented water are one of those which mobilize the least effort in watercourse cleaning.
2. *Muhajir* villages have been putting in more man days/mile/year for cleaning of their watercourses.
3. There are no large landowners in unaugmented villages. However, data on augmented villages reveal that all small owners tend to mobilize much more effort than the villages where large landowners are also present.
4. A *panchayat* nominated by a single influential such as the village *lumbardar* can mobilize less effort than a *panchayat* elected by members of various castes in the village. Although somewhat greater than a nominated *panchayat*, the effort mobilized under a disorganized leadership is still low relative to elected *panchayats*.

In unaugmented villages, the formula spelled out for cleaning the watercourses was two or more persons per square of irrigated area. But the size of holdings is generally so small that it takes several households to own as much as one square of land. Therefore, it becomes imperative to make cooperative decisions within the larger system of watercourse cleaning. Those households sharing a square must make a separate decision with regard to which individual should represent a specific square at the time the announcement is made regarding watercourse cleaning.

PART III: DECISION TO SWITCH TO PACCA WARABUNDI

Kacha warabundi was thought to be unsatisfactory by some or all members of a watercourse before villagers petitioned for a change. Disputes about water turns arose for two reasons: (a) when a member thought that the water flow on his turn was not adequate so that he should take more time to irrigate; and/or (b) some persons intentionally turned their watches fast or slow to gain more time. If a neighbor was prepared to bear the loss, there would be no dispute and the mischievous fellow would continue to obtain more than his share of water. If a neighbor reacted with anger there was sure to be a dispute.

It is difficult to stop influential persons with big landholdings from taking advantage of small farmers in the allocation of water turns under *kacha warabundi* system. In case of conflict, most other villagers sided with the "influential" and if a case was referred to Police or Irrigation Department, the outcome typically was to the advantage of the more wealthy. Those at the head of the watercourse, near the *mogha*, could steal water from those toward the tail. According to informants this was particularly so on long watercourses where a thief cannot easily be caught.

Specific reasons why *kacha warabundi* has been viewed as unsatisfactory are listed in Table 17 for each category of villages--unaugmented and augmented. One of the villages, in each category, still practices *kacha* system, so the data about decision to switch to *pacca warabundi* pertains to the remaining villages which have switched.

(Table 17 about here)

Kacha warabundi had been practiced in these villages since the end of the 19th century and, in case of *muhajirs*, since 1947. Some villages

TABLE 17

REASONS FOR SWITCH TO PACCA WARABUNDI SYSTEM BY VILLAGE

Name of the Village	Reasons
Chandan Talawan	Mischievous persons got more than their share of water. These were mostly those with more adult male members in their family.
Sabuana	Mischievous persons got more than their share of water.
Bismillapur	Very few instances of a couple of persons taking advantage of others by turning their watch fast or slow.
Mullanpur	Danger of armed conflict over disputed water turns. Some mischievous persons had, in fact, obtained more water than the rules permitted.
Gokhuwal	Those near the head obtained more than their share of water. These were persons with larger holdings of around 25 acres.
Jhabal	Those with holdings of a square or more got more than their share of water.
Jhangir Kalan	People were not cooperative. There were severe disputes on scheduling of water turns.
Gullar	Quarrels among big landlords about water shares.
Kang Meraj	Whosoever could fight and cared not for litigation used to get more than their share of water. An armed gang broke their neighbor's <i>nakkas</i> and manipulated their watches to obtain a longer turn of water.
Muharanwala	Larger land owners got more than their share of water at the expense of small owners.
Rodi	Danger of serious conflict. Some people tried to take longer than their scheduled turn. Big landlords unable to compromise on water schedules under <i>kacha</i> system.
Sherowala	Disputes on scheduling of water among big landlords.
Jhok Shadoo	Disputes among big landlords. They obtained more than their share of water at the expense of small owners. Danger of serious dispute over the schedule of water.

changed the system earlier than others. With regard to the question since how long the villagers had switched to *pacca* system and how long it had taken to change, see Table 18.

TABLE 18
DATES OF CHANGE AND TIME REQUIRED TO SWITCH
TO *PACCA WARABUNDI* SYSTEM BY VILLAGE

	Name of the Village	Date of Change	Time Required to Change
Unaugmented	Chandan Talawan	1970	1 year
	Sabuana	1966	6 months
	Bismillapur	1969	6 months
	Mullanpur	1969	6 months
	Gokhuwal	1966	6 months
	Jhabal	1970	6 months
	Jahangir Kalan	1965	1½ years
Augmented	Gullar	1970	3 months
	Kang Meraj	1971	3 years
	Muharanwala	1969	6 months
	Rodi	1971	6 months
	Sheroowala	1969	3 months
	Jhok Shadoo	1959	1 month

With two exceptions the usual time taken to change from *kacha* to *pacca* system in both augmented and unaugmented villages is six months. Where an interested party had influence in Irrigation Department, as in Gullar and Sheroowala, the task was completed in three months. For Jhok Shadoo, it was said, the Department did it sooner because there was great hostility between two groups. In Kang Meraj, where it took three years, the reason was said to be that the villagers did not aggressively pursue the change. When asked why some villages changed earlier and

others later, the usual response was that the earlier a watercourse had a serious dispute, the sooner villagers petitioned to switch to *pacca warabundi*. Minor disputes involving nothing more than verbal aggression and malicious gossip did not galvanize people to action and "influentials" managed to temporarily settle matters. People did not mind being dragged to courts for months if it was all done quietly and patiently. But, where serious physical injuries were inflicted, villagers would then push for more permanent solutions.

Table 19 shows who petitioned for *pacca* system and how much support the petitioner secured from other villagers.

(Table 19 about here)

With regard to unaugmented villages, Table 19 reveals that persons initiating change were all farmers with substantial holdings except those in Bismillapur where small holders of four to five acres suggested and petitioned for *pacca* system. In every case of a double or multi-caste village, the members initiating petitions belonged to the majority caste. In four cases--Chandan Talawan, Sabuana, Jhabal, and Jahangir Kalan--those suggesting change were at the tail of the watercourse; in Bismillapur two of them were toward the middle and two toward the tail; in Mullanpur both were towards the tail. Gokhuwal is the only case where the initiator was toward the head. In every case at least half of the *khala* members signed the petition. In Jahangir Kalan, however, no one else signed.

Table 19 further reveals that in four cases of augmented villages, the petitioners were *lumbardars*, two of them were at the head and two in the middle of the watercourse. In Gullar, the petitioner was said to have had support from a village key influential. Everywhere in

TABLE 19
CHARACTERISTICS OF THE FARMERS WHO INITIATED CHANGE OF WARABUNDI BY VILLAGE

	Name of the village	Number members who suggested and petitioned	Position in the village	Caste (with recognized sub-caste if any)	Their land-holding	Their position on the water-course	Number of other petition signers
Unaugmented	Chandan Talawan	2	-	Jat	12 1/2 acres each	Tail	1/2 of <i>khala</i> members
	Sabuana	1	-	Rajput (<i>manj</i>)	12 1/2 acres	Tail	3/4 of <i>khala</i> members
	Bismillapur	4	-	Arain	4 to 5	2 in the middle & 2 on the tail	3/4 of <i>khala</i> members
	Mullanpur	2	-	Jat (<i>Randwala</i>)	15 and 18 acres	Towards the middle	All members
	Gokhuwal	1	-	Arain	12 1/2 acres	Tail	All members
	Jhabal	1	-	Dogar	12 1/2 acres	Tail	All members
	Jahangir Kalan	2	-	Rajput	17 & 18 acres	Tail	None else
Augmented	Gullar	1	-	<i>Kharl</i>	2 acres	Middle	None else
	Kang Meraj	1	<i>Lumbardar</i>	Arain	25 acres	Middle	1/2 of <i>khala</i> members
	Muharanwala	1	-	Arain	1 1/2 acres	Tail	None else
	Rodi	1	<i>Lumbardar</i>	Rajput	225 acres	Head	1/2 of <i>khala</i> members
	Sheroowala	1	<i>Lumbardar</i>	Rajput	50 acres	Middle	1/4 of <i>khala</i> members
	Jhok Shadoo	1	<i>Lumbardar</i>	(<i>Baluch Inait-Ke</i>)	75 acres	Head	None else

augmented watercourses except in Muharanwala, it was a key influential such as the *lumbardar* who petitioned or indirectly supported the petition. The controversies arising from *kacha* system appear to have been resolved by a village leader in majority cases.

Table 20 shows the minutes of turn per acre by village under the two systems. On the whole, there can be no change in the overall supply of the water but individual farmers might well witness an increase or decrease in their supplies as a consequence of the switch. There was no way available to this researcher by which the specific gains and losses of water by individual farmers could be determined.

(Table 20 about here)

In all unaugmented villages informants indicate that the people are satisfied with *pacca* system of *warabundi* because it has stopped disputes. The predominance of small holdings on unaugmented watercourses, combined with the fact that the number of farmers on each watercourse increases year after year, creates difficulties in the way of satisfactorily adjusting schedules drawn up by any committee or any individual as was necessary under the *kacca* system.

With regard to augmented villages, however, there are two villages in which informants are not satisfied with the *pacca* system--Kang Meraj and Muharanwala. Both say that water, according to their needs, is not adequately available under the *pacca* system. There are a number of farmers who miss water turns several times in a cropping season. In Kang Meraj informants said that there used to be a committee to schedule water distribution among the farmers. This committee was also held responsible for initiating and supervising watercourse cleaning. As the *warabundi* changed, the committee disappeared. Informants believed

TABLE 20

ESTIMATE OF WATER SUPPLY AFTER CHANGE OF *WARABUNDI* SYSTEM BY VILLAGE

	Name of the village	Minutes of turn per acre under <i>kacha warabundi</i>	Minutes of turn per acre under <i>pacca warabundi</i>
Unaugmented	Chandan Talawan	30 minutes every 11 days	22 minutes every 7 days
	Sabuana	12 minutes every 12 days	8 minutes every 7 days
	Bismillapur	29 minutes every 15 days	14.5 minutes every 7 days
	Mullanpur	30 minutes every 12 days	22 minutes every 7 days
	Gokhuwal	86 minutes every 11 days	53 minutes every 7 days
	Jhabal	30 minutes every 12 days	17 minutes every 7 days
	Jhangir Kalan	30 minutes every 17 days	12.60 minutes every 7 days
Augmented	Gullar	29 minutes every 12 days	24 minutes every 11 days
	Kang Meraj	30 minutes every 14 days	15 minutes every 7 days
	Muharanwala	21.6 minutes every 10 days	12 minutes every 7 days
	Rodi	19.2 minutes every 12 days	14.4 minutes every 7 days
	Sheroowala	29 minutes every 10 days	22 minutes every 7 days
	Jhok Shadoo	44 minutes every 10 days	29 minutes every 7 days

that the change to the *pacca* system has indirectly led to deterioration of the quality of decisions about cleaning of the watercourses. In other places, people said they were satisfied, but informants pointed out that some people missed their water turns under the new rigid system, when the watercourse supply is interrupted. In each case, however, they said that nothing could be done about *pacca* system because of fear of disputes arising from *kacha* system.

DISCUSSION

There is significant difference in the characteristics of those who initiated the switch in unaugmented and augmented areas. One person was enough to initiate in augmented water--a *lumbardar* in four out of six villages. He was the biggest among the biggest landholders in his respective village. In the remaining two villages persons initiating were among the smallest landowners. However, no one else signed the petitions in the latter cases. It can be surmised that they had backing from the big owners. The small owners had come up with mutual consensus, for these two villages were not victimized by factionalism.

None of the petitioners was at the tail of the watercourse; two were in the middle and two at the head. A comparison of those who initiated to switch on unaugmented and augmented villages with regard to their location on watercourse is presented in Table 21, Fisher's exact probability was computed. (See Appendix C.) The difference is significant at 0.5 level.

TABLE 21

RELATIONSHIP BETWEEN LOCATION OF PETITIONER AND AUGMENTATION OF WATER

	Head/Middle	Tail	Total
Unaugmented watercourse	4	9	13
Augmented watercourse	5	1	6
Total	9	10	19

P = .0464

Petitioners in augmented villages happen to be among the largest landowners. Previously it was pointed out by the informants that such persons were not only abusing the *kacha* system of *warabundi*, but also were supporting factionalism in the villages. A deeper probing reveals that in villages dominated by landlords, small owners are not expected to directly approach a court of law. They go to the large owners for such purposes who then initiate legal actions. The small owners are obliged to do so to avoid any economic and social hardships that would be imposed upon them if they annoy big landlords. Avoidance of court cases is natural too, because of their inability to bear the expenses involved. Big owners oblige small ones by telling them that all are equal in the eyes of the law and that they would bring about a permanent solution to the water disputes by switching to *pacca* system of *wara-bundi*. They try to impress upon those who are economically and socially inferior, that the larger landowners could break the law and that they

are accepting the rule of law in the larger interest of their community.

Which villages switched to *pacca* system of *warabundi* earlier than others? It can be generalized on the basis of available data that the sooner a village had a serious dispute, the sooner that village changed its system of *warabundi*. A comparison of unaugmented and augmented villages with regard to their caste structure, residence pattern, presence or absence of large landowners, presence or absence of factionalism, and type of leadership in relation to the date they switched to *pacca warabundi* is presented as Appendix D (Table 6-10). These tables reveal that:

- a) Double caste villages tended to change the system of *warabundi* more recently. Overall, single caste villages switched to *pacca* system earlier than the multicaste villages;
- b) Villages with large landowners, excluding one, changed the system of *warabundi* later than those inhabited exclusively by small owners;
- c) Villages where factionalism prevails were switched more quickly to *pacca warabundi*.

PART IV: INTERACTION WITH AUTHORITIES

This part of water management decision making was difficult to ferret out. Informants clearly understood that initiation of this sort of interaction was intended to secure favors from the lower level irrigation authorities--*Patwaris*, *Pansals Naweas*, and Overseers plus the Tubewell Operators in augmented areas. Informants indicated that

farmers approached irrigation officials when they received less water than their perceived needs.

Interaction of farmers with each one of the four irrigation officials is described below. Both categories of water (unaugmented/augmented) are jointly discussed because of the similarities among them. Sharp differences will be noted. As the researcher promised, names of farmers and villages will not be quoted in this part of the report.

Patwari

Farmers interact with *Patwaris* when they obtain their revenue assessment during each crop season. Everywhere, the researcher was informed that it was the *Patwari* who went to the farmers. The *Patwari* makes two assessments for each crop; one is tentative and the other final. This means he approaches every farmer at least four times a year. In most cases it is more than that. In unaugmented villages, the minimum number of visits per farmer/respondent is four and the maximum eleven. Of the eight unaugmented villages, informants estimated the average number of farmers visits per year with a *Patwari* is as follows: In two villages, five visits and in the remaining six villages the estimated average number for all farmers was thought to be about four, six, seven, eight, ten and eleven respectively. In augmented villages, the minimum average number of visits is also four times but the maximum is nine in two villages. Averages for other augmented villages are five, six and eight times. In one village, informants revealed that farmers do not see their *Patwari*. Nor do they admit to be interacting with any lower level irrigation official for, according to them, the village is so close to the main irrigation

office that higher officials frequently visit. Therefore, the lower officials have little latitude to deviate from officially prescribed norms.

In every village, farmers seek concessions in crop revenues by having some portion of the crops declared as *kharaba*. Larger landholders (50 acres or more) typically bargain for concessions and for the fraction of the concession which should be rebated to the *Patwari*. Farmers with holdings below fifty acres usually operate with a formula dividing the amount saved through concessions equally between the farmer and the *Patwari*.

Pansal Naweess

A *pansal nawees* (literally meaning a "Gauge reader") operates a guage at the origin of a minor or a sub-minor canal. He sends daily reports to higher irrigation authorities about the quantity of flow in the canal. A report of "short" constitutes a request for more water, whereas a report of "overflow" will lower the water level the next day. A report of "short" is considered to be favorable to farmers. A *pansal nawees* may favor--or create a disadvantage for--several watercourses at a time.

There are four villages in unaugmented watercourses where the villagers discuss water allocation with the *pansal nawees*. The frequency of visits is estimated to average four, four, eleven, and twelve times per year respectively. Of the four villages in which there is no contact, informants in two said that their *mogha* is in the middle of the canal and that only those villagers served by *moghas* located toward the tail of a minor canal must contact *pansal nawees*. In two other

villages the *moghas* originate directly from the main canal; therefore, a *pansal nawees* is not involved.

In augmented villages, only two have contact with a *pansal nawees*, one six times and the other twelve times. In the first case, villagers make contact six times because their village is located at the tail of the minor and in the second case the tubewell water is not good and villagers need more canal water for proper mixing. As for the other five villages, respondents from one stated that their village proximity to a city makes for such close supervision of the *pansal nawees* and other lower level officials that they work according to proper norms. One village,* near the tail of a minor has a private tubewell, besides the official one, which makes up the water deficiency. In another village, the *mogha* is located on a major canal; there is no *pansal nawees* with which to deal. In the remaining two villages--one near the head and the other positioned in the middle of the minor canal--villagers claimed to have no need to see a *pansal nawees*. *Pansals nawees* are rewarded in kind, such as a fixed amount of wheat per household according to the farmer's acreage. The average payment for concessions is forty pounds per square of land.

Overseer

Defects in the *mogha* generate a need for farmers to periodically deal with the Overseer. The interaction between him and village farmers is primarily collective in nature. In the case of one unaugmented

*This village is already one of augmented water. An addition of a private tubewell is simply an alternative sought by the farmers at the tail to augment water supplies rather than maintain their watercourse properly.

village, the farmers approached this official to obtain permission for a new *mogha*. *Mogha* defects, informants said, are sometimes intentionally created. But, in most cases, damage is caused by farmers. Unauthorized altering a *mogha* is a legal offense; a fine can be imposed or a farmer's water turn can be terminated for a period of time. But this has never happened in any of the villages studied. A handsome reward amounting to Rs. 1,000/- is paid to the Overseer by all farmers sharing a common *mogha* to get necessary repairs done. When a new *mogha* was to be fixed in an augmented village the overseer had to be "tipped." The amount paid in another case was approximately Rs. 2,000/- that amount was a collective contribution by the *khalā* members deposited with a village representative.

In a village, where the tubewell water is too saline for irrigation, the overseer was approached--once during each crop season--with a request that he widen the size of the village's two *moghas*. An amount of Rs. 1000/- was given to him for each *mogha* enlargement. In another augmented village, a big landlord gave the overseer enough wheat for his family every year in return for permission making it possible for villagers to graze their cattle along the canal sides.

Tubewell Operator:

Tubewell Operators may choose to place a burden on farmers by not operating their wells according to scheduled hours or by not operating a full pumping period. Frequently, the excuse is that there is a power shutdown. This official is relevant to augmented watercourses only and decisions of *pansal nawees* may make up deficiencies. Where tubewell water is relatively saline farmers on augmented watercourses intensify their bargaining with *pansal nawees*.

Farmers toward the tail of a watercourse, especially, must visit him. The frequency of visits ranges from six to twenty-four times a year. The frequency increases with distance from the tubewell. In one village, farmers do not seek any special concessions from him because the water supply is sufficient for all. In addition, higher authorities repeatedly checked on the tubewell operation.

The most common rewards are payments in kind--for example wheat for the operator's family and fodder for his cattle. In one village it was noted that the farmers did not interact with any of the four lower level irrigation officials. A careful probing led the researcher to believe that there is one key influential who entertains higher level officials profusely so that the lower ones are obliged to perform their normal duties. Generally speaking, anybody who can pay what is locally called the "necessary fee" can get the things done in his favor. Access to each of the four officials is easy for larger land-lords.

CHAPTER V

CONCLUSIONS AND SUGGESTED HYPOTHESES

GENERAL DESCRIPTION OF THE DECISION MAKING PROCESS IN WATER MANAGEMENT

In order to provide a more generalized statement about water management decision making, it seems useful to look at the following general elements of the decision making process. The two decisions--to clean watercourses, and switch to *pacca warabundi*--will be described in summary form in this chapter to highlight the process by which farmers attempt to minimize their water losses.

The Decision Making Process

The elements of the process are:

Felt need: How do village farmers perceive their need to engage in watercourse cleaning and to switch from *kacha* to *pacca warabundi*?

Articulation of problem: In what ways do their first transmute a felt need into an articulated problem statement?

Evaluation of alternative solutions: Does there exist more than one solution. If so, which one do they choose to utilize as means to achieve their goals, and why?

Aggregation of consensus: Getting people to agree about the problem and the preferred solution.

Selection of Authority: What individual or authority is approached for assistance in obtaining a solution?

Actual implementation.

Evaluation: Are the members satisfied or dissatisfied: How do they seek new choices?

Cleaning of Watercourses

Felt need: Farmers' needs for cleaning watercourses relates to their perception of silt, grass, and weeds blocking water flow. They do not see cleaning in any other form as for example repairing buffaloes' bathing places. Nor do they see it in terms of repairing *nakkas*. Furthermore, one cannot say that those who clean more often feel a greater need for it. Farmers might clean with a relatively high frequency only because they do incomplete work on irregular schedules. The actual need for cleaning cannot fully be determined unless one studies the type of soil, the location of a *mogha*, the directness of a watercourse, and the activities of villagers on a watercourse--laundry, bathing buffaloes, and herding livestock. In augmented water areas, farmers clean less frequently and they employ fewer workers for cleaning. Water supply is enhanced, not by cleaning, but through installation of tubewells on watercourses.

Articulation of Problem: Farmers' articulation of the problem is centered around how to facilitate water flow. They do not concern themselves with the level, length and width of the watercourse. According to them, impediments have to be removed from near the *mogha*. They know that this benefits those at the head most of all, but this is the only real focus for any collective decision making.

Aggregation of Consensus: Aggregation of consensus is achieved through traditional mechanisms. One to four persons per square of irrigated area are assigned to clean a watercourse each time. They agree to contribute to it manually.

Selection of Authority: Initiators of cleaning are either *Panohayat* members, or a trusted and influential *khala* member. The most effective authority is where a *Panohayat* or a *khala* member is specially nominated to take responsibility for initiation and supervision of cleaning watercourses. Where persons initiating cleaning are arbitrarily determined regardless of their location on the watercourse, they do not enjoy as much real authority.

Actual implementation has to do with the number of persons cleaning each time, number of days they work, the distribution of work, and the type of technology used. One or two persons per square of the area irrigated on a watercourse get together to work for a day or two, the assignments are arbitrarily determined, the technology used consists of manual use of spade and sickle. In a majority of cases their joint responsibility is to clean the watercourse up to the first *nakka* only.

Evaluation: Farmers revealed different levels of satisfaction regarding quality of cleaning but none perceive possibility of improvements other than lining of watercourses. Some dissatisfied farmers wanted improvements in the process of decision making; they want more persons engaged in cleaning from head to the tail. Dissatisfaction was related to position on the watercourse. Levels of dissatisfaction increase as distance from the *mogha* increases. But, in all of this, central emphasis is placed on lack of leadership as the real cause of dissatisfaction. Informants clearly admitted that the lack of adequate cleaning was due mainly to dissensus prevailing between various groups and individuals in their respective villages.

Change of Warabundi

Felt need: Regarding the decision to switch to *pacca warabundi* the felt need among farmers lay in disputes that occurred repeatedly about water turns plus excessive demands of big landlords which were met because of the latter's social, economic, and physical power.

Articulation of Problem: Prior to choosing *pacca warabundi* farmers generally resorted to suing each other in courts of law. Court procedures were lengthy and incorporated false witnesses, thus enraging one or more of the parties and worsening the situation.

Aggregation of Consensus: The law permits that the change can be initiated by any one of the *khala* members. In most cases, however, members were brought to agree by getting them to sign the petition. The initiator of a petition was generally a small farmer located at the tail of the watercourse in unaugmented villages, and a big farmer located at the head or toward the middle of the watercourse in augmented villages.

Selection of Authority: The approving authority was a superintending Engineer of the Irrigation Department. Where the petition was filed by an "influential" the decision to change was given much sooner than in cases where a small owner initiated a request for action.

Actual Implementation: The actual decision was to draw up a rigid schedule of water turns. This was done by the Irrigation Department and was implemented by one of its officials--a Sub-Divisional Officer.

Evaluation: In a couple of villages, farmers realized that a *kacha* system, because of its flexibility, provided water according to the needs of the farmers. Under *pacca warabundi* some members missed

their turns several times in a crop season due to an empty canal when their turn was scheduled. No informants suggested any solution; the *pacca* arrangement was retained because of danger of disputes.

Interaction with Authorities: An Element of Alternative Solution

Farmers' decision to interact with *Patwaris*, Overseers, *Pansals*, *Nawees*, and Tubewell Operators may well fit as the element of "evaluation of alternative solution" not covered in the foregoing discussion of water management decision making process. Irrigation authorities frequently provide alternative means to cover the water deficiencies resulting from improper watercourse cleaning and from missing turns due to a *pacca* system. Officials are paid the required "fees" for rebates in revenues, repair of *moghas* and reports of "short" water by the respective officials. The interesting thing is that farmers consider that "fairness" in dealings with an official to be a favor in itself. Officials are rewarded for arranging water supply according to the prescribed schedule, for not damaging *moghas*, for punctuality in the operation of tubewells, and for correct assessment of losses due to shortage of water. Where undue concessions are given the rates of "fee payment" are much higher. Such concessions are usually given with caution to only a selected number of farmers, who are intimately known to the official concerned.

SUGGESTED HYPOTHESES

Rationale

The rationale for the hypotheses and research problems that follow is drawn from the data analyzed in the preceding chapter.

The most pertinent findings in this regard are as follows:

- 1) With an increase in the number of households sharing water from a *mogha*, there is difficulty of getting people to agree to a single formula for cleaning ditches and scheduling water distribution. The greater the number of share-holders the longer the watercourse with more diversions (*nakkas*); therefore, a greater loss of water on its route to farmers' fields occurs.
- 2) As the land is divided according to the Islamic law of inheritance, the average size of holdings in a village decreases. This leads to problems of water re-scheduling for which cooperation of a much greater number of persons is involved.
- 3) The following villages mobilize less effort in terms of man/days/mile/year employed to clean a watercourse:
 - a) With a double caste as compared to a single or multiple caste structure;
 - b) Having an incidence of factionalism;
 - c) One single individual, rather than an elected *panchayat*, dominating decision making for collective actions.
- 4) Factionalism and lack of well defined leadership are not related to any specific caste in the village, but they appear to be associated with the balance of power between these castes. In two villages--one double caste and the other multi-caste in unaugmented water--distribution of agricultural castes is equal in number of households. These two villages have no well defined leadership and are victims of

factionalism. The end result is that they lack consensus for any collective decision and, therefore, mobilize the least efforts in watercourse cleaning.

- 5) Farmers at the tail of a watercourse receive less quantity of water, because of poor quality of watercourse maintenance. Such farmers must work harder while obtaining less service.
- 6) Farmers at the tail of a watercourse seek to interact with irrigation officials more than others to make up water losses; similarly the villages as a whole, located at the tail of a minor canal, look for more favors from these officials.
- 7) Misuse of *kacha warabundi* in terms of taking time longer than one's prescribed turn is more frequently practised by large landowners, who also happen to be located nearer the *mogha*. The switchover to *pacca warabundi* is more satisfying for small land owners.
- 8) In big landlord villages there are arrangements for hosting government officials. The officials, therefore, are more aware of problems in these villages.
- 9) Augmentation of water with public tubewells has made people less concerned about scarcity of water and missing water turns.

Hypotheses

1. The more the number of households sharing a watercourse, the poorer will be the quality of water management decision making.

2. The more there are two or more major agricultural castes of equal size, the more difficult for the overall village to organize collective decision making.
3. The more there is an organized and active *panchayat*, the greater will be the frequency that the commonly held portions of watercourses will be cleaned.
4. The more villagers are dominated by a small number of large landlords, the greater the factional tendencies and the poorer the quality of water management decision making.
5. The longer the watercourse, the greater the pressure for *pacca warabundi*.
6. The greater the number of large landowners toward the *mogha*, the poorer will be the quality of water management decisions.
7. Villagers located toward tail of watercourses are more likely to support collective leadership arrangements in villages than those toward the head.
8. Villagers located toward tail of watercourses contribute more efforts to cleaning watercourses than do those toward head.
9. The greater the differential between the smallest/largest landowners, the greater the pressure for *pacca warabundi* if there is more than one large landlord.
10. The irrigation bureaucracy is more aware of, and responsive to, the problems in villages which are landlord dominated as compared to those inhabited entirely by small owners. The larger the landlords, the more responsive is the bureaucracy as measured by time required to change from *kacha* to *pacca warabundi*.

11. The greater the distance a village is located from a *mogha* or the head of a minor canal from which its *moghas* draw water, the greater the frequency and intensity of interaction between villages and the public irrigation authorities.
12. The less a watercourse is supplemented by tubewell water, the more the frequency and intensity of interaction between farmers and the four types of lower level irrigation officials. A corollary is that the less the quality of tubewell water, the greater the effort on the part of farmers to purchase favors from irrigation officials.
13. The presence of public tubewells on a watercourse increases the need for cleaning and maintenance but simultaneously reduces effort devoted to these tasks.

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APPENDIX A

SCHEDULE NO. 1

VILLAGE ORGANIZATION AND NETWORK OF RELATIONSHIPS

Respondent's Name _____

His occupation or position in the village _____

Name and Identification No. of the village _____

Tehsil _____

Minor _____ Mogha No. _____

A. VILLAGE SETTING:

1. Nearest town _____ Distance _____

2. Nearest Pucca Road (Distance) _____

3. Nearest Bus Station/Railway Station _____

4. Are the following institutional items present in the village;
if not, how far off are they?

	Yes	No	If no, distance from the village
a. Post Office	_____	_____	_____
b. Telegraph Office	_____	_____	_____
c. Primary school	_____	_____	_____
Middle school	_____	_____	_____
High school	_____	_____	_____
d. Rural Dispensary	_____	_____	_____
e. Veterinary Center	_____	_____	_____
f. Family planning clinic	_____	_____	_____
g. Any other government office or agent _____	_____	_____	_____

5. Size of the village

- a. Total agricultural land _____ Squares/Acres
- b. Largest size of holdings: _____ Squares/Acres
- c. Smallest size of holdings _____ Squares/Acres
- d. Average size of holdings _____ Squares/Acres

6. Number of Moghas _____

Area irrigated by each	Minutes of turn per acre
1) _____	_____
2) _____	_____
3) _____	_____
4) _____	_____
5) _____	_____

B. VILLAGE STRUCTURE:

7. Total number of Households in the village _____

8. Which are the major castes in the village (mention all agricultural castes and only the largest one from non-agricultural castes including landless laborers).

- 1) _____
- 2) _____
- 3) _____
- 4) _____
- 5) _____

9. Are there any recognized sub-castes (gots) in the village?

_____ Yes

_____ No

What are these?

14. Which groups are dominant in

a. Village Economy

Groups

Why?

b. Land ownership

c. Village politics

15. Who are the largest land owners in the villages (50 acres and above)

	Acres	Live in village?	
		Yes	No
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

Of those who do not live in the village, are there any who are in some way interested in the village?

LEADERSHIP STRUCTURE:

13. Which of the following Panchayats are there?

a. Biradari/Intra-Caste

Panchayats and how many? _____

What is their membership in terms of any intra-caste groups?

b. Inter-caste Panchayats? _____

How many members are in it and what is the basis for its membership in terms of castes, etc.

Are the members elected or nominated? _____

If elected, what is the procedure? _____

If nominated, who nominates them? _____

14. What attributes are important to become a Panchayat member? Be specific.

Education _____

Age _____

Ability to act honestly and justly _____

Ability to represent the group _____

15. What are the issues brought to the attention of the Panchayats?

16. Who exercises leadership in Panchayat meetings?

a. Biradari/Intra-caste Panchayats

b. Inter-caste Panchayats

IN CASE NO PANCHAYAT

17. Who are the key individuals who handle village issues? Who are their characteristics in terms of:

a. Income _____

b. Education _____

- c. Age _____
- d. Land Tenancy _____
- e. Caste _____
- f. Any other _____
- What type of issues are handled by these individuals? _____
- _____

D. FACTIONALISM:

18. Are there any cohesive groups or factions in the village?

_____ Yes _____ No

If so, by what native term a faction is known _____

19. Are these factions of permanent nature or do they develop only on a particular issue?

If permanent, what are the sources of factionalism

- a. Castes/Subcastes _____
- b. Residence: Local, Muhajir _____
- c. Any other basis _____

If temporary, what specific issues would cause factionalism in the village?

To what extent do water issues lead to factionalism in the village?

Elaborate:

20. What are the names by which each faction is known?

- a. By leader's name _____
- b. By a caste or sub-caste name _____
- c. By original resident (in case of Muhajirs) _____
- d. Any other name _____

21. How many households belong to each faction?

E. NETWORK OF RELATIONSHIPS:

22. Which of the following will take part jointly in each of the ceremonies listed below?

Ceremony	Close Relatives only	Members of Caste/ Sub-caste	Biradari Members	Friends
a. Child birth	_____	_____	_____	_____
b. Circumcision	_____	_____	_____	_____
c. Marriage	_____	_____	_____	_____
d. Burial	_____	_____	_____	_____
e. Any other	_____	_____	_____	_____

23. Is land rented along caste and biradari or any factional lines?

_____ Yes _____ No

If no, what are any other bases?

24. To whom would you go if you need to borrow some money? Is any preference given to members of own's caste and biradari or faction?

25. Which groups help each other in plowing, sowing, harvesting, etc.?

26. Which groups unite at these occasions like plowing, hoeing, harvesting, etc.?

SCHEDULE NO. 2

Identification

Village Name _____ Tehsil _____

Respondent's Name _____

Position in village _____

Minor _____ Mogha No. _____

Owner _____ Owner-cum-tenant _____ Tenant _____

Location on watercourse: Head _____ Middle _____ Tail _____

PART A: DECISION TO CLEAN THE WATERCOURSE

1. How many times per year does your watercourse get cleaned?

2. How do you decide when it needs cleaning?

Water flow is inadequate _____ Done on regular schedule _____

How do you know this? _____ What determines it? _____

3. Whose responsibility is it to clean the watercourse?

a. Landlord

Whom would he hire to clean his watercourse?

b. Each should clean his own

c. Collective responsibility

How is the work divided among the farmers on the watercourse?

4. How long is your watercourse? _____ squares

5. How many persons clean it each time? _____

6. Is all the work done with hand tools or is modern machinery used at certain times and places?

Hand tools only _____ Modern equipment _____

Specify _____

7. Do you feel your khala is cleaned:

Often enough? _____ Yes _____ No

(If No, explain)

Well enough? _____ Yes _____ No

(If No, explain)

8. Is the whole khala cleaned at one time or are sections of it cleaned separately?

All at once

One part at a time

In how many days

Is it always so or on particular occasions only?

How much time would it take to clean the whole of the khala?

No. of Days _____ No. of men working each day _____

9. Is there a khala committee _____ or a khala chokidar _____

If yes:

What does he do?

Is he elected _____ appointed _____

or hereditary position _____

Does he receive pay

Yes _____ No _____

How much monthly? _____

10. In the absence of a committee or chokidar who is the first person to suggest that khala must be cleaned each time?

Describe his:

Caste/Biradari, etc.

Relationship to village leaders

Land ownership

Position on watercourse

11. To whom does he go to discuss this problem?
12. Where do these discussions take place?

ONCE DECISION IS REACHED

13. How is this information communicated to the people concerned?
14. How satisfied are the people on this watercourse with the system of cleaning ditches?
 Satisfied _____ Unsatisfied _____
15. Are there any improvements you would like to see in the system of cleaning the watercourse?
16. If some people do not cooperate:
 - a. Do they pay a fine? Yes _____ No _____ (go to b.)
 How much _____
 Who determines it? _____
 Who collects it and what is it used for? _____
 - b. His portion is left undone until later
 - c. Village leadership is approached to bring informal pressure
 If so, see Question No. 17
 - d. Irrigation authorities are approached to bring formal pressure to bear
 If so, go to Question No. 18
17. Which specific leadership?
 Caste/Subcaste/Biradari leaders
 Lumbardars
 Panchayats
18. Which irrigation authority?
 Patwari _____ Higher irrigation authority _____
 Specify _____
19. What action does the authority or leader take to get a decision?

PART B: DECISION TO SWITCH TO PACCA WARABUNDI

20. How long was Kacha Warabundi practiced in your watercourse?
21. When was it changed?
22. Why was it unsatisfactory?
23. Were there some individuals or groups who gained more and some who lost more under kacha system?
- Who were such individuals or groups?
24. Who first suggested that a Pacca system would be better?
- a. One of the Khala members
- Describe his:
- Caste/Subcaste/Biradari
- Relation to village leadership
- Land holding
- Position on watercourse
- b. A government official from Irrigation Department, Agricultural Department or Police
- What was his status and why was he interested in such a change in Warabundi system?
25. Who petitioned the irrigation department for a Pacca Warabundi?
26. How many Khala members signed the petition?
27. How long did it take to change the system (from the time of petition)?
28. When you had Kacha Warabundi, how many minutes of turn did each man have per acre?
29. Now that you have a Pacca System how many minutes of turn does each man have per acre?
30. Are you satisfied with the current Pacca Warabundi?
- No _____ Yes _____ (Go to Part C)
- Why?
- What can you do about it?

PART C: DISPUTES ON WATER MANAGEMENT

31. What recent (last five years) disputes have occurred concerning?

a. System of Warabundi

i) What issue

ii) Which parties disputed Caste vs.
 Biradari vs.
 Tenancy vs.
 Residence vs.

iii) Relative position on watercourse

Neighbors ___ Yes ___ No

Plaintif ___ Upstream ___ Downstream

Plaintif at ___ Head ___ Middle ___ Tail

iv) Severity ___ A ___ B ___ C ___ D ___ E

b. Cleaning of Ditches

i) What issue

ii) Which parties disputed Caste vs.
 Biradari vs.
 Tenancy vs.
 Residence vs.

iii) Relative position on watercourse

Neighbors ___ Yes ___ No

Plaintif ___ Upstream ___ Downstream

Plaintif at ___ Head ___ Middle ___ Tail

iv) Severity ___ A ___ B ___ C ___ D ___ E

c.

i) What issue

ii) Which parties disputed Caste vs.
 Biradari vs.
 Tenancy vs.
 Residence vs.

iii) Relative position on watercourse

Neighbors Yes No
 Plaintiff Upstream Downstream
 Plaintiff at Head Middle Tail
 iv) Severity A B C D E

d. _____

i) What issue

ii) Which parties disputed Caste vs.
 Biradari vs.
 Tenancy vs.
 Residence vs.

iii) Relative position on watercourse

Neighbors Yes No
 Plaintiff Upstream Downstream
 Plaintiff at Head Middle Tail

iv) Severity A B C D E

Severity Code:

- a) Physical aggression: Warfare, i.e., armed combat between groups.
- b) Public verbal dispute: Public insult and accusation of wrong doing, litigation, debate, etc.
- c) Covert verbal aggression: malicious gossip, etc.
- d) Refusal to participate in cooperative endeavors.
- e) Avoidance and tacit non-cooperation

32. A. How was dispute settled?

(Indicate which dispute)

Within Village

- _____ Mutual agreement between parties
- _____ Biradari elders decided
- _____ Panchayat decided. Which Panchayat _____
- _____ Lumbardar

Outside Authority

_____ Irrigation Department Official decided. Which one?

_____ Courts decided

- B. What decision was made (brief description). (Include any payments, fines or compensations made.)
- C. Did everyone then abide by decision? _____ Yes _____ No
- D. Was there a need for enforcement?
 Yes _____ What type? _____ No _____ (Go to next Section)
- Social pressure (describe)
- Legal pressure (describe)
- Government administrative pressure (describe)

PART D: INTERACTION WITH AUTHORITIES

33. How often in the year do you see:
- Irrigation Patwari
 - Pansal Naweas
 - Overseer
 - Other Irrigation Department official (who)
34. For what specific reasons do you see each of them?
- -
 -
 -
35. Has anyone in the village got especially easy access or special relationship with any of these officials (list who and why).
- -
 -
 -

36. If canal water is badly insufficient, can either patwari or pansal nawees help to get more water?

_____ Yes

_____ No (Go to #37)

How do they help?

What must you do to get them to help?

37. If not, what other means do villagers have to increase their water flow?

Do farmers in your village give part of their crop to these officials?

Yes _____

No _____

Approximately what is a normal/usual amount?

Do they reward them in any other way?

APPENDIX B

GLOSSARY

Biradari

Literally means brotherhood. It is of importance for this study to locate any cohesive groups within a caste or a subcaste.

Caste

Some notion of superiority-inferiority is associated with caste categorization in Pakistani villages. A primary distinction is between agricultural castes and non-agricultural castes. The occupations in the latter category are oilseed presser, cobbler, barber, sweeper, etc. The focus of this study is on agricultural castes only. These comprise the persons who are involved in on-farm operations like plowing, sowing, harvesting, etc. Within the agricultural occupations, such *Jats*, *Rajputs*, *Arains*, and *Gujjars* are endogamous groups who may in a certain village structure be hostile against each other. Caste titles usually have the connotation of ancestral identification.

Subcaste

A group within a caste, not completely endogamous but a source of more closer ancestral identification in certain caste groups.

Chowkidar

Literally means "watchman." He serves as a village guard against thieves, etc. Village farmers pay him in kind bi-annually.

Dera

Small house located on a farmer's field to provide protection from the elements while the farmer is irrigating and doing other work.

Kacha Warabundi

A system of rotation of water turns arranged by the cultivators. This system is highly flexible for it can be changed according to individual farmers' needs and the availability of water.

Khal or Sarkari Khal

The water channel starting from the *mogha* running to the last fields to be irrigated. This is commonly shared by all farmers for digging and maintenance purposes but the space and direction is fixed by irrigation department. Its English translation, "Watercourse", has been used in the text.

Locals

Villagers who have been settled in the area since the late nineteenth century when canal irrigation system was developed by the British colonialists.

Lumbar dar

Village headman who collects revenue from farmers and deposits it with the government treasury. He is usually a large landowner and not a government official.

Mogha

This is the point at which water is turned from major canals to flow toward farmers' fields. A *mogha* has a prescribed size to allow

certain number of cubic feet of water per second to flow depending upon irrigation department's allocation of water to a village.

Muhajirs

Migrants who came to Pakistan from East Punjab (India) at the time of partition in 1947.

Musalli

One of the non-agricultural castes. *Musallis* are professional drum-beaters. They may serve as agricultural labor at the time of harvesting.

Nakka

The point from which individual farmers divert flows of water in the watercourse to their fields. The number of such diversions increases as the number of farmers sharing a watercourse increases.

Overseer

Another lower level irrigation official. He looks after the maintenance of water outlets (*moghas*).

Pacca Warabundi

A system in which water turns are fixed for every farmer by the Department of Irrigation. This system possesses the advantage of protecting each farmer's rights to the water but water trading becomes illegal.

Panchayat

A village council elected by the village members or nominated by an influential in a village. It may be intra- or inter-caste.

Fansal Naweas

A gauge reader. This irrigation official determines water discharge from a canal to watercourses.

Patwari

A lower level irrigation department official who assesses crop revenues bi-annually.

Tonga

Horse-drawn cart primarily for the purpose of transporting human passengers.

APPENDIX C

STATISTICAL NOTES

't' Test

In the two sets of villages--augmented and unaugmented, 't' tests have been applied to assess significance of difference with regard to:

- a) Size of village in terms of its total irrigation area;
- b) Average size of landholdings; and
- c) Man days/mile/year employed to clean watercourses.

The 't' test was preferred to one-way analysis of variance because the data on total irrigated area, average size of holdings, and man days/mile/year does not uphold the assumption of equal variance. It is, however, assumed that the level of measurement in all three: total irrigated area, average size of landholdings, and man days/mile/year is "interval" scale and the samples are "independent random." To test the null hypothesis of $\mu_1 = \mu_2$ where μ_1 and μ_2 are population means from which the two independent random samples are drawn, Blalock (1960:172-175) recommends the use of 't' test:

$$t = \frac{\bar{X}_1 - \bar{X}_2}{\sigma_{\bar{X}_1 - \bar{X}_2}}, \text{ where } \sigma_{\bar{X}_1 - \bar{X}_2} = \sqrt{\frac{S_1^2}{N_1-1} + \frac{S_2^2}{N_2-1}}$$

\bar{X}_1 and \bar{X}_2 are the means and S_1 and S_2 are the standard deviations of the two samples respectively.

Fisher's Exact Probability Test

In case of a 2 x 2 Table, as in Table 21, when N is small, it is possible to make use of Fisher Exact Probability Test.

The formula is given by Siegal (1956:96-97):

$$p = \frac{(A+B)! (C+D)! (A+C)! (B+D)!}{N! A! B! C! D!}$$

Group I	A	B	A + B
Group II	C	D	C + D
Total	A+C	B + D	N

"The column headings, here arbitrarily indicated as plus and minus, may be any two classifications: above and below the median, passed and failed, science majors and art majors, agree and disagree, etc. The test determines whether the two groups differ in the proportion with which they fall into the two classifications" (Siegal, 1956:97).

The assumptions used are the same as for Chi-square: (a) that level of measurements of both location on the watercourse and augmentation of watercourses are nominal scales, and (b) the two samples have been drawn as independent and random.

"Because the Fisher test is an exact test, it is to be preferred over the Chi-square test...." (Blalock, 1960:221-224).

APPENDIX D

DECISION TO CLEAN WATERCOURSES: MOBILIZATION OF EFFORT

TABLE 1

Man Days/Mile/Year in Relation to Village Caste Structure

Caste	Unaugmented Watercourses	Augmented Watercourses
Single	864,686,336,67	216
Double	64	128
Multiple	1600,320,180	1800,411,103,48,34

TABLE 2

Man Days/Mile/Year in Relation to Residence Pattern

Residence	Unaugmented Watercourses	Augmented Watercourses
Local	336,320,67	1800,216,128,103,48,34
<i>Muhajir</i>	1600,864,686,180,64	411

TABLE 3

Man Days/Mile/Year in Relation to Presence or Absence
of Large Landowners

Large landowners	Unaugmented Watercourses	Augmented Watercourses
Yes		216,128,103,48,34
No	1600,864,686,336,320,180,67,64	1800,411

TABLE 4

Man Days/Mile/Year in Relation to Presence or Absence of Factionalism

Factionalism	Unaugmented Watercourses	Augmented Watercourses
Yes	1600,864,686,336,180,64	216,128,34
No	320,67	1800,411,103,43

TABLE 5

Man Days/Mile/Year in Relation to Type of Leadership

Type of Leadership	Unaugmented Watercourses	Augmented Watercourses
Elected <i>panchayat</i>	686,320	
Nominated <i>panchayat</i>	67	34
Individual influentials	1600,864,336,64	1800,411,216,128,103,48
Disorganized (neither an individual influential nor a <i>panchayat</i>)	180	

DECISION TO SWITCH TO *PACCA WARABUNDI*
 SINCE HOW LONG THE CHANGE HAS OCCURRED
 Base Date = 1973

TABLE 6

Date Changed (in Completed Years) in Relation to Village Caste
 Structure
 Base Date - Summer, 1973

Caste	Unaugmented Watercourses	Augmented Watercourses
Single	7,7,4,4	14
Double	3	4
Multiple	8,3	4,3,2,2

TABLE 7

Date Changed (in Completed Years) in Relation to Residence Pattern

Residence	Unaugmented Watercourses	Augmented Watercourses
Local	7,4,3	14,4,4,3,2
Muhajir	8,7,4,3	2

TABLE 8

Date Changed (in Completed Years) in Relation to Presence
 or Absence of Large Landowners

Large Landowners	Unaugmented Watercourses	Augmented Watercourses
Yes Large	-	14,4,3,2
No Small	8,7,7,4,4,3,3	4,2

Date Changed (in Completed Years) in Relation to
Presence or Absence of Factionalism

Factionalism	Unaugmented Watercourses	Augmented Watercourses
Yes	8,7,7,4,3	14,4,2
No	4,3	4,3,2 4,3,2

TABLE 10

Date Changed (in Completed Years) in Relation to Type of Leadership

Type of Leadership	Unaugmented Watercourses	Augmented Watercourses
Elected <i>panchayat</i>	7,3	
Nominated <i>panchayat</i>	4	2
Individual influentials	7,4,3	14,4,4,3,2
Disorganized (neither <i>panchayat</i> nor an individual influential)	8	-