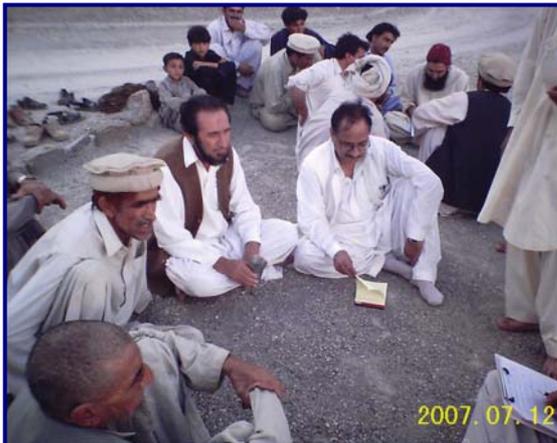


## **Social and Farmers' Institutional Impacts on Water Rights, Allocation Rules and Availability on Lower Riparian in Spate Irrigation of Balochistan**

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## Social and Farmers' Institutional Impacts on Water Rights, Allocation Rules and Availability on Lower Riparian of Spate Irrigation of Balochistan

Muhammad Tahir<sup>3</sup> and Dr. Shahid Ahmad<sup>4</sup>

### 1. Social and Institutional Context of Spate Irrigation in Balochistan

#### Spate Irrigation System

Spate irrigation is being practiced in all the four provinces. It is based on diversion of floodwater for irrigation and is locally named as Sailaba farming in Balochistan and Rod-Kohi in other provinces. It is being practiced in Balochistan since 3000 BC. One of the world's largest Spate irrigation systems is in the Kachhi plains. Floodwater available in an average year is 10.8 billion m<sup>3</sup>, which increases to over 25.2 billion m<sup>3</sup> in one-out-of-four years. Around 80% of floodwater is unutilized in an average year indicating a potential of four-fold increase in Sailaba farming.

Spate irrigation systems are non-perennial and perennial and same channel is used for both the flows. Non-perennial floods normally demolish the perennial systems and water users have to maintain these systems. Perennial systems are of smaller in size but value of water is high. These systems are constructed, operated and managed by the water users and their informal institutions. IPD (Irrigation and Power Department) has been involved in the construction of diversion structures. OFWM (On-Farm Water Management Directorate) and NGOs are working on the improvement of water conveyance network.

#### Social Context

Main ethnic groups are Pashtoon and Baloch, which live in northern and southern regions of

Balochistan. Culture of these two regions differs and gradually changes with the change in location due to spatial variations in environment, climate and clan composition. Northern region distinguished by socially strong community norms and sustained income from agriculture. While level of traditions, values and norms are lower in the southern region. Social bindings are weak in the southern region, where the community is losing respect of seniors resulting in breaking of traditional institutions.

The tribal system is still prevailing in the province. In the northern region, the Pashtoons are having two-tier system, where Malik is a Leader of the major clan and Sardar represents the tribe. There can be many Maliks within a tribe based on the size and spread of the tribe.

In the southern region, the Balochs have well established tribal leadership system and is described in ascending order – Takri — Mir — Sardar — Nawab — Khan. Khan of Kalat is the overall leader of Balochs. Sardar, is the tribal leader and there are 7-8 Sardars in the Baloch area.

#### Water Rights and Role of Farmers' Institutions

Water rights in most of the cases are not sharply defined. These are generally historic and mostly depend on the command area or strength of the tribe. Water allocation largely depends on water rights and sometime it also considers share of farmers in system's O&M. The support of public-sector institutions in most of the cases resulted in destabilizing the scheme performance as farmers' participation continuously decreased once the public-sector started providing the support.

Farmers jointly manage Spate irrigation systems, which are being operated under recognized water rights and allocation rules. These systems are now deteriorated due to influence of large holders and notables, and lack of discipline enforced by the IPD. These systems now could not be operated in accordance with the established rules, which are subject to discretion of local key leaders.

#### Interactive Focus Group Dialogues

Methodology for the selection of Spate irrigation systems was developed jointly with the Spate Irrigation Consultant. The interactive focus group dialogues were conducted to have consensus information about the scheme rather than

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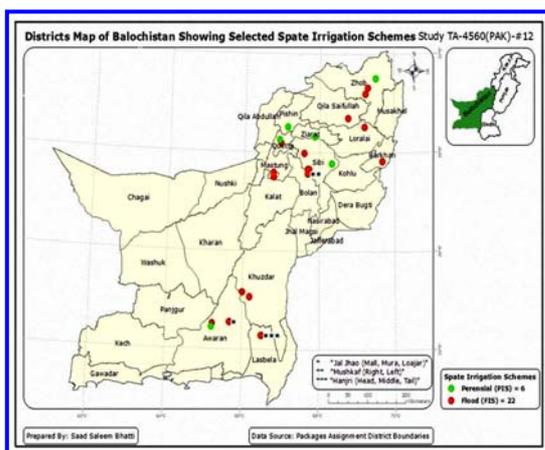
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structured interviews of individual farmer. A checklist was designed and pre-tested prior to the conduct of the focus group dialogues (Figure 1).



**Figure 1. Interactive focus group dialogues with water users of Spate irrigation system**

Interactive focus group dialogues for 28 selected schemes were conducted (Figure 2).



**Figure 2. Location of interactive focus group dialogues at selected Spate irrigation systems**

Focus group dialogue is a right approach to assess the involvement of water users' and their informal institutions in managing the Spate irrigation. Information collected in these dialogues was evaluated with focus on lower riparian and regional variations.

## 2. System Stakeholders and Informal Institutions in Spate Irrigation

Stakeholders and informal institutions prevailing in Spate irrigation are: Sardar (Tribal Leader); Malik (Clan Leader), farmers, tenants, labour and money lenders. Family background, landholdings, prosperity and education, business skills and interaction with prestigious persons

characterize social class of family in rural society.

### 2.1. Malik/Takri

Local community leader 'Malik' represents the main clan in northern Balochistan, while in the southern Balochistan different names are used (Malik in Harnai, Takri in Kalat, Wadara in Sibi, Polat in Ournach and Raeis in Kachhi area). Position of Malik in community is influential and his decisions are implemented. Malik plays key role in system's O&M and in resolution of conflicts. He holds the nucleus position in the community and socially accepted as a leader of the community.

Malik inherits position from his father or from some close relative. Sardar may nominate someone outside the family for the position of Malik. The top leadership can change the Malik with the consent of community. Malik has moral support and authority from all clans and is recognized as a leader. Farmers bring problems to the notice of Malik for resolution. The serious conflicts are mutually discussed by the seniors under the chairmanship of Malik in front of conflicting parties and are settled through consultation. Disagreement in system's O&M by any member, after the decision of Malik is rejected by the community.

Malik enjoys various benefits, like double share from division of common lands, lion share of income from common rangelands, free labour from farmers and legal privileges. Some of them also take fixed share from the Sailaba farming in southern Balochistan for providing assistance in system's O&M. This is why that in these areas, Malik's hold on community is reducing and this gap is filled by the Councilor because of his capacity to arrange development funds. Reduced hold of Malik in the community has also affected the social cohesiveness of community vital for system O&M.

### 2.2. Sardar

Sardar of the area is a leader of a tribe. His authority depends on the influence, power and strength of the tribe's population. He inherits the rank from his father. When he could not continue the role, he nominates some of his relative or son as the next Sardar after the consent of the Nawab.

Sardar's major responsibility is to resolve conflicts of community within a tribe or with

other tribes. He protects the tribe from social, climatic, physical threats and represents tribe at higher forums. He also possesses position of Chief in the joint meetings on local issues of tribe or area under his jurisdiction. Many Sardars have a large place allocated for visitors/affected persons, where he listens to complaints of community members and takes decisions. Traditionally, community implements the decisions of Sardar. Many Sardars provide free residence and meal for the visitors. Sardar has many privileges, which are:

- acquires unoccupied land other than the community land, which falls in the area under his control;
- takes full or part of income from the common land either in shape of rent of rangelands or price of produced materials;
- occupies resources, which are not being utilized by the community; and
- stipulates share in agriculture production certain areas as a tax from the farmers.

Some Sardars in southern Balochistan loose popularity and command due to their involvement in forceful seizing of illegal share from contractors of development works and agricultural produce of local farmers.

### 2.3. Seniors

Senior persons of families play an active role in maintaining conducive environment in the community through dispute resolution and enforcement of agreed decisions. Seniors also play an active role as activists. Every family has a senior person, who represents the family in the decision making process and other social activities. A senior is usually a wise person, who is socially active in the community. The internal matters or disputes of family are decided by the seniors to protect family dignity. Minor disputes between families are resolved by the seniors as per local moral values.

### 2.4. Landowners

Landowners usually are males possessing inherited land. There is no upper or lower limit for land holdings. In many areas the landowners are not allowed to sell land to a person out of the clan. Women are normally not considered for inheritance (Figure 3).

In 18% of the surveyed schemes, some of the women inherited lands. One of the justifications

is to reduce division of land among different clans. Uncultivated or rangelands are joint property of clans, which when required is divided among the male members of the clan and the person with more sons get larger share. This practice has been observed in Zhob, Loralai and Qila-Saifullah districts. Malik generally has entitlement of a double share.



Figure 3. Allocation of inherited land by sex

#### 2.4.1. Large Holders

Community leaders (Nawab/Khan/Sardar) possess more land compared to others. Sardar may hold the right of entire valley or area. In northern Balochistan the landholdings are small, while in southern Balochistan (Chagai, Kharan and Awaran) landholdings are large (Figure 4).

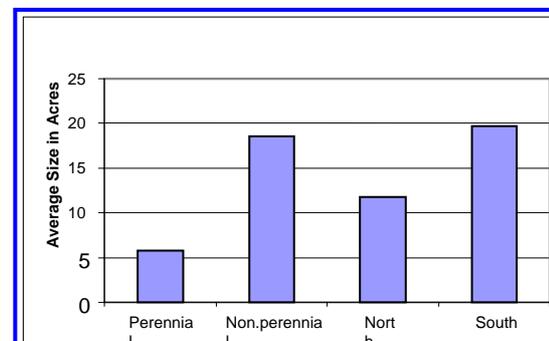


Figure 4. Size of landholding in Spate irrigation

Large holders could not maintain their lands and give lands to sharecroppers in non-perennial systems, while personally maintain perennial systems or lands having supplemental irrigation. Large holders have more resources and sustain failure of crop or some other losses under uncertain non-perennial Spate irrigation.

#### 2.4.2. Small Holders

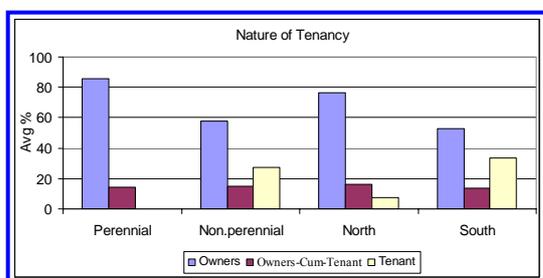
In some of the perennial systems of northern Balochistan, the landholdings are so small that

some farmers own less than 1.0 ha of land. Smallholders usually cultivate their own lands and only give land to sharecroppers, if they could not manage the lands in absentia. Smallholders are less influential and usually cultivate cash crops and wheat for self consumption. Failure of crop put unbearable burden on smallholders, who re-cultivate land after getting help from large holders or money lenders, etc.

### 2.5. Tenants

Landowners hire services of tenants to cultivate their lands if they do not cultivate the land themselves due to inadequate labour to cultivate their lands or they are absentee farmers. Female landowners, such as divorcees and widows, often find it difficult to cultivate their lands due to lack of labour and draft animals, as well as cultural constraints. Some landholders may be "too poor to farm" as they do not own draft animals or have access to a tractor, for the preparation and repair of bunds. Furthermore, they cannot afford inputs such as seeds to grow crops. As a result, they are forced to rent their lands to tenants.

There are three tenancy classes in Spate irrigation: a) owners; b) owner cum tenants; and c) tenants (Figure 5).



**Figure 5. Tenancy proportion in Spate irrigation systems in Balochistan**

Tenants are more common in areas where it is difficult for the owners to cultivate their lands. This has evolved to a form of debt-bonding, when sharecroppers have to work for the same landlord until the loan, with interest, is repaid.

Owner of large tracts of land gave a portion of land to a renter for development of land and assigned the status of hereditary tenant as compensation. The hereditary tenant loses his rights if he fails to cultivate and maintain the fields. Landowners receive from one-eighth to a quarter of the harvested crop as per contract. The hereditary tenant is responsible for providing

inputs and labour including the O&M of field bunds, channels and diversion structure.

### 2.6. Merio or Mir-i-aab

In the perennial system, local water specialists are engaged to supervise distribution of water and called as Merio or Mir-i-aab. Merio regulates distribution of Spate water by managing turns of individual farmers as per water allocation. He makes irrigation plan for all the water users as per water allocation; decides turns and period of irrigation for each piece of land. He adjusts turns or duration of turn as per requirement. There may be more than one Merio for larger or longer Spate irrigation systems and each one will be responsible for the designated area.

Non-perennial systems do not need services of Merio because floodwater is generated from torrents of short duration and it is not possible to schedule irrigations because many fields are under irrigation at a time. Merio has some advantages like allocation of extra supply of water for personal lands and at some places share from production.

### 2.7. Tractor Owners

Most of the farmers are now using tractors due to their versatility in operations. At least one tractor is available in every village. Tractor owners provide services for renting of tractor time on hourly basis for O&M of Spate irrigation systems. Tractor rent increases with the increase in price of diesel fuel and during peak periods. Tractor owner takes full payment of rent at the completion of the task. But if farmer could not pay the bill then he provides guarantee for delayed payments.

### 2.8. Women

Involvement of women in livestock and crop handling at the household level in farming involves cleaning & storage of produce, storage of dry stalks and livestock feeding. Women assist males during peak season like crop harvesting and handling. Women are also responsible to fetch water from outside of their homes for domestic use in about 50% households.

## 3. Sharecropper Arrangement under Spate Irrigation Systems

Sharecropper holds land after an agreement with the owner and takes agreed share from the

income. He markets his services through a contract and takes full responsibility for Sailaba farming. There are two major types of contracts: a) sharecropper takes complete authority on farming operations and bear full expenses including labour without any share in expenses by owner; and b) partly or full inputs are supplied by the owner and tenant makes rest of the expenses and provides 100% labour.

Sharecropping agreements vary for non-perennial and perennial systems due to different productivity potential, reliability of irrigation and prevailing customs. Seasonal inputs for Sailaba farming are seed, seedbed preparation, irrigation, harvesting and threshing. The major sharecropping arrangements being practiced in Spate irrigation systems are:

### Non-Perennial Systems

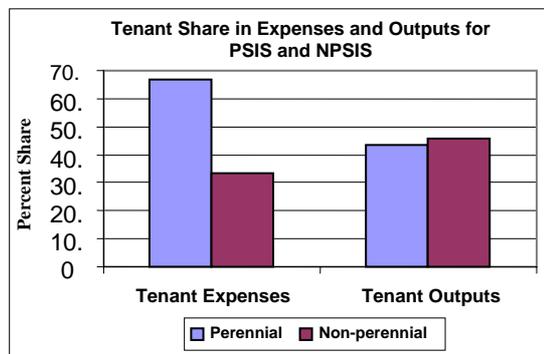
- Sharecropper receives **60-75%** of produce, if he incurs all expenses.
- Sharecropper receives **50-60%** of produce if the owner provides seed and tenant incurs all other expenses.
- Sharecropper receives **50%** of produce, if the owner contributes half of the expenses and tenant incurs remaining half including all cost of labour.
- Sharecropper is given **33%** of produce, if he contributes labour for all activities (planting, weeding, harvesting etc), while all inputs (seed, tractor charges, etc.) are incurred by the owner.

### Perennial Systems

- Sharecropper receives **33%** of produce, if he incurs all expenses. While tenant receives 50% income in case of vegetables and orchards.
- Sharecropper receives **25-33%** of produce; if the owner provides seed and tenant incurs remaining expenses and labour.
- Sharecropper receives **25%** of produce, if the owner contributes half of the expenses and tenant incurs other half and full labour.
- Sharecropper is given **20%** of produce, if he contributes labour for all activities, while all inputs are incurred by the owner.

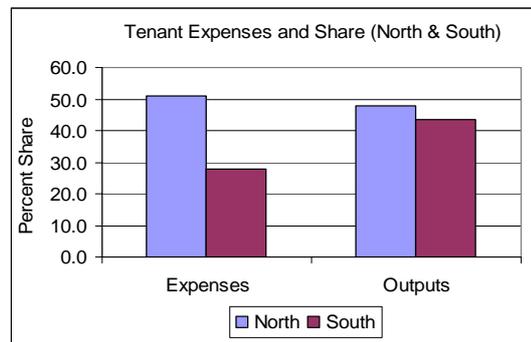
In perennial systems, sharecropper's contribution in expenses is more for a relatively low share, while in non-perennial systems the share in produce is more for lesser contribution in inputs

due to uncertain circumstances for crop maturity and relatively low crop yields (**Figure 6**).



**Figure 6. Share of tenant in expenses and outputs in Spate irrigation systems**

The share per unit area received from perennial system is much higher than the non-perennial. Sharecroppers are also responsible for O&M of field bunds and in some cases reconstruction of diversion structures. Their shares in expenses and outputs for northern and southern regions are presented in **Figure 7**.



**Figure 7. Tenant share in expenses and outputs in Spate irrigation systems**

Less tenancy ratio is found in perennial systems and in head reaches, while the tenancy ratio is higher in non-perennial systems especially at tail reaches. At the head reaches of the Chandia non-perennial system (Chandia village), most of the area is being cultivated by owners and only 25% produce is given to tenants for full labour. While at tail reaches (Mul Gachkori village) half of the land is under tenancy and there are two sharecropping arrangements: a) sharecropper is given 2/3<sup>rd</sup> of produce for cultivation expenses + all labour; or b) sharecropper is given 50% of produce for only labour activities.

Hereditary tenants provide 1/8th to 1/4th of produce as a rent for the use of land. Hereditary

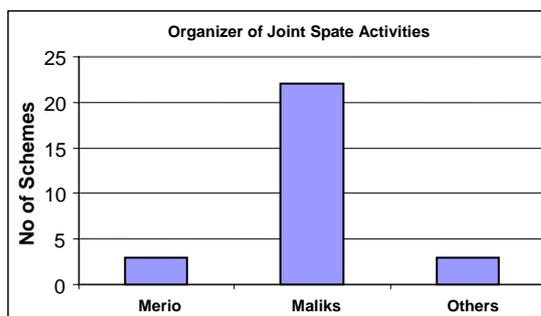
tenant is responsible for providing inputs and labour, including O&M of bunds, channels and diversion structures. Spate irrigation systems are used by landowners as well as sharecroppers and tenants but there are wide variations in cropping pattern and ratio of area under tenants (Table 1).

**Table 1. Percent area cultivated by tenants in Spate irrigation systems, Balochistan**

Name of Spate Irrigation Scheme	Estimated Percent Cultivated area under Sharecroppers
Chandia NPSIS in district Sibi	24
Maskaf NPSIS in district Bolan	25
Kohak NPSIS in district Kalat	20
Shabo Headworks in district Pishin	20
Brunj PIS in district Zhob	20
Sarawang NPSIS in district Qila-Saifullah	10

## 4. O&M in Spate Irrigation Systems

O&M of Spate irrigation systems is jointly done by the farmers with or without the support of the public-sector institutions. Malik and seniors collectively decide water allocation on the basis of water rights and contribution (Figure 8).



**Figure 8. Organizer of joint maintenance works for Spate irrigation system**

Merio declares O&M of Spate irrigation and announces the need for farmers' contribution. Previously, most of the farmers physically contribute in O&M, but currently they are using tractors. Local activist takes initiative and solely completes the O&M task and collects the share afterwards. Sometime a farmer is nominated turn wise for O&M. Organization of O&M is carried out by Malik, Merio and notables (Figure 8).

## 5. Social Fabrics of Spate Irrigated Areas

### 5.1. Migration and Displacement Pattern

Farmers migrate due to lack of basic amenities like potable water or reduced supply of Spate

water to sustain livelihood. Because of persistent drought in the province (1998 to 2006), there has been temporary out-migration in the areas due to unavailability of Spate water and feed for animals. This trend has sometimes been self-reinforcing in southern region particularly in the lowlands, whereas at a certain point the number of able-bodied farmers that stayed behind becomes inadequate to sustain Sailaba farming. There is also seasonal migration of male members in search for jobs in nearby towns. These migrants return to their home towns before the start of the cropping season to assist in irrigation, seedbed preparation and sowing of crops. With alternative labour markets developing and rise in standards of living, the movement to nearby towns has accelerated.

### 5.2. Livelihood Strategies

Non-perennial Spate irrigation is characterized with intrinsic uncertainty of Spate flows. Prediction of Spate flows is not possible due to complexity of stream flows and catchment areas. In certain years, even the farming inputs could not be recovered and sometime complete failure of crop was experienced. Farmers are dependent on crops and livestock in average and wet years. With low crop returns even in average years and the possibility of crop failures in dry years, which make Spate farming as non-profitable. Spate farmers are relatively poor from that of irrigated areas but reasonably rich compared to Khushkaba farmers.

Spate communities have developed a range of livelihood strategies to cope with unpredictable variations in water supply and crop production. Adoption of an understanding of socio-economic circumstances of farmers, and coping strategies that they adopt, is needed to have effective and sustainable improvements in existing systems. The strategies adopted by Spate farmers vary within and between schemes, regions and cultures. Farmers have adopted a number of strategies to reduce the risks of Spate irrigation and used practices to cope with the conditions of total crop failure. Salient strategies concerning Spate farming are:

- **Diversification of household economy** to provide sustainable income from crops, livestock, off-farm sources and to a lesser extent from handicrafts.
- **Cultivation of drought resistant traditional crops**, such as sorghum, which produce at least some fodder even in relatively dry years.

- **Fallowing** is practiced during one season and cultivation in the subsequent season, to adjust water availability and to maintain soil fertility.
- **Inter-cropping or mix-cropping**, whereby two or three different crops with different water requirement and harvesting dates are planted in a field, so that at least one crop could be harvested in a dry year – i.e. pulses (mash, mung and moth) mix with sorghum.
- **Crop choice** is normally determined by the water users at the timing of the pre-sowing irrigation.
- **Supplemental irrigation** from spring or well or tubewells is used where feasible to avoid risk of crop failures during the dry years.
- **Livestock** is an integral part of Sailaba farming to have income during dry years when crop failure is common. Livestock performs as a bank with the farmers and they sell it to meet their emergent needs. Farmers also plant forest trees which survive during dry years and provide forage for their animals.
- Increased **farm mechanization** has facilitated management of Spate irrigation systems in timely operations but on the other hand, the number of draught animals has reduced having adverse consequences for resource-poor farmers and social organization of farming communities.
- **Sharing of resources** is common in Sailaba farming, where farmers share labour and means of production with others. Farmers without seeds at the start of the cropping season may ask their fellow farmers to help them out. If a farmer cannot access his field or bunds are broken during the flood season, other farmers extend support to repair bunds or assist in irrigating the fields.

### 5.3. Conflict Resolution

Spate irrigation systems are by and large characterized as farmers' managed. Major conflicts among tribes arise on water rights, stoppage of water by upper riparian, system's O&M, boundary of fields and stealing of Spate water or crops. The conflict intensity is low in Sailaba owing effective resolution of conflicts. The decisions are made after hearing both the parties in a joint gathering. Normally a group of seniors, chaired by Malik resolves the conflicts after hearing all concerned parties and as per prevailing customs.

Local leadership system is well accepted and traditional mechanisms of solidarity and mutual assistance play an important role in dispute

resolution. Trying to implement new methods without grafting with local traditions might not produce desirable outcomes. It is rare that conflicts are not settled at local level and are taken to police or court.

## 6. Water Rights, Allocation and Distribution to Lower Riparian

### 6.1. Social and Institutional Impacts on Water Rights and Allocation

Spate Irrigation has extensive rules and regulations. Farmers are aware of their water rights. Conflicts emerge when some influential parties violate these and use water for their own benefit. Community leaders and influential farmers have impact on water rights and allocation rules. Farmers at tail-end receive little or no water which result in lack of cultivation of crops and farmers have to eventually migrate to other places.

In smaller non-perennial Spate irrigation systems, water rights are enforced by the farmers. Outside political or administrative support may be requested by the farmers if conflicts could not be resolved. The distribution of water and repair of irrigation infrastructure is largely a responsibility of rural communities. Involvement of local leadership and administrative support is normally limited to extend help on an incremental basis, at varying degrees of intensity, keeping in line with principles of patronage and divide and rule.

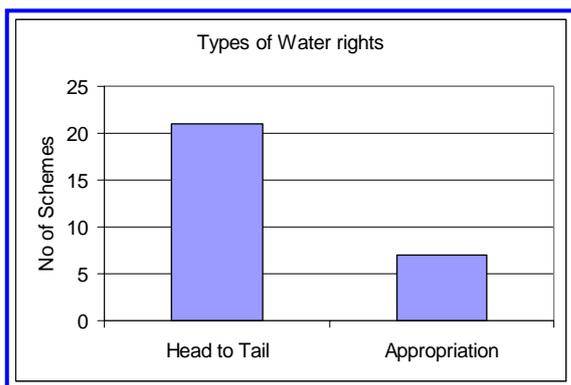
### 6.2. Water Rights and Distribution Rules

Water rights and distribution rules help to mitigate the unpredictability that is inherent in Spate irrigation. Rights and rules impose a pattern and reduce the risk of conflict, by regulating relations between land users that have access to floodwaters. The way rights are defined in non-perennial systems is different from perennial systems. In essence water rights in Spate irrigation systems are reactive. They deal with agreed claims in a changing and variable environment. They describe acceptable practices in a given situation, rather than quantifiable entitlements to a resource, as in perennial systems. Water rights and water distribution rules also define the likelihood of irrigation for different areas and hence serve as the key to the collective maintenance and rebuilding of diversion infrastructure. In particular where Spate water users depend on one another for maintaining Spate channels and reconstructing

diversion structures and if this work is substantial, agreement on how water is distributed is a precondition for co-operation.

### 6.3. Importance of Water Rights

Water rights and distribution rules in Spate irrigation systems regulate access to water and hence minimize conflicts. Water distribution rules make it easier to predict which land has entitlement to Spate water. As such they encourage land preparation by pre-flooding, which is important for adequate water storage and moisture conservation. Mostly, head to tail rule is being followed in most of the Spate irrigation schemes in Balochistan, but in some areas, the stream flow is proportionally divided into different sizes of Spate channels relative to the command area. The farmers of perennial Spate irrigation systems have smaller farms but have more sustainable livelihoods. Water rights are more precisely formulated and recognized by the farmers (**Figure-9**).



**Figure 9. Types of water rights prevailing in Spate irrigation systems**

There is a categorical difference in the water rights of non-perennial and perennial Spate irrigation systems. In the perennial systems, individual water rights are often sharply defined in fixed proportions of flow and allowed usage time, whereas in the non-perennial system water rights are 'reactive'. They cope not only with the unknown proportions of the next flood, but also with the medium-term changes in the river morphology. Water distributions in the non-perennial systems are thus based on allocation rules rather than alienable property.

### 6.4. History of Water Rights

Major progress in establishment of water rights has been carried out twice in Balochistan, once

during the British era and secondly during the Ayub's regime (1960s). Water rights of other Spate irrigated areas have been developed latter on and the process is still continuing. Water rights in Spate system are not static. The link between enforcement and overall governance is very strong. The nature of water rights changes with increase in population, new land development, changing cropping patterns and new marketing opportunities. The introduction of more robust diversion structures; shifts in power relations; and changing levels of enforcement also affect the nature of water rights.

The water rights of large Spate irrigation systems have been established by the British rulers i.e. areas commanded by the Porali, Hingol and Nari rivers. As these large systems exist in the southern Balochistan, so during this period major work on water rights was carried out. Afterwards, during the regime of President Ayub Khan (1960-70) water rights have been prepared for remaining large Spate irrigation systems, which mostly fall in northern Balochistan and mainly covers perennial irrigation flows. Need for establishment of water rights for other areas originates as some Spate irrigation systems have expanded with the induction of machinery, which sometimes don't have share in water rights. With the change in river course or morphology, the area subject to direct irrigation changes and the areas having historic rights fail to irrigate. This may develop disputes on water use and original beneficiaries may demand either water fee or construction of new water diversion structures for additional water to irrigate their lands.

### 6.5. Rules on Spate Irrigation

There are several types of rules that regulate the distribution of varying quantities of Spate water. Not all rules apply in every system, but it is usual to find that several rules are used simultaneously. The repertoire of water distribution rules includes:

- Demarcation of land entitled to irrigation;
- Rules on breaking diversion bunds;
- Proportion of the flow going to different flood channels and fields;
- Sequence in which different fields along a flood channel are watered;
- Practices regarding second and third water turns; and
- Rules on low and high floods.

In addition there are Rules that regulate changes in the command area and system morphology:

- maintenance of bunds and boundaries;
- adjusting the location of intake structures;
- manipulating stream bed and Spate canal scour and siltation processes; and
- compensation for lost land.

### 6.6. Water Allocation Procedures

Water allocations are made under institutional setup. Water allocation on small scale is decided by the prominent persons of community in joint meeting called by Malik/Merio to discuss water distribution issues. Primarily, water allocations are based on water rights which are sometime ignored for the farmers who fail to participate in O&M activities according to the prescribed program and water share is distributed on the basis of contribution in O&M. Similarly, some farmers may get extra share for large contribution in O&M. Water allocation is not required for un-commanded areas due to topo-graphic limitations.

For large systems in which many villages and tribes fall require Jirga of respective leaders of villages/tribes along with public representatives. The agreement made by Jirga has legal value, and Jirga participants and law enforcing agencies are responsible for implementation of the agreement. Equitable Spate water distribution based on water rights is the most crucial problem faced by the farming community. Age-old water distribution system provokes disputes among farmers on sharing of water. Water allocation involves agreed share of water user, diversion procedure and repair of diversion structures.

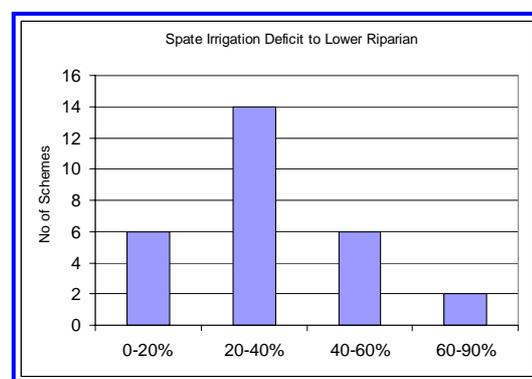
### 6.7. In-equality in Distribution of Spate Water to Lower Riparian

Lower riparian of non-perennial Spate systems by and large are poor and living at subsistence levels. The tail end reaches are facing both the extremes in water availability – too little flows which may not irrigate any field and too much uncontrolled flows, which damage the fields. They also have lower dependency on crops, whereas livestock and off-farm earnings contribute heavily in their livelihood.

Lower riparian generally possess very low cropping intensity as compared to upper riparian both in perennial and non-perennial systems. Tail-end farmers of perennial systems have

difficult living as they suffer much during the shortage of water supplies. The quantity of perennial flows is usually small ranging from 0.5 to 4 cusecs and very low flows reaches at the tail-end due to higher infiltration rates and longer length of channels. Lower riparian grow low income drought-tolerant, while farmers at head-reaches grow high income and higher water requirement crops.

Lower riparian on an average receives less water from that of water allocations made in different schemes. The data collected shows that in half of the surveyed Spate irrigation schemes the tail-end farmers were receiving on an average 30% less water from that of head reaches (**Figure 10**).



**Figure 10. Spate irrigation deficit to the lower riparian in Spate irrigation systems in Balochistan**

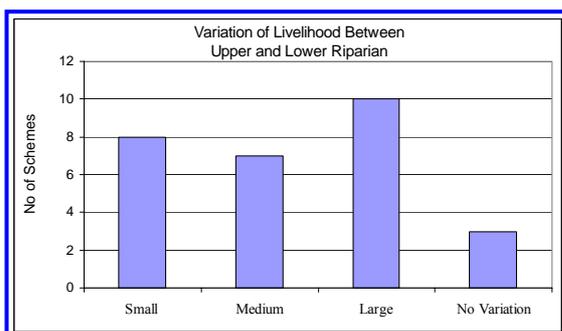
Water rights of non-perennial Spate irrigation systems largely follow head to tail pattern. Head farmers have right of irrigation at every flow and during normal circumstances there is hardly any flow left for utilization by the tail-end farmers except during high-flow regimes. Sometime the upper riparian are influential and does not release the Spate water for downstream areas as per their rights, making farming impossible for the lower riparian. The reluctance of upstream water users to have their bund broken is not only because it allows more water to be diverted to the upstream area, but it also saves the effort of rebuilding the bund in subsequent years. The lower riparian in these cases forced to irrigate and shift livelihood on off-farm income.

The replacement of numbers of independent traditional diversion structures by a single permanent "engineered" diversion structure has a strong probability that concentrating diversion at one location will result in conflict between upstream and downstream farmers due to the

inequitable distribution of available Spate water that is made possible by permanent structures. It is suggested that this approach should only be adopted when downstream water users are not deprived of their water rights. Upper farmers normally have capacity to completely divert medium & low flows to their fields without leaving any portion for lower riparian except when all their fields become saturated. For medium to large Spate irrigation systems, tail-end farmers are entirely dependent on upper reach farmers for release of Spate water during manageable flows as per established principles for Spate irrigation, otherwise only unmanageable high flood flows crosses lower reaches.

Deficiency of livelihood sources in the tail-end reaches forces migration of new generation to the cities in search of livelihood, while water scarcity in some areas caused displacement of whole population to nearby places like it happened in the Sadiqabad area of Mangochar. The inequity in water distribution results in creation of more conflicts at the tail-end reaches and farmers are unable to cultivate crops due to lack of water and they eventually migrate to find labour jobs.

The upper riparian are enjoying more intensity of Spate irrigation and therefore achieve more agriculture production. The lower riparian are practicing non-profitable agriculture due to lack of Spate water (**Figure 11**).



**Figure 11. Variation of livelihood between upper and lower riparian in Spate irrigation**

## 7. Incorporating Social and Institutional Fabrics in Spate Characterization and Classification

Spate irrigation was classified using the water availability pattern within the physiographic regions of Balochistan covering: a) highlands; b) sub-highlands; and c) plains. Each of preceding three classes is further divided into perennial and

non-perennial Spate systems. Each Spate class contains specific Social and Farmers' Institutional setup, required under the conditions. The social and institutional characteristics for different classes of non-perennial systems were assessed from the surveys.

Socio-economic conditions under the perennial systems are different from the non-perennial Spate irrigation systems with respect to income, amenities and resources. Perennial systems support high value agriculture due to reliability of irrigation, controllability of flows and assurance of irrigation supplies.

## 8. Policy Issues

The policy issues identified based on the findings of the study are:

- Floodwater is the largest resource of water available in Balochistan. Out of this hardly one-fifth is utilized for Spate irrigation and Sailaba farming because low priority is assigned for the utilization of floodwater. The floodwater also affects the infrastructure in flood years.
- Investments in Spate irrigation made by the public-sector in the past were largely in piecemeal without developing participatory scheme development process. The investments were largely made for constructing water diversion structures and in certain schemes the main canal was also constructed. No investments were made for developing secondary and tertiary level system resulting in lower water productivity.
- Schemes designed for control and diversion of floodwater are largely developed based on the principles of canal irrigation. The indigenous knowledge and experiences of local communities are hardly utilized in developing the scheme development process. Even the experiences of modern Spate irrigation system available in Shabo Headworks in Pishin district were never used for developing new schemes.
- Water users of Sailaba farming systems are having history of managing Spate irrigation since millenniums and their institutions are well established although informal but performing reasonably well.
- Involvement of public-sector institutions in improving Spate irrigation without participation of water users resulted in reduced involvement of water users in managing the interventions, because they

think that these interventions belong to the public-sector and they will manage these structures.

- Devolution of power at the district level and provision of development funds to the Councillors affected the strength of existing informal institutions led by Maliks. The experiences of devolution were hardly integrated with the local institutions. In some of the systems water users are more inclined with the Councillors than the Maliks which had negative impacts in managing Spate irrigation systems.
- The development of new Spate irrigation and Sailaba farming systems require integrated approach which is lacking in the current planning process.
- Most of the schemes are facing problem of water availability at the tail end and lower riparian are facing difficulty even in raising crops and earning their livelihood in dry years. Although water rights and allocation rules are well established but due to expansion of Sailaba farming and introduction of interventions by the public-sector institutions has affected the performance of water users' institutions.

### 9. Policy Reforms and Guidelines

#### Participatory Scheme Development Process

The guidelines for incorporating social and institutional dimension in the Participatory Scheme Development Process are:

- Accord higher priority for development of Spate irrigation in the province as floodwater is the largest resource of water available for future development.
- Ensure involvement of water users and their informal institutions in Spate irrigation to have access to historical perspective, system's strengths and weaknesses, current state of system's O&M and related issues for implementation of scheme development process.
- Promote interactive group dialogues with rural communities while formulating feasibility for development, management and rehabilitation of Spate irrigation systems.
- Support the process of social organization to further build the existing informal institutions, which have established roots in the local communities to ensure adoption of participatory scheme development and management process in the province.

- Strengthen the current conflicts resolution procedures to make the local institutions more transparent and sustainable because Village Organizations organized by NGOs hardly have any role in managing the Spate irrigation systems primarily because their focus is largely on credit and savings at the village level.
- Enforce water rights and allocation procedures to ensure equitable distribution of water to the lower riparian, which are adversely affected in both the regimes of low- and high-flows.
- Introduce Programme approach, where sub-basin must be taken as a planning unit to ensure that water rights of all riparian are respected.
- Define the water rights of each and every stream in the province and concept of Rawajat-a-Rod-Kohi documented in NWFP can be considered as an example for building the registry of water rights for Spate irrigation systems in Balochistan.
- Undertake a study to sharply define the water allocation rules while implementing the scheme development process to build water users institutions so that interests of lower riparian are fully incorporated in the scheme development or rehabilitation process.
- Register the existing informal institutions of water users of Spate irrigation systems as Farmers' Organizations under the BIDA Act.
- Ensure participation of water users' institutions in planning, design, operation and maintenance of the Spate irrigation systems
- Develop standard operating procedures (SOPs) for operation and maintenance of Spate irrigation systems and scheme development process for the new schemes
- Build capacity of water users' institutions and ensure their involvement in scheme execution and implementation for the type of the activities which can be done by them. For complex structures contracts may be awarded with the consent of representatives of water users' institutions.

#### Guidelines for Future Investment Projects

- Ensure that investments must be based on Basin Management Plan for each of the sub-basin in terms of availability, use and balance of water available for future development. An integrated and participatory planning process is needed for future investments.
- Introduce an integrated approach where Spate irrigation and Sailaba farming is linked with

groundwater recharge to make these schemes feasible for investment.

- Promote involvement of Department of Irrigation and Power, Agriculture, Forestry and Livestock right from the planning phase to have effective implementation of integrated projects to achieve ultimate objective of higher water productivity and sustainable livelihoods.
- Upgrade the local informal institutions through a process of social organization and agreements with water users and their institutions at the stream level so that lower and upper riparian all agree for future development of floodwater and Spate irrigation in Balochistan.
- Include social and institutional components for any investment project along with the capacity building of farmers' institutions with provision that community institutions undertake the implementation of schemes including the award of contracts for jobs which can not be implemented by their institutions.

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*The Policy Briefings is a Series of Issues, which will be prepared and circulated to the policy and decision makers in the province of Balochistan and in other provinces of the Country with an objective to synthesize and disseminate the studies outputs under the TA-4560 (PAK).*

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**Websites:**

<http://www.brmp.gob.pk/pbriefings.html>

<http://www.brmp.gob.pk/tpbriefings.html>

*Reference: Tahir, M. and S. Ahmad. 2008. Social and Farmers' Institutional Impacts on Water Rights, Allocation Rules and Water Availability on Lower Riparian in Spate Irrigation of Balochistan. Vol. (4), No. (9), TA-4560 (PAK), Quetta, Pakistan.*

*The topic to be addressed in the next Issue of Policy Briefings is "Restructuring and Strengthening of Agricultural Planning Directorate of Department of Agriculture, Balochistan". The topic includes; a) Introduction; b) Inadequacies of Existing Institution and Planning Activity; c) The Erstwhile Policy Vacuum; d) Essential Elements of IWRM Policy; e) Key Issues; e) Users' and Respondents View for Future Development of APD; f) Future Restructuring of APD; and g) Way Forward.*