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Community Based Natural Resource Management in Roghani Valley, Northern Pakistan

Iffat Tabassum, Fazlul Haq, Fazlur-Rahman

Institute of Geography, Urban & Regional Planning, University of Peshawar

Abstract

Facing the scarcity of natural resources, high environmental risks and threats, and undependable accessibility, most of the mountain communities have evolved indigenous sustenance strategies through adaptations. Adaptation is a two-way process either adapting human demands according to resource limitations or amending the resources according to the rising human needs and wants. Such adaptations make them able to cope with the growing gap between the productivity of natural resources and the demands of increasing number of dependent users. The present study is an attempt to investigate the indigenous resource management and utilization mechanisms in a mountainous community located in Dir district northern Pakistan. The study is based on qualitative information collected through interviews and focused group discussion. Like most parts of the northern mountainous belt of Pakistan, the resources are kept and managed under locally introduced ownership system in the study area as well. The inhabitants have evolved self-administered institutions for managing resources and there is no interference from the state authorities.

Keywords: Natural Resources; mountain communities; Northern Pakistan; the Hindukush

Introduction

Most parts of the Hindu Kush-Himalayan region — extending from Afghanistan to Myanmar and covering eight countries — are not only poor, but also face problems of natural resource degradation at a very rapid pace. Mountainous areas exhibit different social and physical characteristics distinguishing them from the

plain areas (Biswas et al. 2012; Bernbaum 1997; Ives et al. 1997; Messerli & Ives 1997). The characteristics of mountainous areas have been called 'Mountain Specificities' by Jodha (1992), which include inaccessibility, marginality, fragility, diversity, resource potential and social adaptations. In general, the mountainous areas have limited natural resource base determined by the rugged topography and harsh climatic conditions. On the other hand, the population is continuously increasing, which results into an imbalance between the natural resource potential and the dependent users (Sharma & Banskota 1992; Pretty 2003; Steins & Edwards 1999; Eckholm 1975; Jodha 2007).

Nevertheless, the mountains' inhabitants are well aware of the opportunities, threats and constraints and have indigenous knowledge which enables them able to withstand the fragile environment. Facing low productivity issues, high environmental risks and threats, and limited and undependable accessibility options (Bjonness 1983; Thomas 1979), most of the communities in these areas evolve indigenous sustenance strategies through adaptations to the limitations and potentialities of the local natural resource base (Barkin 2012). Adaptation is a two-way process i.e. adapting human demands according to resource limitations; or amending the resources according to the rising human needs and wants (Bjurnsen et al. 2012; Britan & Denich 1976; Ehlers 1996, 1997; Pugh 2005). Such adaptations included seasonally and spatially diversified and interlinked land-based activities such as diversified agricultural mechanisms, farm-forestry, and indigenous resource management and utilization systems. Although there are internal inequities and occupation-specific differences in the stream of benefits from the natural resource base; however, the close dependence of the inhabitants on local resources created an integrated collective venture in their natural resources, reflected by cooperative actions to protect and manage them (Berkes 1989; Jodha 1998; Leach et al. 1997).

With the growing population, the natural resource use mechanism has shifted from supply-driven to demand-driven pattern. This shift is another major factor behind the imbalanced between the productivity of natural resources and their usage. Nevertheless, the relative isolation and small size of rural communities and proximity to environmental resources imparted indigenous knowledge and understanding of the constraints and usability of their natural resource base. It helped in the development of methodological practices for protecting and regenerating the resources while using them in a sustainable manner. Moreover, it facilitated the creation of local social institutions and formulation of locally implementable range of rules and regulations to insure the adequate utilization of natural resources. Such regulatory measures include rotational grazing, periodic fallowing of cultivated lands, reciprocal activities and cooperative actions and periodic contribution of labour and

capital in investment for trenching, fencing and other community based practices (Pant 1935; Jodha 1998; Tamang *et* al. 1996; Bijoness 1983).

The present study is an attempt to explore and analyze the indigenous natural resource management approaches and the effectiveness of local social institutions which monitor the management and utilization of natural resources. The study is focused on the Roghani Valley located in the Hindu Raj Mountains — an off-shoot of Hindukush Mountain Range – Northern Pakistan. Similar to most other parts of this mountainous belt, the resources are kept and managed under de facto[1] ownership. The inhabitants of the valley have introduced indigenous approaches and mechanisms for the management of natural resources. Certain rules and regulations have been formulated orally by the local inhabitants, which regulate and guide the utilization of natural resources.

Study Area

This study is conducted in Roghani Valley located in the Hindu Raj Mountain (an offshoot of the Hindukush Mountains Range) lying between 34°54′33″ to 35°00′28″ N latitude and 71°55′35″ to 71°00′13″ E longitude. It stretches northward from the right bank of River Panjkora in Lower Dir district and reaches up to the high mountains in Upper Dir district. The height of the valley ranges from 500 meters above mean sea level in lower parts to over 3,000 meters in the upper mountains. The whole valley is divided into four altitudinal belts locally known as *tal* including; Jelar, Sami, Shahkani and Shalkani and eleven villages (Figure 1). The first five villages, Shalfalam, Mano, Khararai, Shalkani Payeen, Shalkani Bala, are part of Lower Dir district while the remaining six villages including Umarkot, Shahkani, Naseerabad, Gato, Samai and Jailar are located in the administrative jurisdiction of Upper Dir district. The wide altitudinal variation determines the uneven distribution of natural resources in the valley.

The study area is inhabited by Roghani tribe which is divided into four main clans; namely Mahmood Khel, Kwadezi, Yaqoobzi and Enazi and each of them is further divided into three sub-clans making up a total of 12 entities. The population of Mahmood Khel and Kwadezi clans is distributed throughout the valley, while the other two clans are settled in few villages. These four clans are de facto owners and have equal share in resources located within the valley. However, the non-bona fide residents, such as blacksmiths (*ingar*), prayer leaders (*pesh imam*), and barbers (*nai*) have been given rights only in cultivated land and irrigation water in return for the services they perform to the tribe (Sultan-i-Rome 2005, 2007).

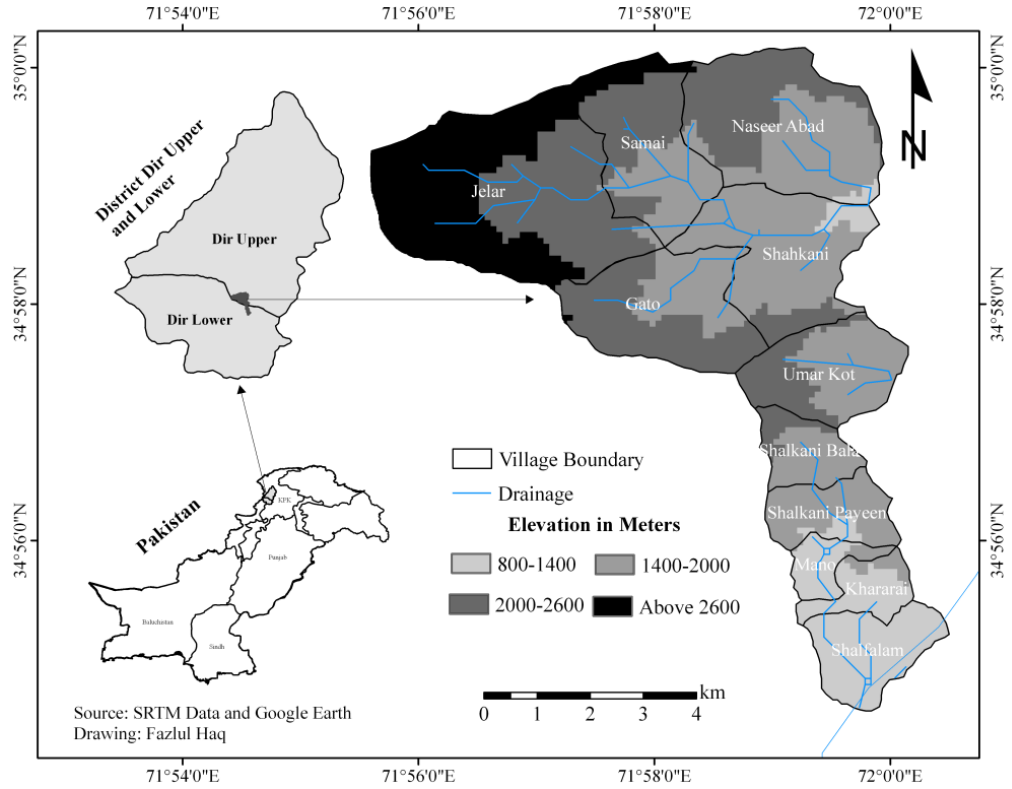

Figure 1: Location and Physiography of Roghani Valley

Research Method

Data Collection Method

As mentioned earlier, the resources are owned and managed by the local inhabitants with no interference from the state. The regulatory measures and management strategies are orally formulated and there are no written records regarding the institutional arrangements for natural resource management. Therefore, this study is primarily based on qualitative information collected through interviews and focused group discussions. Interviews were arranged with knowledgeable elders (17 in number) about the evolution and enforcement of institutional mechanisms for natural resource management. Moreover, at least one Focused Group Discussion (FGD) was arranged in each of the four *tals.* The FGDs were scheduled on Sundays (nonworking day) and were kept open for all the inhabitants of the valley in order to have maximum participation. However, it was made sure that the group contains at least one elder from each village located in that *tal* in addition to one representative from each of the four major clans. These

discussions were focused on the resource management strategies and their efficiency in the sustainable management of natural resource. The information provided the main basis of retrospective discussion on the natural resource management mechanisms and their effectiveness.

Frequently used Terms

A few important local terms, frequently used in this study, are explained below:

1. ***Dawtar:*** *Dawtar* is a common local term which refers to territory belonging to the bona fide members i.e. the original residence of an area. This term has been extensively used in literature, spelled sometimes *doftar* or *daftar* as well (Zarin & Schmidt 1984; Sultan-i-Rome, 2005, 2008).
2. ***Wesh:*** *Wesh* is a term implies for the allocation of shares in *dawtar.* Usually, *wesh*[2] is used for the temporal allotment of land or resources (Janjua 1998; Sultan-i-Rome 2008; Nafees et al. 2009). However, literally it means division, distribution or allotment; therefore it may be used to describe the permanent allotment as well.
3. ***Dawtariaan:*** The people having shares in *dawtar* by inheritance are known as *dawtariaan* (Sultan-i-Rome, 2008). The shares in *dawtar* automatically transferred to the descendents.
4. ***Barkha/Brakha:*** *Barkha* literally means part or share and is used to describe the plots, strips or strata into which a land or forest area is divided for allotment among the shareholders.
5. ***Khasanry:*** *Khasanry* means drawing lot. It refers to the traditional method of drawing lots during *wesh* and through which the land and other resources are allotted among the users (Zarin & Schmidt, 1984; Nafees et al., 2009).
6. ***Salay:*** It is a conical shaped heap of stones also referred to as a pyramid of smaller stones[3] made on the boundary of two *barkha* in forests and barren hillsides. Usually the *salay* is whitened with lime in order to look prominent.
7. ***Qaumsaray:*** It refers to the common lands and resources, also known as *Shamilat* in some areas. In Roghani valley *qaumsaray* refers to an area inside or near the villages, which is still not divided among the people.
8. ***Mulan:*** These are the people who perform religious duties for the villagers (Sultan-i-Rome, 2008), like matrimonial rituals, prayer and funeral leading (*Imamat*), and mosques management etc. The descendents of *mulan,* who may not perform these duties, are also entitled as *mulan.*
9. ***Serai:*** It refers to the cultivated lands under the ownership of *mulan* and artisans, which is awarded to them in return for their duties (Sultan-i-Rome, 2008). *Serai* is usually the most fertile and high valued cultivated land in the village. The owners of *serai* are called *serikhwara,* who have no shares in other

privileges of *dawtar* (withdrawal rights from forests, rangelands and other common property resources of the village)

10. ***Banda:*** *Banda* refers to a hamlet in the remote mountains pastures (Sultan-i-Rome, 2008). Temporary dwellings and huts are constructed for animals' shelter. *Banda* is used as summer house where the herds are shifted for feeding and breeding during the summer months.
11. ***Warsho:*** *Warsho* implies to the rangelands (vegetation covers areas) inside and around the villages (Sultan-i-Rome, 2008).
12. ***Nagha:*** *Nagha* literally means ban, restriction or prohibition. The community forests or rangelands where the collection of forest products and grazing are banned are said to be in *nagha* or under *nagha.* It also refers to the absolute fine, which is taken from those who commit to violate the ban.
13. ***Kakhy:*** *Kakhy* is the person appointed by the community for monitoring of resources. The *kakhy* also called *zaitu*[4] in some areas, is responsible for implementing the ban, guarding the forests, rangelands, prevention of grazing and extraction of products from the restricted areas, check and report the actions of violators.
14. ***Dhand:*** It is a small pond constructed near a spring to store water for irrigation. Water storage in a *dhand* is a mechanism to regulate the discharge of water.
15. ***Wala:*** *Wala* (plural: *wale*) may be called a minor canal. It is the main water course taken off from rivers or streams from which further narrower extensions are branched off. *Wale* are usually constructed and concreted running along the uppermost margin of cultivated land up to which the water level can rise.
16. ***Lakhtay*** (plural: *lakhtee*)***:*** These are the narrow water courses taken off from *wale* or streams or taken out from *dhand,* which supply water to the fields also referred as *kuhls*[5] in some areas.
17. ***Waar/Number:*** *Waar* literally means turn. It is used for the turn in water utilization scheme and in sharing responsibilities such as animal husbandry, guarding the community protected areas i.e. forests and grazing lands etc.
18. ***Godar:*** It means spring. This term is usually used for the particular spring in a village which is specified for the fetching of drinking water only.
19. ***Tal:*** *Tal* literally means a set or a combination. This term is used to describe the combination of villages to form one large segment.

Ownership Regimes and Management of Resources

Natural resources are kept under various ownership regimes according to their nature, availability and importance (Fazlur-Rahman, 2005, 2009). The indigenous tenure system locally known as *wesh* provides base for the categorization of natural resources into different ownership regimes. The resources of the valley are

classified into the following major categories based on ownership status. Every category has a set of orally formulated rules and regulations and the resources under each ownership regimes are managed accordingly. Figure 2 gives a detailed description of the ownership regimes for different resources.

1. Private Ownership

Agricultural lands of all the villages have been privatized and distributed amongst the individual owners according to the *wesh* system. Three types of agricultural land can be found in the valley i.e. *sholgara* (irrigated land), *jwardara* (semi-irrigated) and *lalma* (rain fed). The distribution of these lands over different villages is determined by the availability of irrigation water. The allotments have been made in such a way that every member of the village is given share in all types of the cultivated land. Therefore, agricultural land throughout the valley is fragmented into small fields owned by individual users.

Residential lands within the villages' boundaries are divided among the shareholders of each village and owned individually. Due to a continuous growth in population, the residential areas of each village are expanding towards the nearby barren slopes and rangelands. The open lands and gentle slopes near and around the built up areas, are divided into *barkha* (plots) and allotted to the individual owners in most of the villages. These *barkha* are used for the construction of new settlements by the members separated from large joint families. However, in few villages the residential lands are not privatized due to certain factors and are still considered as *qaumsaray* (common), for example in Shalkani *Tal*. Here the people use to construct houses in the *qaumsaray* areas prior to the process of allotments. Then during the time of division, the people make certain adjustments. The *qaumsaray* land is divided into *barkha* and the area under the possession of someone is allotted to the clan or sub-clans whose member have constructed house or occupied it. Then the *barkha* is divided among the shareholders of the clan or sub-clan in such a way that every member may get equal share as well as the one who has already occupied a part, may also not suffer. The same is the case of g*harieza* (barren hillsides). The *gharieza* is also divided into *barkha* and allotted to the individuals, while in some cases these lands are still treated as *qaumsaray* or common.

Forest resources are treated differently in different villages. In some villages forest areas are divided among the individual shareholders and both the trees and land are privately owned (Fazlur-Rahman, 2005). On the other hand in few villages the trees are allotted to the owners, while the land under forest cover is considered as common. The trees are divided among the owners in two ways:

a) In case of widely scattered big trees like pine, the number is counted and divided among the shareholders. For example, in southern part of the valley, the pine trees are very few in numbers and sparsely distributed on the hill tops. Here the trees are counted and allotted to the owners.
b) The hillsides in the northern part of the valley; hence these areas have been divided into *barkha* for individual allotments. The forest *barkha* belonging to different owners are usually separated by watersheds or *salay* (heap of stones indicating boundaries).

2. Communal Ownership

The privatization of natural resources started almost a century ago, when the old tenure system was replaced by the present one. However, the process has not been concluded and many resources are still under communal ownership. The commons of Roghani valley can be classified into two categories on the basis of scale of ownership. (a) Commons of the whole tribe. (b) Commons of individual villages

(a) Commons of the Whole Tribe

During the process of permanent allocation of shares, Umarkot village was excluded from distribution. It was decided that the territory of this village including all the resources will be a common property for the whole tribe. According to the elders, there were two reasons due to which this village was not subjected to the process of distribution. (i) This village is very harsh and unfavourable for living due to its remoteness, rough topography and steep sloped hills, lack of cultivable land and scarcity of water. Due to these factors, no one was willing to settle here permanently and restrain themselves to this impoverished village. (ii) Umarkot village has a very thick forest cover with diversified species composition. It was supposed that the communal restrictions might prevent the uncontrolled exploitation of these forests.

(b) Commons of Individual Villages

Besides the commons of the tribe, there are certain resources which are common for the members of individual villages e.g. water, w*arsho* (rangelands) and forests (Fazlur-Rahman, 2005). Usually the village's commons are shared equally by all the inhabitants living there including the *mulan* and other migrants. For example, there are no exclusions in utilizing domestic water and no restrictions are observed on grazing in the rangelands for anyone residing in the village. However, in case of some resources the user rights are confined to the bona fide members only. For instance, the people with some other origin are not allowed to extract forests and rangelands products. Similarly, they cannot utilize the commonly owned barren

hillsides or other communal lands inside the village for cultivation or construction of settlements. The barren hillsides, rangelands and open spaces in the residential area within the territorial boundaries of each village are mostly undivided and are treated as common.

The communal management of such individually owned assets is due to the degradation of forests and rangelands. In the past few decades, the vegetation covers of Shalkani *tal* have been degraded at a very rapid rate. Almost 90% forests have been removed in a very short period of time (Fazlul-Haq, et al. 2011, 2012; Fazlul-Haq, 2012). From the last five to seven years the inhabitants of these villages have covered most of the barren areas with new plants. Every year the community contributes money to buy plants and participate actively in plantation. The newly grown plants and existing sparse vegetation covers are protected through implementing locally formulated rules and restrictions. A guard is usually appointed by the community known as *kakhy* who looks after these forests. The *kakhy* is paid in cash for his services on monthly basis, which is contributed by the community. However, in some cases the *kakhy* is given a fixed amount of grain by every household in both *Rabi* and *Kharif*. The *kakhy* is responsible for guarding the community forests and rangelands. Grazing of animals and extraction from these protected areas are strictly banned for the community members as well as the outsiders. In case of violations, sanctions are imposed on the defaulters, which are orally decided by the people.

3. Open Access Resources

The rangelands and pastures of the whole valley are treated in a way like open access resources for the inhabitants of Roghani valley as well as the herders from the surrounding valleys. Pastures are found only in the high mountains of Jailar village. This area is given the name *dhanda* (lake) because of the presence of two natural depressions where rainwater accumulates resulting into the formation of lakes. These lakes provide drinking water to the grazing animals during the summer grazing season. The people of Jailar village have built summer houses and huts in the area resulting into the development of a traditional *banda.* The inhabitants of Jailar village shift their livestock to these pastures in summer and spend from 4 to 6 months here. A number of professional herders or *gujjars* also come here along with their livestock to spend the grazing season. Similarly, the people from the surrounding valleys also graze their cattle in these pastures during the summer months. However, the property belongs to the bona fide residents of Jailar village only. The houses and huts are constructed and used by them, while the outside herders and *gujjars* drive their cattle daily for grazing and return to their residence in the nearby mountains at night.

Almost half of the members of each family of Jailar village spend the summer months in these high mountains with their livestock in their summer houses. The remaining members of family stay in their permanent dwellings in the village and perform other activities like agriculture, irrigation, fuel wood and fodder collection for winter and other economic activities. The pastures are snow free and favorable for grazing from April to the end of August. While in the winter months and early spring the pastures regain the greenery. The people of Jailar village have to look after these pastures, care for the maintenance of *dhanda*, repair paths to the pastures and construct huts. The outsiders have no obligatory duties regarding these activities. The daily use items for the herders and their families are supplied from the main village. The herders' community adopts a turn-wise (*waar*) mechanism for the transport of materials to these pastures by donkeys. A group of 5 to 6 members is sent along with a number of donkeys to the village, usually on monthly or weekly basis. Those members load the donkeys with the food stuff and other items required by the herders' and go back to the pastures.

Such pastures are not available in the rest of the villages of Roghani valley. However, every village has some rangelands locally known as *warsho.* There are no restrictions on grazing. As a property, the rangelands within the territorial limits of a village are owned by the bona fide residents; however grazing lands are treated as open access resources. Nevertheless, in case of those villages, where afforestation is in progress, grazing is prohibited for everyone, even the owners are not allowed. If someone is found violating the restrictions, will face sanctions formulated by the community. In case of rearing cattle and extraction of forest products from such restricted rangelands or community forests, certain *nagha* (fine) is imposed according to the severity of offence.

Water Management

The availability of water, both for irrigation and domestic use is quite limited in the valley. Due to limited availability, water resources are managed very carefully throughout the valley. Wherever irrigation water is available, the community has developed excellent storage heads, distribution channels and controlling mechanisms for the adequate utilization of water resources. Similarly, proper care is taken for the maintenance of springs which provide water for drinking, storage reservoirs and distribution networks which supply water for domestic uses.

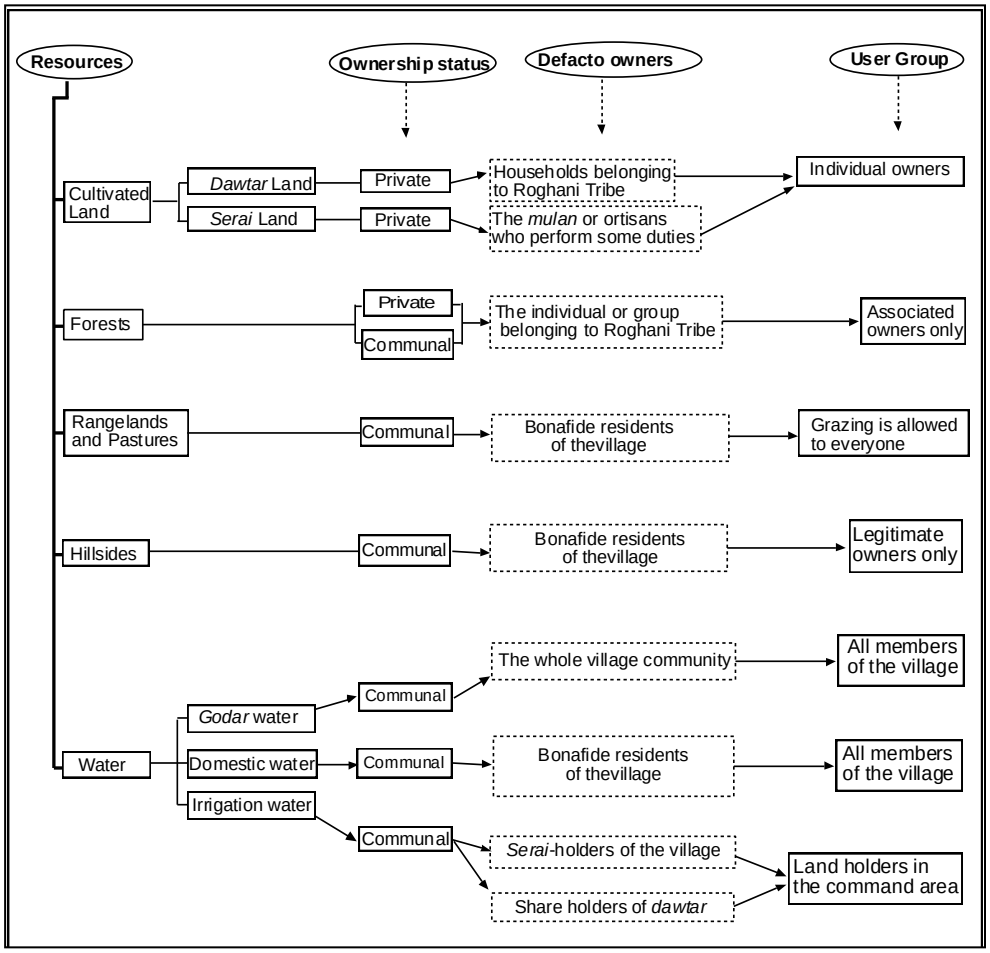

Figure 2: Ownership of Natural Resources

Management of Irrigation Water

The management strategies for water resources vary from village to village depending on the availability of water, clan-wise composition of population and cultivable command area in case of irrigation water. In Shalfalam village, the flood plain of river Panjkora is used for cultivation. Therefore, most part of the cultivated lands of this village lies in the command area of the river. Two minor canals locally known as *wala* are taken off from the river at different places with such an altitude to bring as much area under irrigation as possible. Water from the river is diverted into these *wala,* which are branched off into many narrow water courses called *lakhtay* (plural *lakhtee*). The main channel or *wala* is well structured and lined while the minor extensions i.e. *lakhtee* are mostly un-lined and made up of stones and

clay or excavated in the fields' surface. The *lakhtee* are driven throughout the cultivated lands, which distribute water to each and every field. All these structures for the distribution of irrigation water are constructed by the community (Velde 1992; Jodha et al. 1992; Fazlur-Rahman 2005) through collective actions. Those members of the community who have lands in the command area of a particular *wala* are responsible for the construction, repair and maintenance of water supply network (Ura & Gupta 1992). They have to contribute both physically in the form of collective labour force in order to carry out the work, and economically in the form of collecting money for other expenses.

In most of the other villages, irrigation water is not permanently available throughout the year. Here springs are the only sources of domestic and irrigation water. In each village there are one or more springs, which usually fulfill the domestic water requirements. In a few villages the surplus spring water is used for irrigation purposes as well (Velde 1992). However, the amount and availability of irrigation water in these villages, is not the same every year as it depends on precipitation. In dry years, irrigation cannot be practiced at all. In the years, when sufficient snowfall and rainfall takes place, the springs discharge some surplus amount of water which is used for irrigation. Small reservoirs or lakes locally called *dhand* are constructed near the springs in order to store the surplus water (Figure 3). The water is stored in the *dhand* at day time and released at the evening to irrigate the fields. At night the *dhand* is again filled with water, which is released to the fields in the morning. The water stored in the *dhand* is distributed to the fields through *lakhtay* (Figure 4) taken out from the mouth of the *dhand,* which is further divided into a number of branches running throughout the cultivated land (Velde 1992). The mouth or opening of the *dhand* is guarded by a valve or stone which regulate the discharge of water into *lakhtay.*

The *dhand* are constructed by the community, mostly concreted but sometimes may be made up of stones and clay. The distribution of *dhand's* water among the people is controlled and regulated by the traditional day and night *waar* mechanism formulated on the basis of *wesh* system. While irrigating fields, two persons of a family go to the site of irrigation in order to utilize their water *waar* efficiently. One person operate irrigation in the fields, while the other one regulate the discharge of water from the *dhand* and walk frequently through the course of *lakhtay* in order to prevent the wastage of water on the way.

Management of Drinking and Domestic Water

In every village certain springs are specially chosen by the community for fetching drinking water. Such springs are locally called *godar*, mostly associated with

women as fetching of water is exclusively female dominated activity in the area. Traditionally male are not allowed to visit the *godar* or interfere in the fetching of water. While filling the water pots in *godar,* the women follow the 'first come first served' rule i.e. the one who reached earlier to *godar,* will have an early turn to fill the pot. However, the elder women are respected by the younger ones and are allowed to fill water regardless of their turn.

Figure 3: *Dhand*

Figure 4: *Lakhtay*

Water for other domestic uses is distributed to the houses through water supply schemes operated by village communities. For household supply, water from one or more springs is channeled through a main pipe to a storage tank, which is properly constructed and protected. It is constructed at such a height that water can be supplied to the maximum possible number of houses through gravity (Figure 5). The tank opens into a big main pipe and the opening is guarded by a regulating valve. For every house a connection is taken from the main pipe. Water is stored in the tank for the full day and is released one time either in the morning or in the evening. For operating the valve, a man is appointed by the villagers to operate the valve, care for the cleanliness and maintenance of water tank and prevent the illegal use of water. The villagers contribute money for the fixed monthly salary of the valve-man. The money is collected on per connection basis both for the salary of the valve-man as well as the repair of main water supply schemes if needed.

Property Rights and Utilization of Natural Resources

Property rights, the claim to the stream of benefits from the resources (Bromley 1991; Ostrom 2004) involves a relationship between the beneficiary (right holder) and other members of the user group as well as the institution that supports the claim of the user by placing corresponding obligations on others (Gregorio et al. 2008). A property right does not necessarily imply the sole authority or full ownership of a resource to the user; rather it is a multiplex of different rights like access to resources, exploitation for economic purposes and rights to management etc. The access, withdrawal and utilization rights for different resources in Roghani

valley are clearly defined and well understood. These rules are formulated and implemented orally. However, these rules have been and are functioning successfully in guiding and governing the use of natural resources. Each ownership category has a defined set of access and utilization rights, restrictions and exclusions as well as the associated obligations. The ownership of *dawtar* is the key to utilization rights and exclusions from resources for the individuals. The access-withdrawal and utilization rights of the users in case of different resources are summarized in Figure 6.

Figure 5: Water Supply Scheme

Right to Land

Arable land, which is kept under private ownership, is utilized by the individual owners independently. However, certain customs do exist in the valley regarding the obligations concerned with the use of privately owned cultivated land.

The cultivated fields are used for free grazing after harvesting crops. Livestock belonging to anyone can freely graze on the stubble residue in all the fallow fields without any restrictions. No one can be excluded from the rights to graze livestock in the fallow lands whether he has share in *dawtar* or not.

As the sowing season starts, the entry of livestock into the cultivated lands is banned by the community.

The cultivated lands located along the paths need protection from livestock walking to the rangelands or returning back to the homes without a guiding shepherd. In such cases, the owners of the outermost fields (bordering the paths) are responsible to mend the fences before the cultivation of fields.

When harvested, wheat crop is dried and threshed in the fallow fields. The fields owned by anyone can be used for this purpose. The fallow fields are also used as pathways for thresher to pass through to the next threshing site. If needed, the retaining or boundary wall of a field or its part may be detached (destroyed) to give way to the thresher, while the owner of the field can pose no restrictions. However, the restoration of the detached walls is the obligation of the needful person and the owner of the field can claim it.

Similarly, in case of cultivated lands, *lakhtee* (water courses) pass from one field to the other. The owner of the field through which a *lakhtay* is passed is not allowed to destroy it or engulf it into his field area. Rather the owner is obliged to take care for the maintenance of *lakhtay* passing through his field. Some minor variations in the above mentioned customs can be observed from village to village. For example, free grazing is not allowed in few villages in order to protect the agro-forests.

Right to Forest Resources

Only the members of Roghani Tribe have the rights to utilize forests, while the migrated *mulan* or other outsiders are excluded from the access and utilization rights of forests. Forests are either owned privately or communally by small user groups, usually the members of a clan inhabiting in the village. The members of such a user group sharing a forest *barkha* have equal rights to extract benefits from their communal share as well as they equally perform the concerned duties. The members of the user group ban the extraction of forest products for the whole summer season, and release the ban for a specific period usually two or three months in winter (Figure 6). During this period, a fixed number of head loads of fuel wood and fodder can be brought by every household daily. Cutting of tree trunks, ripping up the plants with roots or any such extraction, which may result into degradation of vegetation cover, is not allowed. Selling of trees or exploitation of forests for income generation is also prohibited. Every member of the user group is responsible to check and monitor the exploitation of the communal *barkha* by the legitimate owners as well as discourage the entry of outsiders. In case of afforestation, every member has to participate in the collective actions and contribute equally (Ura and Gupta, 1992) in terms of labour force and money. If the rules are properly implemented, such small scale communal arrangements become very effective for the management and conservation of forest resources.

Pasturage Rights

The pasturage rights are not restricted to the village community or any other specified user group (Figure 6). The pastures and rangelands of a village can be used for grazing by the herders of other villages as well as the outside *gujjars*. The *gujjars* from outside the valley have no permanent houses and livestock shelters of their own. A member of the village community provides house and shelter to the *gujjar* in return for manure, dairy products and services like the collection of wood and repairing of fields etc. (Fischer 2000). The *gujjars* are restricted to grazing rights only (Stuber & Herbers 2000; Schmidt 2004) and are not allowed to use the pastures and rangelands for any other purpose like the extraction of wood or construction of dwellings and shelters etc. However, if a general ban is observed by the village community, then both the outsiders and the owners must tolerate the restrictions. For example, grazing is not allowed in the rangelands of the villages of Shalkani *tal* due to the afforestation. The plants are protected from the livestock for a period of 10 to 15 years, and grazing is allowed when the plants grow enough.

Water Rights

In case of irrigation water, the utilization rights are confined only to the land owners or the bona fide residents (Figure 6). On the other hand, there are no exclusions in case of domestic water. The *godar* water is utilized freely by the women of the village without any restrictions on the number of users from one household or the volume of water taken by a household in one day. The inhabitants of the village – regardless of their origin – can utilize *godar* water. For domestic water, every household has the right to take one connection at least, and a standard criterion of household size is decided by the village community for the right to take an extra connection. In most of the villages, if a household size exceeds 15 members, it is considered for the allotment of second connection.

Utilization rights in irrigation water are basically allocated to the lands not to the people, whether the lands belong to *dawtar* or *serai*. Irrigation water is utilized through the traditional *waar* mechanism (turn). The mechanism of *waar* and the distribution of water rights among the users are different in different villages, depending on the availability of water, overall value of villages in *dawtar* and clan-wise composition of population. In a general context, the *waar* is regulated on a weekly basis in the whole valley. The utilization rights are distributed among the users in such a way that every member can have access to water (Velde, 1992) once a week. The water rights of the individual users depend on the size of landholdings in the cultivated areas. The seven days of a week are allocated to the landholders in two major ways depending on the existence of *serai* lands in the

command area of a particular irrigation network. As a result two main types of *waar* mechanisms are developed:

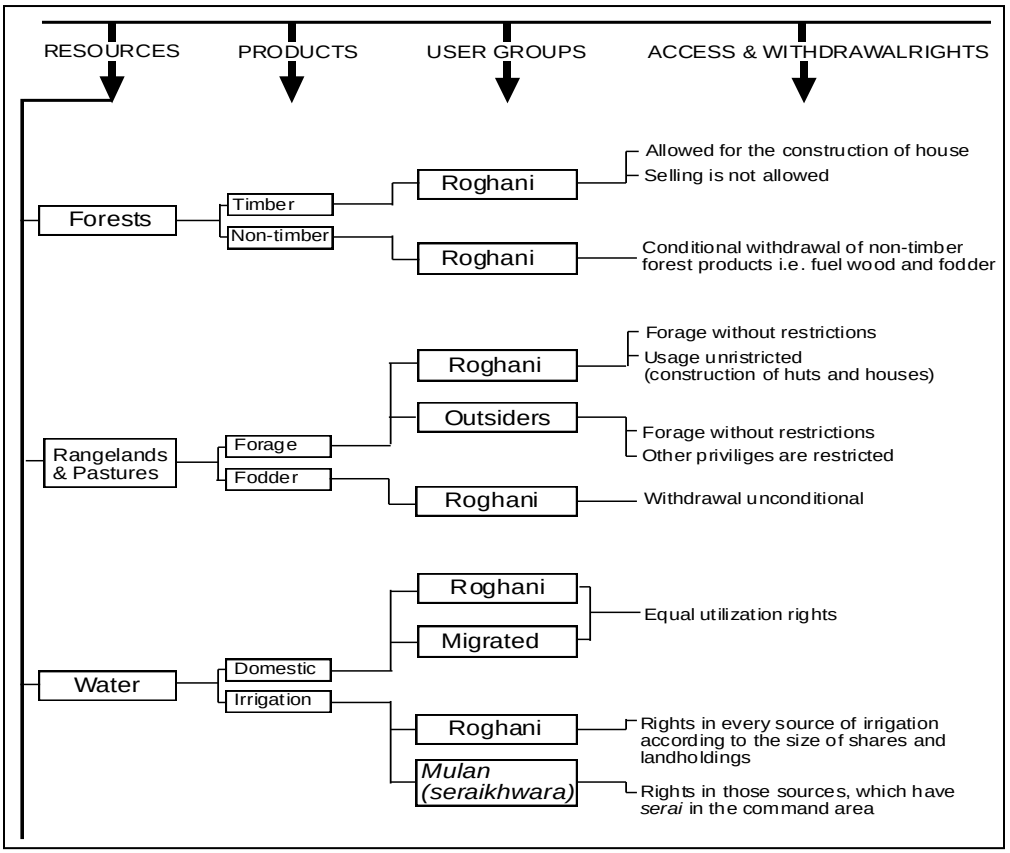

Figure 6: Utilization Rights in the Communal Resources

(a) *Waar* with weekly rotation: Those water sources (*dhand* or *wala*), which have no *serai* in the command area and irrigate the lands of *dawtar* only, are utilized on a rotating *waar* basis. Six days of the week are allocated among the users, while the seventh day is kept free in order to rotate the *waar*. For example a person having water *waar* on Saturday in the first cycle, will have his *waar* on Friday in the second cycle i.e. one day earlier in the next week.

(b) *Waar* with no rotation: Those irrigation channels, which irrigate both the lands of *dawtar* and *serai,* are operated on a fixed *waar* basis. One day of the week is specified to the lands of *serai,* while the remaining six days are allocated to the lands of *dawtar.* Hence, all the seven days of a week are allocated to the users permanently without any free day for weekly rotation. Every user has water rights

on a specified day of the week, either a full day in case of larger shares or few hours if he possesses smaller share.

Conclusion

This paper examined the mechanism of natural resource management in the mountainous regions of Pakistan. Most parts of the northern mountainous belt of Pakistan are unsettled and there are no cadastral records for the ownership of natural resources. Here the resources are kept under de facto ownership and the state does not interfere directly in any kind of activities regarding the management and utilization of natural resources. All kinds of resources are managed and utilized under the customary tenure arrangements or *wesh* which are introduced locally by the inhabitants. *Wesh* system has worked successfully for a long period of time in the whole Khyber Pakhtunkhwa Province. However, this system was gradually abolished in the plain areas wherever cadastral settlements took place. Nevertheless, the system is still in practice in most of the mountainous areas such as, Swat, Dir, Malakand, Kohistan and other surrounding areas.

The local communities have designed social institutions which guide the management and utilization of natural resources. Certain rules and regulations have been orally formulated which define the rights and obligations of the users who own and use the resources. A set of rules and regulatory measures have been defined for all kinds of resources. The user groups and property rights are clearly understood and there are sanctions imposed by the community in case of violating the rules or disobeying the mandatory duties. Though there are no written codes but these orally formulated rules are respected by the community members. The community based natural resource management can be an effective way for the conservation of natural resource base. However, this argument depends on the proper implementation of the regulatory measures adapted by the community.

Notes

[1] Such type of ownership is not recognized by the state authorities; that is there is no interference from the state regarding the management and utilization of natural resources.

[2] According to colonial sources, this system has served for a long time in the entire Khyber Pakhtunkhwa Province (cf. Barth 1956; Spain 1973).

[3] For more details see (Stuber & Herbers 2000)

[4] See (Janjua 1998 p.419)

[5] For details see (Velde 1992 p.572)

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