INTERDEPENDENCIES AND RECIPROCITY OF PRIVATE AND COMMON PROPERTY RESOURCES IN THE CENTRAL KARAKORUM

With 10 figures, 2 tables and 2 supplements (I, II) (fig. 2–4 on suppl. I, fig. 6–8 on suppl. II)

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Zusammenfassung: Interdependenzen und Reziprozität von Privat- und Allmende-Ressourcen im Zentralen Karakorum

Ackerbaulich und weidewirtschaftlich nutzbarer Boden sowie für die Bewässerung verfügbares Wasser stellen für die Bevölkerung des Zentralen Karakorum im Rahmen der von ihr betriebenen *combined mountain agriculture* essentielle Ressourcen dar, die aufgrund ihrer limitierten Verfügbarkeit einem strengen Management unterliegen. Die in der Debatte um die „Tragödie der Allmende" erhobene These, nach der die gemeinschaftliche Nutzung einer knappen Ressource zwangsläufig zu ihrer Degradierung führt, wird infrage gestellt. Am Beispiel der Talschaft Shigar in Baltistan (Nordpakistan) werden aktuelle Nutzungsmuster von Land- und Wasserressourcen, die sie steuernden Institutionen wie Wasser- und Weiderechte sowie Regelungen zu Verpachtung und Veräußerung von Land vorgestellt. Dabei beweisen die autochthonen Managementstrategien und Institutionen durch ihre fortwährende Fähigkeit, ein komplexes Netz von Bewässerungskanälen instand zu halten, Zugangsgerechtigkeit zu den Ressourcen zu schaffen, Konflikte intern zu lösen und Regelungen flexibel zu handhaben, eine große Robustheit und befähigen zu einer nachhaltigen Ressourcennutzung.

Summary: Agricultural and pastoral lands as well as water which can be used for irrigation are essential resources for the combined mountain agriculture which is practiced by the population of the Central Karakorum; due to their limited availability they are managed in a strict manner. The assumption – made in the debate about the "Tragedy of the Commons" – that common utilisation of resources necessarily leads to their degradation is challenged. Taking the example of Shigar in Baltistan (Northern Pakistan) current patterns of utilisation for land and water resources, their governing institutions such as water and pasture rights as well as regulations for land tenure and land alienation are presented. It will be shown that autochthonous management strategies and institutions, which are still able to maintain a complex network of irrigation canals, to ensure just access to the resources, to resolve conflicts internally and to apply regulations flexibly, are proving to be very robust and capable of facilitating sustainable resource utilisation.

1 Introduction

The dependency on local land and water resources for securing livelihoods is not a phenomenon of the past but a reality of today for many people worldwide. In regions at the edge of the ecumene natural resources used in a more extensive way, such as pasture lands, forests or water are often characterised as being used by groups and owned by entities such as a collective or the state. The advantages and disadvantages of such common property resources for the efficiency, equity, and sustainability of natural resource use patterns have been debated in legal and economic literatures for a long time.[1)] In his famous article "The tragedy of the commons", HARDIN (1968) argued that common property will always be over-utilised and finally destroyed because the gain that individuals make by over-exploiting it will outweigh the loss they suffer as a result of its over-exploitation. He used the example of a herdsman, keeping his cattle on a common pasture. With every cow the herdsman added to his herds he would gain more than he lost: he would be one cow richer, while the community as a whole would bear the cost of the extra cow.[2)] Many economists and planners have referred to this example, which has been seen since then as a metaphor for the over- or false utilisation of common property resources, and have suggested that the way to prevent this tragedy from unfolding is to privatise or nationalise common land. However, such statements are based on specific prejudices and confusions that relate to the non-observance of differences between common property regimes and free-for-all regimes. They see commons as property regimes that are open-access or everybody's property (CIRIACY-WANTRUP a. BISHOP 1975, 715) where no one has the legal right to exclude anyone from using the resource. If such a resource gen-

[1)] See BERKES (1989); BERKES et al. (1998); FEENY et al. (1990); OSTROM (1990); BUCK (1989); HANNA et al. (1996); OSTROM a. SCHLAGER (1996).

[2)] Similarly, OLSON (1965) argues that in a big group of non-organised actors the utilisation of collective resources is led by the individual interests of the actors; the fear of free-riders hinders improvements and leads to over-utilisation of resources.

erates valued products, then one can expect that the lack of rules regarding authorised use will lead to misuse and over-exploitation (OSTROM 2000, 30).[3] In common property regimes on the other hand, utilisation rights are well defined and limited to a clearly demarked group of rights holders, and must not be confused with resource regimes for which such rights are not specified. But, open-access regimes can also be the result of the ineffective exclusion of non-owners by the entity assigned formal rights of ownership. Many developing countries nationalised land and water resources which had not yet been recorded as private property. Thus, resources that had been under *de facto* common property regimes enforced by local users were converted into a *de jure* government-property regime, but reverted to a *de facto* open-access regime (OSTROM 2000, 39).[4]

It has become generally accepted that neither the state nor the market always, guarantees sustainable and effective utilisation of natural resources as can be seen in many cases. Communities in all parts of the world have governed resources without state or market institutions for long periods of time with significant success. Indigenous institutions for resource management are not generally unstable and inefficient but show sustainability insofar as such resources are utilised over decades or centuries without productivity decreasing. Institutions are understood here as including on the one hand the governing rules for utilisation – comprising both claims for possession and a bundle of rights and duties – and on the other the organisations which define, influence and control such rights (cf. NORTH 1990). When adequate rules for resource utilisation are missing, there is a danger of mismanagement or over-utilisation of the resource base. To avoid this, institutional frameworks have to be established.

Environmental change and recent demographic, political and economic developments such as population growth, migration, interventions by the public sector, privatisation initiatives, market expansion, and technological change put pressure on the vitality of traditional institutions of resource usage in different ways. Over long periods of time in many autochthonous systems an equilibrium existed between utilisation and regeneration of natural resources, which could lead to an institutional deficit when resource utilisation changed while the organisational and juridical structure remained the same (GOODLAND et al. 1989, 149). Compared with the fast technological and economic development the transition of institutions is mostly very slow, resulting in the degradation of the resource base. In response, a solution is often sought by changing the property rights in the direction of privatisation or governmental control. With regard to water and pasture resources in the Karakorum, the question of how the institutions governing land and water usage react to the recent changing frame conditions must be posed. Do they resist without change, will they be transformed constantly or do they collapse? Common resources such as water and pastures are important key variables with regard to sustainable utilisation of high mountain areas (BERKES et al. 1998, 20) and the sustainability of indigenous livelihood strategies.

In this paper the attempt will be made to demonstrate the complex local institutional arrangements that govern natural resource systems and explain why the village communities in Baltistan have been highly successful in governing pasture and water resources over long periods of time. This paper will challenge the conventional theory, which predicts that, without externally imposed regulations, resource users themselves are usually incapable of reformulating the rules they face and escaping from the tragedy of the commons. Based on empirical evidence, it is claimed that, under specific conditions, local actors can self-organise and be successful in managing their scarce resources.

2 *Study area and research methods*

2.1 *Geographical and historical setting*

Geographically, the study area Shigar Valley is located in the Central Karakorum, north of Skardu, the capital of the historically and linguistically defined region of Baltistan (Fig. 1). Its settlements are located only in the valleys, on alluvial fans, gentle slopes, or terraces above the rivers, at altitudes between 2,300 m (Marapi) and 3,050 m (Askole) (Fig. 2).

Until the middle of the 19th century, Shigar was ruled by local autocratic sovereigns (SCHULER 1978; EMERSON 1984; HASHMATULLAH KHAN 1987), whose authority was grounded on a system of land revenues and dues. All land within the political boundaries of Shigar was defined as the property of the ruling sover-

[3] These resources have to be differentiated from public goods; the latter could be used by many people at the same time without reducing the usage for each one; examples for public goods are scientific knowledge, solar energy, or news (cf. DIETZ et al. 2002, 19).

[4] The degradation of natural forests in Northern Pakistan is a typical example since the state is not able to control the resource utilisation (cf. SCHMIDT 2000; SCHICKHOFF 1998, 2002).

eign, who gave agricultural land to local farmers only in exchange for services and revenues, which had to be paid for in kind in the form of grain, livestock, butter, apricot nuts, wool, grass or wood. In 1846, a few years after being conquered by the Dogra, Baltistan including Shigar became part of the Princely State of Jammu and Kashmir.[5)] For the next 100 years all governmental business was carried out by the administration of the Maharaja of Jammu and Kashmir. The Maharaja declared that, as he had purchased the valley of Kashmir from the British, he was the sole owner of all lands in his territory; farmers were only his tenants-at-will (cf. THORP 1870, 26). However, at the local levels, the former sovereigns retained – at least for some decades – their right to collect revenues and to organise the administration, but the civil servants of the Maharaja demanded tribute from them to finance their garrison and administration in Skardu. Step by step the authority of the former sovereigns was further undermined and after some decades land revenues were collected by the administration of the Jammu and Kashmir state itself.

Just after the independence of India and Pakistan in 1947, the first war was fought between the two newly created states, resulting in the dissection of the former Principality of Jammu and Kashmir by a still disputed cease-fire line. Baltistan, together with the former Gilgit Agency, came under the administration of Pakistan as a disputed territory without achieving the status of a proper province. Traditional links to Ladakh and to the valley of Kashmir were cut off by the cease-fire line, leading to a redirection of commercial and political relations: new roads have been constructed linking Baltistan to the rest of Pakistan. Today, the region is dependent on grain supplies and consignments of other goods from the lowland of Pakistan, and even trading products from China arrive at the markets via the Karakoram Highway (KKH).

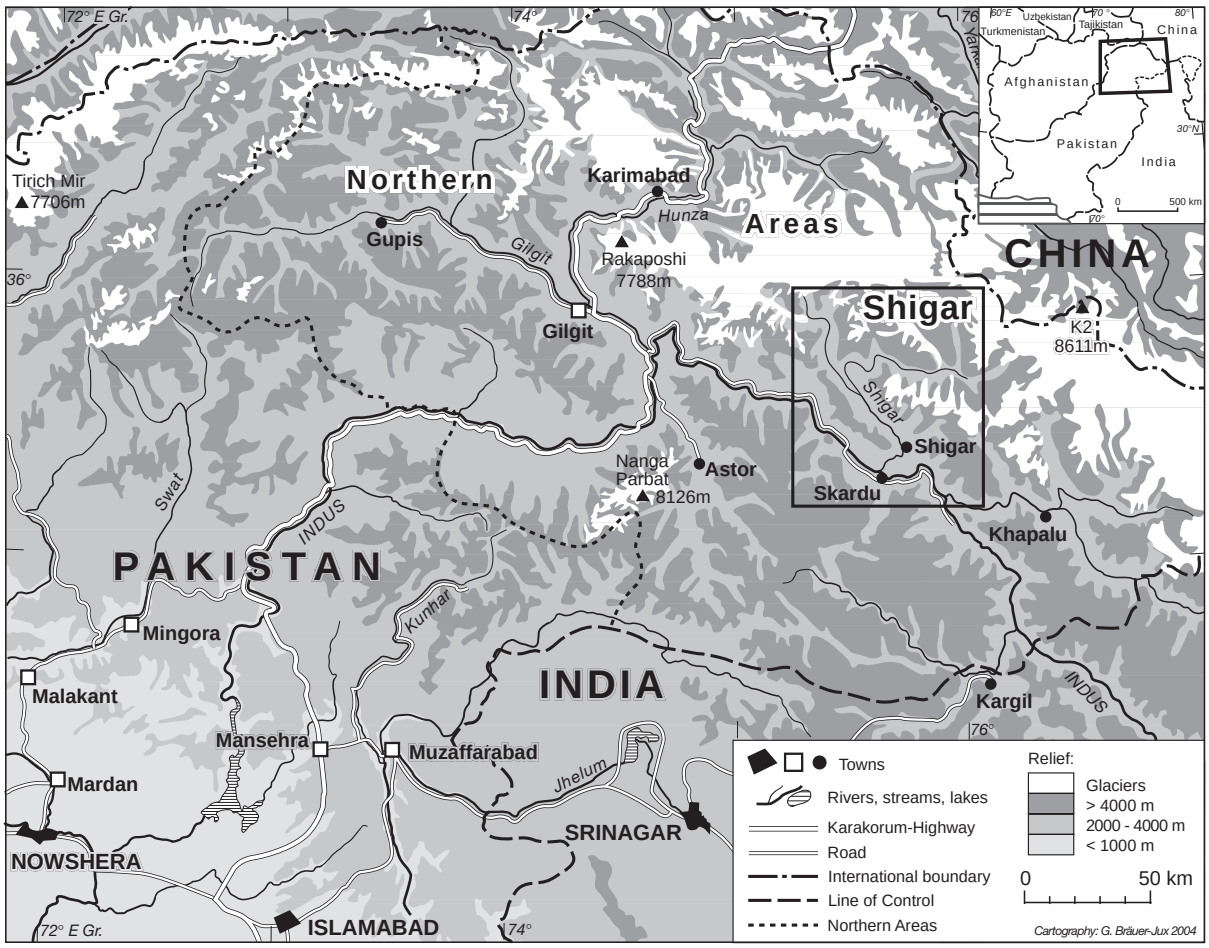

Fig. 1: Location of research site within the mountain belts of Northern Pakistan
Lage des Untersuchungsgebietes im nordpakistanischen Gebirgsraum

Table 1: Population of Shigar between 1911 and 1998
Bevölkerung in Shigar zwischen 1911 und 1998

Union Council	1911	1951	1961	1972	1981	1998
Total	26,256	24,136	24,723	27,738	32,364	45,322

Sources: DAINELLI (1924, Ser.II, 8, 392); AFRIDI (1988, 271–274); MALIK (1961, Part V, 3–5); GOVERNMENT OF PAKISTAN (1972, 46–49; 1984, 48–50; 2000, 2254–2257). All numbers are based on census data.

Almost all inhabitants of Shigar are of the Balti ethnic group, speaking Balti, an archaic non-written Tibetan dialect (BIELMEIER 1998). The majority of the population belongs to the Shi'ah (Twelver Shi'ah), a large minority are Nurbakhshi (cf. RIECK 1997), and less than 5% belong to the Sunnah. The population of Shigar has almost doubled over the past one hundred years and was more than 45,000 at the end of the 20th century (see Tab. 1). A population density of around 13 persons per square kilometre seems to be very low, but is calculated on the basis of the whole area of Shigar, ignoring the fact that vast areas of mountains, glaciers and deserts are not populated. Since less than 1% of the total area is irrigated and all settlements are located within these lands, the population density per square kilometre of irrigated land today is more than 1,100 persons. The average household, the smallest but most important social and economic unit, comprises 7.8 persons (GOVERNMENT OF PAKISTAN 2000, 2254–2257).

Settlements or *villages* in Shigar vary in size significantly, ranging from 15 households (Monjing) to 160 households (Marapi). They are entities which play a major role in social and economic affairs: Rights to water, pastures, and infrastructure like canals and paths are held by village communities, a necessity since the maintenance of such infrastructure needs collaborative efforts by all village households. Communal decisions are made by the village assembly or village headmen (*tsharma*). Furthermore, the *lineage* with clearly traceable genealogic connections, the *clan*, the patrilinear descent group (*qaum*), as well as the *neighbourhood*, are of sociocultural and economic relevance. Relatives and neighbours support each other in agricultural work such as ploughing, grass cutting, or harvesting. The question to be asked is: Which entity – state, village, household – has access to, utilisation of or ownership rights over the resources water and land? Whether water and land are governmental, communal or individual goods, and whether the utilisation is limited to a specific social entity or not, are points to be clarified.

2.2 Field research, archive studies and sources

Empirical field work in Baltistan was carried out between 1996 and 1998. Within the empirical data collection, qualitative, reconstructive forms of empirical social research were preferred, including participatory observation and focused interviews. Semi-standardised interviews were carried out in all villages within the research area, and thematically focused interviews with local experts served to obtain more in-depth information about specific aspects. Different local persons, mainly students and teachers, assisted during field work as interpreters and contact persons.

Historical sources which refer to water and property rights in Baltistan are limited and have to be handled with care. It must be borne in mind that accounts by locals about the past only describe how the narrator imagines the past to have been; history is constructed rather than uncovered. A similar problem arises with written sources which not only deliver assured facts but also interpretations of the "reality", in which contemporary ideas are included. Rare monographs, documents and written material were analysed at the India Office Library & Records, the School of Oriental & African Studies and the British Library during a two-month stay in London. Colonial cadastres produced for every village during the land settlements at the beginning of the 20th century, with information on land possession, land revenues, and on water and pasture rights were appraised at local and regional offices in Baltistan. Unfortunately, careless handling of the historical documents now and in the past has meant not only the loss of important files and information but, because of obsolete or false entries by the land assessors (*patwari*), careful interpretation of these data is necessary. Colonial cadastral maps have been used daily up to the present since their preparation by the land assessors so that

[5] The so-called Princely States held legislative and judicative power within their territory, while the British decided on foreign affairs and were represented by a British Resident; see YOUNGHUSBAND (1909, 183–186); DATTA (1984, 56); LAMB (1993, 7).

they are in a very bad condition, with some of them no more than a puzzle of blurred fragments. These maps served as templates for numerous field mappings by the author.

3 Utilisation of land and water resources

In the Central Karakorum, cultivable land and irrigation water are limited resources in time and space, but are fundamental for securing the livelihood of the local population. They are key elements of the *combined mountain agriculture* (EHLERS a. KREUTZMANN 2000), a combination of crop farming and animal husbandry, which forms the economic basis for the local population,[6] whereby the two elements not only complement but also depend on each other. In the valleys with their arid to semi-arid conditions local populations have established complex irrigation systems and arable fields in a long process of canal construction, ground flattening and amelioration. Meltwater from glaciers and snowfields is taken out of the side valley streams (*nalla*) and, following gravity, is brought to the fields by a system of open canals (*hrkong*, *hrka*) (see Fig. 3). Situated on gentle slopes and fans, these irrigated lands serve as fields for crops, fruit gardens, and meadows, while the non-irrigated surroundings function as potential pasture land.

As regards irrigated crop farming, the most important crops in Shigar are wheat (*tro*) and barley (*nas*), grown in several different local and adopted varieties. The vegetation period in the areas below 2,600 m allows the cultivation of two crops per season when barley is sown as a first crop, which is harvested in early July, while in all other higher elevated areas only one crop per year can reach maturity. Usually buckwheat (*blo*) and millet (*tsetse*, *chha*) are sown as autumn crops, whereby the latter is only used as a fodder crop and is generally harvested before reaching maturity. However, it is not only climatic factors that inhibit the cultivation of autumn crops, more often than not social aspects play a part: autumn crops will fail, for instance, if communal decisions do not guarantee that livestock is banished from the field area during the ripening period until October. In other words, the individual decision of a farmer to cultivate a second crop is dependent on collective actions. Other crops of relevance are beans (*mothu*, *naqstran*), peas (*boqstran*), and potatoes (*alu*) – the latter have recently become important cash crops, a trend that can be found in other parts of Northern Pakistan as well (KREUTZMANN 1993, 37). Different kinds of vegetables are grown mainly in kitchen gardens (*drumba*) or on small parcels of land at the edge of arable fields near the villages (see Fig. 4). It is remarkable that almost no fields in Shigar are sown with specific forage crops like alfalfa or rape seed. For the necessary feeding of livestock from late autumn until early spring, grass is cut on irrigated meadows (*ol*), located at the periphery of the field area mostly in less favourable locations like on slopes. The small grassy strips between fields and along canals and paths as well as the numerous fruit gardens (*tshar*) are also mowed regularly. Apricots (*chuli*), the most important tree crop in Baltistan, are grown in at least 15 different varieties in Shigar. Dried apricots (*pharing*) and apricot nuts used to play an important role as barter goods that were exchanged for other products, in particular salt, from neighbouring areas, especially Ladakh (cf. GRIST 1985, 92; AFRIDI 1988, 289; SHEIKH 1998, 342; RIZVI 1999).

Animal husbandry, the other pillar of combined mountain agriculture, takes the form of *Almwirtschaft*, to utilise various pasture resources at different altitudes by means of ingenious mobility patterns. The steep slopes that surround the main rivers feature only meagre vegetation with *Artemisia* (*burse*) and are often just too steep and thus less favourable for pasturing, while livestock is kept during the summer months in a belt of comparatively dense grassy vegetation at altitudes between 3,500 and 5,000 m. These alpine pastures deliver enough fodder for all livestock but are usable only in summer. During the rest of the year the animals are dependent on the meagre pastures in the valleys and on the lower parts of the mountain slopes, as well as on forage gained from agricultural land. Crop residues, tree leaves and hay from irrigated meadows serve as fodder for the livestock from autumn until spring. Therefore, the most important restricting factor for the size of a herd is the amount of fodder that could be supplied for livestock during the winter months. The livestock comprises yak (*hyaq*, *hyaqmo*), *zo* and *zomo* (a cross-breed of yak and cow), cows (*ba*) and bulls (*xlang*), goats (*rabaq*), and sheep (*lu*).[7] Yaks are kept only for breeding purposes to get the highly valued *zo* and *zomo*, and, in contrast to other livestock, are mostly not owned by individual households but by village communities. *Zo* and bulls have been and in some villages are still used for ploughing and threshing purposes, but since there are more and more tractors and threshing

[6] Non-agricultural activities like trade, crafts and labour migration, which always played an important part in balancing the deficits of the household economy, are not discussed here; for details about these aspects see SCHMIDT (2004).

[7] For details on the different cross-breeds and animal husbandry in general in Shigar see SCHMIDT (2000).

machines available in the valley the importance of keeping *zo* and bulls is declining; they are mostly slaughtered before reaching maturity. *Zomo*, cows and goats are the main milk animals. In addition to delivering milk, meat, skins, or wool, the dung of all livestock is highly valued as fertiliser for the fields. Livestock itself is an important investment that can be turned into cash in cases of emergency.

As shown, the combined utilisation of different resources is a significant characteristic of the livelihood strategies of the Shigar population in the fragile environment of the Karakorum. Arable farming, the cultivation of fruit and vegetable gardens, grass cropping and animal husbandry are carried out in an interdependent and symbiotic way. The seasonal and spatial diversification of resource utilisation is a result of the need to use various ecological niches. The diversity of crops and animals, furthermore, can be seen as a strategy for securing a livelihood which not only helps to extend the food base but also means a diversification of risks – natural and economic risks – and therefore a reduction in vulnerability.

4 Property rights regimes and guiding institutions

Important production factors of the combined mountain agriculture are land and water. Land has been differentiated, categorised and classified in different ways over the centuries but was always at the centre of the revenue systems of the time, while water was never taxed in Shigar. Autochthonous customs regarding land and water use have existed for generations. Some of them were fixed in written form during two land settlements which were carried out in Baltistan in 1901 and 1911 by the Administration of Jammu & Kashmir in order to have a basis for proper land taxation.[8] For every village (*mauza*) the related pasture rights (*naql-kahcharai*), water rights (*rewaj-e-aabpashi*) and other customs (*wajib-ul-arz*) were worked out and documented following traditional customs practised in the area for generations. These documents are included in the revenue records and cadastre of each *mauza* and are still used to the present day as important documents in the case of disputes. Specific ownership and utilisation rights[9] are connected with different types of land that have been categorised by the settlement as shown in figure 5. This has led to a distinction between settled land (fields, villages and their surroundings) and unsettled areas (barren land between villages, mountain areas, glaciers etc.). The latter, including the pasture areas, have been declared *de facto* government land but are used in a common way.

4.1 Property rights over common-pool resources

4.1.1 Pasture rights

Pastures in Shigar belong to the unsettled areas and are thus owned *de jure* by the state (*khalisa*) but used in a common way, as common-pool resources (Ostrom 1990).[10] Traditional customs of village territories and connected grazing lands continue to guide herders today and regulate utilisation and access to the various pastures. Each village in Shigar has its own affiliated communal grazing land. Pastures are considered commons and customary pasturage rights are shared by one or several village communities. The user group is usually defined as the village community and includes all households while excluding outsiders. Irrespective of status or ownership of land or livestock, all members of such a user group share equal utilisation rights and connected duties such as maintenance of paths to the pastures or repair of pasture huts – tasks that need a common and collective labour force.

Although the political situation has changed significantly over time, ownership of grazing land has not really changed: The land was and is still owned by a central authority, be it the local sovereign, the Maharaja of Jammu and Kashmir, or the government of Pakistan. But since pastures were always handled as commons by local communities they are seen by them as a kind of *common possession*. As long as grazing lands are used only as pastures, the compromise of state ownership and common possession only seldom leads to conflicts between village communities and the state administration to this day. However, the situation might become precarious if either the state were to cut the rights of the villagers, or the value of the land were to increase significantly, for example due to valuable raw materials

[8] The taxation of land in Baltistan was abolished in 1974.

[9] According to European legal tradition, *ownership* is a legal title coupled with exclusive legal right to possession, while possession stands for the act of owning, occupying, holding or having control over a property. On the other hand, *occupancy* means living in or using premises, as a tenant or owner, and *use* also includes the right to enjoy the benefits of property, whether the owner of the right has ownership of title or not. However, such definitions are often too limited since autochthonous, non-European regimes of resource use and possession could often not be included in such a system.

[10] Apart from the pasture areas discussed here, other lands are used in a common way, too. Communal lands (*shamilat*) within the settled areas include roads, paths, canals and graveyards – owned by the state but used by the community.

such as minerals, or forests,[11] or tourist development. Such a situation already exists in the upper Braldo where numerous expeditions on their way to the Baltoro Glacier cross pasture areas and use them as a camping ground for which members of the affiliated village demand payment. If tourist infrastructure were improved, it would be possible to realise higher incomes, which might however lead to conflicts with the owner of the land – the state.[12] It is most probable that, in conflicting situations between state and village communities, the legal ownership of the state will be given preference over the villagers' usage practice based only on customs; written rules as well as a judgement about a dispute on pastures in Shigar have shown that the state has priority in realising such potential profit.[13]

4.1.2 Water rights

Regulations and customs for water use and maintenance of the physical canal system in Shigar exist in written form as well as in the form of oral arrangements. Although such water-related customs were documented by the state administration during the settlement, no governmental institution is involved in the maintenance and organisation of the irrigation system.

Today, we find different systems of irrigation which reflect natural conditions and are a result of historical and social developments. Only a very few villages in Shigar have sufficient water available all through the season, while in all others there is an episodic water shortage (*chhurkon*). As a result institutions have had to develop means for restricting water use. The water situation and the related systems differ from one village to the next, however five main types can be distinguished as shown in table 2.

Not all irrigation systems can be clearly assigned to the above-mentioned categories, in some cases water use may be restricted to one canal, while the water from other canals can be used without restriction. In general, the amount of water available varies according to the weather situation: more water is available on sunny days, when it is cloudy there is less melt-water and thus

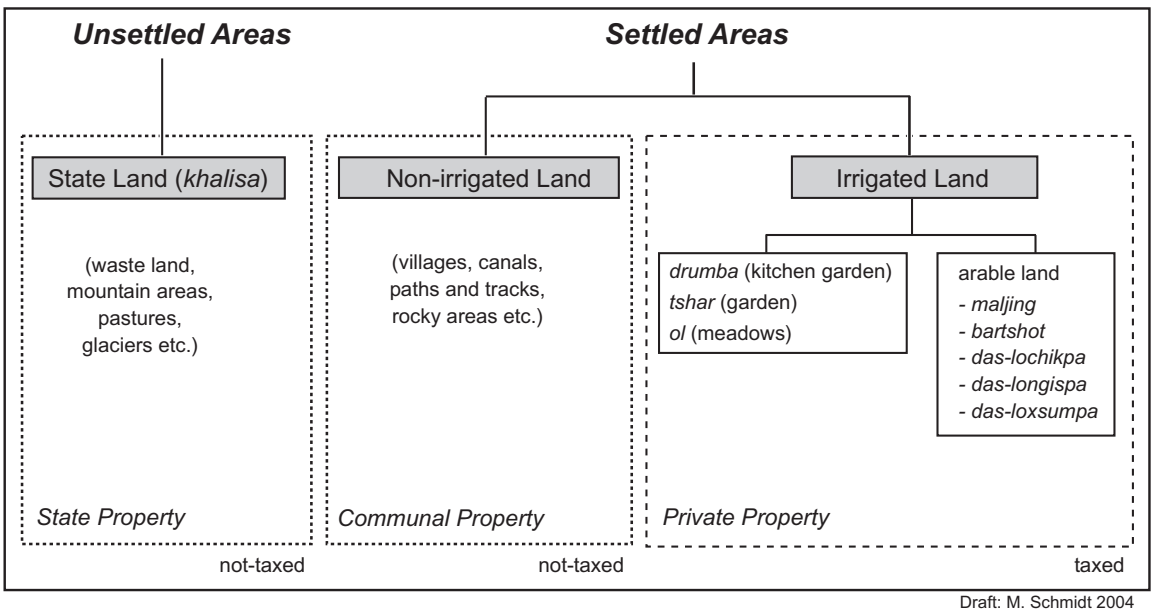

Fig. 5: Land categorisation according to the settlement records
Landklassifikation nach dem Settlement

[11] Many conflicts occur, for example, with regard to the control and utilisation of forests in Northern Pakistan; cf. MUMTAZ a. NAYAB (1991); SCHICKHOFF (1998, 2002); SCHMIDT (2000).

[12] Similar conflicts could arise with regard to the planned national park "Central Karakoram" (cf. KHAN 2004). For conflicts about pastoral or tourist utilisation between the local population and the administration of the Kunjerab Nationalpark see KREUTZMANN (2000b, 104–106).

[13] *Civil Suite No.38/83, Remand No. 105/85*; judgement of 29.03.1988, Civil Judge I[st] Class, Skardu.

Table 2: Main types of water management in Shigar

Die wichtigsten Formen des Wassermanagements in Shigar

Type of irrigation system	Water situation	Customs
No restrictions	Water surplus	Water use is not restricted.
Water right per village (*chhures* = water rotation)	Water shortage from April to June	Water is conducted to villages or parts of villages for a specific time span, during which households can irrigate their fields without limitation; the water right rotates from one village to the next.
Water right per village and household (*hrkares* = canal rotation)	Water shortage from April to June	Water rights rotate between different field areas or villages while the usage right within the community is restricted; households get water for a particular time span irrespective of their land holdings.
Water right per land holding	Serious water shortage all through the year	Water rights are connected with land area; land holders are given water for a specific time span corresponding to their land holdings.
Water right per clan	Water shortage from April to June	Each village clan gets water for a specific time span based on the clan's contribution to canal construction.

Source: Own survey 1997–98

less water for irrigation. The water rights of the villages take into account the difference in water drain, varying from a minimum in the early morning to a maximum in the afternoon. In villages with a serious water shortage, water reservoirs (*rzing*) in which all night water is stored are common. The water is used during daytime when the water flow can be regulated quite easily.

In general, the need for water regulation depends on the relation between water supply and water demand given by the size of the user group; strict regulations are especially found in villages with a water shortage. However, socio-economic and historical aspects are also relevant with regard to the form of water management. For example, water rights based on clans are only found in the more homogenous villages of Braldo, while in villages of lower Shigar with a higher fluctuation in population and land holdings it became impossible to follow a clan system. Generally, water titles are connected with land and cannot be alienated independently. This is justified by the shortage of water and land resources, the intention being that no fields are left fallow. Agriculture in Shigar cannot be carried out without irrigation and water is the main limiting factor for the extension of the cultivated field area.

4.2 Privately possessed land

The *settled areas* include all irrigated lands which have been surveyed and for which revenues were fixed during the settlement. Arable fields, gardens and meadows are possessed by individuals or households who are now real owners by law since private ownership of land was admitted in 1933.[14] Ownership rights are mostly in the name of one person, mainly the head of the household.

4.2.1 Ownership and system of tenancy

Apart from some exceptions, irrigated land in Shigar is relatively equally divided between households, and today the average land holding per household is less than 0.3 ha. Only a very small number of people are landless, while the biggest land owners are still the former feudal elite, whose land was never expropriated and who were able to keep most of their land through all historical upheavals. Figure 6 shows the concentration of land owned by the former sovereign in the village of Mamochonmo[15] compared with the relatively equally divided land holdings in Chonggo (Fig. 7).

[14] *Nautor lands in the Gilgit sub-division, 1942.* (India Office Library & Records, R/2/1070/138).

[15] The present status of the former autocrat could be described as *zamindar*, someone who lives predominantly from the income of his lands: Apart from the regular rents he received large sums of compensation from the government for giving land for the construction of governmental buildings; for the definition, rights and duties of a *zamindar* see HABIB (1963, 136–189); HERRING (1983, 87).

Most of the irrigated land in Shigar is cultivated by the owners themselves, but many plots are also given to tenants (*chunpa*). Today, three types of tenancy are prevalent in Shigar: a) The *tenant occupier* has a permanent holding right and could bequeath it to his heirs.[16] The land owners are not permitted to increase the rent or cancel the contract without a particular reason, and the land cannot be alienated without the permission of both owner and tenant occupier. Although such contracts, documented in the settlement records, still exist, new treaties are not being concluded anymore and most of the owners are trying to change these contracts into temporary ones. b) The lease contract of a *tenant-at-will* is mostly arranged orally between owner and tenant and is not documented in the records. Land is given to tenants for a fixed time span, mostly one year. Thus the contract could be cancelled afterwards by both parties. In most cases contracts are renewed each year so that tenants could hold rented land over years. The rent is mainly paid in kind – wheat or barley for fields, grass for meadows, nuts for rented apricot trees. After a compromise is reached between owner and tenant regarding the amount of rent in relation to the fertility of the soil, the tenant is responsible for the cultivation and can decide for himself what kind of crop he would like to grow. c) The *bartap-system* is an old lease system, only rarely practised in Shigar today, in which the amount of rent is dependent on the harvest. The grain is divided between owner and tenant equally, and the tenant gets the straw. In the case of a bad crop the owner risks getting lower rents, while he can earn more when the harvest is good. There are more advantages for the tenant, because the risk of impoverishment if there is a total crop failure is minimised.

In all lease types in Shigar the relationship between land owner and tenant goes beyond the pure lease contract. Land owners often expect assistance from their tenants for fieldwork on their own cultivated fields. On the other hand, land owners often feel responsibility for their tenants and help them when they are in need of money, medicine etc. In general, rent contracts can be interpreted as an instrument to integrate landless and poor households socially and economically.

4.2.2 Alienation of land and inheritance practice

Land resources are held in ownership by one or several persons only for a particular time since land is ultimately always bequeathed, sold or alienated in some other way. In Shigar we find a relatively high constancy of ownership and possession: land is mostly transferred within families from one generation to the next by way of inheritance or gifting. However, customs regarding the alienation of land are also defined and practised. Specific governmental, Islamic and indigenous concepts exist that regulate the option of purchase (cf. SCHACHT 1964, 142; LENTZ 2000, 300). Gifting land (*hibah*) is practised mostly within the families and lineage to circumvent the strict rules of inheritance, particularly when a land owner wants to prefer one of his heirs. Couples without their own children often gift land to relatives in return for the promise that they will take care of them in their old age. Land is sometimes exchanged between land owners, for example when a person is in need of land that could be used for house building. In contrast to the above-mentioned forms used to alienate land permanently, a mortgage is a form of temporary land alienation. It is a contract according to which the creditor can dispose of specific property of the debtor until the debt has been discharged. In former times land was often mortgaged when people were in need of money. Frequently they lost their land to the creditor when they were not able to discharge their debt.

Partition of the estate is mostly arranged by Muslim clergymen (*molanas*), village headmen (*tsharma*), or other respected persons such as teachers. Although all these people state that they follow the Islamic law of inheritance, the form as practised in Shigar is a mixture of Islamic law and indigenous customs.[17] According to Islamic law all property (land, buildings, livestock) is divided equally between the heirs, with sons getting twice as much as daughters. In Shigar, it is a custom that daughters gift their share, in particular land, to their brothers, in return for which they sometimes get a small compensation in the form of money, livestock, trees, or other goods. There is strong social pressure on women to renounce their share of the inheritance although this practice is at odds with the Islamic law.[18] This custom is justified in the sense that, if there is a divorce, women are sent back to their parents or brothers,

[16] Status and rules regarding occupancy-tenants are covered by the *Jammu and Kashmir Tenancy Act* of 1923; see also NAQVI et al. (1987, 195).

[17] In 1963, the *Gilgit and Baltistan Muslim Personal Law (Shariat)* came into force and officially replaced the *Codes of Tribal Custom*; governmental laws do not play any role with regard to partition of an estate (LENTZ 2000, 305, 400–401).

[18] Women have only legal position according to Islamic law not according to indigenous rights; for this mostly the patrilinear group decides about the women; see LENTZ (2000, 329–338).

who must support them. Therefore, the partition of the estate as practised in Shigar only nominally follows the Islamic law and is guided *de facto* by indigenous customs. Daughters and widows are still more or less excluded from the inheritance. If they demand their share they risk their good reputation and conflicts with their brothers. Landed property, buildings, trees, livestock, money or other property are divided separately according to their value. For land the soil quality plays a major role and needs to be taken into consideration.

One result of the practised form of land inheritance is an extremely fragmented field area. Due to population growth over the last few decades, and because only very limited amounts of new lands have been cultivated, not only has the land property of a household decreased, the field sizes themselves have also been reduced. The average field plot today is less than one *kanal* (= 0.05 ha), which is too small for rational cultivation by machines. The resulting new boundaries with a width of around 0.5 m are another factor that takes valuable land away from agricultural utilisation.[19] The example of the lineage of the Xalbi in Kiahong (Shigar) shows how field property was divided over five generations and how the agricultural land came to be fragmented today (Fig. 8 and 9). The reason why the plots of the households shown are dispersed over a large area today is linked to the endeavour to divide land as fairly as possible. The fields shown on the map belong to different soil categories, some of them are gardens or meadows. The practice of excluding women from the inheritance could be interpreted as a measure to prevent land fragmentation, but this "positive" effect is more than outweighed by the significant population growth. The same holds true for the traditional custom of marrying relatives as a strategy to keep land holdings within lineage groups (EMERSON 1984, 132); today, the practice of marrying across lineage and village boundaries has become more popular. There are as yet no plans to re-parcel the agricultural land to make cultivation by machines easier.

4.3 Autochthonous institutions of resource use

4.3.1 Water management

The construction, maintenance and organisation of an irrigation system need logistical means and management abilities. The long-term functionality of irrigation systems is a sign of a developed structure, which is defined by institutional and organisational attributes. Social principles like the cleaning and repair of canals or conventions about the preferential utilisation of water have a long tradition in Shigar. The different tasks can be structured into single enterprises (construction or extension of existing canal systems), episodic activities (mobilising help in case of natural hazards), and periodic tasks (maintenance of canals, regulation of water flow). All aspects are based on communal decisions and undertaken jointly.

Most of the canals might be several hundred years old, although some new canals were constructed over the last century in connection with the cultivation of new land. Normally, all male adults of a village build new canals together, thereby gaining the right to part of the newly cultivated area, which is divided between all households in the village.[20]

In principle, every farmer is responsible for the maintenance of the water canals adjoining his fields. At the beginning of the irrigation season he has to check that the discharge is not impaired, so that no backwater could damage affiliated fields. Repair work on the main canals flowing through unsettled areas is the task of the whole water use community and is carried out by all. Every household has to provide one male labourer regardless of land property, otherwise the household will be fined. Maintenance work includes the regular removal of accumulated gravel and sand from canal beds due to the high sediment load of the water, the repair of damage which has occurred in the winter or following natural hazards, and sometimes the daily reconstruction of canal heads destroyed by the strong force of the water from the rivers.

To guarantee the operation of the canal system, canal watchmen (*hrkongpa*; *chhu-lsock*, *hrkong-strung*) are nominated by the community or by the village elders. They control the canals, do small repairs or call the community if there is larger-scale damage.[21] Furthermore, canal watchmen increase or decrease the water flow in some canals to avoid damages. At the end of the season they receive a specific amount of grain, butter or cash from each household. Men from households with a labour surplus and a shortage of income especially apply for such a job. In some villages, canal control is carried out by members of all households of the community in rotation (*res*). The performance of this duty has the highest priority for everybody, and failure to do so is not even contemplated.

[19] The boundaries are mostly grassy strips; the farmers to whom the adjoining fields belong divide the cut grass equally.

[20] EMERSON (1986, 90) describes the process of canal construction and land cultivation – an enterprise for several years.

[21] For duties of canal watchmen in the Hindukush, Karakorum and Himalaya see KREUTZMANN (2000a).

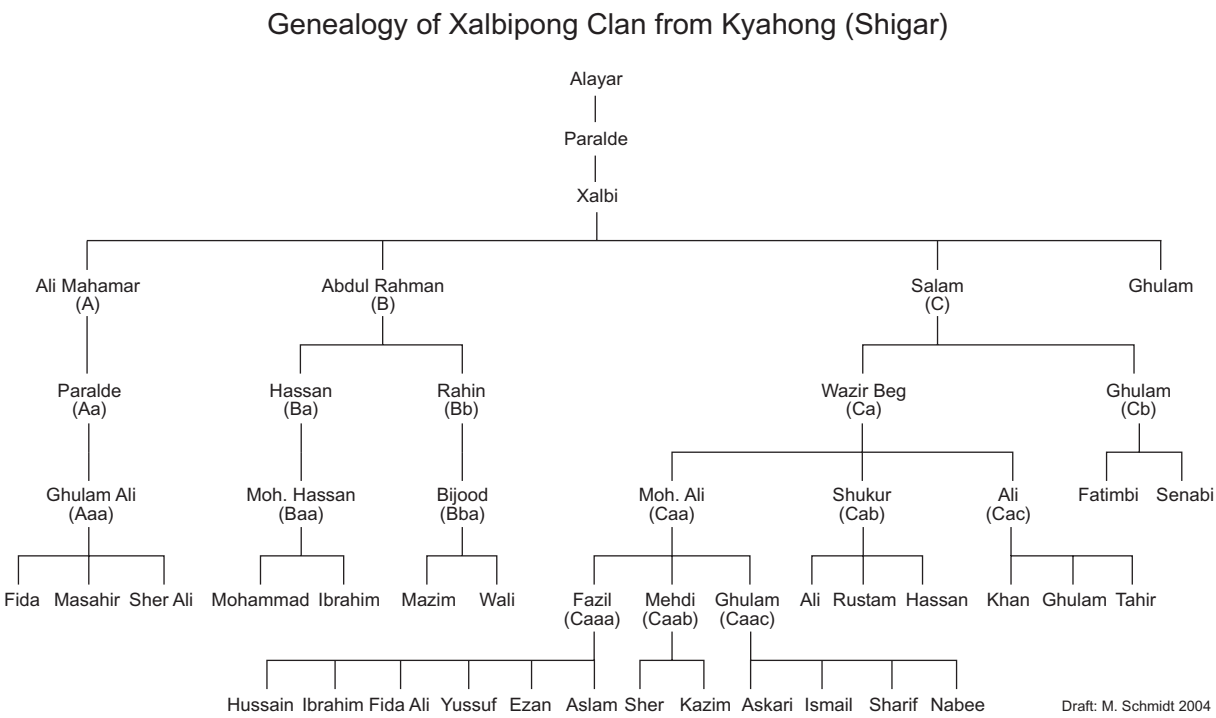

Fig. 9: Genealogy of Xalbipong clan from Kyahong, Shigar
Stammbaum des Xalbipong-Klans aus Kyahong, Shigar

The regulations of water distribution are not controlled by the above-mentioned canal watchmen but by the water users themselves. In some cases, especially when canals cross the area of another water use group, several men protect the canal against water theft. Frequently, conflicts arise between water users since water is scarce at certain times of the day and in certain seasons.

4.3.2 Land management

Individual strategies for animal husbandry are guided by communal customs with regard to the utilisation of the common pastures. The alpine pastures (*bloq*) can be used only within a specific time span that is determined by the village headmen. All animals from a village are moved to the high pastures on a fixed day. On the alpine pastures, the livestock is tended by a number of villagers who work there as herdsmen on a rotational basis (*res* = turn-taking). Mostly, each farmer looks after the whole village's livestock and dairy production for an agreed period of time. The pasture settlement consists of one or more clusters of small stone-built living huts with associated cattle-sheds and pens for the livestock. Unlike other regions in the Karakorum (OSMASTON et al. 1994, 239), stables and huts are not privately but commonly owned and are used by the whole village community. Furthermore, the trails (*balam*, *bangstrangbu*) leading to the high pastures require building and maintenance, an undertaking which calls for large coordinated labour inputs. The village headmen of the respective villages are responsible for calling their villagers to such communal work (POLZER a. SCHMIDT 2000).

The utilisation of privately possessed land is also in some way restricted by communal decisions, not only during fallow periods, when the harvested fields are used as pastures for livestock or as footpaths.[22] But for instance, there is a ban on free grazing in the field area after sowing, which means that people are not allowed to herd their livestock even on their own fields. A village guardian (*lurapa*), selected by the village community,

[22] According to BUZDAR (1988, 1) and KREUTZMANN (2000b, 109) in Hunza the ownership of arable land by farmers is limited to the time span of the crops growing; during the rest of the time when the fields are fallow these lands should fall back to the communities. With regard to the form practised in Shigar such a statement seems to be plausible. But, the fact that fields do not really become communal land seasonally is shown by the feasibility of converting the land: When arable fields are converted into gardens or even a house is built on them, they are fenced. The utilisation of such a plot by the public is thus made impossible.

protects the cultivated field area. He has to ensure that no livestock enters any field until the crops are harvested. Village guardians receive a specific amount of wheat (3–5 kg) or cash from each household as payment for their services. The time span of the free grazing ban is important with regard to the feasibility of cultivating autumn crops. Their success is dependent on the certainty that damage to crops by grazing livestock will be prevented, which can only be achieved by communal arrangements.

Particular customs also regulate the construction of houses or water-mills, the planting or felling of trees, as well as land conversion. The construction of houses or stables on a person's own land is not restricted by law but by local customs. New buildings can only be erected within the built-up and garden area, and only in exceptional cases in the open field area, something that has to be authorized by the village community. Similarly, trees can only be planted in the open field area if they replace old ones, since the shadows of trees influence the crop growing on the fields. Fruits of trees belong to the owner of the tree who is not necessarily the owner of the land[23] but according to autochthonous customs trespassers are allowed to collect fruits from trees.[24] According to local customs gardens can be converted into fields, while the conversion of fields into gardens is only allowed within the village area. Furthermore, fields cannot be fenced in by walls outside the built-up area. These customs reflect the high value of arable land which is protected by specified restrictions. Since arable land serves for growing the staple crops, it is in the interest of the community to prevent a reduction in the amount available. In general, the above-mentioned customs show how communal decisions restrict individual actions: The individual farmer has to follow communal strategies.

4.3.3 Settling of Disputes

Disputes about water and land are mostly settled in an informal way in Shigar by religious leaders (*ulama*), village headmen (*tsharma*), or other authorities like teachers or members of a high-ranked clan before going to court. And even members of the state administration sometimes settle such disputes in an informal way. It is not uncommon for disputes to be transferred from the court to informal arbitrators.

Decisions are made according to governmental, Islamic and indigenous law, and it is often not possible to recognise clear distinctions between them in practice. In most cases the arbitrator tries to find a compromise (*sulah*), a fair balance for both parties, which is based more on indigenous law (LENTZ 2000, 212). Decisions and proceedings can vary according to the situations and always follow the principle of not destroying the basis of livelihood. Only very rarely are decisions not accepted by one of the parties, which can lead to a social boycott of the particular household (LENTZ 2000, 247–248). Since each household is dependent on the solidarity of the community, there is strong pressure to accept the decisions.

5 Organisation of land and water use as an internal task of a mountain community

As has been shown, land and water resources in Baltistan are in no way free for all, but are managed by a well-defined group of interdependent resource users who, working within a given set of rules and regulations, communicate with one another and manage the resources to the benefit of all group members. The distinction between common land and privately used plots is linked with different concepts regulating their utilisation. Non-irrigated lands are *de jure* in state ownership but used and held in different ways. Since the state cannot control all these areas and probably has no objection to their utilisation, productive areas like pastures are used *de facto* as common-pool resources by the affiliated village communities, while the non-productive areas, i.e. high mountain regions, glaciers, and waste land, can be defined as open-access resources (Fig. 10). However, when conflicts occur between different claims it can be assumed that the ownership rights of the state will take preference over the holding customs of the village communities. The utilisation of privately held land, i.e. irrigated agricultural fields, gardens and meadows, is also regulated by local customs, showing that individual strategies of land management are influenced by communal decisions.

Local institutions regulating water distribution, conflict resolution and the maintenance of canals, pasture huts and paths have been developed over centuries as an adaptation to natural conditions and are the result of various socio-economic and legal-institutional aspects. All tasks and responsibilities are carried out and decided within the user communities. In most cases dis-

[23] There is often conflict when trees are owned by persons who are not the owner of the land since trees are not documented in the settlement records. Examples of different ownership of land and trees are the result of land alienation by the way of gifting, mortgage, purchasing, or distribution of the estate.

[24] This can be a major problem when large groups such as expeditions cross garden areas; see also GRUBER (1981, 44).

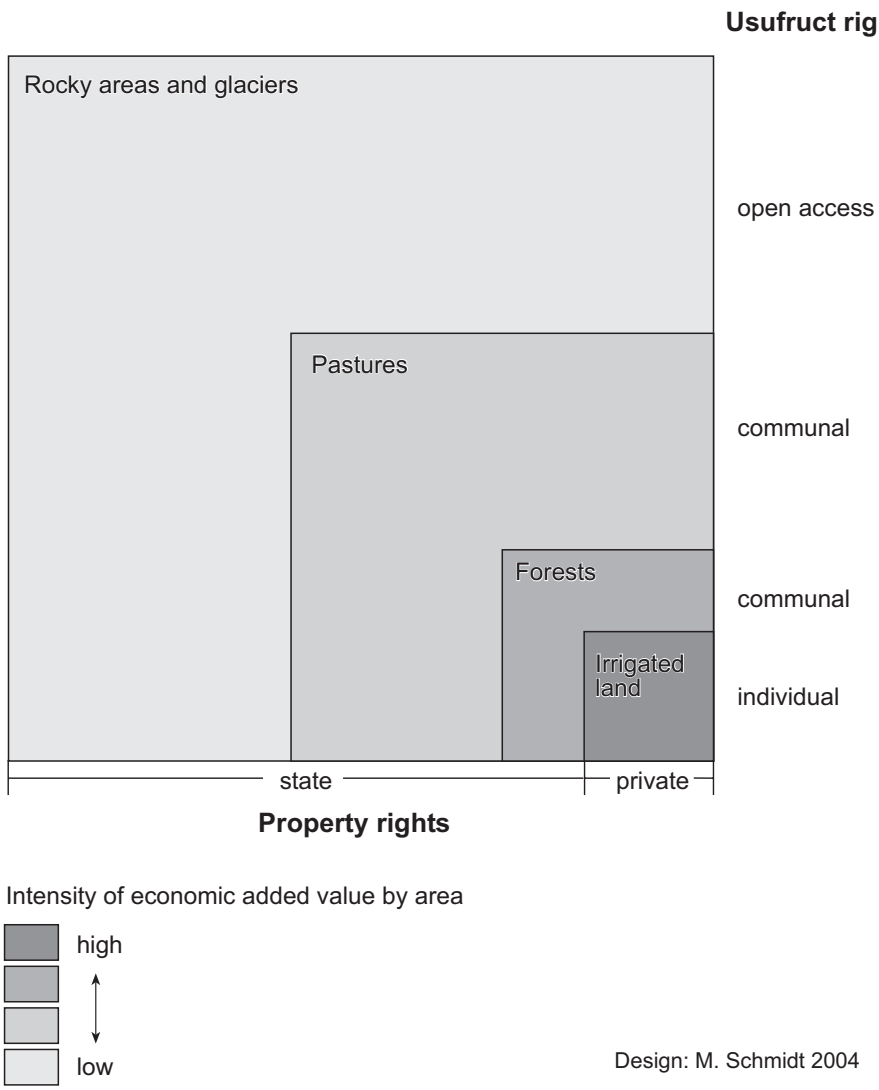

Fig. 10: Property and usufruct rights on land resources in Shigar
Eigentums- und Verfügungsrechte an Landressourcen in Shigar

putes about water and land are settled locally in an informal way within the user community since means for sanctioning are still effective. The good condition of the irrigation system as well as the fact that there are no signs of serious degradation or over-utilization[25] to pastures in Shigar show that the management of land and water is carried out by the village communities of Shigar in a relatively effective and sustainable way,[26] thus showing, that the 'drama of the commons' (DIETZ et al. 2002) is not necessarily a 'tragedy of the commons'. To achieve the goals of the Bishkek Global Mountain Summit (2002), namely "to improve the livelihoods of mountain people, to protect mountain ecosystems and to use mountain resources more wisely", it seems obvious that local communities must be empowered and the principles of subsidarity respected.

However, recent changes such as tremendous population growth, the influences of globalisation, the introduction of new concepts of living, or political events in

[25] This is also to be explained by the fact that the number of animals held by each household is limited by the size of the privately held arable land since livestock has to be fed in winter by fodder generated on this land.

[26] Sustainability is understood here in the sense of securing livelihood – economic and socio-cultural fundamentals – as a normative goal.

the shadow of the Kashmir conflict, have put pressure on forms of resource management that have worked pretty well for centuries. Without doubt the present forms of land and water use no longer guarantee the livelihood of Shigar's population. Thus non-agricultural incomes are becoming more important and are playing an increasing part in household strategies. Forms of non-agricultural employment which have been practised in recent decades include labour migration, employment by the government, and working as porters for the numerous mountain expeditions and trekking groups. Yet, agriculture and animal husbandry still fulfil their function as the primary pillar of households' survival strategies. Thus, the relevance of land and water as basic resources for livelihood security in Shigar remains.

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Fig. 3

Shigar-Proper

Field Patterns and Irrigation Canals

Flurgliederung und Bewässerungskanäle

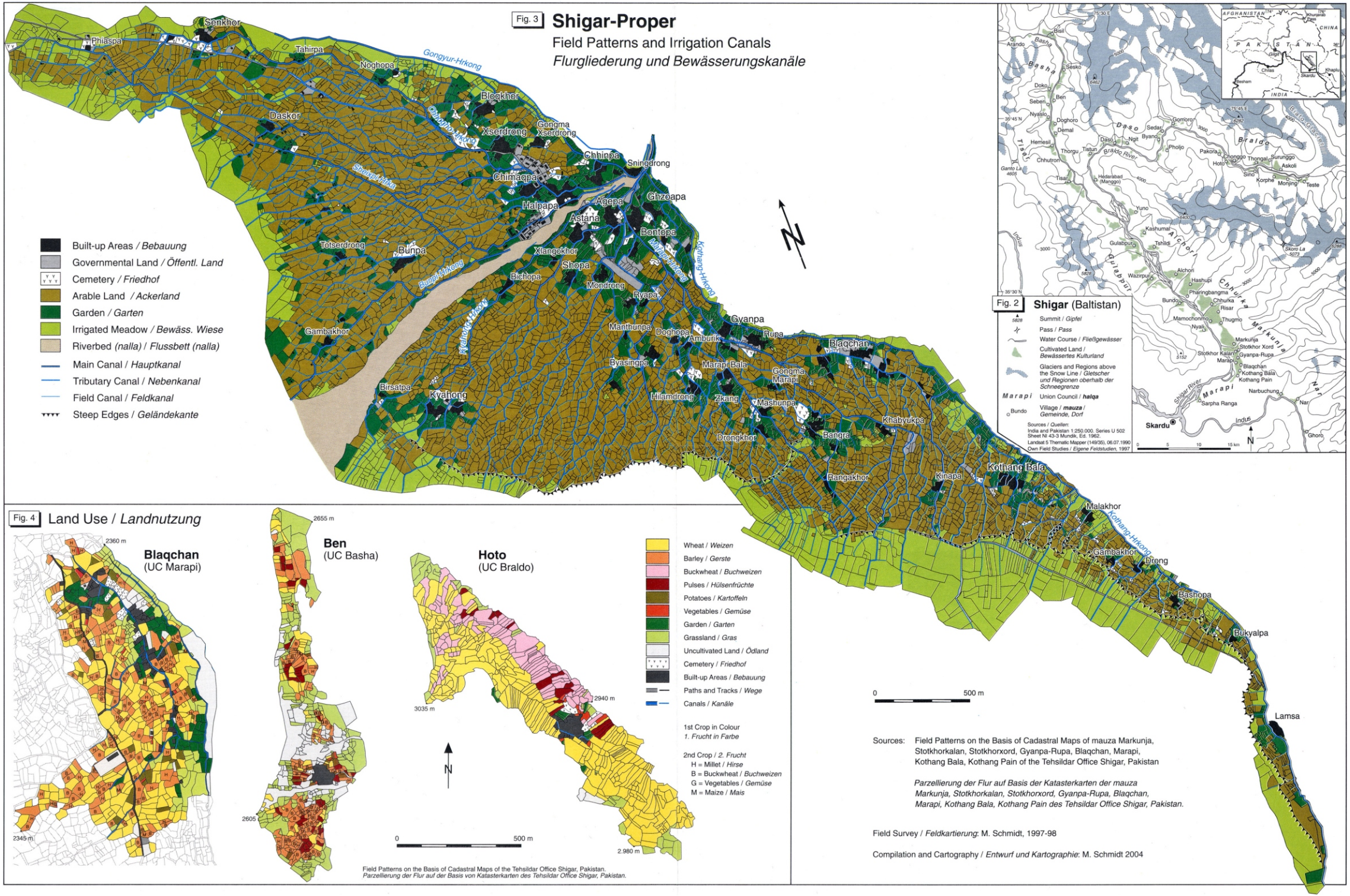


Fig. 4 Land Use / *Landnutzung*

Field Patterns on the Basis of Cadastral Maps of the Tehsildar Office Shigar, Pakistan.
Parzellierung der Flur auf der Basis von Katasterkarten des Tehsildar Office Shigar, Pakistan.

0 500 m

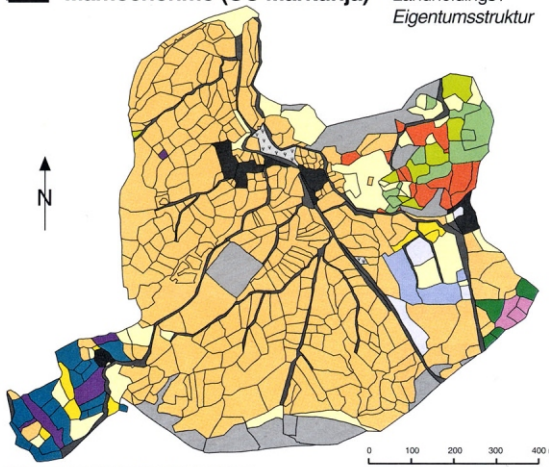
Sources: Field Patterns on the Basis of Cadastral Maps of mauza Markunja, Stotkhorkalan, Stotkhorxord, Gyanpa-Rupa, Blaqchan, Marapi, Kothang Bala, Kothang Pain of the Tehsildar Office Shigar, Pakistan

Parzellierung der Flur auf Basis der Katasterkarten der mauza Markunja, Stotkhorkalan, Stotkhorxord, Gyanpa-Rupa, Blaqchan, Marapi, Kothang Bala, Kothang Pain des Tehsildar Office Shigar, Pakistan.

Field Survey / *Feldkartierung*: M. Schmidt, 1997-98

Compilation and Cartography / *Entwurf und Kartographie*: M. Schmidt 2004

Fig. 6 **Mamochonmo (UC Markunja)** Landholdings / *Eigentumsstruktur*

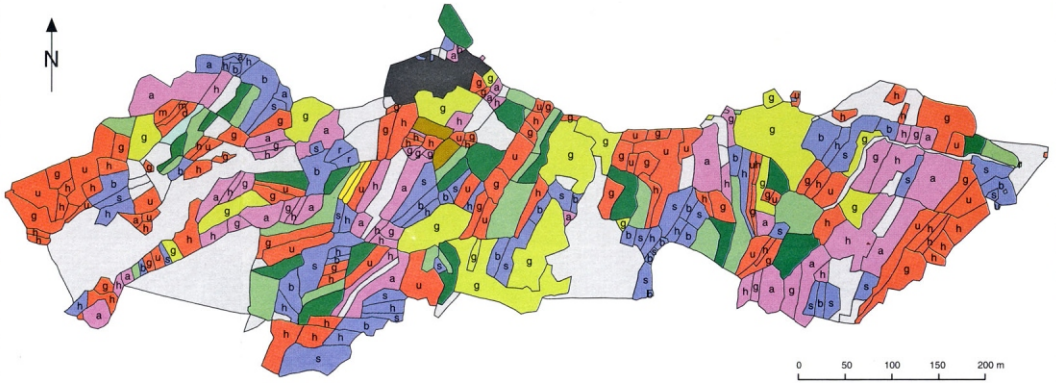


Name of Landowners / *Namen der Landeigentümer*

- Raja Mohammad Ali Shah (Shigar-*Cho*)
- Mohammad Hassan
- Ghulam Haider
- Abdul Karim
- Ali Hussain
- Shukur Ali
- Fida Ali
- Ghulam
- Karim
- Hassan
- Fida Hussain
- Scattered Property / *Streubesitz*
- Built-up Areas / *Siedlung*
- Canal, Path / *Kanal, Weg*
- Gov. Lands / *Staatsland*
- Cemetery / *Friedhof*

Sources / *Quellen:* Land Register of *mauza* Mamochonmo, Tehsildar Office Shigar, Pakistan.

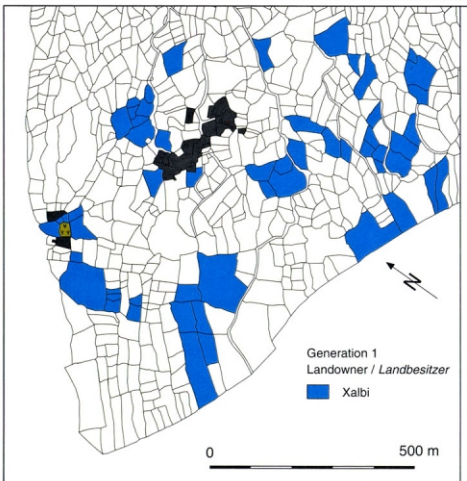
Fig. 7 **Chonggo (UC Braldo)** Landholdings / *Eigentumsstruktur*

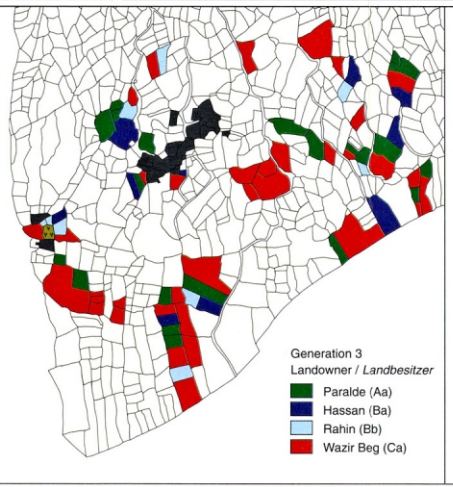


Name of Landowners (with cadastral number) / *Namen der Landeigentümer (mit zugehöriger Katasternummer)*

- g Miziqpa, Gyelbi et al. (8)
- a Miziqpa, Ali & Ibrahim (9)
- h Miziqpa, Hussain et al. (10+11)
- u Miziqpa, Ghulam et al. (13+14)
- m Miziqpa, Mohammad & Hassan (19)
- d Miziqpa, Hadi et al. (20)
- s Mullapa, Shukkur & Abdullah (21)
- a Mullapa, Abdul et al. (23)
- b Mullapa, Abdul et al. (24)
- h Mullapa, Hussain et al. (25)
- u Mullapa, Shukkur et al. (Mill 26)
- r Mullapa, Rahin et al. (27)
- Baldangpa, Haji et al. (1)
- Ayopa, Ramzan et al. (2)
- Abupa, Malik et al. (3)
- a Almaspa, Ali et al. (4)
- g Almaspa, Heder & Ghulbi (5)
- h Almaspa, Ali & Hussain (7)
- g Apikapa, Ghulam et al. (17)
- r Apikapa, Ramzan et al. (Mill 18)
- Hotopa, Mohammad et al. (28)
- Nagerpa, Hassan et al. (15)
- Built-up Areas / *Siedlung* (29)
- Gov. Lands / *Staatsland* (30+31)

Sources / *Quellen:* Land Register and Cadastral Map of *mauza* Chonggo, Tehsildar Office Shigar, Pakistan *Kataster und Katasterkarte der* mauza *Chonggo, Tehsildar Office Shigar, Pakistan*





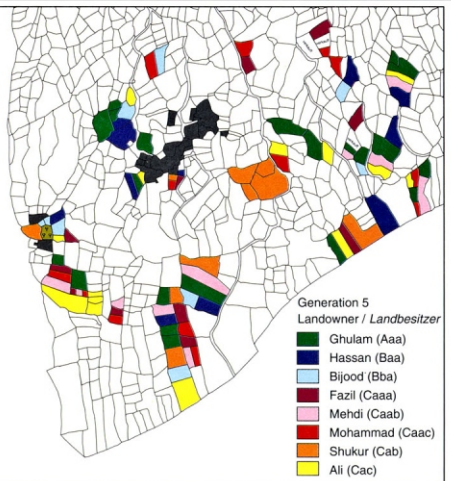


Fig. 8 **Kyahong, Shigar** Landed Property of Xalbipong Clan / *Landbesitz des Xalbipong Klans*

- Built-up Areas / *Siedlung*
- Cemetery of Xalbipong Clan / *Friedhof des Xalbipong Klans*

Field Patterns on the Basis of Cadastrial Maps of mauza Stotkhor Kalan, Tehsildar Office Shigar, Pakistan. *Parzellierung der Flur auf Basis der Katasterkarte der mauza Stotkhor Kalan, Tehsildar Office Shigar, Pakistan*

Field Survey / *Datenerhebung:* M. Schmidt, 1998

Compilation, Cartography / *Entwurf, Kartographie:* M. Schmidt 2004