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The Agri-Karakoram Project: An Introduction

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The Northern Areas of Pakistan

The Northern Areas of Pakistan lie at the junction of the Karakoram, Western Himalayan, and Hindu Kush mountain ranges. The Western Himalayas create a rain shadow, shielding the region from monsoon rains and leading to semi-arid conditions that include typical annual precipitation in the valley floors of 150 mm (Zheng Du 1998). Temperatures can drop to well below freezing in winter, while in summer heat trapped in barren valleys can send temperatures to above 40°C. Despite these harsh conditions, over one million people live in the Northern Areas of Pakistan, with most deriving a substantial proportion of their income from livestock and agriculture (AKRSP 2000). Although precipitation is scant, water is abundant in the form of glacial snowmelt, which is used to irrigate parcels of land via elaborate systems of irrigation channels. The use of irrigation has led to the development of two distinct land-use types within the region. Areas receiving irrigation, known locally as ‘below-the-channel’, are relatively productive and can support one or two arable crops per year; maize, wheat, and lucerne are the major crops. ‘Above-the-channel’, the ground supports scrub vegetation dominated by *Artemisia* spp. At higher altitudes, precipitation is greater, and temperate pastures and sparse coniferous woodlands occur.

Livestock production within the agro-pastoral system

The agro-pastoral system found in the Northern Areas includes subsistence arable cropping, fruit production, livestock production, and, to an increasing extent, cash cropping (Saunders 1983). The vast majority of households keep livestock. The characteristics of a typical household (a smallholder farming system with relatively small land holdings supporting a mixed-species herd) are presented in Box 1.1. The livestock enterprise relies on arable production in that winter feeding is dominated by arable by-products. In turn, arable production relies on inputs of manure from the livestock system. Livestock are thus one component of an integrated system, and the keeping of livestock serves multiple purposes.

A key feature of livestock production in the Northern Areas of Pakistan is the practice of transhumance. Livestock are kept within the village during winter and stall-fed on cereal by-products, lucerne hay, and kitchen waste (Wardeh 1989). Animals are also allowed to graze freely on fallow arable fields and on winter

Box 1.1: Characteristics of a typical household in the Northern Areas

- ◆ 0.9 ha cultivated land
- ◆ 6 cows, 17 goats, 8 sheep, 1.4 donkeys
- ◆ Major crops: wheat and maize
- ◆ Major forage: straw, maize stovers, and lucerne
- ◆ Access to communally grazed pastures
- ◆ Some family members away from home for seasonal labour

pastures close to the village. During summer, animals move in stages to communally grazed high-altitude alpine pastures, where they are tended by family members (Figure 1.1). This movement of animals from villages to pastures has the dual role of exploiting the nutritive resources of high pastures and avoiding damage to arable crops during the summer months. In the autumn, livestock are returned to the villages to complete the annual transhumance cycle (Nuesser and Clemens 1996).

Recent change in the Northern Areas

The Northern Areas have been subject to rapid development in the last two decades as a result of two main factors. First, construction of the Karakoram Highway, linking Pakistan and China, has led to dramatic improvement in communication infrastructure (Kamal and Nasir 1998). The road has opened the region and has spawned a network of 'jeepable' roads throughout the Northern Areas. The result has been an increase in the movement of commodities and people in and out of the region. Imports of external products have both opened markets for internal produce and led to increased competition in local markets.

The second main stimulus for change has been the activity of the various agencies of the Aga Khan Development Network, notably the Aga Khan Rural Support Programme (AKRSP), along with government line departments and other NGOs. AKRSP has encouraged impressive community-based rural development, which has catalysed a large number of small infrastructure projects including irrigation channels, link roads, and micro-hydel schemes (see Box 1.2). Another consequence of this recent change has been in employment patterns. Improved transport infrastructure has increased the opportunity for short-term migration out of the region, and a substantial proportion of the working population travels outside the region for employment on a seasonal basis. Furthermore, improved education, trade, tourism, and transport have led to increased opportunities for off-farm employment. However, the pace of development has not been uniform across the Northern Areas. Areas close to the Karakoram Highway tend to be at a more advanced stage of development than more remote areas.

AKRSP has become increasingly interested in some of the indirect effects of these changes. For example, changes in opportunities for off-farm employment are likely to impinge upon labour availability for tending livestock. What impact does this have on livestock numbers and on the extent of pasture use? Conversely, are rising human populations mirrored by increased livestock numbers? And what

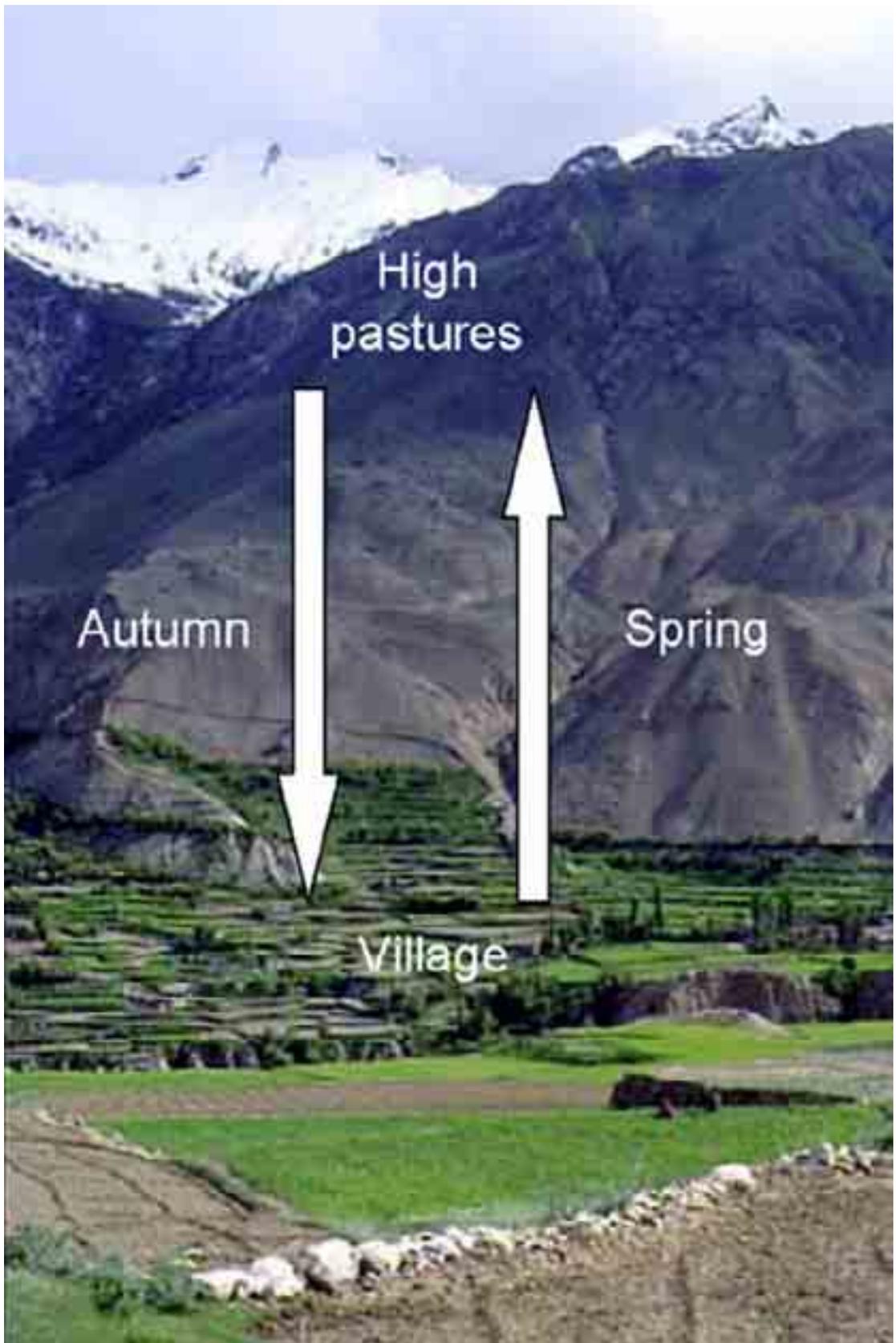


Figure 1.1: Livestock within the Northern Areas are managed according to a transhumance system with seasonal movements of livestock between villages and high pastures

Box 1.2: The Aga Khan Rural Support Programme

The Aga Khan Rural Support Programme (AKRSP) is a private, non-communal, nonprofit company established by the Aga Khan Foundation in 1982 to help improve the quality of life of villagers of the Northern Areas and Chitral in Pakistan. The organisation is funded by a consortium of bilateral and multilateral donors including the Government of Pakistan with a mandate to focus on income-generating activities in collaboration with national and international development agencies. Since its inception in 1982, the Aga Khan Rural Support Programme has contributed substantially towards the socioeconomic development of the Northern Areas and Chitral.

Mission: AKRSP's mission is to enhance the capacity of the people of the Northern Areas and Chitral to sustain and improve the quality of their lives. This is achieved through institutional and economic development. Institutional development helps to build local capacity and to create an enabling environment for sustainable livelihoods, while economic development initiatives help to alleviate widespread poverty across the programme area through various income generation measures.

Capacity building: AKRSP solicits the active involvement of local communities in identifying, planning, and implementing development interventions. AKRSP has facilitated the formation of almost 4,000 village organisations (VOs) for men and over 2,000 women's organisations (WOs), covering over 85% of rural households in the Northern Areas and Chitral. Human resource development is an important component of AKRSP's development model. Over the years, AKRSP has offered training to build capacity in local communities by invigorating indigenous knowledge as well as introducing new technologies where appropriate. In the process, over 30,000 village specialists have been trained in fields ranging from natural resource management and enterprise development to accounts and book-keeping.

Creation and management of resources: Over 2,200 village- and cluster-level infrastructure projects including irrigation channels, link roads, bridges, protective bunds, and water supply schemes have been completed, benefiting over 166,000 households in the Northern Areas and Chitral. As a result of land development projects, approximately 92,000 ha of new land and over 2.1 million ha of existing land have been developed. AKRSP has also been active in the area of credit and finance; as an outcome of regular saving by around 140,000 savers, the VOs and WO's have evolved a capital base of more than Rs. 430 million.

Poverty alleviation and income generation: To alleviate poverty and enhance income generation, AKRSP has helped increase cultivable land holdings through capital projects leading to improved income generation at the household level. Various natural resource inputs have also been supplied to communities, including over 150 tonnes of improved vegetable seeds, over 3.5 million fruit trees, over 350 tonnes of improved cereal seed, and about 370 tonnes of improved fodder seed. Similarly, as a result of the livestock breed improvement programme, around 500 improved cows, 3,700 improved sheep, 200 improved goats, and 1,200 rams have been supplied to farming households across the programme area. This has helped increase livestock productivity besides increasing the number of improved animals as a result of crossbreeding practices.

are the consequences of these changes for local natural resources? The Agri-Karakoram Project was established in 1998 with questions such as these in mind – sponsored by the INCO-DC programme of the European Union and including a range of partners with skills in both biological and social sciences.

The project had three main components. The first was aimed at studying livestock management with the focus at the village level. The objective was to quantify seasonal resource use by livestock and the outputs derived from the livestock enterprise, with a view to identifying constraints. The second component focused on the grazing ecology of the high pastures, seeking to quantify pasture productivity and botanical composition, as well as assessing the extent of utilisation of high pasture resources. The final component was concerned with the social and economic context of livestock production. The aim was to assess the influence of wider issues, including labour, marketing, and the role of traditions on livestock production. The project thus adopted a systems approach to allow assessment of the impact of change in individual components of the system on the whole system.

Study design

A single-study design was adopted for all three components of the project to allow effective integration of the information from all components. The research was conducted in three agro-ecological zones, along two geographical transects, in a 2 x 3 factorial design. The three agro-ecological zones, at decreasing altitudes, were the single, transitional, and double-cropping zones. In the single and double-cropping zones, one and two arable crops per year are grown, respectively. In the transitional zone, one main crop and one subsidiary crop are generally grown.

The two transects formed the main comparison of the study. The first lay along the Karakoram Highway (termed the KKH transect) and its associated transport infrastructure. The second lay within the Gilgit-Ghizer Region (designated the GGR transect) and was served only by jeepable roads with a limited length of paved road. The selection of these two transects allowed the impact of infrastructure development on the livestock enterprise to be assessed. The two transects were effectively at different stages of the development continuum, allowing the impacts of development to be assessed within the time frame of a three-year project. Six study villages were selected at the start of the project, with one lying in each of the six cells of the 2 x 3 factorial design (Table 1.1, Figure 1.2). Villages were selected on the advice of AKRSP personnel, who were able to provide local knowledge, ensure that all Islamic groups within the region were adequately represented, and generally ensure that village selection was in tune with local politics and the activities of other local NGOs.

Following village selection, a baseline survey was conducted in each village to gather basic information on household size, livestock holdings, and other relevant details. Households were then selected for detailed study on the basis of the

Table 1.1: Study villages

Village	Transect	Agro-ecological Zone
Bargo-Bala	GGR	Double cropping
Gahkuch-Bala	GGR	Transitional
Darkot	GGR	Single cropping
Bunji	KKH	Double cropping
Minapin	KKH	Transitional
Morkhun	KKH	Single cropping

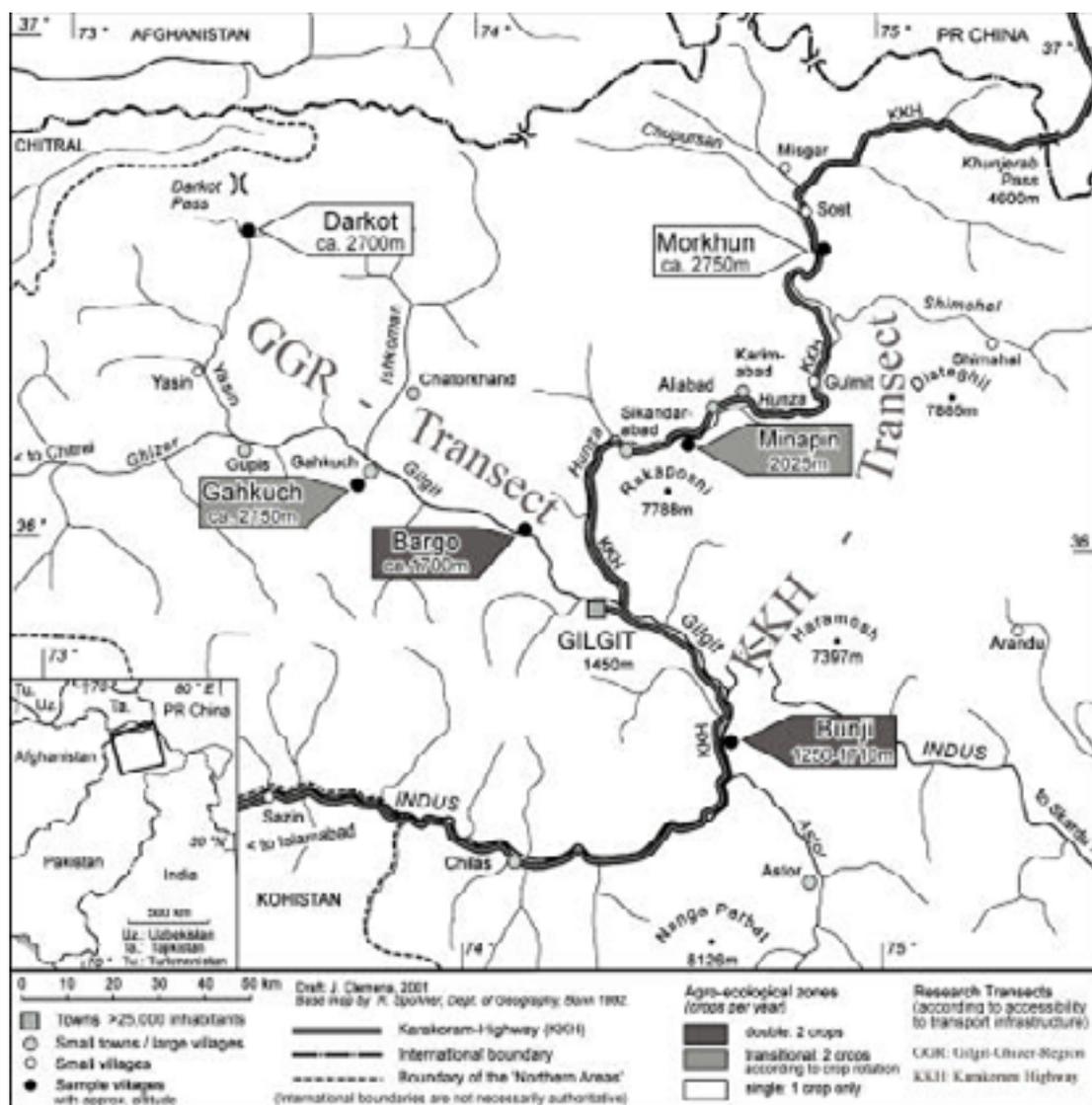


Figure 1.2: Map of the study region showing location of study villages within the overall study design

baseline survey, using a stratified, random sampling procedure to ensure that the full range of household sizes was covered. About 20 households in each village were selected for socioeconomic study, with six or seven of these selected for more intensive study as part of the livestock production component.

The chapters that make up the rest of this volume present the detailed findings of the various project components. These are then drawn together in a final synthesising chapter that draws on systems thinking to assess the major constraints to change within the livestock enterprise.

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