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Improving Livestock Output of Small Holder Mountain Communties in the Hindukush

PAMS Proposal nr. SAs-9

Joint Areas
of Case Studies:

East Africa
Horn of Africa
West Africa
South-East Asia
South Asia
Central Asia
Central America
and Caribbean
South America
Switzerland

JACS South Asia

Requesting agency: HUJRA, Holistic Understanding for Justified Research and Action, Peshawar, Pakistan

June 2004

office

1 Project summary

Project title (short)	**Improving Livestock Output of Small Holder Mountain Communties in the Hindukush**
Project title (long)	**Improving livestock output through location-specific and low cost nutrient supply – Contributing to sustainable natural resource use, poverty alleviation, local empowerment and mitigation of increased competition over natural resources of small holder mountain communities in the Hindukush mountain (Pakistan)**
Project rationale and objectives	**Problem statement** Livestock output/performance (milk, meat, wool, reproduction) of small holder mountain communties in the Hindukush mountain range appears to be low/reduced due to (i) insufficient / limited / non-optimal fodder resources both in quality and quantity combined with inappropriate use of them (managerial factor), (ii) diseases and/or parasitic load (hygenic factor), and (iii) low breeding performance (genetic factor) Livestock production plays a key role for the livelihoods of small holders in the Hindukush mountain range where small herds of goats, sheep and cattle are the common animals of the poor. Ongoing deteriorating environmental conditions, due in particular to overgrazing and the depletion of firewood resources, linked to the continuous increase of population pressure, contribute to worsen the living conditions of the mountain population. Therefore the proposed PAMS project intends to contribute to improve livestock output of small holders in three (test) valleys in the North-Western Frontier Province (NWFP) in Pakistan by providing locally adapted nutrient supply to the animals. The focus of the PAMS will be on small ruminants (mainly goats, sheep to a lesser extent). The basis for the project lays in a PhD research carried out by Dr. Inam-ur-Rahim (2003) at the University of Agriculture in Faizabad (Pakistan) and his long standing and intensive contaxt to various stakeholder groups in the proposed area including in particular the local herders. He has carried out extensive field research for more than 20 years in NWFP, holds an additional professional background as veterinarian and acts as chairman of the NGO 'Holistic Understanding for Justified Research and Action'. Out of Dr. Inam-ur-Rahim's experience, the viscious circle intended to be addressed by the PAMS can be described as follows: the less minerals and trace elements animals are capabale to absorb due to their non-optimal health status, the more vulnerable they become with regard to diseases and parasites; the more they are af-

	fected by diseases and parasites, the less efficient they can incorporate nutrients and the more livestock output is reduced (low overall performance); the smaller the livestock output per capita the more animals are needed to cover the needs of the small holders and the more animals are kept for grazing; the higher the stocking rates, the more pastural resources are affected; the more overgrazed pastures, the less minerals and trace elements supply can be provided through the reduced quality of fodder resources; the less minerals, nutrients etc. the affected animals are able to absorb the the more vulnerable they become … In order to break this viscious circle single animal performance / output must be increased. For this to happen the three entry points mentioned above (i, ii, iii) must/can be addressed. By providing both health care supply (thus addressing the hygene / medical factor) and by providing need specific comlementary nutrient supply (thus addressing the managerial factor) to the small ruminants of the poor mountain dwellers, livestock output can be increased and thus livelihood conditions improved. This can – jointly with an appropriate grazing land management (cf. Inam-ur-Rahim and Maselli 2004) contribute to improve the conditions of pastures and reduce pressure on natural resources.

2 Project Details

Country or countries of impact	**Pakistan** (North Western Frontier Province NWFP), Hindukush mountain range. The activities could later on be extended to other regions with similar livestock output problems e.g. to the JACS of Central Asia provided results are encouraging.
Introduction: Geographic, social, political, economic, cultural context as relevant	**Background** Thirty years ago there were less households with larger herds in the proposed test areas. A single family possessed comparatively more animals but the absolute number of animals was lower per valley. The pressure on the environment and the natural resources was less and the output per animal unit was higher due to more available fodder resources. Nowadays there are about three times more people living in these valleys. Although the dependency has partially shifted from self-sufficiency based on local natural resources to off-farm employment and remittances earning, small herds as food and financial livelihood asset are still indispensable a large majority of small holders. **Hypothesis** Widespread diseases and infections[1] (health problems) as well as nutrient deficiencies (managerial issue) are two of three main groups of causes responsible for a decreased yield in milk, meat, wool and reproduction and to a lesser extent also for mortality rates above common average. A possible effective contribution to mitigate this unsatisfactory situation consists in de-worming the animals at the appropriate period(s) of the year and in compensating nutritional deficiency through artificial administration of site-specific missing minerals and trace elements, which improve livestock output. Recent studies carried out by the University of Agriculture in Faizabad (PhD work of Dr. Inam-ur-Rahim) have shown that the latter could be an option to improve livestock output and thus the conditions of natural resources and the livelihoods of remote mountain communties. The proposed PAMS project intends to test this scientific knowledge in three test valleys jointly with local small holders. Since intensive livestock production is pre-dominantly a female activity in this area, intensive collaboration especially with women is planned. PAMS activities will thus consider gender equality when delivering free of cost nutrient supply during the PAMS experimental period.

1 Fasoliasis, worms, ticks/ mange infestations, an-eastrus, mastitis, metritis, metabolic/ deficiency diseases, foot and mouth disease, Anthrax, Black Quarter disease, Entero-toxaemia, Pleuro-pneumonia, contagious eczema

	Introduction to the area (see also table in the annex) The three selected test valleys lie in the Hindukush Mountain Range and belong to the North Western Frontier Province (NWFP) in Pakistan. The elevation above sea level varies from 1000 meters in the South to 7000 meters in the North. In all the valleys the dependence on livestock for subsistence is higher than cropping. *A) Arkary Valley* The valley of Arkari lies South-West of Tirichmir peak and is characterized by dry, temperate vegetation, without conifers, oaks and alpine steppes. Snow leopard, wolf, ibex, booted eagle, goshawk, himalayan snow cock and chakur characterise a high diversity of endangered wildlife species associated with birch, willow and juniper species as well as other rare plants. Human population is concentrated in the bottoms of the valleys and high pastures are used in summer months for grazing, hunting and gathering wild life resources. Cultivated land in the region is privately owned where as pastures are generally communal. Holding patterns for agricultural land are generally equitable with very few landless farmers or large land-owners. Agriculture and livestock production provide the main source of livelihood for these mountain communities. Remittances from migrant labour, employment in small enterprises like small roadside shops, hotels, outfits for tourists and employment in Government departments and NGO's make the additional income. Arkari valley is part of the Tirichmir conservancy which covers an area of about 970 sq. km. The principal sub-valleys are Mizhigram, Besti, Dir Gol, Agrmagol and Anu gol. There are 10 permanent villages of different size with a total of 570 households and about 4000 inhabitants. The villages are Shali, Besti Payeen, Besti Bala, Afzalabad, Porponi, Siah Arkari, Safed Arkari, Rabat, Ovir and Ovirlasht. The "Jamat Khanas", religious institutions synonymous to mosque committees, have a strong decision making power for regulating the code of conduct of the communities. The valley population is quite liberal and cooperative and has been associated with the regional Rural Support Programs (RSPs) for the last 20 years, chiefly the Aga Khan Rural Support Program (AKRSP). The AKRSP has facilitated the formation of Village Organizations (VOs) for men and Women Organizations (WOs), which have established themselves at the village/sub-village level to address common development needs, mainly physical infrastructure. *B) Chagharzai Valley* Please see separate document with scheme and also table with valley information in the annex. *C) Kalash Valley(s)* In the southern Chitral District, between the Kunar River and the Afghan border, lie the three Kalash valleys of Rumbur (130 households), Bumburet (680 households) and Birir (450 households). Around 11'000 people live in these vallys of which about 1/4 belong to the indigenous people of

	the Kalash (seee www.kisp.org). The Kalash practise their own culture, religious rites and customs and are not Muslims. The Muslims living in the valleys have either in-migrated from the surrounding muslim majority or converted Kalash. The Kalash and the Muslims live together in the same villages and sometimes even in the same families (Wynne 2001). The valleys are located on the edge of the monsoon belt, the vegetation is dense and on the valley floors barley, wheat, vegetables and animal fodder plants are cultivated. The steep 3000 m high ridge between the valleys is covered by evergreen forest up to many tops. Their use appears so far to be ruled by religious respect for the creation having thus conserved natural resources to a much higher degree than any other surrounding areas under similar geographic conditions. Each household has a couple of goats, some cattle and sometimes a horse and/or a plough bull. Different animal diseases and parasites diminish livestock output and reproduction rate.

Objective(s)	The overall goals of the proposed PAMS are to contribute to (a) focus on small ruminants and find pathways to alleviate poverty of the poorest by increasing livestock output (b) empower local population to more effectively address animal health issues and to effectively compensate nutrient deficiency of livestock, and (c) a more sustainable use of natural resources by mitigating the increased competition over natural resources of small holder mountain communities. The more specific objectives are to: 1) Assess the different site-specific nutrient conditions determined by the mother rock, soil, and vegetation conditions in three proposed test valleys - Chagharzai, Kalash, Arkari (see annex) -> research objective out of the scientific evidence gathered by Dr. Inam-ur-Rahim (see references in the annex) 2) Provide specific nutrient supply formula for the test valleys and produce doses to complement nutrient defficiencies for the selected test herds (about 900 small ruminants all together) thus providing direct (mitigation) support to selected small holders 3) Provide de-worming for the selected test herds thus showing the positive effect of keeping herds in a healthy state and in demystifying the 'secrets' of veterinary treatments1 (direct mitigation action) 4) Actively involve small holders in applying, testing and monitoring the effect of administrating such site-specific complementary nutrient doses and thus contribute to capacity building and awareness-rising among local population 5) Transfer and disseminate the acquired knowledge (know- and do-how) on mineral supplementation and on preparing the needed nutrient supply doses to the entire population of the test valleys through feedback-events; this shall include the supply formula in order to allow the self-production of future complementary nutrient doses by small holders in the concerned valleys -> contribution to empowerment and sustainability 6) Involve local actors (administration, national and international NGOs) and media in order to provide feedback regarding the achievements of the nutrient supply and to eventually contribute to its future wider application -> policy and public relations work; wider dissemination of know- and do-how

1 Local farmers often perceive de-worming as a tonic needed for week animals. The local veterinary practitioners - who largely depend for their living on exploiting the unawareness of the farmers - don't inform the farmers correctly.

Methodology and Approach	Representative initiative and open-minded stakeholder group representatives in the test valleys shall have the opportunity to take part in the project and to benefit from the very beginning. To verify the quantitative output particular suited entire herds will be chosen. To be able to separate the impact of mineral supplementation and de- worming, three different groups of animals are necessary: The following test scheme is being envisaged involving about 1200 animals in total: (see first table in the annex) Each group will consists of several complete small herds in each test valley. Group A and B animals may belong to a same herd while Group C animals will allways be kept as separate herds in order to avoid as much as possible that de-wormed animals are contaminated by untreated animals again. Group B animals will receive nutrient doses free of charge for one year after the test period is over. Herders who allow to monitor Group C animals without receiving any treatment and nutrient support will have their animals de-wormed free of charge after the test period. They will also receive the nutrient supply doses for their animals for one year free of charge after the test period (and thus eventually allow for further monitoring). This shall insure that all herders actively participating in the test will get the same support in the end. Livestock status and performance as well as natural resource conditions will be assessed before the testing will start (T0). For this work an MSc study is planned which will also include part of the monitoring during the test period (Eva Syfrig, University of Berne). After de-worming and upon beginning of the treatment with nutrient supply doses demography and milk production of all herds (groups A, B and C) will be assessed on a weekly basis. Live-weight, wool quality and wool quantity will be assessed seasonally. Productive performance will be monitored continuosly. Mating, conception, lambing interval, twinning percentage etc. will provide quantitative figures of small ruminants livestock performance in the area. In order to evaluate qualitative output and aspects, herders will be questioned regarding their personal benefit and experiences related to medical treatment and nutrient supply through semi-structured interviews. Their willingness to participate in possible future farmer's cooperatives intended to prepare and distribute nutrient supply doses shall be asked, too.
Expected outputs	• A scientific and accessible report showing the impact of de-worming and site-specific nutrient supply on small ruminants in the three test valleys chosen. • An MSc study providing an up-dated overview on the (current) conditions of livestock and natural resources before starting with the interventions (T0) complemented by some results of the monitoring of the activities of the PAMS. • A database containing the information on all the fodder sample analysis, on the animals involved in the test (results of continuous monitoring) etc. stored at HUJRA and made available for concerned persons and institutions.

	• An awareness raising effect on the local population and other actors involved (including responsibles for development projects/programmes and government representatives) in the area with regard to livestock improvement, natural resources, livelihood etc. • A capacity building effect for the involved NGOs, VCCs, herders etc. in the area. • An improvement of the performance of the herds provided with health care (de-worming) and complementary nutrient supply.

Activities planned to achieve outputs.	Remark: Preliminary to the subsequent activities listed a considerable amount of work has been already carried out in visiting the proposed test valleys and sub-test valleys and in contacting numerous institutions and persons to seek collaboration and support for the PAMS as well as to discuss different issues with concerned stakeholders to secure the feasibility of the proposed PAMS. As such several man weeks of work has been carried out by Dr. Inam-ur-Rahim mainly consisting in field visits. All the related expenses have been covered by himself and by HUJRA. **First Phase** – preparatory work to be done by Dr. Inam Rahim and Eva Syfrig (MSc study Berne University) 1. Collection of samples of the main forage species in different categories of grazing lands in all three valleys during summer 2004 and winter 2004/05. 2. Analysis of the samples in a laboratory to determine the contents of minerals and trace elements and to identify regional defficiencies. 3. Establishment of the Formula according to the results of the analysis in order to compensate missing or insufficient nutrients; preparation of test doses for the animals. 4. Production of sufficient doses of the mineral mixture for the selected livestock in all valleys and working out a simple and easily comprehensible administration plan for the involved … (drawing of a scheme). 5. Information and training of the participating farmers: In several assessments the local population and authorities shall be informed on the research and the participating stakeholders shall be trained for the correct administration of the nutrient supply. 6. Choosing appropriate herds of small ruminants (goats and sheep) and collecting additional information in order to assess the current health status, weight, milk yield etc. of the livestock; the animals of the selected herds shall be marked in order to allow a reliable monitoring e.g. of the demography; during the application of the doses, the development of these chosen animals shall be observed regularly; further additional information on the area (see 2nd table in the annex) will be collected. **Second Phase** 7. Application of the doses during one year: The livestock keepers themselves will applicate the doses according to the administration plan; the valley associates will assist, monitor and report 8. Measuring output and protocol health status of animals: During the application collaborators from local organisations measure the output of the marked animals regularly and protocol the health status of the animals; institutions of the elected Union Council at valley-level will monitor the process.[1]

[1] In Chagharzai valley the SDC funded IPRP project is working and in Arkari MACP is active, similarly we may collaborate with IPRP. If agreed I will write the Chief Technical Advisor of IPRP a letter, and we can monitor the impact assessment through the CBO they

	9. Evaluation of the results: The gained data shall be interpreted and the formula (if necessary) changed accordingly. All the documents will be stored in a central place (possibly at the Malakand University) and made accessible to everybody interested/concerned. 10. Feedback: Public Restitution will take place on several specific events open to local stakeholders, scientists and representatives of the government and other institutions; the launching of the first steps for building (village or sub-valley level) farmer's cooperative for the marketing of the nutrients in a broader area shall be taken.
Relation to PAMS Principles	Improving livestock output of marginal poor small holders has a direct tangible impact on their livelihoods and – in a long term perspective – on their environment and natural resource base. Those involved in the test application will benefit directly from the concrete activity of livestock nutrient supply provided by the PAMS, which aims at mitigating the impact of marginalisation of remote mountain areas. As such the project addresses at least two core problems of the NCCR North-South and the concerned JACS – deteriorating (land) natural resource and critial livelihood conditions. The proposed PAMS has a strong transdisciplinary approach and counts on various partnerships for its success. Local NGO's – in particular HUJRA and KISP, local herders, local and regional authorities and a range of external actors (IUCN, WWF and others) will be motivated to work together. Preliminary informal meetings have taken place during the preparatory phase of the PAMS and feedback has been very positive.
Duration	Launching date: August 2004 Duration: approximately two years (untill July 2006)
Reporting	Regular administrative and activity reports every 6 months. Final report with accounting in August/September 2006.
Budget	Total amount: 44'128 CHF (for details please see annex in separate document)
Work plan	Please see separate document in the annex.

are working with, or other mechanism, they are using in the area. Union Councils may not have the capacity, further the tenure of existing Union Council term will terminate and re-election will take place that may hinder the monitoring process. In Kalash valley KISP will do the job, however prior discussion will be needed with all such stakeholders)

3 Actors involved

Memorandum of Understanding (MoU)	☐ YES ☐ NO HUJRA and KISP are ready to sign a MoU which however still needs to be drafted. Additional organisations have assured their support in case the project is allotted[1].
Regional Coordinator (RC)	RC Dr. Manandhar Siddhi JACS SAS RCO in Kathmandu Tel. ++977 1 5547756 (office / secretariat) Fax: ++977 1-5547756 E-mail: nccr@wlink.com.np
Lead IP	The project has been elaborated through contacts established by Dr. Daniel Maselli, Coordinator IP2. However, the JACS concerned is JACS SAS with Prof. Dr. Ulrike Müller-Böker as HIP and Dr. Manandhar Siddhi as Regional Coordinator in Kathmandu (Nepal).
Scientific backstopping	Dr. Inam-ur-Rahim, HUJRA Dr. Daniel Maselli Dr. Jakob Zinsstag (IP4) concerning veterinary aspects eventually Dr. Urs Geiser (IP6) concerning livelihood aspects (yet to be negotiated)
Requesting agency	HUJRA, Holistic Understanding for Justified Research and Action Dr. Inam-ur-Rahim, chairman Opposite Government Degree College for Girls College Colony, Saidu Sharif, Swat NWFP, Pakistan hujra@swat.pol.com.pk
Executing agency (agencies)	HUJRA (with lead in Chagharzai valley[1]) • for Kalash Valleys jointly with KISP, Kalash Indigenous Survival Program Miss Lakshan Bibi, chairperson KISP

[1] Mail from responsible of MACP: "Dear Daniel, We in the project of Mountain Areas Conservancy Project (MACP) of IUCN will be more than happy to collaborate with your reserch work. Besides persuing the cooperation and willing involvement of the community, wherever possible the material and manpower help besides logistics and transport can be contributed for the studies by MACP. I assure the support of MACP when ever asked for. Regards, Iqmail Shah" / The responsibles for a project working in the pastures of Rumbur valley (Kalash valley) for the protection of wildlife (World Wide Fund for Nature, WWF) have been contacted, too; they have indicated their willingness to provide their support and are ready to sign MoU, if desired.

	Rehman Plaza 1081 3rd floor – Opp. HBL near GPO Saddar Road, Peshawar Contt. Pakistan Lakshan77@hotmail.com kisp@kalash.com www.kalash.it • For Arkari valley jointly with Jumat Khana and the Valley Conservation Committee (VCC)[2] Mr. Shah Syed Iqmail3, Manager of the Mountain Area Conservancy Project (MACP)
Stakeholder involvement in project	The selected local farmers – in particular women involved in livestock management – in all three test valleys will actively participate. Additional farmers will be invited to information and restitution events and gatherings. Further collaborators from the communities e.g. village teachers, people from the village council, local elders shall be personally associated to the measuring and writing of the protocols.
Beneficiaries	During the test period the involved herders and their families will directly benefit from the PAMS activities. In a broader understanding the concerned communities will benefit from the increased awareness about means to improve livestock output. Should the PAMS succeed in convincing other farmers, NGOs, Government bodies etc. to invest in such medical and nutritional treatments the effect could be expanded to all the valleys and possibly beyong. The possible creation of farmers' cooperatives would help in spreading these improved livestock management practices.

Place and date	HUJRA, Peshawar, 10 June 2004
Annexes	List of annexes

1 Contacts have been established with the Chief Techinical Advisor of the SDC funded Innovation for Poverty Reduction Project working in the area.
2 The VCC has a Valley Conservation Fund (VCF); the fund has been capitalized through 25% share by the communities and 75% share by MACP
3 Dr. Inam-ur-Rahim visited Arkari valley and discussed the PAMS idea with the community elders; they were very much enthusiastic about the activity, and indicated their willingness to cooperate in case the project is approved.

Annexes

Group A: de-wormed animals receiving nutrient supply doses	Group B: de-wormed animals without nutrient supply	Group C: control group without any treatment
120 goats per test valley	120 goats per test valley	80 goats
30 sheep per test valley	30 sheep per test valley	20 sheep
150 animals per test valley	150 animals per test valley	100 animals per test valley
450 animals totally	**450 animals totally**	**300 animals totally**

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	Chagharzai			Kalash			Arkari		
Sub-valleys	Panderh	Tangorha	Topai	Rumbur	Bumburet	Birir	Bestigol	Agram-gol/Anugol	Pechus-gol/Aspaniol
Research Area									
Area (in km$^{2)}$	40	100	60	200	180	120	150	250	200
Altitude in m a.s.l.	1000-2200	1000-2000	1200-2200	1500-4500	1500-4500	1500-2500	2600-5000	2600-5000	2200-4500
Climate	Sub-humid			Semi-arid			Arid		
Precipitation	1000-1500 mm/y			450-800 mm/y			250-450 mm/y		
Number/ size of pastures	Pastures are intermingled in croplands and shrublands; allocation of a land unit for pastoral use at lower elevation depends on accessibility and moisture availability; at upper elevation it depends on slope/ aspect, elevation and accessibility.			Upland pastures are available at an elevation of more than 3500 m a.s.l. and occupy more than half of the total geographical area of the valley; six main pastoral units are available in the valley; Rumbur has the highest proportion of upland pastures; a zone of Deodar and Oak forest follows pastures respectively towards the valley bottom; main pastoral areas include Shool, Baghbareet, Otak, Astoi, Zenoor, and Acholgah.			Upland pastures are available at more than 3500 m a.s.l. and occupy more than 75% of the total geographical area of the valley; main settlements are available at the valley bottom of seven important pastures; occasional patches of Juniper trees are rarely seen at moisty locations; main pastures include, Khoeengol, Kurhumbukhtgol, Agramgol, Anugol, Mijigramgol, Pechusgol, and Aspanigol.		
People									
Villages and inhabitants	Panderh Kot Shangrha Paiza Doma Rajkan	Gul Bandai Alami Banda Gumbat Shamnal Tangorha Batara	Bar Tiraj Koz Tiraj Amnay Sar Qala Maradhu Inzer Maira Topai	Gaz Kuru Dundulut Kalash Gram Shaikhanan-deh	Owang Wadus Palowanan-deh, Anaish, Gambak Broon, Batrik Kandisar Karakal Shakhanan-deh	Aspar Birir Beharh Gree Grumit Gol Zhao Kuru Shakhanan-deh	Besti Bala Besti Pain Siah Arkari Safed Arkari Purpuni Saddam Shoul	Oweer Oweer Lasht Rabat Rabat Mukhee Afzalabad	Momi Memon Heraini Haraini Andakhti Pechus Shali Mijigram

Farming systems	Subsistence level livestock and crop production. ♦ Main valley: irrigated cropping lands with rice: wheat and maize 1-2%, ♦ 5-6% rain-fed agriculture with wheat and Maize, ♦ 10-13% dispersed grasslands for hay ♦ 24-26% free grazing rangelands (grass dominated), ♦ 37-40% scrub-land (shrub dominated) ♦ 13-23% natural forest Mainly sedentary farming system, with landowners residing in integrated settlements of the valley bottom with irrigated agriculture and double cropping; tenants on hill slopes in hamlets with rain-fed agriculture and sedentary grazers on steep slopes in dispersed settlement with grazing and browsing potentials; transhumant grazers also reside at lower elevation hill slopes during winter and the valley serves as transition route for nomads travelling with their herds between Buner and Kohistan to upland pastures.			Subsistence level livestock and crop production. ♦ Main valley: irrigated cropping land with rice plus wheat/legume fodder; alternating cropping pattern on the riverbanks, orchard tending 1.5% ♦ 1% low elevation grasslands for hay making ♦ 14% Oak forest at low elevation slopes for lopping and fuel ♦ 15% Deodar forest beneath upland pastures ♦ 60% upland pastures ♦ 8% of area with permanent snow cover Mainly semi-transhumant system (prevalent inside narrow valleys): mono-seasonal cropping of maize or fodder or vegetable rotation; transhumant/semi-nomadic system with population of sheep and meat type goat grazing and browsing on hillside outside the valley and using upland pastures inside the valley (in summer 4-5 months on lease basis).			Subsistence level livestock and crop production. ♦ Main valley: irrigated farming system with wheat, maize, oats, barley and vegetable/medic fodder; alternating cropping pattern on the riverbanks, orchard tending 1-1.5% ♦ 80% upland and middle elevation grazing lands with sparse vegetation of less than 35% cover ♦ 18.5-19% area with permanent snow cover Mainly semi-transhumant system (prevalent inside narrow valleys): mono-seasonal cropping of maize or fodder or vegetable rotation; transhumant/semi-nomadic system with population of sheep and meat type goat grazing and browsing on hillside outside the valley and using upland pastures of Mijigramgol pastures owned by Mehter of Chitral (in summer 4-5 months on lease basis).		
land holdings per household	Approximately 3 ha including less than 0.5 ha irrigated land or rain-fed land; rest as private grazing land			Approximately 0.5 ha per household of irrigated land and 0.25 ha grassland for hay, while the pastures are communally utilized by inhabitants of different villages			Approximately 0.5 ha per household of irrigated land; pastures are communally utilized by inhabitants of different villages		
number and size of households	550 households with 4500 inhabitants	680 households with 5600 inhabitants	620 households with 5500 inhabitants	150 households with 35% Muslims and 3500 inhabitants	800 households with 65% Muslim and 7000 inhabitants	250 households with 50% Muslims and 2500 inhabitants	370 households with 3000 inhabitants	350 households with 2800 inhabitants	450 households with 4000 inhabitants
languages	Pushtu, Gujri			Kailashwar, Khowar, Nooristani, Gujri			Khowar, Gujri		
ethnic groups	Pukhtuns, Miangan, Tenants, Gujars			Kalash, Shaikhan, Shafnai, Azakhel, Katourai, Alghani, Beshqari, Gujar			Anjasay, Sayed, Chowkaiy, Shafnai, Azakhel, Katourai, Alghani, Beshqari, Gujar		
religions	Sunni Muslims			Kalash religion, Sunni Muslims			Ismaili Muslims		

Vegetation									
Vegetation (type/belts, cover) depending on altitude and slope-aspect	Coniferous forest (Pinus wallichiana), upper montane to supalpine deciduous forest, fodder trees include grewia, celtus, olive, ailanthus, oak and mulberry near habitation			Alpine mats, coniferous forest, upper montane to supalpine deciduous forest, montane to supalpine dry coniferous forest, montane to subalpine meadows and (Artemisia) steppe at lower elevation; orchards grown throughout the valley			Rare patches of Juniper trees on shaded places, no forest, montane to subalpine meadows and (Artemisia) steppe, lower montane semidesert (Chenopodiaceae) steppe, willow tree on cropland boundaries mainly for fuel; orchard production at low elevation settlements		

Most important forage species	Quercus incana, Grewia oppositifolia, Celtus australus, Morus alba, Diosyros lotus, Ausculus indica, Celtus caucasica, Robinia pseudoacacia, Olea cuspidate, Melia azedarach, Ailanthus chinensis, trees, Anisomoles indica, Dodonia vescosa Shrubs. Heteropogon Contortus, Chrysopogon aucheri, Panicum antidotale, Dicanthium annulatum, Digitaria decumbence, Chrysopogon achynolatum, Cymbopogon jwarancusa, Chrysopogon montanus, Themeda anathera, Aristida adscenciaidis, Cymbopogon schaenanthus, Aristida adscencionis and Aristida poaceae. The Chrysopogon aucheri, Panicum antidotale, Digitaria decumbence, Cymbopogon jwarancusa, Cymbopogon schaenanthus Chrysopogon achynolatum, Dicanthium annulatum, Heteropogon contortus and Themeda anathera grasses are available on hillside. The marginal land grasses included Cynodon dactylon, Apluda mutica, Seteria pumila, Panicum turgidum, Pennisetum orientale, Digitaria sanguinalis, Saccharum spontanum, Rottbeollia exaltata, Arthroxon prionodes, Cenchrus cilliaris, Sorghum almum, Desmostachya bippinata and Andropogon squanosus.	Quercus incana leaves are pruned from forest, mulberry, grape wines, walnut tree leaves are also fed as a supplementary resource, Artimesia maritima species are available at low elevation winter grazing lands; wheat, rice and barley straw, and maize/oat stalks are procured from the field and fed during winter; Medicago is sown as fodder crop and mainly stored for winter-feeding.	Willow, birch, poplar tree, seabuck thorn shrub, mulberry, walnut, potato (leaves), wheat, rice and barley straw, and maize/oat stalks are procured from the field and used during winter; medicago is sown as fodder crop and mainly stored for winter feeding; Salvia, Rheum, Polygonatum, Pipthatherum hilarae, Scruphularis, Ephedra, Agrostis, Mentha, Acethelimaris, Chrysopogon, Filigo, Prongos, Grotalaris, Iris, Euroca and Alliaris are important grazing land/upland pastures forage species available in the valley.
Nutritional deficiencies	Iodine, Phosphorus, Magnesium and sporadically Calcium seems to be the important mineral deficiencies occurring in different valleys in different intensities, while Copper and Sulphur may be available in toxic amounts in different valleys; this needs to be further investigated by collecting and analysing summer and winter samples.		

Livestock									
Average herd size per household	Landowners (35% of the population) may have on average of 3 buffaloes, 2 cattle and 2 goats in their herd; tenants (63% of the population) may have 2 buffaloes, 4 cattle and 4 goats on average in their herd; grazers (2% of the population) may have 1 buffalo, 9 cattle, 60 goats and 15 sheep on average in their herd.			Kalashi people on average may have in their herd 2 cattle, 50 goats and 2 sheep; the converted Kalashi (now muslims) people on average may have in their herd 4 cattle, 20 goats and 1 sheep; the Nooristani people on average may have in their herd 5 cattle and 32 goats; some households of Chitralis settled for trade may have on average in their herd 2 cattle and 10 goats.			Cattle: 2 Sheep: 8 Goats: 12	Cattle: 3 Sheep: 10 Goats: 15	Cattle: 3 Sheep: 3 Goats: 10
A Goats									
Number[1]	2400	4400	2250	2600	6500	3200	4440	5250	4500
Occurrence of diseases/ parasites[1]	Possible diseases: Fascoliasis, worms infestation, warble flies, ticks/mange infestations, an-eastrus, mastitis, metritis, metabolic/ deficiency diseases, foot and mouth disease, Anthrax, Black Quarter disease, Entero-toxaemia, Pleuro-pneumonia, contagious exema are the common ailments prevailing in different valleys with different intensity; the occurrence will have to be evaluated in each valley								
Reproduction rate[1]	Different breeds available (milk and meat) 1-3 kids per year, usually single parturition per year			1-2 kids per year, usually single parturition per year			1-2 kids per year, usually single parturition per year		
Milk yield per animal[1]	0.25 to 1.5 litres per day depending upon breed			0.25 to 0.5 litres per day			0.25 to 0.5 litres per day		
Meat yield per animal[1]	Three main breeds: Ajarhi (meat breed 35-50 kg live weight), Barberri (30-40 kg live weight), Teddi (20-25 kg at puberty age			Three main breeds: Ajarhi (meat breed 35-50 kg live weight), Local (15-22 kg live weight) at puberty age			Two main breeds: Ajarhi (meat breed 35-50 kg live weight), Local (15-22 kg live weight at puberty age		
Wool yield per animal[1]	Hairs are only obtained from the Ajarhi goat possessed by 2% Grazers at the rate of 1.5 kg per year per mature animal and used for rope making and mesh for load carry over donkey and mules			Hairs are obtained from both the Ajarhi and local breed at the rate of 1.5 kg and 0.5 kg per animal respectively and converted into Palas (a carpet type use)			Hairs are obtained from both the Ajarhi and local breed at the rate of 1.5 kg and 0.5 kg per animal respectively and converted into Palas (a carpet type use)		

B Sheep									
Number[1]	900	120	150	150	900	450	2960	3500	1350
Occurrence of diseases/ parasites[1]	possible diseases: Fasoliasis, worms, warble flies, ticks/ mange infestations, an-eastrus, mastitis, metritis, metabolic/ deficiency diseases, foot and mouth disease, Anthrax, Black Quarter disease, Entero-toxaemia, Pleuro-pneumonia, contagious ecthema								
Reproduction rate[1]	1-3 lambs per year, usually single and rarely 2 parturitions per year			3-5 lambs per year, usually 2 and occasionally 3 parturitions per year			3-5 lambs per year, usually 2 and occasionally 3 parturitions per year		
Milk yield per animal[1]	0.25 litres per sheep per day			Milk never taken			Milk never taken		
Meat yield per animal[1]	Local Errhai breed 25-35 kg live weight. Ramboillete cross 35-45 kg live weight			Local Kairhi breed 14-22 kg live weight			Local Kairhi breed 14-22 kg live weight		
Wool yield per animal[1]	Local Errhai breed 0.50 to 0.75 kg per shear in three annual shearings; Ramboillete cross 0.75 to 1.00 kg per shearing in three annual shearings			Local Karhi breed 0.25 kg per shearing in three shearings			Local Karhi breed 0.25 kg per shearing in three shearings		

[1] to be updated through PRA / during field visits/work for each (sub-)valley

PAMS Activity plan

Activity	2004												2005											
	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
Elaborate PAMS proposal (gather & analyze literature, contact local stakeholders & local partners in the field etc.)																								
Recruit & train collaborators (valley associates), contact potential test herders																								
Collect summer samples (plants) in rangelands of test valleys																								
Assess T0 situation in all (sub-) test valleys; select and inform test herders; draft monitoring protocol																								

Global Budget and Business Plan (August 2004-July 2006/24 months)

Expenditure / activity	Price per unit & no. of units PKR	PKR*	CHF*	PAMS / NCCR	HUJRA	KISP	IP2 / CDE	Others
Fodder sample analysis	100/mineral per sample; 120 samples with 12 min.	144'000	3'200	3'200	0	0	0	0
Nutrient supply doses	120/animal/y; 900 1st year, 300 2nd year	144'000	3'200	3'200	0	0	0	0
De-worming	50/animal	60'000	1'334	1'334	0	0	0	0
Salary for coordinator[1] (part time)	20'000/m for 2 years	480'000	10'667	10'677	0	0	0	0
Salary assistant[2] for documentation / account.	8'000/m for 2 years	192'000	4'267	4'267	0	0	0	0
Salary for 3 valley associates[3]	5'000/m for 2 years per person	360'000	8'000	8'000	0	0	0	0
Travels & accommodations	Bulk sum coord. & associates & extra visitors	300'000	6'667	6'000	0	667	0	0
Sensitising & restitution events	20'250/event for 2 events per valley	121'500	2'700	2'700	0	0	0	0
Equipment (digital camera / labtop)	33750digital camera; 101'250 labtop	135'000	3'000	2250	750	0	0	0
Stationary & communication	2250/m for 2 years	54'000	1'200	1'000	200	0	0	0
Expenditures MSc[4]	2 travels & field work 2x2 months	279'000	6'200	0	0	0	5'000	1'200
Supervision / coaching by IP2[5]	Work time; 1 field visit (travel & accomm.)	-	33'000	0	0	250	32'750	0
Supervision / coaching by IP4[6]	Work time; 1 field visit (travel & accomm.)	-	28'000	0	0	250	2'750	25'000
Miscellaneous / reserve	-	-	1'500	1'500				
Total	-	-	112'945	44'128	950	1167	40'500	26'200

[1] Dr. Inam-ur-Rahim, chairman HUJRA (50%), [2] Employee of HUJRA (100%), [3] local pre-identified people with good educational base (75%), [4] Eva Syfrig, University of Berne, [5] Dr. Daniel Maselli, Co-ordinator IP2, University of Berne [6] Dr. Jakob Zinsstag,

45 Ruppies correspond to 1 CHF (http://www.xe.com/ucc/convert.cgi, accessed on 7 June 2004)