
Disadvantaged Mountain Farmers of Gurez Valley in Kashmir: Issues of Livelihood, Vulnerability, Externality and Sustainability

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ABSTRACT

Gurez, the land of ancient Aryans or *Dardistan* is a land locked mountainous valley with a geographical area of 362.88 sq. km inhabiting population of 37, 992 persons purely of tribe *Dard*, falling within the Kashmir province of Jammu and Kashmir state. The valley is a typical case of disadvantaged regions due to its economic, social and regional specificities. The study attempts livelihood analysis and tries to explore issues of vulnerability, externality and sustainability of disadvantaged tribal community of Gurez valley. The work was carried as a priority assignment by SKUAST-Kashmir for disadvantaged and inaccessible areas of J&K state in order to improve livelihood base for inclusive growth in such areas. Agriculture in Gurez valley is characterised by subsistence farming, a prominent feature of hill agriculture. Mixed cropping is a common agricultural practice in the region. Forests act as a prime natural resource which provides ample direct and indirect benefits to the people of valley. Despite rich environmental values and geographical profile, the livelihoods of Gurezi's were found vulnerable to geo-political affairs of being a border valley and various mountain specificities. People are trapped in the vicious circle of various sensitive factors such as inaccessibility, marginality of resources, fragility, poor carrying capacity, vulnerability of non-farm employment, un-explored niches, out-migration and erosion of *Dard* tribe due to displacement etc. Externalities of being a border valley was found in terms of large contingent of security forces stationed in a fragile and ecologically sensitive valley impacting environment as well as restricted area of forest and pasture lands which has a huge opportunity potential to generate income through small ruminant production system worth more than Rs. 25 crores per annum. The study also identified and analysed the indicators of unsustainability, their underlying processes and the focused efforts to reverse the same in order to restore sustainability within Gurez valley agro-ecosystem along with policy recommendations for upscaling the developmental efforts in agriculture and allied sectors in order to improve the livelihood base of tribal community of Gurez valley.

Keywords: Tribal community, migration, Sustainable livelihood, Kashmir.

JEL: C42, R0, R58, J2,

I

INTRODUCTION

The Jammu and Kashmir (J&K) state is a border State neighbouring Pakistan and China. The state is located mostly in the Himalayan mountain range with rugged terrain due to which several parts of it remain partly connected. The state has three distinct regions viz., Jammu, Kashmir and Ladakh with marked difference in climate,

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language, culture, ethnicity, resources and geographical proximity with the rest of country. Lack of all-weather permanent connectivity has put the Ladakh and Kashmir region (administratively known as Kashmir division) to a disadvantageous position coupled with the harsh winter which almost halts economic activities in these parts. The state being part of the Himalayan region has some unique economic disadvantages arising out of remoteness and poor connectivity, hilly and often inhospitable terrain, vulnerability to natural disasters, a weak resource base, poor infrastructure, shallow markets and most importantly plagued by conflict and political uncertainty from last three decades which have taken heavily upon the development of state in general and Kashmir valley in particular. These economic disadvantages have substantial implications for the size and nature of the development problem and offers a challenge to planners as well as administrators in tackling the manifold problems associated with the economic backwardness of the state.

Industrially, state in general and Kashmir Division in particular is backward and thereby economy is predominantly agriculture and service sector based. The initial land-use pattern in the state was purely agriculture, which has changed over to agri-horti-silvi-pastoral system. Considering the poor scope for industrialisation in mountains, agriculture remains an important sector for livelihood and economic growth despite its declining share in the economy. The state has a huge potential to accelerate agricultural growth through diversification from low to high value crops. Demand for attribute-based products that can be produced only in hill ecosystem is rising rapidly. These offer tremendous scope for enhancing the farm income, addressing gender issues and creating job opportunities. However, this potential needs to be harnessed very carefully without disturbing the natural system and in harmony with socio-economic and cultural factors (Partap, 2011).

The J&K State is not only a conglomerate of three distinct regions but there are smaller regions within regions marked off from one another by geography, culture, history, ethnicity, language and more important agro ecology and resource endowments. The state has many remote, isolated, and partly disconnected valleys among which Gurez valley, the land of ancient Aryans or *Dardistan* represent a true picture of disadvantaged region and the people thereof because of its economic disadvantage (small size of operational holdings and assets), social disadvantage (entire population of Gurez valley belongs to schedule tribe) and regional disadvantage (geographically very much remote and inaccessible for 5-6 months). It is a small picturesque valley situated in the lap of snow clad lofty and glaciated mountains. Crystal clear streams, lush green pastures, meadows and dense fir forest trees are the prominent features of this valley. Kishenganga river and its tributaries serves as the hub or knot along which are inhabited most of the villages. The region was once a link and transit point between Kashmir and Gilgit-Baltistan (Pakistan) via old silk route. Situated within $34^{\circ} 25'$ North latitude and $74^{\circ} 38'$ East longitude, the valley covers a geographical area of 362.88 sq. km with an altitude ranging from 2460 to 3000 metres above mean sea level (m amsl). The valley is a huge repository

of natural wealth in terms of forests, herbs, water, organic rich soil and salubrious summer climate with potential niche area for agi-horti-silvi-pastoral system.

II

METHODOLOGY AND DATA

The present study was carried out as a special assignment under Tribal Sub-Plan by the Sher-e-Kashmir University of Agricultural Sciences and Technology of Kashmir (SKUAST-K) through a team of multi-disciplinary scientists to carry livelihood analysis in economically, socially and geographically disadvantaged region of the Gurez valley and explore issues of vulnerability, externality and sustainability in order to formulate a future road map for target interventions through research and development in agriculture and allied sectors. In order to better dissect and understand the contribution of crops, livestock, other sectors and natural resources on livelihoods as well as explore issues of vulnerability, externality and sustainability of the disadvantaged tribals of Gurez valley, the study attempts (i) to evaluate the natural and household assets (resource base), (ii) analyse productivity of present resources (iii) how these influence decisions on resource management (iv) describing and understanding current livelihood strategies and exploring options for reducing poverty and addressing issues of sustainability.

The study made combined use of secondary information and household and village surveys. Primary data source for the livelihood survey of Gurez valley included (i) interaction with sarpanchs, village elders and local farmers of surveyed villages and (ii) discussions with Gurez based scientists and field functionaries. Proportionate sample of 20 per cent of households from each selected village were interviewed through a well structured schedule. For the village survey, semi-structured interviews with panchayat members provided the quantitative descriptions of the village (people, resources, and infrastructure). Group and individual discussions with respondents described the crop and livestock sub-systems practiced in the village and other significant aspects of village livelihoods. Discussions with the respondents also identified constraints and opportunities for improving their livelihoods and that of the village. The quantitative primary data from the village surveys were summarised using descriptive statistics. Secondary data on various aspects of the study area were collected from District Animal and Sheep Husbandry Offices, Agriculture/ Forest/Irrigation departments and District Statistical and Evaluation Agency, Bandipore along with selected reference works like Economic Review of Bandipore, District Agriculture Plan (DAP) and Village Amenities Directory of Gurez tehsil. The study period pertains to the years 2012 and 2013.

III

PROFILE OF GUREZ VALLEY

The socio-economic conditions of the region are diverse and steered by inaccessibility, marginality, fragile ecosystem and harsh winter. Generally viewed as poor and remote community but strategic defence location has added glamour and source of affluence to the inhabitants. Livestock keeping and farming on limited patches of mostly unirrigated arable land forms the traditional subsistence economy of the population. However, increased mobility with schedule tribe status, newly diversified off-farm activities and external interventions in the form of rural development initiatives and construction of road work and Kishenganga hydro project have been contributing to the socio-economic changes, community based paradigm shift, influencing cultural traditions and exerting pressure on natural resource use pattern. Overall, the population is heavily dependent on nature and exploitation of natural resources for goods and services to sustain their livelihoods. Cultivators and livestock rearers constitute 45 per cent of the total workforce. Nearly 10 per cent are agricultural labourers, 20 per cent are working in household industry and 35 per cent in other activities like army potters, *poniwallas*, trade, commerce, construction and other activities (Table 1).

Around 12 per cent of the total area (as per village papers) and only 3 per cent of the total geographical area is available for cultivation, out of which 40 per cent is irrigated. Broadly, the valley of Gurez comprises three imaginary zones, viz., lower Gurez (Bagtoor belt), middle/central Gurez (or main valley of Gurez) and upper Gurez (Tulail belt). Slight difference in agricultural practices and profound difference in socio-economic status of the people is seen across the zones even though there is no marked difference in climatological parameters. The population of the region was 37,992 persons with a population density of 104 persons per square km (2011 Census). The whole population area is rural and schedule tribe of *Dard* tribe. Sheena (Dardi) is the main language spoken in Gurez along with Kashmiri and Urdu. The Gurez valley comprises of 27 census villages, 10 panchayats, 2 blocks namely Dawer and Tulail, one tehsil with Dawer as headquarter (HQ). The literacy rate of region is about 59 per cent against 56 per cent literacy rate of state as per 2011 Census (Government of Jammu and Kashmir, 2013).

The valley has a salubrious climate during summer and experiences severe cold in winter. The summer period of June, July and August experiences maximum of 30° C. Summer rains are uncertain and rare, making crop cultivation a gamble in the hands of rains. The month of November marks the beginning of harsh winter with frost which lasts upto March. During this period, temperature falls as low as -20° C. Heavy snowfall of 5-10 feet, mild rainfall, severe cold and snowstorms are characteristic features of winter period. At Rajdhan Pass (11,672 ft altitude) snowfall forces land route of Gurez to remain closed for five to six months.

TABLE 1. PROFILE OF MAJOR CHARACTERISTICS OF GUREZ VALLEY

Major characteristics			Area and population		
S. No. (1)	Particulars (2)	Profile (3)	S. No. (4)	Particulars (5)	No. (6)
1.	Geographical distribution	-27 villages -10 panchayats, -2 blocks (Dawer & Tulail), -one Tehsil/ Assembly Constituency	1.	Area (sq. km)	362.88
2.	Principal crops/fruits	Maize, Wheat, Pulses, millets, vegetables	2.	Population (2011 Census) Male	37992 22978 15014
3.	Major livestock	Sheep, goat, local cow, yak, horses and mules	3.	Density of population (per sq. km)	104
4.	Average land holdings (ha)	0.278	4.	Literates to total population (per cent)	59
5.	Net irrigated area (per cent)	40	5.	Rural population as percentage to total population	Rural
6.	Soils	Sandy loam	6.	Schedule tribe population (per cent)	100
7.	Major river	Kishenganga	7.	Below poverty line population	8750
8.	Altitude range (m amsl)	2460 -3000	8.	AAY Population	6590
9.	Average annual rainfall (mm)	5 - 30	9.	Work force (100 per cent)	10075
10.	Temperature (°C)	Max. (25) Min. (-20)		a) Cultivators (per cent)	45
11.	Thermal index	Very Cold		b) Agricultural labourers (per cent)	10
12.	Hydric index	Humid		c) Household industry (per cent)	20
				d) Others (per cent)	35

Source: District Statistical Digest-2012, Village Amenities Directory-2012.

IV

MOUNTAIN FARMERS, LIVELIHOOD AND CAPITAL FORMATION

Mountain farmers of valley live and operate in ecologically fragile landscape. Their marginalisation makes them even more sensitive to environmental degradation. Practices in farming and grazing that enabled people to thrive in the past may not continue to be effective due to ecosystems degradation, population dynamics and globalisation exerting pressure on resources and communities. Livelihood is sustainable when it can cope with and recover from stresses and shocks and maintain its capabilities and assets both now and in the future, while not undermining the natural resource base. The livelihood framework identifies five core asset categories also known as asset pentagon upon which livelihoods are built, these are (i) human capital, (ii) social capital, (iii) natural capital, (iv) physical capital and (v) financial capital (DFID, 1999). The livelihood construction and capital formation in Gurez valley is discussed under these sub-sections.

Human Capital

At the household level, human capital is a function of knowledge, health, quality and quantity of available labour, and livelihood relevant skills. The results obtained from the household survey are comparable with several human capital indicators; the percentage of respondents who had received at least primary education was 68 per cent. As many of the survey respondents finished their education a long time ago, the current level of 98 per cent enrolment in primary education is indicative of progress towards the second Millennium Development Goal (MDG), achievement of universal primary education. Furthermore, the residents of Gurez valley fall under Schedule Tribe (ST) category (Dard) and have reservations in professional degree courses as well as government jobs that have led to a sizeable number of people acquiring higher posts in various government departments.

The disease profile and their magnitude was drawn after discussions with the doctors who have been serving for the last several years as well as by questioning the respondents about the most frequent diseases that affects their household. Tuberculosis and Brucellosis were found more severe among the upper zone of Gurez valley. Both diseases are livestock related and are transmitted to human beings who remain in close contact with the animals. The diseases profile and their magnitude across various zones of Gurez valley are summarised in Table 2. Thirty four per cent of households said they were not affected by any serious disease outbreaks in preceding three years, indicating that when problems do occur they are localised and effect within household, although cumulative effect on level of human capital may be significant. Access to health care facilities was more skewed to central zone due to presence of Sub District Hospital/CHC at tehsil headquarter followed by lower zone due to its proximity and low by upper zone which is even more constrained during winter months due to road cut-off.

TABLE 2. DISEASES PROFILE AND THEIR MAGNITUDE

Name of disease (1)	Lower zone (2)	Middle zone (3)	Upper zone (4)
Tuberculosis	*	*	***
Brucellosis	*	*	***
Respiratory diseases	**	**	**
Chronic bronchitis	*	*	*
Asthma	**	**	**
Chronic obstructive pulmonary disease	**	**	**
Hypertension	**	**	**
Diarrhoea	*	*	**
Allergic disease (Rhinitis)	**	**	**
Diabetes	*	**	*

Source: Table was formulated after discussions with the doctors as well as respondents.

Note: * mild, ** moderate, *** severe.

Access to latest technical knowhow about the farming and livestock rearing will probably be affected by the level of education. However, no such profound trend was

observed either across the zones or by education level. The access to agricultural/animal husbandry information was found to be more pronounced by the extension agency, their programmes and schemes as well as target domain. Table 3 shows the different sources of information and access to such extension agencies. From farmers' perception, it seems that there is hardly any extension work/program going on in the region. However, after cross checking with the field functionaries and officers of development departments as well as beneficiaries of their programmes, it seems that some work/extension programmes of lower magnitude do exist in the region but is purely confined around the village hamlets of their offices/stations with lower level of adoption of such schemes.

TABLE 3. ACCESS TO AGRICULTURAL/ANIMAL HUSBANDRY INFORMATION

Information source/Extension agency (1)	Lower zone (2)	Middle zone (3)	Upper zone (4)
Agricultural Extension Officer	*	*	*
Horticulture Development Officer	*	*	*
Animal and Sheep Husbandry Deptt.	*	**	*
SKUAST-K/KVK	**	*	*
Other farmers	**	**	**
Seed/input suppliers	**	**	**
Media	*	*	*
Any other source	*	*	*

Source: Field survey data, 2012/2013.

Note: *Low accessibility, **Moderate accessibility and ***High accessibility.

Natural Capital

Natural capital was found to be an important component of livelihood asset basket among the residents of Gurez valley, particularly among the agro-pastoralist group. The natural capital and the products derived and accessibility to such natural resources on household basis is depicted in Table 4. Gurezi people are traditionally practising agro-forestry methods. On an average, the private (*milkaeti*) land vary from 5.5 kanals (0.28 ha) in lower zone to 9.25 kanals (0.46 ha) in upper zone with 6.75 kanals (0.34 ha) of average land holding size in middle/central zone of Gurez valley (one hectare is equal to 20 Kanals). The proportion of non-milkaeti land also known as *gass charai* (grassland) is relatively more per household in lower and upper zones whereas at lower side in central zone. The private land is generally used for crop production and if necessary for construction while as non-milkaeti land on which a person does have usufructuary rights is usually meant for harvesting the grass for cattle and also putting cattle in such lands for grazing once grass is harvested (Table 4). The non-milkaeti land/*gass charai* on an average household makes about 26.60 qtls of fresh green fodder in lower zone and 43.23 qtls in upper zone while it is the least in middle zone (19.76 qtls) depending upon the holding size of such grasslands. The cutting of grass starts from the month of July-August and lasts till October. Huge piles/bundles of grass are dumped in specially constructed grass godowns made up of

wood logs which act as a buffer stock/fodder bank for a prolonged winter season at almost every household level. The farmers raised serious concern about the accessibility to these grasslands during discussions, which have got restricted/squeezed over time from the security agencies.

TABLE 4. HOUSEHOLD SURVEY ABOUT NATURAL CAPITAL AND ACCESS TO RESOURCES

Natural Capital (1)	Lower Zone (2)	Middle zone (3)	Upper zone (4)
1. Land (Kanals)			
(i) Milkaeti/Private land	5.5	6.75	9.25
(ii) Non-milkaeti/grass land	7	5.25	12.43
2. Livestock			
(i) Cow local	1.23	0.73	1
(ii) Bullock	0.21	0.20	0.43
(iii) Calf	0.43	0.37	0.62
(iv) Sheep and goats	7.5	3.75	11.73
(v) Horse/poney/mules	1.37	1.12	2.11
3. Water resources (availability)	*	*	*
4. Forest Resources			
(i) Grass (qtls)	26.60	19.76	43.23
(ii) Wood (qtls)	17.87	15.32	25.43
(iii) Black cumin (gm)	437	325	422
(iv) Medicinal plants (kg)	5.32	2.37	7.79
(v) <i>Banus</i> (forest litter) (qtls)	3.79	3.11	4.98
5. Fish catch (kg)	5.78	4.10	5.39
6. Plantation/fruit trees (No.)	9.35	8.26	8.23

Source: Field survey data, 2012/2013.

Livestock is the main economic contributor in the Gurez valley from primary sector. Households maintain livestock for milk production, draught power and mutton. Small ruminants especially sheep are the prominent livestock type in the area followed by cattle, horse and mule. Animal breeds are mostly indigenous with low production potential. Livestock number as well as composition invariably varies to some extent across three zones. Overall, the upper zone was found with more livestock numbers per household (15.89) followed by lower zone (10.74) and least by middle zone (6.17). Sheep and goat constitute about 70 per cent of the household livestock composition. On an average, every household owns 1-2 cows giving milk from 4-6 kgs per day. Sheep and goats are purposively reared for mutton purpose whereby, the pastoralists also get wool as by-product. Keeping of horses/poneys/mules is a characteristic feature of Gurezi's as a means of livelihood by acting as potters for carrying goods to security forces at higher pickets/posts.

Forests act as primary source of fodder for the livestock population in the region besides providing ample grazing hours in its pastures during summer season for local livestock as well as migratory from other areas of Kashmir valley/state. Wood being the primary source of fuel in Gurez valley for cooking as well as heating during winter is collected from the forests. On an average, 20 qtls of wood is collected/consumed by household in a year out of which more than 50 per cent is used for heating purpose in winter and rest for cooking. Black cumin (kaala zeera) which

grows wild in forest area is collected by people of region and is becoming rare after every passing year primarily because of mismanagement of resource due to tragedy of commons (Clark, 1977 and Ostrom, 1990). There is an urgent need to aware people of its proper harvesting time and management through user rights on community based approach in order to rejuvenate the vanishing glory of this niche product of the region. Leaf litter of forest trees locally known as *banus*, is another product collected by the farmers in the autumn season and is mixed with farm yard manure which gets decomposed during winter and is toiled on the farm fields in spring season. It was reported by the people that it acts as a good medium in softening the hard soil pane and increases the humus content of soil to a greater extent. A number of medicinal plants endemic to region are harvested by the people for various uses as well as marketed for commercial gains from forests. On an average, a household harvests about 5 kgs of medicinal plants of varied nature in a year; however, the quantum of extraction varies across the zones.

Fishery resources in the region are confined along the water courses of Kishenganga river and its tributaries/rivulets. The main species found are snow trout. Fishing of trout from the rivulets and river is legally permitted to license holders issued by the Department of Fisheries. The potential exists for cold water fisheries in the region where some potential beneficiaries can be identified under RKVY programme for development of trout culture under private sector as carried out in other areas of the state by the Fisheries Department.

Most of the fruit trees found in the region were of wild nature bearing fruits of minimal use and value. There is need for introduction of some quality plant material suitable to the agro-climatic conditions of the region and phasing out of unproductive wild trees in an orderly manner without impacting biodiversity of the region.

Physical Capital

Physical capital consists of the basic infrastructure and producer goods needed to support livelihoods. The information in Table 5 reveals varied degrees of physical asset either under public or private domain along with their usage and accessibility. Overall, the physical asset quality, accessibility and usage were found more skewed towards middle/central zone with obvious reason of being as the tehsil headquarter and higher socio-economic status of the people. While as, the upper zone was rated poor almost among all the physical quality parameters for the obvious reasons of remoteness, inaccessibility, marginality and low socio-economic profile within region as compared to other two zones.

Financial Capital

The average cash deposits in the banks vary across the zones with maximum in the central zone and minimum from upper zone. As per the J&K Bank records, there is an amount of 43 crores of core deposits of residents of the Gurez tehsil which forms majorly land compensation to farmers for hydropower dam project by

TABLE 5. PHYSICAL CAPITAL ASSETS ACROSS THE VARIOUS ZONES OF GUREZ VALLEY

Particulars (1)	Lower zone (2)	Middle zone (3)	Upper zone (4)
(A) Road and transport			
(i) Road network connection	Moderately	Well connected	Poorly
(ii) Quality of roads	Poor	Average	Very poor
(iii) Availability/Affordability of transport	Low	Average	Very low
(B) Building Infrastructure			
(i) Stone/Concrete Bullocks	18 per cent	24 per cent	7 per cent
(ii) Hard brick with concrete	7 per cent	32 per cent	5 per cent
(iii) Mud brick	32 per cent	11 per cent	15 per cent
(iv) Wood-log house	43 per cent	33 per cent	73 per cent
(C) Water Supply & Sanitation			
(i) Piped drinking water	Average	Average	Poor
(ii) Availability of water	Average	Average	Poor
(iii) Quality of water	Average	Average	Average
(iv) Timeliness of water	Average	Average	Poor
(v) Sanitation	Average	Average	Poor
(D) Energy Source and Access			
(i) Cooking gas	**	***	*
(ii) Wood	**	*	***
(iii) Electricity	**	**	*
(E) Telecommunication Network			
(i) Cell phones	-	*	-
(ii) BPTs booths	*	*	*
(iii) TV/Dish TV	*	**	*
(iv) Radio service	*	**	*

Source: Field survey data 2012/2013.

Note: *, ** and *** Low accessibility/usage, Moderate accessibility/usage and High accessibility/usage, respectively.

Hindustan Constructions Corporation (HCC). Most of the land compensation money is going out of the Gurez valley as the dislocated population have already purchased lands either outside or in process.

Land is one of the important capital item and land value was higher in middle zone followed by lower and upper zones. Livestock capital constituted Rs. 1.16 lakh in lower zone, Rs 0.79 lakh in middle zone and about Rs. 1.64 lakh in upper zone (refer Table 6). The total household income was found minimum of Rs. 2.25 lakhs in upper zone and relatively higher by middle zone (Rs. 3.99 lakhs). Agriculture contributes minimal to annual household income across the zones, while as, livestock and forest products had a major contribution. Dependence on income flows from agriculture and allied sectors was found higher (51.55 per cent) in upper zone of Tulail valley whileas least among the households of middle zone (17 per cent).

Off-farm income formed significant portion of household livelihoods in the lower (74.03 per cent) and middle zones (83 per cent) of Gurez valley while it was low (48.485 per cent) in upper zone (Table 6). Among off-farm income sources, employment under public/private sector makes the major contribution (about 50 per cent in lower and middle zones and 25 per cent in upper zone) to household incomes. Remittances from the members of households doing jobs outside Gurez valley contribute about 10 per cent in lower and middle zones and 6.67 per cent in upper

zone. It was reported that a large number of people migrate outside valley before the onset of winter for labour work and other petty businesses.

TABLE 6. HOUSEHOLD FINANCIAL CAPITAL OF SAMPLED FARMERS

Particulars (1)	Lower zone (2)	Middle zone (3)	Upper zone (4)
(A) Stocks (Rs in lacs)			
(i) Deposits in banks	1.23 (6.54)	5.78 (15.97)	0.73 (3.82)
(ii) Land (Value)	12.37 (65.76)	19.31 (53.36)	14.80 (77.44)
(iii) House	3.25 (17.28)	8.97 (24.78)	1.27 (6.64)
(iv) Jewellery	0.67 (3.56)	1.23 (3.40)	0.52 (2.72)
(v) Livestock	1.16 (6.17)	0.79 (2.18)	1.64 (8.58)
(vi) Tools and implements	0.12 (0.64)	0.10 (0.28)	0.15 (0.78)
Sub Total	18.81 (100.00)	36.19 (100.00)	19.11 (100.00)
(B) Income Flows from			
(i) Agriculture	0.07 (1.95)	0.05 (1.25)	0.12 (5.33)
(ii) Livestock	0.49 (13.68)	0.34 (8.52)	0.48 (21.33)
(iii) Forest products	0.36 (10.05)	0.25 (6.26)	0.54 (24.00)
(iv) Fisheries	0.01 (0.28)	0.007 (0.17)	0.009 (0.40)
Sub Total	0.93 (25.97)	0.67 (17.00)	1.165 (51.55)
(C) Off-farm Income			
(i) Employment (Public/Private)	1.80 (50.28)	2.11 (52.88)	0.56 (24.89)
(ii) Business	0.23 (6.42)	0.54 (13.53)	0.11 (4.89)
(iii) Non-farm labour	0.17 (4.74)	0.11 (2.76)	0.23 (10.22)
(iv) Remittances	0.38 (10.61)	0.47 (11.78)	0.15 (6.67)
(v) Other source	0.07 (1.95)	0.09 (2.25)	0.04 (1.78)
Sub Total	2.65 (74.03)	3.32 (83.00)	1.09 (48.48)
Annual HH Income	3.58 (100.00)	3.99 (100.00)	2.25 (100.00)

Source: Field survey data, 2012/2013.

Social Capital

Social capital is difficult to quantify and analyse; this is particularly apparent with regard to understanding the informal networks and institutions that people access and engage with. Formal and informal networks, groups and institutions are the defining characteristics of social capital in this research. Among formal institutions, a number of people are members of major state political parties and get help to solve their individual as well as community level problems. The NGOs are almost non-existent in the region; however, security agencies have emerged as a major social capital for the local residents in case of emergencies. No profound difference was observed with regard to social capital across the three zones in the region.

Capital Asset Pentagons

The degree of dependence and nature of inter-relationship among capital assets gives the shape to formation of livelihood construction and capital generation. Figure 1 on capital asset pentagon is the outcome of the scores gained on the set of indicators in each capital asset and their collective score. The pentagon of lower zone

reveals more skewed towards financial capital (1.4 score) with moderate aggregate score on physical (1.2 score) and natural capital (1 score) followed by human and social capital (0.8 score). On the other hand, middle zone have scored maximum in human capital (1.6) followed by financial Capital (1.4 score), physical capital (1.2 score), social capital (0.8 score) and least in natural capital (0.4 score).

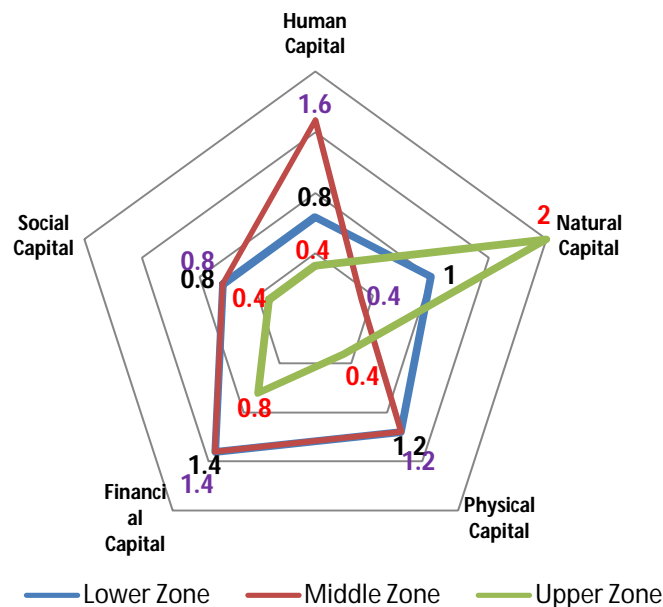


Figure 1. Capital Asset Pentagons across in Gurez Valley

The capital asset pentagon of upper zone show maximum score of 2 in natural capital, however, the performance on part of other set of capital indicators is poor (below one). It has been found that the poor and marginalised communities' dependence on natural resources is more as observed in upper zone and if proper interventions are not taken, it may lead to resource degradation at some point of time due to over-exploitation and mismanagement of the resources in the valley.

v

VULNERABILITY OF LIVELIHOOD

Despite rich environmental values and geographical profile, the livelihoods of the people are vulnerable to geo-political affairs and various mountain specificities. People of Gurez are trapped in the vicious circle of various sensitive factors which making them vulnerable. These are discussed as follows:

Inaccessibility/Marginality of Resources

Gurez valley has rich natural resources but access to these is a point of concern. The village settlements in the valley are aligned on the banks of Kishanganga river and its tributaries having enough flow to meet valley's agriculture and other needs. However, access to its water is constrained by topography. Another natural resource base is limited available arable land which impinges development of Gurez in general and agricultural sector in particular. Per capita availability of land (according to village papers) in the valley is about 0.31 hectares but the availability of cultivated area exhibited marginality of production base in the region. The average holding size in the valley was about 0.28 hectares per household, indicating marginal productive natural resource. The holdings would become more marginalised if available land area is equated with 2011 population census. This marginalisation of valleys' setting becomes more prominent in association with poor access to additional land area. Steep slopes/ undulated topography and restriction imposed by security forces owing to its strategic location along line of control (LOC) hampers in bringing additional land under productive utilisation.

The valley is repository of rich forest resources; however, the people of valley have limited access to these forest lands. Whatever is accessible has been a renewable source of fodder, non-timber forest products, fuel wood, timber and other herbs of rich medicinal values. Furthermore, the pressure exerted by rising population had led to over-exploitation of accessible portion of forests resulting a potential threat to biodiversity. This is substantiated by the fact that black cumin (Kala zeera), the heritage wild flora of the valley, seems to be a species at risk due to its over-exploitation.

Fragility and Intensification of Agriculture

The intensity of marginality further multiplies due to fragile agro-ecosystem of the region. Receding holding size and lack of location-specific technological breakthrough have put barriers to development initiatives of the farming sector which necessitates improvement of agricultural intensification with poor chances of extensification. Moreover, the region has to face hostile climate during winter that leaves poor scope for increasing cropping intensity. Furthermore, winter months aggravate the hardships of people to sustain their livestock for want of feed. The available land area may not have enough capacity to sustain its existing population; hence, the situation demands improvement in productivities through technological breakthroughs to give relief to existing livelihood from agriculture.

Poor Carrying Capacity of Natural Resources

Attempt to assess the carrying capacity of accessible natural resources portrays a grim picture of the valley. Production system was found to produce much less than

required by local population to meet nutritional requirements as per Indian Council of Medical Research (ICMR) norms. The valley's production figures fall deficit with respect to requirements as shown in (Figure 2). People depend upon public distribution system (PDS) supply and private traders for their food commodities. Gurez valley remains cut off from the entire Kashmir valley due to heavy snowfall and the PDS has made arrangements to maintain buffer stock in the region. But a big question in the background of food security issues is that 'does PDS supplies and arrangements made by them suffice nutritional requirements of all Gurezi residents'? Haphazard distribution through PDS has been one among other claims people have, though they showed deep concerns about black marketing and shortage during winter months.

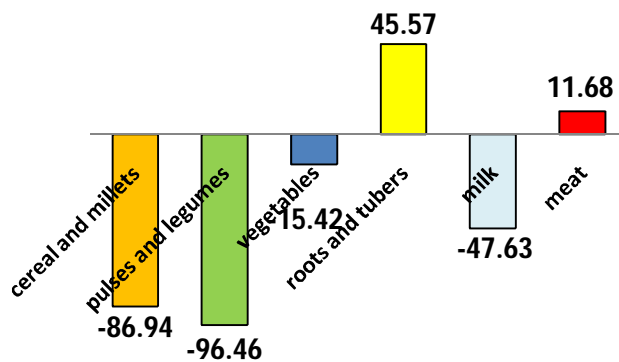


Figure 2. Food Production and Requirement Gap in Gurez Valley (per cent)

The carrying capacity of common property resources (CPRs) (including forest, pasture/grazing lands, barren and uncultivated land) to provide suitable production environment for livestock was analysed. The existing adult cattle units (ACUs) in Gurez (25834 ACUs) are not fully supported by this land. Available CPRs have carrying capacity of sustaining about 91.43 per cent of existing livestock population (if we assume optimum CPR requirement of 0.5 ha/ACU). The carrying capacity will further dwindle if the proportionate allocation of CPR per ACU is even marginally increased. Moreover, inaccessibility to additional area demarcated forests had put pressure on accessible CPRs. The food situation in the valley demands increasing density of livestock population but this proportion would put ecology of valley under strain.

Unexplored Niches

Despite various mountain specificities, the valley has comparative advantage in the form of niche areas yet to be exploited. The region has a potential for upscaling horticulture on commercial lines. Introduction of apricot, walnut and other temperate

fruits would get a conducive environment for better performance and changing climate would support this transformation. Few households in middle Gurez (Dawer) had their venture in apiculture activities. Institutional intervention and mechanism is demanded to acquire the regional agriculture a status of being organic. Encouragement for application of organic nutrient supplements should have good pay off. The rejected organic manures (dung of livestock) in lower Gurez could be efficiently utilised for this purpose. The region can be developed into organic valley due to its minimal reliance on inorganic inputs for crop and livestock produce. Introduction of cold-water fisheries (particularly trout farming), never talked before, has the potential to provide a subsidiary livelihood support. Further, propagation of medicinal and aromatic plants and non-timber forest products having industrial importance can be taken on scientific lines.

Out-Migration from Gurez Valley

Limited livelihood options in the region persuade people for out-migration, for few months to a year, either temporarily or sometimes permanently. All types of migration for economic gains are highly advocated however increasing tendency to migrate would definitely raise concerns of the losing value of Gurez valley. No one other than local could better understand and deal with nature and eco-system of the valley. This emphasise upon strengthening human-ecosystem interactions for sustenance of the natural geographic setting. Provision of basic necessities along with development of socio-economic overheads would help in this context. Barring the security concerns, encouragement of tourism can be a good option however, it warrants long term strategic decisions.

VI

BORDER VALLEY EXTERNALITY

Estimating the externalities of Gurez being a border valley, one has to take into account the spill-over effects of large contingent of security forces stationed along the length and breadth of valley and their impact on the environment as well as the restricted area of forest and pasture lands which has a huge opportunity cost of production for the local residents. While estimating the externalities (Table 7), the main component is restrictions on the use of pasture and forests to local residents for security reasons. As per the interaction with village *sarpanchs* and elders, an approximate 629 ha area of pastureland and 19,074 ha area of forests is restricted to people. Even if valley is very well suited for livestock production system it remains under-utilised due to the present situation of forced restrictions and inaccessibility. An estimated quantity of 47,427 qtls from 629 ha area of pastureland and 7,20,997 qtls from 19,074 ha area of forest land is the forgone quantity of green fodder which makes up 36,050 qtls of fodder on dry matter basis with a monetary value of Rs.

17.43 crores. An additional population of about 55,450 small ruminants can sustain on this unused fodder/ pasture area with a potential of Rs. 25 crore livestock business in terms of sale of such small ruminant population. Apart from this, there are livestock death reports due to explosion of mines as well as loss on account of inaccessibility to non-timber forest products (NTFP).

TABLE 7. ECONOMIC ESTIMATES OF BORDER VALLEY EXTERNALITY FOR GUREZ

S. No. (1)	Description and estimation of externality (2)	Magnitude (3)
1.	Inaccessible Pastureland area	629 ha
2.	Inaccessible Forest area maintained by Forest Department	19074 ha
3.	Total inaccessible area	19703 ha
4.	Quantity of green fodder forgone due to restricted pastureland area @ 3.77 qtl/Kanal from 629 ha	47427 qtls
5.	Quantity of green fodder forgone due to restricted forestland area @ 1.89 qtl/Kanal from 19074 ha	720997 qtls
6.	Fodder on DM basis forgone due to restricted area	28074 tonnes
7.	Monetary value of forgone DM fodder @ Rs.40/7kgs	Rs. 16.04 crores
8.	NTFP of restricted forest land forgone	19074 ha
9.	Loss of property (livestock death) due to mining problem	Rs. 8.10 Lacs
10.	Total DM forgone per year	28074 Tonnes
11.	No. of small ruminants which can sustain on such fodder @ 1.5kg/sheep or goat/day	51277
12.	Total monetary value of lost opportunities/unused natural resources	Rs. 25 crore

Source: Calculated by authors based on primary information and secondary data available.

The region has a huge repository of medicinal and aromatic plants with great potential for development into herbal valley is jeopardised due to border area sensitivities. Likewise, Gurez can be an attractive tourist destination for being serene and picturesque landscape valley if security issues can be properly addressed. Hence, the valley has a great potential for development provided the concerns of being a border valley are taken care of. Though security agencies have imposed restrictions on the access to forests/pastures along LOC but their deployment in the valley has few positive externalities in terms of employment generation and providing medical and rescue operation services in times of emergencies.

The study has identified and analysed indicators of unsustainability, their underlying processes and the focused efforts to reverse the same to restore sustainability within the Gurez valley agro-ecosystem. The framework has been conceptualised based on the past work in similar field by Jodha *et al.*, (1992) and Shrestha (1992) and same has been summarised under Table 8.

TABLE 8. SEARCHING SUSTAINABILITY THROUGH UNDERSTANDING UNSUSTAINABILITY DYNAMICS IN GUREZ VALLEY

Visibility of change (1)	Changes related to		
	Resource base (2)	Production flows (3)	Resource use/Management practices (4)
Directly visible	Various forms of resource degradation: Vast area of agriculture land under-going dam, water-logging in adjacent and upstream dam area; fragmentation and marginalisation of land holdings; Biodiversity loss.	Reduced total and per capita biomass availability; declining productivity levels of crops; increasing pressure on sub-marginal lands for crop cultivation; higher dependence on inferior options of crop and livestock rising; low production of black cumin; mixed farming losing their identity and efficacy in changed context; rising severity of climate change impacts; increased dependence on public relief; increasing trend of out-migration for livelihood;	Changes in land use pattern: cropping on sub-marginal lands; decline in common property resources (e.g., black cumin and medicinal herbs); reduced diversity of agriculture (e.g., number of crops/enterprises and their inter-linkages); reduced feasibility and effectiveness of traditional adaptation strategies.
Changes concealed by responses to changes	Non-existence of institutional arrangements to enforce resource conservation measures; Rain-fed farming dependence increasing due to ineffective irrigation infrastructure; Desperation for undertaking mechanisation for cultivation and water lifting from Kishenganga river; reclamation of idling and wasteland areas; Shift and desire from local to external inputs (e.g., from manure to chemical based farming inputs); Desperation to acquire jobs under public sector- doing away from farming .	Loss of recoupment capacities; higher coverage by public distribution system (food, inputs) and other anti-poverty programmes; reduced reliance on self provisioning system and greater dependence on external market forces; changes in land use pattern.	Discarding of traditional crops; shift towards cropping schemes with packages from public sector departments (e.g., Agriculture, Horticulture, Animal Husbandry department, KVKs etc); increased land use intensity; replacement of self-help systems by public support systems (e.g., previously, the irrigation <i>kuhls</i> (canals) were looked after by the farmers themselves on <i>halshari</i> - self-help basis which is now no more in practice and farmers are now dependant on Irrigation department for even small repairs).
Potentially negative changes due to development initiatives	Large area of cropped and pastureland undergoing dam, water-logging in adjacent and upstream area; Loss of biodiversity, aquatic and human health hazards due to pollution of water-bodies; habitat disturbance; anthropogenic pressure on natural ecosystem around the project activity sites; R&D focus on crops rather than on resources; technique rather than user perspective (e.g., method/species/inputs rather than group action for watershed/rangeland development/social norms for harvesting black cumin.	Large scale population displacement and disintegration of unique cultural fabric of tribal settlements; A total of 1634 ha area affected from HE power dam; pressure on forest ecosystem; negative changes in aesthetic quality of landscape by over-crowding beyond its carrying capacity; Anthropogenic pressure of labour force in and around construction sites; threat of biodiversity loss; deteriorating water quality; demographic changes leading to erosion of ethnic culture and social value system; changing of serenity and pristine nature of valley to shanty-crowded township resulting in aesthetically pleasing landscape into an eyesore.	Sectoral focus of R&D and other support systems ignoring flexibility and diversification needs; privatisation of common property resources; disregard of indigenous knowledge in formal interventions; top down approach of development departments rather than bottom up or demand driven; replacing local informal arrangements by administrative measures.

VII

CONCLUSION AND RECOMMENDATIONS

Various facets of rural livelihood in Gurez were comprehensively analysed in relation with supporting or suppressing factors. As supporting factors, the region has rich resources like water, lands and vast pastures/forests, but these variables have not been fully utilised in an effective way. The associated factors like harsh weather, locked resources and various mountain specificities are there to put both man and environment in strain. Unscientific management of livestock/ farming and poor scope for development of non-farm sector amounts to the vulnerability of peoples' livelihood in the Gurez valley. Though the region is transforming steadily but still it falls deficit with respect to number of socio-economic overheads. The study suggests replacing existing less productive varieties of crops grown in the area with improved (productive and disease resistant) ones. High-yielding varieties of fodder, viz., Sabzaar and Shalimar fodder oats-1 suitable for region may be introduced. Experimentation regarding exploring possibility of cultivating two fodder crops in a growing season needs to be conducted at Izmerg station. Protected vegetable cultivation has lot of scope and possibilities for limited period to ensure better production. Introducing quality planting material of walnut, apricot, apple, cherry and strawberry may give commercial orientation to fruit cultivation in Gurez. In order to save the heritage crop (black cumin) from the threat of extinction, efforts for in situ conservation need to be undertaken in consultation with stakeholders on community basis. The study further advocates the efficient utilisation of farm yard manure and its use in mushroom cultivation. There is a need to harness the possibilities of introduction of cold water fisheries in the region. Above all Gurez should be specialised for the production of organic mountain products for which efforts from the development departments are required. A sustainable backyard poultry breed needs to be introduced in the area. Encouragement of livestock sector should be associated with introduction of feed banks, feed blocks, urea molasses mineral block technology, and roughage improvement technique to overcome scarcity of feed during harsh winters. Smallholder dairying could also be experimented in view of assured market for its products by the security agencies. Better utilisation of water resources through maintenance of existing irrigation infrastructure in terms of dilapidated canals and field channels as well as creation of new irrigation schemes. The region is also best bet for the integrated watershed development programmes. Creation of basic amenities around inhabited villages would help in sustenance of Gurez economy which requires an effective role by the R&D institutions and government.

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