JICA, Pakistan Office

Basic Study on the Horticulture Sector in Gilgit-Baltistan

STUDY REPORT

Study conducted by:
Aga Khan Rural Support Programme (AKRSP)
(A Project of Aga Khan Foundation)

April 2010

FORWARD

The high-mountain valleys of Gilgit-Baltistan (GB) are famous for producing a diverse nature of delicious fruits, more particularly apricots. For centuries, the farmers of the region have been practicing horticulture as part of their livelihoods management strategy. Fruits and vegetables remained important food supplements in addition with a vital source of minerals, fiber and antioxidants. Dried fruits and vegetables were an important source of houseld food supplies in the long winter period. Many scholars have linked the mineral-rich diet of the region with the famed longevity of its people.

With the formal opening of the Karakoram Highway (KKH) in 1978, GB started to produce small market-bound horticultural surpluses. During the subsequent two decades (1980s, 1990s), the local economy began diversifying from the susbsistance tradition of livelihood to the orientation of market-dependence. The horticulture sector thus became an integral source of cash income for small farming families. Over the past 25 years, the government departments, the United Nations agencies, particularly the Food and Agriculture Organisation (FAO), the Aga Khan Rural Support Programme (AKRSP), community organizations (CBOs), and the private sector played major roles in fostering emergence of horticultrure sector in GB.

Consruction of the KKH and investments by the governemnt, the AKRSP and communities in the construction of valley and link roads, the constraints of physical access began to improve that put a limit on development of high-value horticulture. In the current context, with improving accessibility and further plans for new and planned improvements in the road, air and telecommunication infrastructure and services, the role of horticulture in the local economy is expected to increase manifolds. GB has a natural advantage with the rest of the country for supplying many high value fruits and vegetables during off-season.

Since its inception, the AKRSP has been endeavoring for effective ways to create sustainable sources of income for local communities through wise use of natural resources. High value horticulture has been one of the areas that has tangibly contributed to social and economic well being of local communities. And yet, its potential is still under-utilized, which offers a huge opportunity, especially as the area opens up to national and regional markets.

For this reason, the AKRSP prompted to initiate as first opportunity to offer its services to JICA Japan International Cooperation Agency (JICA) to conduct this Basic Study on Horticulture Sector in Gilgit-Baltistan. Typically, the AKRSP refrains from competing with private sector players in commercial bids. In this particular case, our main interest was however similar to that of JICA: a good state-of-the-art document of this sector to serve both as a baseline and a starting point for new investments in this sector. Our objective in this study was therefore to come up with a comprehensive report that can serve as a foundational document for the government, donors, private investors, and the primary stakeholders (that is, the hard working famers of GB). I very much hope that we have been successful in this endeavor, and this document serves the purpose for which it was commissioned and meets the expectations of JICA.

I would like to take this opportunity to express our sincere gratitude and appreciations to JICA office in Islamabad, particularly to Ms. Chieko Yokota, Representative, JICA Pakistan office, for her kind management support for this study, including invaluable input and feedback at critical stages of the study. I am also grateful to our colleagues in the Department of Agriculture, the Planning and Development Department and other public sector agencies, community leaders and private sector partners for sharing their knowledge and experiences with us in compiling this report.

Izhar Ali Hunzai
General Manager/CEO
The Aga Khan Rural Support Programme (AKRSP)

TABLE OF CONTENTS

LIST OF TABLES

List of Abbreviations

ADP	Annual Development Plan
AED	Agriculture Extension Department
AKCSP	Aga Khan Cultural Services' Pakistan
AKDN	Aga Khan Development Network
AKF	Aga Khan Foundation' Pakistan
ASF	Agribusiness Support Fund
BCDP	Baltistan Culture Development Foundation
CIDA	Canadian International Development Agency
COs	Community Organisations
CSOs	Civil Society Organisations
DFP	Dry fruit Project
DoA	Department of Agriculture
FAO	Food and Agriculture Organisation
FATA	Federally Administered Tribal Areas
FGD	Focused Group discussion
FSC&RD	Federal Seed certification and Registration Department
GB	Gilgit-Baltistan
GBC	Gilgit-Baltistan and Chitral
GDP	Gross Domestic Product
GE & NER	Gross and Net Enrolment rates
IFAD	International Fund for Agriculture Development
IRDP	Integrated Rural Development Project
IUCN	International Union for Conservation of Nature
JICA	Japan International Development Agency
KADO	Karakorum Area Development Organisation
KARINA	Karakorum Agriculture Research Institute Northern Areas
KCBL	Karakorum Cooperative Bank Limited
KKH	Karakorum Highway
KIS	Key informant survey
LDOs	Local Development Organisations
LFO	Legal Framework Order
LGRDD	Local Government and Rural Development Department.
LSO	Local Support Organisation
MARS	Mountain Agriculture Research System
MINFA	Ministry of Food and Agriculture
MTDF	Midterm Development Framework
NADP	Northern Areas Development Project
NARC	National Agriculture Research Centre
NGO	Non-Governmental Organisation
NAPWD	Northern Areas Public Works Department
NASSD	Northern Areas Strategy for Sustainable Development
NPIWC	National programme for Improvement of Water Courses
NDO	Nunehal Development Organisation
P&DD	Planning and Development Department
PPAF	Pakistan Poverty Alleviation Fund
RMA	Rapid Market Appraisal
RSPD	Regional Sspecific Product Development
RSPN	Rural Support Programs Network
SDA	Sustainable Development of Agriculture
SESGBC	Socio-Economic Survey of Gilgit-Baltistan and Chitral
SESNAC	Socio-Economic Survey of Northern Areas and Chitral
UCs	Union Councils
UNDP	United Nation Development Program
VOs	Village Organisations
WOs	Women Organisations

CHAPTER ONE

1. BACKGROUND

1.1 Introduction to the study

Region Specific Product Development (RSPD) is a pioneering idea of Japan International Cooperation Agency (JICA). Under this approach, the Agency aims to generate employment and income opportunities by creating local brands of featured products. In response to a request of the Government of Pakistan, JICA showed its interest in extending the idea of RSPD to Gilgit-Baltistan (GB) to help local people capitalize on the GB's comparative advantage in horticulture. But for JICA to plan and implement any future assistance for development of horticulture sector in GB, availability of the basic—sector specific—information is crucial, which lacks in the case of Gilgit-Baltistan. In order to address this information gap, JICA therefore assigned a study entitled "Basic Study on Horticulture Sector in Gilgit-Baltistan" to the Aga Khan Rural Support Programme (AKRSP), Gilgit in December 2009. Consequently, the AKRSP started conducting the field study in the fourth week of December 2009 and completed it in mid March 2010.

1.2 Project team and their ToRs

The AKRSP assigned a team of multidisciplinary professionals who had extensive prior experience of working on programmatic and research issues in GB, including designing and conducting qualitative and quantitative studies. Among others, the core team of professionals included the following:

(1) Mr. Muhammad Saleem	Economist/Team Leader
(2) Mr. Abdul Malik	Public Policy Specialist[1]
(2) Mr. Melad ul Karim	Horticulture Development Specialist
(3) Mr. Muzaffar Uddin	Marketing and Enterprise Specialist

A brief profile of each consultant is attached as Annex 1.

1.3 Research Methodology

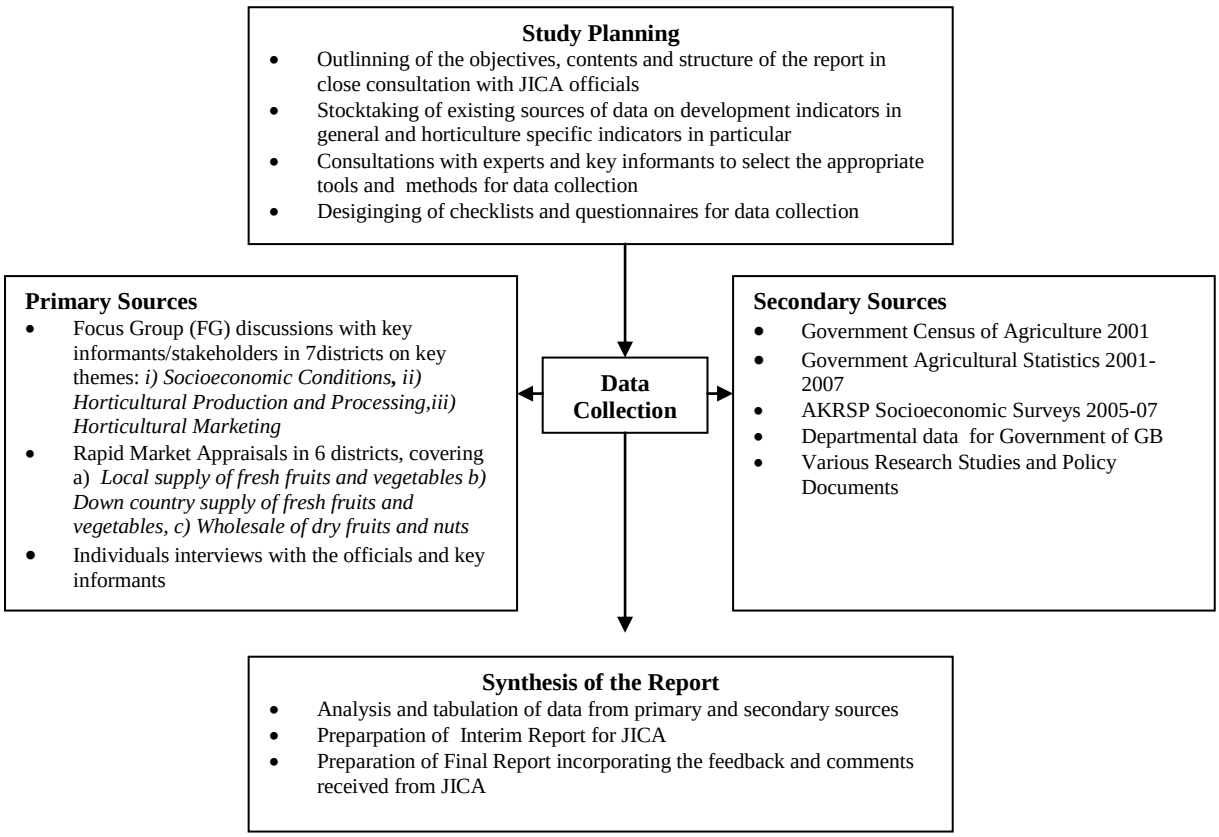
1.3.1 Planning

At the planning stages of the study, the consultants held a series of consultative meetings with senior officials at JICA as well as with the stakeholders (Government, Civil Society, and the Private Sector). Soon after the signing the contract with JICA to conduct the the Basic Study of Horticulture Study, henceforth refered to as 'the Study', the consultants met the JICA senior officials, Ms Chieko and Mr. Bukhari in Islamabad to discuss the structure and contents of the Study. In this meeting, JICA officials shared their concerns and expectations, and explained the key aspects of the study to the consultants. Subsequently, the consultants convened an internal meeting in Gilgit to discuss the research methodology and the next stages of the Study. In the meeting, the consultants also reviewed all the structure of study in the light of the the comments received from JICA officials in Islamabad. The team also took stock of the existing data sources

[1] The consultant provided extensive input during the initial stages of the study before taking up a new assignment with the World Bank. He also assisted the team from time to time in improving various sections of the study.

and identified the areas where data gaps existed. The team also scheduled a meeting with the Chief Secretary and Secretary Food and Agriculture, Gilgit-Baltistan on 23rd December 2009.

Figure 1: Research Methodology



On December 23, the consultants met with the Secretary Food and Agriculture besides other officials including the Directors, Deputy Directors, and field staff of the respective department. The Chief Secretary could not join the meeting because he was in Islamabad. The consultants explained the background, objectives and the plan of the Study and requested the Secretary to extend maximum possible support to the Study, especially in providing guidance and access to official data. Following up on the consultants' request, the Secretary appointed Mr. Mehmood Asghar, Deputy Secretary Agriculture, as the focal person from the Government Secretariat to assist them in the Study.

1.3.2 Designing of Data Collection Instruments

The consultants organized a consultative meeting with a selective group of stakeholders to stocktake the existing data and discuss specific methods and tools to collect data both from primary and secondary sources. This meeting was attended by the participants from the Agriculture Secretariat, Agriculture Directorate, Chambers of Commerce, private sector representatives and a selective number of farmers. The Consultants developed a checklist of key questions based on the discussion of the the meeting, which guided the preparation of the draft questionannaires. (See Annex I for questionnaires). At a later stage, the the Consultants tested

the draft questionnaires and the revised versions were shared with all the stakeholders who attended the meeting.

Based on the assessment of the availability of data from existing sources as well as in view of the input from various consultative meetings, the Consultants decided to use the following instruments and techniques to collect the data for the study:

- Questionnaires and checklists to collect data from both primary and secondary sources
- Focus Group Discussions with key stakeholders around three three themes:
    - Socioeconomic Conditions
    - Horticultural Produciton and Processing
    - Hortculatural Marketing
- Rapid Market Appraisals to assess the supply and maketting of fresh fruits within and out of the region.
- Interviews with officials and key informants
- Opportunity Sampling
- Special meetings with senior government officials

1.3.3 Selection of Research Teams and Enumerators

After finalizing the selection of research techniques and data collection instruments, the Consultants selected researchers and organized them into three distinct groups: i) Socioeconomic Conditions; ii) Horticultural Produciton and Processing; and, iii) Horticultural Marketing. Each team was made responsible for collecting data from both primary and secondary sources around their respective themes and to tabulate the findings to reflect the needs of the report. Ech team was then given training and orientation in using the questionnaires and relevant secondary sources of informations (including official statistics on agriculture and the AKRSP household data on socioeconomic indicators, and other research reports). At this stage, a complete Inception Report, including the plan of the Study, was prepared and shared with JICA.

1.3.4 Data Collection

In terms of organization, the fieldwork had two distinct components: i) collecting and synthesising statistics from secondary source; and ii) holding district-wise Focus Group discussions and implementation of Rapid Market Appraisals. In order to deliver the outputs in a timely manner, the field work under the two components was launched simulataneously. The overall process of data collection lasted for 17 days.

Under the first component (data collection from secondary source), the team of researchers with the active assistance from the Consultants collected data from a diverse set of sources on various socioeconomic and farm indicators that were outlined in the structure of the report. Among others, the field work under this component focused on the following elements:

- Data collection from major official surveys of agricultural sector (such as Northern Areas Agricultural Statistics 2007) on the state of agricultural and horticultural production and marketing in each district of Gilgit-Baltistan.

- Tabulation and analysis of the AKRSP Socioeconomic Surveys (2005-08) to complement the information from official agricultural statistics as well as to generate district-wise tables on household level socioeconomic indicators (such as per capita income, poverty, and literacy). As part of this exercise, the Consultants also used Hudur Valley Baseline Survey 2007 to tabulate information for Diamer district.
- Data collection from the Government line departments on fiscal measures (such as sector-wise budgets and investments) and capacity measures (such as physical facilities and human resources). Similarly, the data was also collected from invididual agencies (such as information on banking sector) from both public and private sector.
- Information gathering from existing resesearch and strategic documents.

The second but a critical component of the data collection process was holding Focus Group Discussions (FGDs) with key stakeholders to collect firsthand information on the state of horticulture in GB. As part of this component, the Consultants, assisted by the research teams, held a total of 21 FGDs across all districts of GB. FGDs were organized under the three themes of socioeconomic conditions, production, and marketin. The participants were assigned to each theme based on their preference and prior experience. The participants were chosen from both public and the private sector, including the staff of Agriculture Department, farmers, traders, and community members (both men and women). The district-wise summary of participants of FGD participants is presented in Table 1.1 (see Annex IV for the detailed list).

Table 1.1: Summary of FGD's Participants

FGD Group	Gilgit	Ghizer	Hunza-Nagar	Astore	Diamer	Skardu	Ghanche
Socio Economic	10	12	13	08	08	11	7
Marketing	9	16	18	12	13	11	11
production	11	12	21	9	15	18	7
Total	30	40	42	29	35	40	25

Add a column to give total for each FGD topic

As an integral part of data collection on issues surrounding marketing and marketing channels, the Consultants also conducted a series of Rapid Market Appraisals (RMAs). Table 1.2 presents the district-wise summary of the RMA samples. In order to better understand the state of marketing in the horticulture, RMAs focused on five areas: i) local supply of fresh vegetables, ii) local supply of fresh fruits; iii) supply of fresh vegetables to other parts of Pakistan; iv) supply of fresh fruits to markets in other parts of the country; and v) the wholesale of dried fruits and nuts.

Table 1.2: District-Wise RMA Samples

Type of RMA	Gilgit	Ghizer	Hunza-Nagar	Astore	Diamer	Skardu
Local Supplies - vegetables	17	9	5	5	6	11
Local Supplies- Fruits	17	9	4	5	6	10
Down Country Supplies-Vegetables	7	2	2	2	3	1
Down Country Supplies – Fruits	8	2	2	2	3	1
Dry Fruits and Nuts – Wholesale	**8**	**11**	**3**	**5**	**5**	**5**

1.3.5 Synthesis of the Report

The synthesis of report was done in a modular fashion. Each member of the core team of Consultants was assigned the responsibility to produce the sections of the report that were more relevant to their area of expertise. The Consultants, assisted by the research team under each theme, also tabulated the data received from both secondary and primary sources to reflect the key questions that were raised under each section of the report. In many instances, the Consultants used statistical packages to analyze the raw data received from secondary sources (including the AKRSP's Socioeconomic Surveys) to generate the tables used throughout the report.

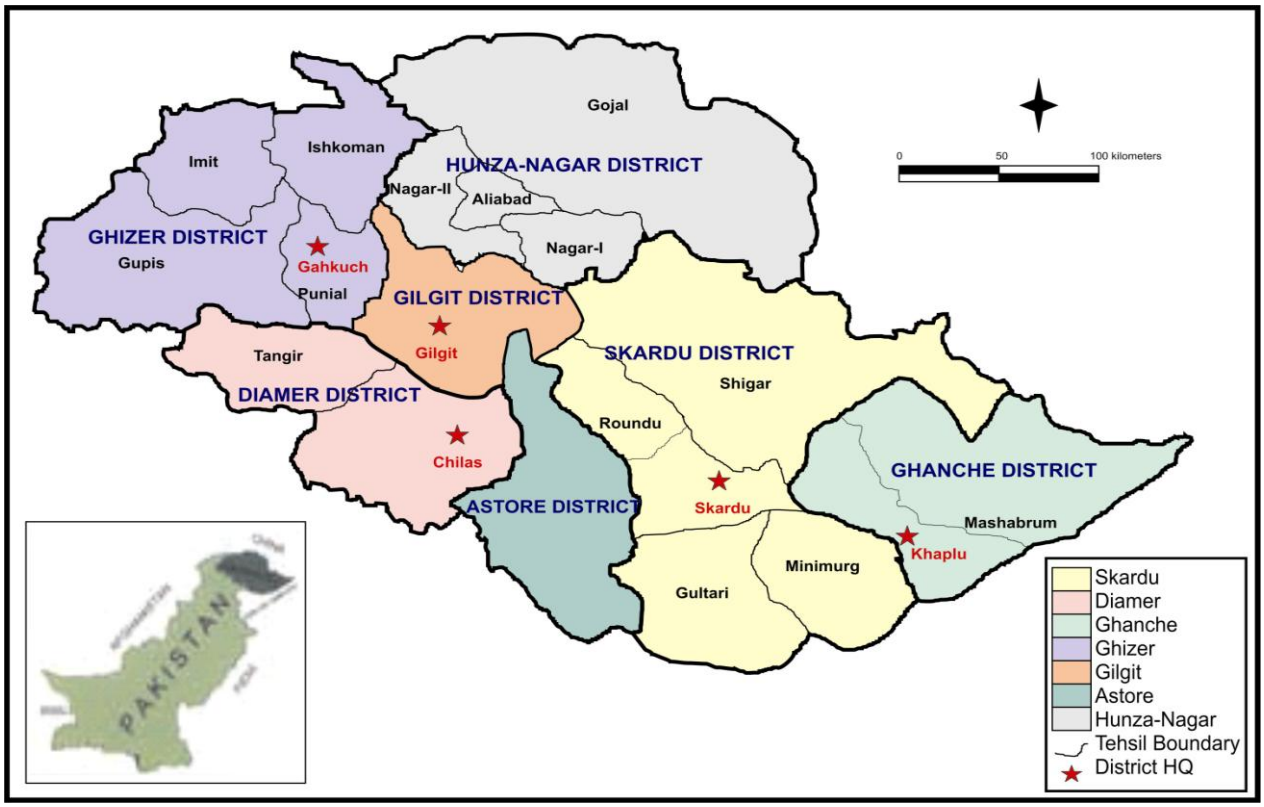
On the basis of initial analysis, the Consultants produced an Interim Report and shared it with JICA for their comments and feedback. The team received invaluable comments from JICA which provided the basis for additional analysis and revisions. On January 12, 2010, the Consultants produced a second draft of the Study, which reflected the comments from JICA as well as new information that was collected from the field. After receiving the comments from JICA on the second draft, the team submitted a final report on April 19, 2010.

CHAPTER TWO

2. SOCIO-ECONOMIC FEATURES OF GILGIT-BALTISTAN

2.1 Geographcial Setting

Spread over an area of 72,496 square kilometres, the Gilgit-Baltistan region is situated in the north of Pakistan, northwest of India, southeast of Afghanistan and southwest of China. Aminsitratveily, the region is divided into seven districts. Possessing rugged and mountaineous characteristics, the region is surrounded by the world's three highest mountain ranges - the Himalayas, the Karakoram, and the Hindukush. Most of the landscape is above 1,200 metres from the sea level, and farming communities live at the altitudes of above 3,000 metres. The agricultural production system is based on gravity fed irrigation with water supply from streams and rivers originating from melted snow and glaciers from high lying areas in the mountains. Since the region lies outside the monsoon rainfall system, it receives a very low annual precipitation estimated between 100 and 500 millimetres, mainly from snow during winter season. The climate is temperate with temperatures ranging from -30^0 in the winters to 47^0 C in the summer (source: Presentation by the Chief Sectary). [The source quotted here is took weak: needs academic source]



2.2 Population and Culture

The region has a combined population of approximately 1.10 million (Table 2.2.1), consisting of about 100,000 households, with an average household size of 11, settled in more than 1,000 villages. The Gilgit district has the highest population and the Astore and Ghanche districts have the lowest population in the region. The population of the region exhibits religious and linguistic diversity - four Islamic traditions, Sunni, Shia Ithnasheri, Noorbakshi, and Shia Ismaili live together in this region. The people of the area speak five languages that include Shinna, Balti, Buroshaski, Chitrali, and Wakhi.

Table 2.2.1: Population of Gilgit-Baltistan as of December. 2007

Districts	Population	Growth Rates
Gilgit-Baltistan	**1,115,687**	**2.07**
Gilgit	314,725	2.74
Ghizer	159,350	3.08
Astore	96,495	3.30
Diamer	178,137	3.30
Skardu	267,575	2.24
Ghanche	99,405	1.18

Source: 1998 Population Census projected for 2007

Because of this diversity of languages, the population encounters difficulties in understanding all these languages in order to establish a smooth communication. Therefore, Urdu remains the most popular language and spoken and understood by most inhabitants. The ethnic diversity is very common in the area, and people mostly identify themselves in the districts with their distinct ethnic background (see End Table 1 &End Figure 1, Annex II).

The ethno-linguistic and religious diversity is a strong embedded part of the social fabric in all the district of Gilgit-Baltistan, except for the Gilgit city. There are several reasons for general harmony amidst diversity in Gilgit-Baltistan. First, it primarily exists at the districts' level but not at the villages level, except in rare cases in urban towns. For instance, communities living in the villages usually speak their respective languages; belong to the same ethnicity and sect. Therefore, in most cases, interaction takes place between communities with similar background. Second, even within the districts, communities belong to different backgrounds are highly interdependent on each other in several ways. For example, they share common resources such as forests, wildlife, pastures, land, water, and other social infrastructure like schools and hospitals. This inter-dependency encourages them to cooperate to maintain social harmony, and nudge forward the development processes. However, in-depth anthropological investigation is necessary to find exact factors that promote or hinder social harmony in GB .

Many social festivals were celebrated in all the districts of the region in the past. In the FGDs, the participants identified several such festivals that their ancestors celebrated on regular basis to commemoreate special occasions (End Table 2, Annex II). However this tradition has gradually been fading away because of growing modernization in the region. The focus group participants in all the districts mentioned that they celebrated only the three most important festivals: Eidul Fiter, Eidul Azha, and Novroz.

2.3 General Administration

In the past, the region was a collection of small kingdoms and states, and these states were ruled by the *Mirs* and *Rajas* till 1974 under various administrative structures (Table 2.3.1). The *Maharaja* of Kashmir ruled this region till the independence of Pakistan in 1947. When Pakistan

was created, the people of this region fought with the *Maharaja* of Kashmir and liberated it on 1st November 1947. These states were finally abolished in 1974. Until 2009, Gilgit-Baltistan was known as the Federally Administered Northern Areas (FANA) of Pakistan.

In 1970 a self-governance system was introduced in the region, and the first Northern Areas Council was formed in the same year. This governance system has undergone several transitions over the years (Table 2.3.2). In late 2009, the Government of Pakistan granted the region provincial equivalent status with a full set of institutional reforms to bring it at par with other provinces. Politically and administratively, Gilgit-Baltistan is now governed like a Province with a Governor as the head of the province and the Chief Minister as the head of the Provincial Government in the Gilgit-Baltistan Legislative Assembly (GBLA). GBLA is comprised of 33 members, which includes 24 elected, three technocrats and six women's seats. In order to create a systematic and functional link with the mainstream national system of governance, a Gilgit-Baltistan Council (GBC) has been put in place above the GBLA. GBC is consisted of fifteen members, of which six members are the ministers from the federal cabinet with Prime Minister of Pakistan as the Chairman and the Governor of the GB as the vice chairman of the Council. The rest of the seven members include the Chief Minister of GB and six members elected by the GBLA from within the GB. The GBC has been put in place as a mechanism to create a provision for a systematic representation of the GBLA in the National Assembly. It may be noted that till the year 2009, the GB was federally administered through the ministry of Kashmir Affairs and Northern Areas, headed by a Federal Minister and had no formal representation in the national governance structure due to the disputed status of GB.

The Local Government System in GB is different from what is prevalent in other parts of Pakistan; and the devolution has not yet been introduced in region. For example, in addition to the GBLA, there are 7 District Councils, 106 Union Councils, and 7 municipalities which constitute the local government structure. Administratively, the Gilgit-Baltistan region is divided into 7 districts[2], 14 sub-divisions and 23 Tehsils (End Table 3, Annex II).

In the district headquarters, sub-divisional headquarters and in municipalities, the prices of commodities are controlled by the District Administration through Price Control Committees (PCC) composed of members from the District Administration, the Municipalities and *Anjuman-e-Tajra'n* (Association of Traders). These committees in each district are headed by the Assistant Commissioners.

To monitor and control the commodity prices, the Food Inspection Branch of the concerned Municipality conducts market price surveys for both the local and down-country markets to collect information on wholesale and retail prices. The Price Control Committees meet every month to discuss this information collected on prices. In these meetings, the Committees then decide a 10 to 20 percent increase on the purchase price to incorporate the the transportation cost from the origin of purchase to the ultimate destination of consumption. Through this process, the prices of essential commodities in GB are regulated on a monthly basis.

[2] It is noteworthy at the outset that the seventh district of Hunza-Nagar has recently been announced by the Government of Pakistan. For the most part, information and data on this newly district is therefore not available in the disaggregated form. Nonetheless, the Consultants have made an attmempt to provide information that is currently available.

Table 2.3.1: Administrative Setup of the Gilgit-Baltistan Region

Period	Setup
1878 TO 1950	POLITICAL AGENT
1950 TO 1986	RESIDENT COMMISSIONER
1986 TO 1992	ADMINISTRATOR
1992 TO 1994	CHIEF COMMISSIONER
1994 TO-DATE	CHIEF SECRETARY

Source: Chief Secretary Presentation to Standing Committee

Table 2.3.2: Journey of the Governance Setup of Gilgit-Baltistan

Year	Governance setup
1970	The Northern Areas Advisory Council with 14 seats was setup
1975	The Advisory council renamed as Northern Areas Council with 18 members
1994	Legal Framework Order (LFO) extended, with eight additional seats (6 for men and 2for women) bring the total to 26. Post of the Deputy Chief Executive along with 3 to 5 advisors was created.
1999	Council renamed as Northern Areas Legislative Council and powers given to legislate on 49 subjects, the seat of Speaker and 3 women seats also added.
2003	Seat of Deputy Speaker was created
2004	6 seats of technocrats were created and women seats were increased from 3 to 6 (one from each district)
2007	Northern Areas Legislative Assembly
2009	Gilgit-Baltistan (Empowerment and Self-Governance Order 2009) announced with wide ranging reforms.

2.4 Economic Situation

Table 2.4.1 explains the overall economic situation of the region on the basis of some selected economic development indicators. The per capita income of the population of the region as a whole was Rs. 29,426 in 2008. The level of income is still very low with that of the national average GDP per capita, accounting for 49 percent of the national average (SESBG 2008). Furthermore, it appears that there are considerable differences in the per capita incomes among the districts. The analysis shows that per capita income is much higher in the Gilgit district than rest of the districts, while the per capita income in the Diamer district is only half of the Gilgit district.

Table 2.4.1: Per Capita Incomes, Poverty, and Household Expenses-2008

Districts	Nominal PCI	Poverty (HCI)	HH Expenses(Rs)
Gilgit-Baltistan	**29,426**	**25**	**161,613**
Gilgit	41,334	18	196,112
Ghizer	30,366	29	147,933
Astore	25,183	35	175,029
Diamer*	21,546	24	126,357
Skardu	30,339	17	179,706
Ghanche	27,790	35	115,353

**Source: Hudur Valley Baseline Survey 2007 for Diamer district; SESGBC 2008 for the rest of districts.*

The prevlence of poverty is also quite visible, 25 percent in the overall region. Again, the poverty levels vary from region to region. The Gilgit and Skardu districts are very close to each other

and perform much better than the other districts. However, poverty appears much higher in the Astore district followed by the Ghanche district (Table 2.4.1).

Household expenses constitute an important measure of household welfare. As a whole, the household as a unit of composition spent an average amount of Rs. 161,613 on an annual basis on various items of daily needs in 2008. Within the districts, the consumption levels seem different. The level of spending in the Gilgit district was much higher compared to the rest of districts. In this crucial indicator, the Diamer and Ghanche districts fall far below the level of the Gilgit district, only half of the expenditure that a household on average enjoys in the Gilgit district.

Table 2.4.1b: Districtwise unemployment rate %

Districts	Unemployment Rate
Skardu	1.10
Ghanche	1.72
Giglit	2.85
Ghizer	1.72
Astore	2.56
Gilgit Baltistan	**1.99**

The unemployment level is one of the important causes of low household income and poverty. The data given in table 2.4.1b indicates that theover all unemployment rate in GB is 1.99%. Within GB highest unemployment 2.85% is in Gilgit followed by Astore 2.56% and Ghanche and Ghizer 1.72%. Skardu has the lowest unemployment percentage.

Table 2.4.2a and b presents the shares of various farm constituents in the overall household farm income. This picture is very interesting. The Agriculture Sector had a share of 54 percent in the farm sector that includes agriculture, forestry and livestock sectors. A similar trend is also observed in all the districts with the exception of the Astore district. In Astore, families earn incomes mainly from the livestock (65% share in the household income). This explains that the livelihoods of the population of the region greatly depend on the earning from the Agriculture Sector.

Table 2.4.2a: Share of Constituents in Farm Incomes 2008

Constituents	Gilgit Baltistan	Skardu	Ghanche	Gilgit	Ghizer	Astore
Income from Agriculture	57,069	77,186	56,226	72,553	32,520	38,351
Income from Forest	12,576	18,187	13,335	9,389	10,884	9,841
Income from Livestock	48,229	59,795	42,003	36,259	43,901	68,316
Total Income	**117,873**	**155,168**	**111,564**	**118,201**	**87,306**	**116,508**

Source: SESGBC 2008

Table 2.4.2b: Percentage Share of constituents in Farm Income 2008

Constituents	Gilgit Baltistan	Skardu	Ghanche	Gilgit	Ghizer	Astore
Income from Agriculture	48	50	50	61	37	33
Income from Forest	11	12	12	8	13	8
Income from Livestock	41	38	38	31	50	59
Total Income	**100**	**100**	**100**	**100**	**100**	**100**

Source: SESGBC 2008

Table 2.4.3: Percentage Share of Constituents in Agriculture Incomes 2008

Region/District	Agriculture Constituents		
	Cereal	Horticulture*	Total
Gilgit Baltistan	**17**	**83**	**100**
Gilgit	11	89	100
Ghizer	24	76	100
Astore	9	91	100
Diamer	47	53	100
Skardu	22	78	100
Ghanche	13	87	100
**** Potato, Vegetable and Fruit***			

Source: SESGBC 2008
**Source :Hudur Valley Baseline Survey 2007*

Table 2.4.4: Percentage Share of Constituents in Horticulture Incomes 2008

Region/ District	Horticulture Constituents			
	Vegetable	Potato	Fruits	Total
Gilgit Baltistan	**11**	**29**	**60**	**100**
Gilgit	12	37	51	100
Ghizer	21	11	68	100
Astore	26	52	22	100
Diamer	10	16	74	100
Skardu	7	31	62	100
Ghanche	6	25	69	100

Source: SESGBC 2008
**Source :Hudur Valley Baseline Survey 2007*

The analysis highlights another very important aspect of this sector. For example, within the Agriculture Sector, the Horticulture appears an emerging sector with its highest share, accounting for 83 percent of the entire household farm incomes earned from the agriculture. Across the district this percentage share ranges from 76 percent in the Ghizer district to 91 percent in the Astore district (Table 2.4.3).

Further analysis within the Horticulture Sector shows (Table 2.4.4) that the share of income from fruits is 60 percent in Gilgit-Baltistan followed by potatoes. Moreover, the share of incomes from fruits is overwhelmingly higher than that of earned from vegetables and potatoes. However, in the Astore district, farmers are earning much more incomes from potatoes, more than twice that of combined income from vegetables and fruits.

Household and farm assets are also one of the indicators of communities in specific setting. Tables 4 and 5 in Annex II present in detail the percentage of sample households that own several items of household assets and farm assets for use to meet different purposes. The tables show that household own at least 40 items of household assets and 9 items of farm assets. This is really an exhaustive list of household assets. The assets presented in the tables consist of both the conventional assets such as residential quarters, cattle sheds, utensils, furniture, shops, lanterns, irons as well as some latest assets such as hotels, saw mills, computers, vehicles, mobile sets, TV sets, satellite antennas, and refrigerators.

Some of the conventional assets such as residential houses, cattle sheds, utensils, lanterns, and irons are owned by the majority of the sample households, ranging from 47 percent households in Ghanche for iron ownership to 100 per percent households in all the districts for residential houses. A very low percentage of households in the Ghanche district however own cattle sheds. As far as the latest assets are concerned, a high majority of sample households own TV sets in the Gilgit district as compared to the rest of the districts in Gilgit-Baltistan. The use of mobile sets is very common in the Skardu and Gilgit districts, followed by the owners of vehicles in these two districts.

A similar trend in the use of farm assets is also observed in all the districts. The conventional farm assets, such as ploughs, axes, hammers, shovels are owned by the majority of sample households. The ownership of tractors, threshing machines, modern plough machines are quite low in all the districts.

The overall value of the assets that the sample households own is captured in Table 5 in Annexure - I.

2.5 Access to Natural Resources

2.5.1 Biodiversity

Biodiversity includes diversity of ecosystems, species, genes and the ecological processes that support them. Natural diversity in ecosystems provides all essential economic benefits and services to human society such as food, clothing, shelter, fuel and medicines as well as ecological, recreational, cultural, and aesthetic values and thus plays an important role in sustainable development.

Mountains' ecology in Gilgit- Baltistan provides a numbers of goods and services to the inhabitants of the area. This includes; forest, water and agriculture products, biodiversity resources and tourism recreational opportunities. The various zones of Gilgit-Baltistan have distinct flora and fauna which is important for the economy of whole country. The area is native to some of the flora and fauna and others are brought into these areas by the traders and the invaders. All the introduced animal and plant species surviving in the area for centuries now possess the genetic basis for tolerance to extreme climate, diseases and pests and represent a unique genetic base for future horticultural development.

2.5.2 Fruit Diversity

Table 2.5.1 presents some data on the availability of fruit varieties in GB. The table indicates a very high diversity among the fruit species. According to Doolan (1993), GB has favorable

environment for the production of deciduous fruit and nut crops from an agro-ecological standpoint. GB also lies close to the two major centers of fruit diversity, namely, Central Asia and China. The ancient trade route from China to India passed through Gilgit-Baltistan and many of the regions fruit species were originally brought here by traders. Fruit crops have been grown here for centuries and now possess the genetic basis for tolerance to extreme cold, heat, frost, drought, diseases and pests; they represent a unique resource for future horticultural development.

Table 2.5.1a: Fruit Varieties Found in Gilgit-Baltistan

Fruit Species	Number of Varieties/Cultivars
Almond	3
Apple	17
Apricot	28
Cherry	13
Grapes	8
Mulberries	4
Olive	6
Peach	5
Pear	14
Plum	8
Walnut	15

Sources: Doolan, 1993; GB Department of Agriculture

Table 2.5.1 shows different varieties of fruit existing in Gilgit Baltistan. Apricot has the highest number as 28 varieties are currently found in the area; apricots are an important food staple especially in Hunza, where the steep valley sides and narrow terraces help the production of tree crops. Apple varieties have the second highest rank with 17 varieties, and walnut has the third highest number with 15 varieties. Pear has 14 varieties, cherry has 13, grape and plum have 8; andolive has 6; while peach and Almond are the lowest following as 5 and 3 varities repectivevely. Since traditionally a few varieties of apricots, grapes, mulberries and walnuts were grown in Gilgit Baltistan, but over the last century, many other kinds of fruit trees were also introduced such as the AKRSP that brought various kinds of apples, cherries and apricots in the region. Though, the exotic fruit varieties increased fruit production per unit area and the nutritional value but decreased the number of disease resistant indigenous varieties. No detailed study has been conducted to document verities of various species of fruit and their status in GB. However, there is a possibility that many traditional fruit plants and their genetic resources are under threat of disappearance. The major threat seems to be from unchecked introduction of the western fruit plants by horticulture development programmes. This rapid introduction of western cultivars is replacing the old established ones, and in many areas farmers are discarding about the local varieties. The extent of this transition can be judged from the fact that as Whiteman mentioned (1985, 1983 and 1984): about 33 different new verities of apple were imported from England and introduced as mother trees on eight different government nurseries in GB.

Table 2.5.1b: Average Fruit tree holdings per household in GB 2008

Fruit Tress	Skardu	Ghanche	Gilgit	Ghizer	Astore	Gilgit Baltistan
Apricot	28.43	36.25	1.57	1.77	1.10	15.10
Apples	4.47	4.24	9.00	4.66	3.68	5.36
Mulberry	8.59	2.20	2.77	1.70	0.80	3.45
Almond	1.45	0.43	1.63	9.48	0.57	2.93
Walnut	1.01	0.62	2.65	1.99	1.06	1.51
Pears	0.39	0.19	1.22	0.64	0.10	0.55
Grapes	0.64	0.16	2.11	1.65	0.13	1.02
Cherry	0.53	0.52	7.55	1.09	0.86	2.23
Peach	0.33	0.34	1.48	1.33	0.12	0.78
Pomegranate	0.05	0.02	1.85	1.17	0.00	0.68
Plums	0.24	0.11	0.30	0.27	0.18	0.22
Fig	0.01	0.00	0.42	0.15	0.00	0.13
Others	0.02	0.00	0.25	0.02	0.01	0.06
Total Trees	**45.83**	**44.74**	**31.31**	**24.59**	**8.49**	**33.24**

2.5.3 Forest Resources

Forests in GB provide critical ecosystem services for climate range and forage, wildlife habitat, biotic diversity, watershed protection, soil erosion control, etc. Only 9% of the total land in GB is occupied by forest and out of which more than 50% is the Agro/social forest. The forests are mostly limited to southwestern parts of GB in the districts of Diamer, Baltistan, Gilgit and Ghizer. Communities own almost all forests in Diamer District and their official nomenclature is "Private Forests" with the legal cover to these forests provided by the Gilgit Private Forests Regulations (1970) and the rules framed in 1975 under the regulation. The other legal category of forests is state-owned "Protected Forests" meaning forests in state ownership in GB that have been designated under the Pakistan Forest Act, 1927.

Table 2.5.2: Land Use in Gilgit Baltistan (in ha)

Total Area	Agriculture	Farm Trees*	Natural Forests	Range Lands	Glaciers/ snow covered	Un-reported Area**	Rivers, Lakes, etc.
7,250,000[3]	57,000[4]	11,450[*]	295,000[5]	2,100,000[6]		4,697,000	12,871
Percent 100	0.78	23,000[7]					

Table 2.5.2 indicates land use in GB by different sectors, such as range lands occupy 2,100,000 ha that is over 22 percent of GB's total area; these range lands provide grazing area for livestock, protect water catchment and support many wild flora and fauna. A total of 57000 ha are covered

Source: NASSD Background Paper on Biodiversity

[3] Forestry Sector Master Plan (Northern Areas) 1992
[4] Agriculture Department NAs
[*] This area is included in the agriculture area figures
[5] Forestry Sector Master Plan (Northern Areas) 1992
[6] Forestry Sector Master Plan (Northern Areas) 1992
[7] Forestry Sector Master Plan (Northern Areas) 1992

by the agriculture sector and 90 percent of the population has some form of involvement in agriculture to meet their livelihood requirements. While 295,000 ha a huge area is under natural forest. The unreported huge areas have not been surveyed for land uses, but most of these areas are inhabitable and are comprising of glaciers, snow cover and high mountains. Maintaining biodiversity in GB is not only crucial for the sustainability of agriculture, forestry, fisheries, wildlife, tourism, health, irrigation and power sectors in GB, but is also lifeline for the downstream people in other provinces in Pakistan. Almost entire population of GB, in one way or other, depends upon the natural resources to meet their daily needs. Vegetables, fruits, nuts, honey, spices and many other food items that the people use every day come from the natural ecosystems. Similarly, timber for construction of houses and furniture, fuelwoods (an important source of energy), come from natural forests. Conservation of biodiversity is fundamental to achieve sustainable development in GB, indeed. The forests in the region are important watersheds of the valleys below where agriculture is practiced and settlements subsist and Indus River and some of its tributaries also exist in the area. The water of GB is the main reside for agriculture and hydropower for the flood plains in Pakistan. Many species of wild animals and plants depend on these forests for their survival. Thus these forests are important for the rich biodiversity in region. Some of the species and habitats have national and global significance. Their role as carbon sinks like any other long-living trees needs no emphasis.

2.5.4 Natural Forests in GB

The natural forests are an important source of softwood timber for the country. Locally, they provide timber, firewood, torch wood, grazing, medicinal plants e.g., kuth, (Sassuria, lappa) black cumin, and other non-timber forest products (NTFP) including food (chilghoza, mushrooms, honey, berries of sea buckthorn); and animal products. They have great potential for country side recreation and eco-tourism in GB. Forest activities generate employment and help to reduce poverty. Forests also have cultural and religious values. They are a source of income for the communities and government. Forests are God gifted open laboratories of nature for education and research. The people of GB largely depend on wild plants for fuel, as food supplements, medicine, construction material, farm nutrients and livestock feed. Many of these plants are now threatened by a number of factors.

Table- 2.5.3 : Forest Area by District in Gilgit Baltistan

District/ Areas	Forest Area		
	Sq.miles	**Sq.km**	**ha**
Chilas,Darel and Tangir	848	2,1712	217,088
Astore District	120	307	30,720
Gilgit, Ghizer and Nagar	96	346	24,576
Skardu,Ghanche	36	92	9,216
Total Forest Area	**1,100**	**2,816**	**281,600**

Source NASSD background paper on Forestry
Note: Almost all of it is Coniferous. Reliable estimates of area of sub tropical scrub forests are not available.

Table 2.5.3 mentions forest area that is covered by natural forest in different districts of Gilgit Baltistan. The total forest area in GB is 281,600 ha, and a largest proportion of this natural forest is found in the Diamer district, including Chilas, Darel, and Tangir with a covered area of 217,088 ha, and the communities own almost all the forests in the district. The total area under natural forest mentioned in Table 2.5.3, according to forestry sector master plan 1992, was 295,000 ha. The area drastically decreased in 2003, as noted in the above table, to 281,600 ha. The reasons are illegal cutting of forest trees and seasonal variations. The second largest area, under

forest is in district Astore which is 30,720 ha. A very small proportion of the area is covered by natural forest in the district Gilgit, Ghizer and Nagar sub division of the Hunza-Nagar district, measuring to 24,576 ha. The smallest area under natural forest is in Skardu and Ghanche covering an area of 9,216 ha. To minimize the massive pressure on natural forest for extraction of timber due to illegal cutting of forest, the government and NGOs have started farm forestry on private land. The southern slopes of Gilgit Baltistan (for instance the Diamer district) receive heavy rainfall and consequently are covered with forest of deodar, pine, poplar and willow trees. The more northerly ranges and north-facing slopes receive practically no rains and are, therefore, without trees. The lack of tree cover in northern parts cause many problems to the agricultural sector, and these problems includes soil erosion, the silting of streams, flooding and a shortage of timber and firewood.

Table 2.5.4: Cropwise Land utilization (% hh)

Crops	Skardu	Ghanche	Giglit	Ghizer	Astore	Gilgit-Baltistan
Wheat	24.01	22.76	20.24	35.33	23.02	25.30
Maize	1.81	0.00	15.34	21.57	6.77	9.31
Barley	16.24	21.14	1.94	7.98	5.02	11.05
Potato	7.43	14.42	22.17	9.70	22.73	14.51
Buck wheat	4.16	5.17	0.44	0.00	0.00	2.16
Millet	4.52	2.07	0.09	0.00	0.00	1.47
Rice	0.00	0.00	0.00	0.00	0.00	0.00
Fodder	35.63	29.48	31.41	14.17	33.88	28.40
Vegetables	4.70	4.91	8.12	11.15	8.59	7.38
Other Crops	1.49	0.05	0.27	0.09	0.00	0.42
Total HH	**100**	**100**	**100**	**100**	**100**	**100**

Source: An assessment of Socio-Economic trends (2005-2008) by AKRSP

Table 2.5.4 represents the cropwise land utalization patterns. At over all GB level, the highest percentage of land is utilized for fodder production. This patteren is consistent in all other districts except for Ghizer. Wheat holds the second position after fodder in all districts except Gilgit where potatoes of 22.17% is a bit ahead of wheat, i.e., 20.24%. In Skardu and Ghanche districts, barley production engages a big proporation of land that are are 17% and 21.14% respectively. In Gilgit and Ghizer, 15.34% and 21.57% land respectively is utilized for maize production. Ghizer has maximum percentage of land under vegetable production which is 11.15%; then followed by Astore (8.59%) and Gilgit (8.12%).

2.5.5 Income from the Forest Resources and the System of Distribution/Utilization

The origin of private forest ownership goes back to the accession period when the people of Diamer decided to join Pakistan. The people of the Darel and Tangir sub-division acceded to Pakistan in 1952. The conditions of accession provides proprietary rights of the tribesmen over the forests and lay down that one-third of the income from the forests would be spent on development projects in their areas. At present the private forests covered in a Working Scheme (now harvesting plan) are managed under Lease System. Forest contractors purchase timber extraction rights from owners of a particular forest and execute a sale Agreement at a certain fixed price on per cubic-feet basis. The Sale Deed is attested by concerned Assistant Commissioner of the Revenue Sub-Division whose office also maintains the record of all forest sales. The sold forest is included in a working scheme (now working plan) subject to its

silvicultural feasibility for categorization in Selection Working Circle. After execution of the Lease Agreement, the Conservator of Forests issues a work order in favor of the Lessee allowing commencement of felling in the forest under strict supervision of the field staff located in the area. Supervision of the lease activities is assigned to a trained forest officer along with reporting responsibilities on prescribed formats including Control Forms.

Past and current sale prices and Royalty: Before partition of the Indo-Pakistan (1947), the forests of Chilas sub-division were not exploited for any commercial purpose. However, in Darel and Tangir sub-division, unsystematic and indiscriminate exploitation remained in progress up to 1952 when this area acceded to Pakistan. The forests were then sold at very nominal rates of Rs.2/- to Rs.3/- per tree and occasionally whole valley forests were sold for a meager lumps sum amount. The owners of the Forests in the past and even after creation of Chilas Forest Division in 1956 sold forest on nominal rates as low as Rs.5/- to Rs.6/- per tree. Now, they are increasing the rates on cft basis.

Table: 2.5.5: Royalty Rates by Species in GB

Species	Sleepers/cft (Rs)	Logs/cft(Rs)
Deodar	40.50	32
Kail	30	24
Fir/Spruce	19	16

Source: Forest Department

Table 2.5.5 presents the royalty rates by specie as Rs.32/cft for logs which is less processed wood and Rs.40-50 for the more processed timber wood for construction purposes called Sleepers/cft. The royalty varies from specie to specie as indicated in the table the rate is higher for Deodar and lower for Kail the common name is blue pine and Fir/Spruce. Generally, 50% of this Royalty thus collected from the sale of forests is given to the owner communities and the remaining 50% to the Forest Department for the Forest Regeneration Fund. Apart from controlled government harvesting of private forest, communities also directly sell processed timbers called *patwas* (logs) to contractors at Rs. 200 to Rs.300 per log. This system of prerogative sale is termed as *Malikana* (ownership) in local terminology. The entire income earned through this system is given to communities that own the forest.

Method of distribution of Royalty among owner communities: In the Diamer district, commercial forests are 100% owned by the local tribal communities. The communities in the Diamer district receive forest income through two systems of forest sale: *Malikana* (ownership) and Royalty. In the ***Malikana*** system, communities sell process timber directly to the forest leases. The rates are being decided between the owner communities of a specific village and private contractors (usually called forest lessees) through sale agreements. These rates have been changing over the time. The government has no control or role on fixing these Malikana rates. There are different methods of Malikana distribution among different communities. Generally, communities of the Diamer district have been divided into two groups. One group is called *Malikans* (owners) and the other is *Ghair Malikan* (non owners). Only *Malikans* have the forest ownership and have full share in incomes earned from forest selling, while *Ghair Malikans* have no forest ownerships and as such have no share in forest sale income. Even among *Malikans* there are many vague methods for distributing forest sale amount among themselves. For example, the share of two females is equal to the share of one male in Tangir. Similarly, in some villages in Darel, male and females have equal share rights, while in some villages only males have the share. In some villages in Chilas, only male have share while in some villages male have double of that of females.

2.5.6 Farm Forestry

The Forestry experience of AKRSP played a vital role in protecting horticulture through huge plantations on barren lands to create sources for fuelwood and animal fodder, and to promote fruit orchards and round the year vegetable production. Farm forestry got a big boost with the support of AKRSP, wherever it worked in GB. While GB Forest Department was focusing on the management of natural forests, the AKRSP took lead in farm forestry by raising nurseries and promoting farm plantations with the help of village/women organizations (VWOs). Planting fast growing timber, firewood and fodder species on the agricultural fields has been undertaken on a large scale. Farmers have even established wood lots. Saplings were supplied to the farmers free of cost by the AKRSP from its own nurseries, and the village/women organizations were also supported to raise their own nurseries. These interventions were quite successful.

Table 2.5.6: Percentage of Household Growing Forest Trees 2008

Tree Species	Program	Skardu	Ghanche	Gilgit	Ghizer	Astore
Poplar	80.11	94.95	87.37	75.25	83.33	42.59
Willow	75.11	93.94	89.39	54.55	87.37	29.63
Russian Olive	42.11	41.41	46.46	52.02	51.01	0.93
Rubinia	29.89	27.27	12.63	48.99	42.42	8.33
Ailanthous	12.89	1.01	0.51	33.33	22.22	2.78
Mulberry	58	82.83	54.55	64.65	52.02	17.59
Chilly	2.11	0.51	0.51	3.54	1.52	6.48
Chinar	0.56			1.01	0.51	1.85
Others	4	0.51	0.51	16.16	0.51	0.93

Source: An assessment of Socio-Economic trends (2005-2008) by AKRSP

The above table shows the percentage of households growing forest trees in the five districts of Gilgit Baltistan. Table, 2.5.6 explains different species of forestry by the percentage of households growing forest tree species in 2008. The total households growing poplar tree species is high as 80.11 percent in the program area. Whereas the lowest number of household growing mulberry species is 58 percent in the program area. Chilly proves to be ever green coniferous species, whereas Chinar is an ornamental tree and has very slow growth rate and less in demand. It is evident from data in the table that the percentage of households growing poplar and willow species is very high in all the districts as compared to other tree species. The reason for the high percentage is demand of timber for construction; fuel and fodder requirements. The existing species that mostly included poplar, mulberry, ailanthus, eleagnus, and fruit trees particularly meet the growing demand of fuel wood and fodder. But the poplar species introduced by AKRSP such as 'Poplus deltoids' and willow are fast growing tree species. The Forest Department in Gilgit-Baltistan followed AKRSP's approach and initiated a farm forestry project in 1992 for planting forest trees on an area of 1214 ha in all five districts of GB and was completed in 1998-99. This also included state-owned area of 405 ha. The activities included planting on community lands, training of local farmers, and construction of roads and water channels. On the success of his project, another social forestry project was started in 2001-02, which was to be completed 2005-06.

Table 2.5.7 shows the average of forestry holdings per households in the five districts of Gilgit Baltistan. The different species of forestry shown in the table explains that households own an average of 79 poplar trees in the program area, whereas the average for willow trees is 67, Russian olives 16, Rubinia is 12, Ailanthous 5, Mulbery 5.

Table 2.5.7: Average Household Forest Tree Holdings in 2008- By Species

Tree Species	Program	Skardu	Ghanche	Gilgit	Ghizer	Astore
Poplar	79	121	83	90	59	7
Willow	67	68	92	60	80	4
Russian Olive	16	28	14	21	9	0
Rubinia	12	5	1	40	8	1
Ailanthous	5	0	0	19	5	1
Mulberry	5	14	2	6	3	1
Chilly	0	0	0	1	0	1
Others	6	0	0	27	0	2
Total	**191**	**236**	**192**	**265**	**164**	**17**

Source: An assessment of Socio-Economic trends (2005-2008) by AKRSP

The broad leaved species such as poplar, willow, russian olive, rubinia, ailanthus and mulberry are fast growing tree species. These fast growing species are mostly used for fuel wood and fodder while poplar species are used as timber wood. As it is obvious form the data in the table, farmers in Skardu, Ghanche and Ghizer have the highest average holding of broad leaved tree species. That clearly shows peoples preference for growing the broad leaved species to get the immediate return to fulfill the need for fuel wood, fodder and timber wood for construction. The ornamental and coniferous tree species are planted rarely by the farmers due to their slow growth.

2.5.7 Protected Areas in Gilgit-Baltistan

Maintaining biodiversity is a pre-requisite for sustainable development. People depend on goods and services provided by many ecosystems. The interrelationships of biodiversity and human are complex and close. Besides other factors, different cultures in the world evolved due to biodiversity around them. Hence, loss of cultural diversity and loss of biodiversity are related. Therefore, conservation of biological diversity is a key test for sustainable development. If biodiversity is disappearing due to human actions, sustainably is impossible. The high mountains and narrow valleys kept GB physically isolated until quite recently. This isolation forced people to rely on local biodiversity for food and other essential needs. Indeed, plants and animal diversity has served as the food security for the mountain dwellers and supported the development of early societies, providing the basis for the evolution from hunting and gathering to agriculture, animal husbandry, forestry and now to tourism industry.

There are certain protected areas which are declared as sanctuaries for wildlife conservation and creation of sustainable livelihood sources for the communities through activities, like trophy hunting, ecotourism etcetera. The brief information of these protected areas is given below:

Table 2.5.8: National Parks of Gilgit Baltistan

Name	District	Area (ha)	Established	Current Status
Khunjerab	Gilgit	227,143	1975	Managed by GB Admin
Deosai	Skardu	363,600	1995	Jointly managed by HWF and GB admin
Shandur- Hundrap	Ghizer	165,000	1995	Notified but not managed
Central Karakoram	Gilgit-Baltistan	973,845	1996	Notified but not managed

HWF=Himalayan Wildlife Foundation

Source: Virk, A.T., K.M. Sheikh and A.H. Marwat. 2003. NASSD Background paper on Biodiversity, IUCN Pakistan.

Table 2.5.8 illustrates the total area occupied by the national parks, their current status and year of establishment in GB. The Khunjarab National Park consists of an area of 227,143 ha, and it is managed by the GB administration and communities in the area and is first National Park in GB established in 1975. The communities and the government have introduced trophy hunting activity in the area of the Park. Of the income earned from Trophy Hunting, 75 percent of it is awarded to the communities and 25 percent to the government. The Deosai National Park is jointly managed by the Himalayan Wildlife Foundation and the GB Administration. The Central Karakoram National Park is territorially the largest national park; while the Shandur Hundrap National Park is comparatively the smallest by area occupancy. A number of protected areas have been created in GB including 4 national parks, 3 wildlife sanctuaries, and 9 game reserves. Similarly, several forest areas are designated as protected forests. These protected areas provide biome to many wild animals and plant species. According to 2000, IUCN Red List of Threatened Species, two species of plants listed as internationally threatened. Several endangered and threatened wild animal species are found in GB. Endangered mammals include snow-leopard, flare-horned Markhor, Marco Polo sheep, Ladakh urial, musk-deer, brown-bear, and woolly flying squirrel. Moreover, population of many birds species like snow-cock and monal-pheasant is severely depleted and near to local extinctions. Besides that no systematic study has been conducted to evaluate the status of many of these species; however, some site specific studies indicate that populations of these species are very low and in some areas close to the biological threshold. Patterns of species richness in these protected areas show a general trend of increased richness in plant species from north to south and from west to east. For example, 134 species belonging to 35 families and about 90 genera of plants have been recorded from Khunjerab National Park (WWF 1996). Almost at the same elevations of Deosai National Park in the western Himalayas 342 species of plants belonging to 36 families and 142 genera have been listed. In total 153 plant species belonging to 38 families and 113 genera have been recorded after extensive field research in the area.

Moreover, the large mammal species like markhor, Marco Polo sheep, blue sheep, Ladakh urial, musk-deer and Himalayan-ibex are badly suffered. All these species are prey species of key predators like endangered snow-leopard. The main reasons for depletion of their populations are over-hunting and habitat loss. Among medicinal plants, species like Kuth (Saussria lappa) and Karru (Picrorhiza kurroa) are severely depleted due to overharvest and now these are found only in a few alpine meadows in Astore region. There is also a lack of comprehensive management plans for most of these protected areas, and where plans do exist, they never got implemented mainly because of lack of funds and shortcomings in their effective planning. For example, a management plan was prepared for the Khunjerab National in 1996. Although, the federal government approved the plan, this that never got implemented due to shortage of funds and inability of the concerned agencies to mobilize resources for this very important national park . Similarly, a management plan has been drafted for Deosai and Central Karakoram national parks. Likewise for other important biodiversity area, effective implementation of these plans will require considerable efforts and strategic planning as well as funding.

Though, the focus of AKRSP has been on sustainable development, many of its programs are contributing to raising environmental conservation awareness among the masses, and enhancing biodiversity of the area, particularly agriculture biodiversity. For example, development of land, agriculture, forest plantations, collaborative management of fisheries, and maintaining irrigation systems below the irrigation channels contribute to the diversity of fauna and flora by providing new ecological niches for the species associated with farming. More importantly, the AKRSP has helped other organizations and NGOs to initiate biodiversity

conservation projects in partnership with the local communities and GB Administration. GB Forest Department, IUCN, WWF, and HWP, all have benefited from the social infrastructure created by the AKRSP and have started various biodiversity conservation and sustainable use programs with the assistance and support from the AKRSP, particularly in introducing these organizations to VOs and WOs in NA. The contribution of AKRSP in maintaining biodiversity of GB is indeed far more than one can perceive in a short visit to this rugged landscape of the country.

2.5.8 Access to Water Resources and Irrigation System

Gilgit-Baltistan in a strategic location provides water to other parts of Pakistan. On the whole, over 71% of the flows to Indus River at the upstream of Tarbela and 31% to the total water availability in the Indus basin irrigation system is contributed by Shyok, Hunza and Shiger River basins of Gilgit-Baltistan. The valley lands of the Gilgit Baltistan are largely considered as arid lands where rainfall is in the range of 100 to 200 mm. Therefore, irrigation is an essential input to meet water requirement of agriculture in the mountain valleys. In general, 66% of irrigated area is commanded by open channels fed by water from snow and glacier melt. Ground water provides irrigation to around 20% of the irrigated area. Surface irrigation is therefore the largest system of irrigation practiced in GB.

Sources/ Types of Irrigation: In Gilgit Baltistan, water is mainly drawn from three sources a) precipitation; b) stream flows from glacier and snow melt c) spring water from ground water. The rainfall is so meager that it hardly fulfils consumptive requirement of the crops. Spring water is also limited and available under localized conditions. Thus stream flows provide the major portion of water use in GB, and water is diverted from streams contributing to the tributaries of the upper Indus River. Stream flows are very low in winters, but the flows begin to rise marginally in March as snow melt begins at lower altitudes and gradually rise in May when melting begins at altitudes of glaciated region.

Irrigation water utilization and the crops: Water from streams originate from snow and glacial melt or springs are diverted into water channels (locally named as 'Kuhls') that carry water for kilometers in length in rugged terrains. They may branch out into smaller secondary channels ('Rill') to irrigate the farms. Despite the fact that in many instances water is diverted at head works into filter basins, normally low gradient channels and high turbidity of water result into siltation (Kreutzmann 2000 cited in Ahmad 2008).

Table 2.5.9: Irrigated area by type of irrigation in GB during 1990

Source of Irrigation	Area Irrigated by types of irrigation	
	(ha)	(%)
Channels fed by Snow and Glacier melt	47,096	65.8
Channels fed by Spring	13,716	19.2
Tank	10,297	14.4
Tube wells	183	0.2
Others	302	0.4
Total Irrigated Area	**71,594**	**100.0**

Source : 1990 Census Agriculture, Northern Areas, Vol III

As illustrated in Table 2.5.9, the largest irrigated area is under water channels fed by snow and glacier melt that provide water to 66% of total irrigated area, followed by ground oasis out through springs and tanks which is 19 percent. Tube wells are an insignificant source of

irrigation constituting 0.2 percent of irrigated area. The total irrigated area commanded by different types of irrigation was 71,594 ha during 1990, and this area was increased to 73,905 ha during 1998 (GoP 2001). The water channels are usually constructed and maintained through participatory efforts of communities and public and private sector development organizations. Most dependable irrigation system is water channels which derives water from glacier melt but these often carry amounts of silt which has implications for the farmers. Water channels that derive water from springs usually receive relatively constant flows but are free of silt. In GB, most of irrigated lands are situated on alluvial fans, river terraces and scree slopes formed by erosion of mountain sides. The lower portion of alluvial fans with finer sediments and better developed soils of old river terraces are more intensively cultivated.

Community's access to the water resources: The Gilgit Baltistan region is rich in history to manage irrigation and irrigated agriculture in participatory way under community managed irrigation systems. Even the systems constructed by the public sector (LGRDD and NAPWD) proved to be successful when community took complete control of managing these systems. Currently, all the irrigation systems are communally managed irrespective of the funding support provided by the AKRSP or the public sector for construction or rehabilitation of these systems. The performance of smaller open channels constructed through active participation of water users is reasonable and users' institutions manage these channels effectively. The realization in the communities for managing water for agriculture in these systems has just started.

Table 2.5.10 below presents data on number of irrigation infrastructure constructed by the AKRSP. A total of 1,075 different types of irrigation projects in all the districts have been completed by the AKRSP. The highest number of irrigation projects (397) has been completed in Skardu district. The second highest number of irrigation projects (281) has been completed in Gilgit district. In Ghanche, 173 schemes were completed while in Ghizer district, 133 projects. Within the irrigation infrastructure, irrigation channels have the highest proportion in every district followed by the lift irrigation system. There is generally scarcity of agriculture land in GB and for centuries these channels have played an important role in development of land close to the human settlements.

Table 2.5.10: District-wise list of irrigation infrastructure constructed by the AKRSP

District	Infrastructure	Number
Astore	Irrigation Channel	80
	Lift Irrigation	2
	Pipe Irrigation	8
	Syphon Irrigation	1
Total		**91**
Ghanche	Irrigation Channel	160
	Lift Irrigation	7
	Pipe Irrigation	5
	Pipe Syphon	1
Total		**173**
Ghizer	Irrigation	2
	Lift Irrigation	1
	Pipe Irrigation	2
	Syphon Irrigation	1
Total		**133**

District	Infrastructure	Number
Gilgit	Irrigation Channel	173
	Lift Irrigation	26
	Pipe Irrigation	17
	Syphon Irrigation	8
Total		**281**
Skardu	Irrigation Channel	336
	Lift Irrigation	12
	Pipe Irrigation	43
	Pipe Syphon	6
Total		**397**
Grand Total		**1,075**

Source: AKRSP

The development of land and irrigation system below the irrigation channels indeed enhanced the floral and faunal diversity, particularly of domesticated plants and animals in the districts. The open channels in GB are designed and constructed on the rugged terrain with steep slopes, extremely coarse textured and gravelly soils. Large quantities of water are lost in the transit; these losses may exceed 70% in GB. Subsequently, a large proportion of land has been brought under irrigation through these infrastructure projects and huge forest plantations have been raised on the newly developed lands. Adequacy and reliability of electric power is a serious concern in GB as quality power is needed both for agriculture and domestic water supply systems. Agriculture needs water lifting to expand the command area or cropping intensity or meeting shortfall in supply and demand of water.

Deferred maintenance of projects often results in deterioration of irrigation systems to the extent that sometimes major issues of rehabilitation of systems crop up. The issues for managing participatory irrigation for enhanced agricultural productivity and livelihoods in the GB are as under:

- High water conveyance losses in the existing open channel systems.
- In equity, in distribution of water
- Scarcity of water during winter
- Low water productivity
- Deteriorating irrigation environment
- Inadequate participation of water users and users institutions
- Lack of value addition in agriculture
- Total investment by the public sector in Gilgit Baltistan.

2.5.9 Public Sector Investment in Irrigation Schemes/Projects

Apart from the AKRSP, the Government of Gilgit-Baltistan invests huge public funds for the development of irrigation projects in the region. Table 2.5.11 shows details of number of projects and the funds allocated for the development of irrigation projects in the area since 2003.

Table 2.5.11: Total investment by the Public Sector in Gilgit Baltistan(in Rs.)

District	2003-05		2006-07		2007-08		2008-09	
	No.	Cost	No	Cost	No	Cost	No	Cost
Gilgit	62	3,667,561	104	6,816,909	88	6,990,183	61	6,342,194
Ghizer	42	3,072,246	72	5,715,883	78	6,442,813	72	5,620,313
Astore	47	3,523,120	64	4,849,235	123	7,774,481	62	5,240,863
Diamer	63	4,659,172	81	6,241,124	78	6,970,109	54	4,969,638
Skardu	152	7,425,592	255	12,180,706	267	11,535,146	255	10,960,585
Ganche	89	4,419,108	109	6,783,923	57	4,521,813	131	7,702,894
Gilgit-Baltistan	**455**	**26,766,799**	**685**	**42,587,780**	**691**	**44,234,545**	**635**	**40,836,487**
Avg Cost per Scheme for GB		58,828		62,172		64,015		64,309

Source: Progress Report of LG&RD Department Water Management Department

It appears that the number of irrigation projects for which funding were allocated was highest during 2006-07 and 2007-08 development phases. After this phase the number of irrigation projects and the consequent allocation dropped slightly in 2008-09 compared to that of 2006-07 and 2007-08. The year-wise number of projects is not satisfactory for the total population of the area. This situation will have an adverse effect on the development of the Agriculture Sector, in general, and of the Horticulture Sector in particular. The average cost per irrigation project also appears a little bit low. The reasons might be that the types of projects identified might be of small size and the contribution from communities may have been increased.

2.5.10 Investment in irrigation schemes by Water Management Department GB

Water Management Department in GB is responsible for lining of water courses, construction of water tanks and installation of drip irrigation systems. They are actively involved in the formation and social organization of water users' associations (WUAs) prior to improvement of water courses (open channels). Table 2.5.12 shows details of number of projects and the funds allocated for the development irrigation projects by Water Management Department in the area since 2003. As indicated in the table, it appears that the number of projects for which funding was allocated was high in 2006-07 and 2007-08 development phase.

Table 2.5.12: Sector Investment in irrigation schemes by Water Management Department GB

District	2003-05		2006-07		2007-08		2008-09	
	No.	Cost	No	Cost	No	Cost	No	Cost
Gilgit	17	1,000,076	46	2,859,909	32	2,049,183	10	643,094
Ghizer	7	411,796	22	1,367,783	22	1,408,813	8	514,475
Astore	10	588,280	13	808,235	13	832,481	1	64,309
Diamer	9	529,452	27	1,678,642	30	1,921,109	4	257,238
Skardu	14	823,592	39	2,424,706	31	1,985,146	9	578,785
Ghanche	11	647,108	17	1,056,923	22	1,408,813	10	643,094
Gilgit-Baltistan	**68**	**4,000,304**	**164**	**10,196,198**	**150**	**9,605,545**	**42**	**2,700,996**
Avg Cost per Scheme for GB		58,828		62,172		64,037		64,309

Source: Water Management Consultants Annual Progress Report 2008-09

After this phase, however, the number of projects and the corresponding allocation all of sudden dropped in 2008-09 to a fourth of the 2006-07 and 2007-08 levels. This abrupt decrease in number of projects will have an adverse effect on the development of the Agriculture Sector as a whole.

Table 2.5.13: Public Sector Investment in irrigation scheme by LG&RD Department GB

District	2003-05		2006-07		2007-08		2008-09	
	No.	Cost	No	Cost	No	Cost	No	Cost
Gilgit	45	2,667,485	58	3,957,000	56	4,941,000	51	5,699,100
Ghizer	35	2,660,450	50	4,348,100	56	5,034,000	64	5,105,838
Astore	37	2,934,840	51	4,041,000	110	6,942,000	61	5,176,554
Diamer	54	4,129,720	54	4,562,482	48	5,049,000	50	4,712,400
Skardu	138	6,602,000	216	9,756,000	236	9,550,000	246	10,381,800
Ganche	78	3,772,000	92	5,727,000	35	3,113,000	121	7,059,800
Gilgit-Baltistan	**387**	**22,766,495**	**521**	**32,391,582**	**541**	**34,629,000**	**593**	**38,135,492**
Avg Cost per Scheme for GB		58,828		62,172		64,009		64,309

Source: Water Management Consultants Annual Progress Report 2008-09

The table 2.5.13 shows the investment in irrigation schemes by the Local Government and Rural Development Department (LG&RDD). The figure in the table illustrates details of number of projects and the funds allocated for the development of irrigation projects since 2003-05. The figures show that the number of irrigation projects for which funding were allocated was highest during 2008-09 development phases. Whereas, the number of projects in 2005-06 was the lowest, this abruptly increased in 2006-07. The average cost allocation per project specifies that both the organizations LG&RDD and WMD implement small irrigation projects.

2.6 Access to Social Services and basic infrastructure

Access to social sector services is as important as it is to improve economic conditions of the people of the Gilgit-Baltistan region. Assess the status of access of the population to these services has been based on some selected domains, such as education, health, sanitation, and other infrastructure facilities. These indicators are discussed in detail in the following sections.

2.6.1 Access to Education

To assess the communities' access to education facilities, the following section looks at some selected indicators that include the student-teacher ratio, the gross and net enrollment rate, and the literacy level. These indicators are discussed in detail.

Table 2.6.1 presents some data on the status of availability of teachers to students in schools of all levels. The ratios for the Gilgit-Baltistan region appear below 40 to set as a base for the individual districts. However, in general, there seems that fewer teachers are available to girl students in the schools of all levels in the region compared to those for boys. Across the districts, the availability of teachers for boys and girls at all levels do not differ much with the exception in some levels.

Table 2.6.1: Students to Teacher Ratio in Government Schools-2009

Level of Schools	Pakis-tan	GB	Gilgit	Ghizer	Astore	Diamer	Skardu	Ghanche
Boys Primary	N/A	29	40	24	28	32	26	26
Girls Primary	N/A	37	22	84	47	27	67	41
Total	**N/A**	**32**	**29**	**36**	**30**	**29**	**36**	**32**
Boys Middle	N/A	20	21	20	22	21	24	12
Girls Middle	N/A	35	42	46	-	30	29	55
Total	**N/A**	**25**	**28**	**26**	**22**	**25**	**25**	**21**
Boys High Schools	N/A	18	20	15	25	15	24	12
Girls High Schools	N/A	34	37	25	24	30	40	70
Total	**N/A**	**21**	**21**	**17**	**25**	**20**	**27**	**17**
Boys Schools	12	22	26	20	26	20	25	17
Girls Schools	37	36	26	56	42	29	48	46
Total	**19.5**	**27**	**26**	**27**	**27**	**24**	**31**	**25**

Source: Government Education Records

For instance, the availability of teachers is lesser for boys at primary level in the Gilgit district, and for girls at primary level in the Ghizer, Astore, and Ghanche districts. Similarly, fewer teachers are available at middle level in Diamer and Ghanche districts. During the FGDs it was learnt that the most immediate attentions that needs to be paid is the availability of teachers for primary girls students in the Ghizer and Skardu districts, for middle and high school girls students in the Ghanche district. The comparison of this indicator with the national level indicator is also of interest. For instance, the student to teacher ratio in boys' schools in Gilgit-Baltistan is far behind to that enjoyed at the national level. However, the availability of teachers for girls in the Gilgit-Baltistan region is almost the same that we observe at the national level.

The education services that the private sector has been providing for last 15 years showed similar results for the student to teacher ratios that we observed for the government schools (Table 2.6.2). However, there is a little difference in the two education systems. As we notice that availability of teachers is an issue for girls in the government schools, but it appears an issue for boys in private sector schools.

Table 2.6.2: Students to Teacher Ratio in Private Schools-2009

Region/District	Primary Level		
	Boys	Girls	Total
National Average	10	59	13.5
Gilgit-Baltistan	**37**	**32**	**35**
Gilgit	62	41	50
Ghizer	27	36	30
Astore	34	26	31
Diamer	33	23	30
Skardu	33	26	30
Ghanche	43	26	36

Source: Government Education Records
Source. Pakistan Economic Survey2008-09

A detail picture of gross and net enrollment rates in education for boys and girls are given in Table 2.6.3. The data in the table explains that the combined enrollments rates range from a minimum of 17 percent in the Diamer district to a maximum of 35 percent in the Ghizer district. These enrollment rates for individual boys and girls in the districts exhibit a varied profile. For instance, the net enrollment rates appear better in the Ghanche district followed by the Ghizer district, while it appears very low in Diamer particularly for the girls, reaching only five percent. The girl students in Gilgit have register 35 percent net enrollment which is seven percent higher than that of the boys.

Table 2.6.3: Gross and Net Enrollment Rates (GER, NER) Primary Schools-2009

National Average*	Gross Enrollment Rate (%)			Net Enrollment Rate (%)		
	Male-Female	Male	Female	Male-Female	Male	Female
	91	83	97	55	59	52
Gilgit-Baltistan	**97**	**106**	**88**	**26**	**28**	**23**
Gilgit	110	99	121	31	28	35
Ghizer	137	140	133	35	35	35
Astore	77	68	86	20	19	22
Diamer	61	114	21	17	32	5
Skardu	79	97	59	20	26	14
Ghanche	138	137	140	37	37	37

Source: Government Education Records
**Source. Pakistan Economic Survey 2008-09*

The gross enrollment rates, particularly for male students, appears more than 100 percent in Ghizer, Ghanche and Diamer districts mainly because of the reason that the age of students in different education levels might be either below or above the defined age categories of population for these levels. The overall situation depicted in Table 2.6.3 reveal that 97 percent of boys and girls in schooling age are enrolled in schools, but only 26 percent of them succeed in persistently continuing their education in the long run.

The status of education was also looked into in terms of levels of literacy in the region as a whole and in individual districts. The data presented in Table 2.6.4 show that the overall literacy rate in Gilgit-Baltistan is 61 percent.

Table 2.6.4: Literacy Levels in the Gilgit-Baltistan Region -2008

Districts	Male	Female	Male-Female
National Average*	69	44	56
Gilgit-Baltistan	**76**	**45**	**61**
Skardu	71	34	53
Ghanche	74	35	55
Gilgit	83	61	72
Ghizer	75	47	62
Astore	71	47	59
Diamer**	44	15	30

Sources: (1) SESGBC 2008
*** (2) Hudur Valley Baseline Survey 2007*
** (3) Source.Pakistan Economic Survey 2008-09*

Though the male literacy appears to be 76 percent, which is far higher as compared to the 46 percentage for the females. In fact, the literacy rate in females seems highly encouraging in a setting mainly governed by male domination and traditional mindset towards female education. The literacy rates for both the men and women in Gilgit have left behind the rest of the districts of Gilgit-Baltistan. This is mainly because Gilgit, being the capital of region, offers wide-ranging education facilities and opportunities and the students from all others districts reach out to educational institutions, particularly for higher education. In terms of literacy rates, the Diamer district is lagging far behind the rest of the five districts. The overall literacy rate in Diamer is 30 percent. Between the genders, it is only 15 percent for females and 44 percent for males. This underperformance in education can be attributed to the lack of awareness or ignorance among the people about the importance of secular education, particular for female, in the conservative social context of the district.

2.6.2 Access to Health Facilities

The situation of health in the Gilgit-Baltistan region and its individual districts has been assessed in this section on the grounds of some selected health indicators. The most important ones in the context of this study consist of availability of different health facilities to the population, the infant mortality rate, the maternal mortality rate, and disabilities found in the population.

The situation is evident from the data presented in Table 2.6.5.and End Table 8 in Annex II. We notice here that civil hospitals, dispensaries, first aid posts, and mother and child health centers are widely established in the region. For example, in 2009, one civil hospital was available for a population of 53,128, one dispensary for 9,455 people, one first aid post for 8,389 people, and one mother and child health center for a population of 12,260 in the region. We would like to clarify here that the combined population of male and female per mother and child health center is not considered a best indicator. The population of female and children should be considered while measuring performance of this facility that is specific to women and children. A close look reveals that the availability of these health facilities again varies from district to district. For example, it appears that there is shortage of civil hospitals in the Diamer district, while the average population that has access to civil hospitals seems much higher than the rest of the districts. There appears a shortage of first aid posts in the Skardu district, while the Ghanche district has again a great edge over the rest of districts in the availability of first aid posts. The availability of mother and child health centers looks limited in the Astore and Diamer districts, whereas the Skardu and Ghanche districts are in a much better position in this regards.

Table 2.6.5: Distribution of Population Per Health Facility-2009*

Type of Health Facility	GB	Gilgit	Ghizer	Astore	Diamer	Skardu	Ghanche
Combined Military Hospitals	557,844	314,725	-	-	-	267,575	-
District Headquarters Hospitals	223,137	314,725	159,350		178,137	267,575	99,405
Civil Hospitals	53,128	62,945	39,838	48,248	89,069	66,894	24,851
Rural Health Centers	557,844	314,725	-	-	-	267,575	-
Basic Health Units	65,629	78,681	159,350	48,248	59,379	66,894	33,135
Dispensaries	9,455	13,114	10,623	9,650	14,845	7,870	4,322
First Aid Posts	8,389	8,992	8,387	10,722	7,745	14,083	3,550
Mother Child Health Centers	12,260	14,987	9,959	24,124	22,267	8,919	8,284
TB Leprosy Centers	55,784	78,681	53,117	96,495	59,379	44,596	33,135
EPI Centers	17,709	11,240	26,558	12,062	59,379	24,325	14,201

*Source: Government Health Department Records. *National figures are not available*

The actual status of some other health indicators is listed in Table 2.6.6. Because of unavailability of information for all the individual districts, we have given the information only for the entire region of Gilgit-Baltistan. The population grows at an annual rate of 2.47 percent in the region. The population of the region experienced an infant mortality rate of 79 per 1,000 live births in 2009. The maternal mortality rate is also quite pronounced and registered 450 per 100,000. In addition, crude birth rate was recorded as 36.4 per 1,000 people in the same year with a crude death rate of 9.4 per 1,000 people.

Table 2.6.6: Selected Health Indicators-2009

Indicators	Pakistan	GB
Growth Rate (%)	1.8	2.47
Infant Mortality Rate/1,000 Live Births	73	79
Maternal Mortality Rate/100,000	90	450
Crude Birth Rate/1,000 Pop	25.0	36.4
Crude Death Rate/1,000 Pop	7.70	9.4

Source: Government Health Department Records
Source.Pakistan Economic Survey 2008-2009 (pg 170)

The comparison of these crucial health indicators with the national levels indicators shows an alarming picture of the Gilgit-Baltistan region. For example, the health conditions in the region are far worse than that prevalent at the national level. The only indicator that is close to the national level is infant mortality rate: 79 for the Gilgit-Baltistan region compared to 73 for the whole country.

The health status of the population of the Gilgit-Baltistan region and its individual districts are also analyzed in terms of the incidence of disabilities that people of age 5 and above experience. Table 2.6.7 shows that, in 2008, 2.27 percent of the people suffered from various disabilities. The highest incidence of disabilities was noted in the Diamer district where 6% women and 4% men suffered from disabilities. The people in the Ghizer district were noted to be the least affected from disabilities. The overall rate of disabilities in women is slightly higher than that of men at the Gilgit-Baltistan level. This trend is attributed to various social and economic factors, such as limited mobility of women, increased workload, acute malnutrition, limited access of women to medical care facilities.

Table 2.6.7: Percentage of Population Aged 5 Years or older Experienced Disability – 2008

Region/District	Male	Female	Total
Gilgit-Baltistan	**2.0**	**2.20**	**2.27**
Gilgit	2.10	3.04	2.57
Ghizer	1.07	0.86	0.97
Astore	1.98	1.79	1.89
Diamer*	4.0	6.00	5.00
Skardu	2.30	2.24	2.27
Ghanche	2.57	2.81	2.69

Source: SESGBC 2008
**Sources: Hudur Valley Baseline Survey 2007; NADP Report; DC Diamer Presentation to Chief Secretary*

2.6.3 Access to Other Infrastructure Facilities-2008

Apart from education and health facilities, other facilities that have been listed in Table 2.6.8 play a crucial and equal role in improving the living standards of the population. Among these facilities, some are thought to be traditional ones, such as link roads, water supply systems, and

electricity. In recent years, some very latest information technologies have however overwhelmed the Gilgit-Baltistan region with their coverage even in remote villages. These facilities include the internet system, the mobile phone, and modern flush latrines. The people in the region are also in pursuit of accessing these systems and technologies to fulfill their various purposes.

Table 2.6.8: Access of Percent of Household to Infrastructure Facilities in the Village

Facilities	Pakistan	GB	Gilgit	Ghizer	Astore	Diamer	Skardu	Ghanche
Link Road	**NA**	**83**	100	99	67	75	91	59
Telephone	**15.54**	**61.11**	90.91	50	74.07	54	59.09	45.45
Internet	**15.54**	**45.25**	81.82	39.9	34.26	15	40.91	3.64
Mobile Signals	**56.3**	**50**	82.83	45.45	50	55	50	40.91
Clean Drinking Water	**NA**	**82.44**	100	63.13	91.67	40	54.55	100
Electricity	**NA**	**96.95**	100	100	75	70	96.97	100
Flush Latrines	**NA**	**42.00**	25	21	28	25	59	71

Source: SESGBC 2008

What one finds in Table 2.6.8 is that the percentage of the households that access the above facilities range from a minimum of 42% for flush latrines to 96%for electricity. Moreover, it is also worth noting that access to ICTs (technologies of internet and mobile phones) introduced in the region very recently are growing very fast with the other existing facilities like electricity, water supply system and link roads. For instance, an average of 45% households used internet and 50% used mobile phones in 2008. The households that used internet facility was almost negligible in the Ghanche district (only 4%), while the Diamer district as 15%.

In Gilgit Baltistan the main sources of drinking water are springs, snowmelt water canalized from streams, rivers and lakes which is delivered to population through pipelines from filter tanks and open gravity flow channels and lift pumps.

On the sanitation side, although flush latrines were introduced in the region many years ago, the percentage of households using these latrines is still very low in the Gilgit, Ghizer, Astore, and Diamer districts. The percentage of households using latrines is very high in the Skardu and Ghanche districts. Across the district, the percentage of households accessing the rest of facilities was much higher in the Gilgit district in 2008 compared with the other districts of the region.

The sewerage system is not very common in Gilgit-Baltistan. This system has only recently been introduced by the Aga Khan Culture Services, Pakistan (AKCSP) in Halpa and Chinpa villages in the Skardu district, Khaplu, in the Ghanche district, and the Karimabad, Ganish, Hyderabad, and Altit villages in the novice Hunza-Nagar district (see Table 2.6.9). In aggregate, the households and population that benefit from this facility are much higher in the village of Karimabad, followed by Altit village. The systems in Halpa and Khaplu have been introduced for very few households and population if we compare them with the Karimabad and Altit villages.

Table 2.6.9 Beneficiaries of sewerage facilities in Hunza and Skardu

Name of Village	No. of households benefitted	No. of individuals benefitted	Indirect beneficiaries in the market area
Shigar (village Halpa and Chinpa)	65	650	100
Khaplu /District Ghanche	87	700	2,000
Karimabad Hunza	935	5,610	1,200
Ganish Giram Town-Hunza	135	810	100
Ganish Heritage Trust-Hunza	145	870	150
Hayderabad-Hunza	66	570	N/A
Altit Hunza	186	1,488	N/A

Source: AKCSP report (Gilgit Office)
Source: TMS office records Karimabad (by Ikarm-U-Allah, G. Secretary TMS Karimabad

2.6.4 Solid Waste Management Systems in Gilgit-Baltistan

1. *Government Managed System:* Government is responsible for solid waste management in the urban and semi-urban municipal areas. The seven capital towns of Gilgit-Baltistan which are also district head quarters have municipal committees. The primary job of these municipal committees is to provide basic civic services to the population living in the municipal jurisdiction. Solid waste collection and disposal is one of the main functions of municipal committee in each district. To carry out this task, the MCs are equipped with transport, equipment, and staff. They collect waste from the waste-bins installed at designated points across the commercial and residential areas.

2. *Community Managed Systems:* In some semi-urban and rural areas, the community has taken the initiative and has established proper solid waste collection, processing and disposal systems. Such community-based solid waste management systems are working on self sustainable basis in the villages of Karimabad and Aliabad of District Hunza; Chatorkhand village in Ghizar disctrict; Danyore village in Gilgit district; Shigar village in Skardu district and few other places of the region. Most of these community-lead initiatives have been launched from the platform of the LSOs with financial support from national and international donor agencies whereas the technical support the AKDN agencies provided. Since these are the community-owned initiatives, the communities are fully involved in operations and maintenance of these projects. They are fully operational on sustainable basis, and waste collection, processing and disposal systems has resulted in garbage-free clean environment in the villages especially those that recive national and international tourists.

3. *Waste collection and disposal method:* The staff and community collect the waste in prescribed places then transport it to the designated dumping areas, a barren-land, outside the town which serves the purpose of land-filling. The waste is generally burnt out without caring for any scientific methods of environment protection.

Table 2.6.10: Inventory of resources for solid waste disposal in GB

Resources	MC Gilgit	MC Ghizar	MC Skardu	MC Khapulu	Total
Staff	222	62	153	100	530
Machinery	13	6	12	5	36
Tractor	4	3	4	3	14
Truck	2	0	1	1	4
Small waste bins	200	15	65	40	320
Medium waste-bins	0	10	100	40	150
Large waste bins	0	2	15	12	19
Quantity of waste per day (Tons)	15-20	5-9	6-8	3-4	28-41

Source: Field Survey 2010 for Horticulture Sector study.

2.7 Rural Trade, Industry and Financial Services[8]

There is though a substantial potential for major industries in all key sectors, particularly in mining, gemstones, horticulture, energy, and forestry in Gilgit-Baltistan, but this potential has not been exploited to an optimum level as yet. The small and medium industries that exist in GB are limited to small flour mills, saw mills, furniture and wood workshops, hydro-power stations, and hotels. These industries are operating at a scale to meet only the consumption needs of the local population.

Table 2.7.1: Table showing position of Trade and Industry Sector in Gilgit-Baltistan

Private Sector Business	Assets (In million Rupees)	% of Total Assets in the Private Sector
Transport	316.06	33.69%
General Trade	144.00	15.35%
Agriculture	123.20	13.13%
Infrastructure	101.30	10.80%
Tourism	75.20	8.02%
Banking	40.00	4.26%
Oil & Gas	36.62	3.69%
Mining	28.86	3.08%
Forests	22.00	2.34%
Industry	20.00	2.13%
Livestock	13.24	1.41%
Technology	12.80	1.36%
Power Generation	3.60	0.38%
Cottage Industry	2.12	0.23%
Const. Materials	1.20	0.13%
Total	**938.20**	**100.00%**

Source: NASSD Background paper, IUCN

The **Transport Sector** in Gilgit-Baltistan has grown as the largest sector in terms of assets holdings. This sector holds assets worth Rs. 316 million. This amount constitutes 34% of the total private sector assets. This sector holds the same leading position in terms of geographical

[8] Source: IUCN; Northern Areas Sustainable Development Strategy (NASSD), background paper on Private Sector in GB

coverage of the region and includes businesses such as automobile workshops, spare-parts shops, service stations etc.The public transport system holds assets worth 60% of the total assets in the transport sector compared to 39% by the private transport system and 1% by automobile workshops and service stations. The government and private financial sources invest in the transport sector competitively.

The second largest sector identified is **General Trade,** which has acquired assets worth RS. 144 million. This sector includes businesses involved in the ordinary trade of goods and services required in fulfilling the basic needs within and beyond the region. According to the selected sample profile survey, the share of assets for the trading services is worth 5% of the total assets in this sector, compared to 2% for ordinary trade, and 95% for businesses related to import and export.

The **Agriculture** related businesses constitute the third largest sector in the region. It constitutes 13% of the total PS assets, which seems quite meager for a sector that claims to be the mainstay of the region's population, with 90% of the region's population engaged in it. Cash crop businesses such as potato seed, vegetable, and fruit cultivation dominates this sector. Out of the total assets in this sector, the potato business acquires 81% of the share; vegetable and fruit 16%; and other agronomic businesses merely 2% of the share.

Despite being dependent on the down country agricultural products, Gilgit-Baltistan produces some of the best potato seed and fruits in the country. The potato seed and fruit produced in the region are best, that is, free from disease and organic content.

The **Infrastructure Sector,** which constitutes businesses related to construction of roads, buildings, and power generation, has grown as the fourth largest sector in terms of asset holdings. The assets in this sector amount to RS. 102.50 million. This amount turns out to be 11% of the total assets in the private sector. The public sector investments involved in this sector constitute 75% of the total investments. Out of the total assets involved in this sector, the service providers (contractor's associations) share 98% while the related businesses such as manufacturing, construction materials and value addition share 2% of the total assets involved in this sub-sector. The poor asset-holdings by the manufacturing and construction material businesses are attributable to the free availability of the natural resource base of sand and stone in the region.

The **Tourism Sector,** being the fifth largest asset holding sector, holds 8% of the total assets involved in the private sector. Despite this sector's vast geographic coverage, its poor asset-holdings are indicative of non-prioritized and poor allocation of financial resources, lack of financial support, political instability in the region, and physical threat to the tourist. In terms of profitability in hard currency, this sector has the biggest potential in future private sector growth provided the geopolitical situation of this part of the world improves and the tourist does not feel a threat to his safety.

The local **cottage industry** constitutes local handicrafts, stone carving, woodcarving, traditional jewellery, traditional textile (wool spinning and weaving), fruit processing (dry fruit products) etc. The Cottage Industry business has assets worth RS. 2.12 million, that amount to only 1% of the total assets in the private sector. According to the 'private sector profile survey', this sector operated with a working capital of Rs 48 million and generated revenues worth Rs 56 million. The depressed level of investment in this sector has been an unfortunate trend, considering the huge potential this sector has for creating jobs and strengthening the entire private sector (2.7.1).

The **Mining Sector** holds 3% of the total assets in the private sector. Out of the total assets in mining-related businesses, 87% are in the areas of extraction and mining, while 13% are associated within the area of value addition. Despite the region being potentially rich in mineral resources, the mining sector has not grown to its desired level. Its poor asset-holdings, from an investment viewpoint, are a consequence of the high risks and costs associated with the mining sector and lack of investment. Except for the businesses related to Oil and Gas, Mining, and Forests, whose assets amount to 2 – 4% of the total assets in the PS, the rest of the businesses identified in this background paper have meager asset holdings. These businesses with meager asset-holdings classify as very small-scale businesses and are mainly providing the bare minimum consumption requirements. Nevertheless, these businesses provide foundation for the businesses related to the provision of Services (see Table 2.7.1).

In addition, there are 55 automobile workshops and saw mills in the Gilgit City. These workshops and sawmills provide, as a whole, more than 385 and 150 work force, respectively. Furthermore, 65 state registered hotels in Gilgit-Baltistan, 20 in Gilgit, 4 in Ghizer, 21 in Hunza-Nagar,10 in Skardu, 5 in Diamer, and 2 in the Ghanche district. Government and private transport companies are also very common in Gilgit-Baltistan. In total, 7 transport companies—one government owned and 6 private—are operational in the region. These transport companies own 360 vehicles, and employee more than 993 employees. The largest company is in the Public Sector which owns 300 vehicles and employs 300 employees.

The **Banking Sector** emerges as the sixth largest in terms of asset holding. The banking sector owns assets worth RS. 40 million, that amount to 4.26 % of the total private sector assets. More than six scheduled banks with dozens of branches are operating in Gilgit-Baltistan since the last two to three decades and have deposits worth approximately 100 billion rupees from the region.

Table 2.7.2: Distribution of Financial Institutions in Gilgit Baltistan

Banks/ Institutions	Gilgit	Ghizer	Hunza/ Nagar	Astore	Diamer	Skardu	Ghanche	Gilgit-Baltistan
Formal Banks[1]	23	12	15	9	6	29	11	105
MicroFinance Bank[2]	2	5	3	1	1	6	1	19
Informal Financial Institutions[3]	1,194	626	241	366	397	1165	497	4,486
Total	**1,219**	**643**	**259**	**376**	**404**	**1200**	**509**	**4,610**

1. Included Commercial Banks, Development Banks, Post Offices
2. The First MicroFinance Bank of AKDN
3. Cooperative Societies, including those of the Karakoram Cooperative Bank VOs, WOs

The banking sector operates on investments from both the public and private financial sources. Predominantly, the major banks in the region are government owned, except for a few privately owned banks.

Tables 2.7.2 and 2.7.3 below illustrate the district-wise distribution of banks and other financial institutions operating in Gilgit-Baltistan. It appears from the table below that adequate and a wide range of financial services are accessible to the entire population of Gilgit-Baltistan through these financial institutions. It is evident from the data that the number of informal financial institutions that includes Village organizations (VOs), Women's Organizations (WOs)—fostered by AKRSP—and other Cooperative Societies is the highest in every district of GB except for the

district of Hunza--Nagar which has attracted commercial banks due to its booming tourism industry and which fetches foreign currency. The major cities of Gilgit and Skardu have the largest number of commercial banks while Diamer and Ghanche districts have the least number of all types of financial institutions. Gilgit, being the capital of Gilgit-Baltistan, has the largest number of financial institutions with their headquarters and several branches operating in the herein.

Table 2.7.3: Type of Financial Institutions with number of branches in Gilgit Baltistan

Banks/ Institutions	Gilgit	Ghizer	Hunza/ Nagar	Astore	Diamer	Skardu	Ghanche	Gilgit-Baltistan
Commercial Banks	13	5	4	3	3	14	3	45
Development Banks [1]	3	2	2	2	1	2	1	13
Post Offices (as FIs)	7	5	9	4	2	13	7	47
Micro Finance	2	5	3	1	1	6	1	19
Cooperative Societies[2]	478	70	5	59	27	169	29	837
Village Organizations	369	297	119	176	250	643	251	2,105
Women's Organizations	347	259	117	131	120	353	217	1,544
Total	**1,219**	**643**	**259**	**376**	**404**	**1,200**	**509**	**4,610**

Source: 1) Record of Registrar office, Cooperative societies
2) Records of National Bank, Post Office, and main branches of all commercial banks
1. Development Banks include the Zar'i Taraqiati Bank (ZTBL)…….,
2. Cooperative Societies also include all the branches of Karakorum Bank

It may be noted that the Karakoram Cooperative Bank (KCBL) has 63 branches (including 3 branches providing microfinance services) operating in all the seven districts but it has been reported under the category of Cooperative Societies in table-2.7.3 because KCBL has been registered under cooperative societies act and not yet been declared as a scheduled bank.

The village and women organizations (VWOs), although, are the informal village-based coalitions of the rural communities of Gilgit-Baltistan, these organizations have generated a capital worth of more than 500 million rupees through collective savings. These organizations are involved in internal lending to cater for the financial needs of their member communities using their savings along with the financial support provided by local, national and international donor agencies. Hence, these village-based community organizations are considered as important financial institutions in Gilgit-Baltistan.

Table 2.7.4: Coverage of Financial Institutions with number Gilgit Baltistan

Gilgit-Baltistan	Number of account holders
Commercial Banks	73,954
Development Banks	26,000
MicroFinance Bank	46,640
Total	**106,594**

Source: 1) Records of National Bank and main branches of all commercial banks

Table 2.7.5: Detail of loans offered by Financial Institutions in Gilgit Baltistan

Gilgit-Baltistan	Number of loanees
Commercial Banks	4,948
Development Banks	20,000
Micro Finance	90,543
Total	**115,491**

Source: 1) Records of National Bank, and main branches of all commercial banks

Commercial banks in Gilgit-Baltistan are offering the following credit products to their clientele:

- Salary advance, agricultural finance, demand finance, running finance, and SME finance. ZTBL is providing loaning facilities to all areas related to the agriculture in the area under two main heads, i.e. (i) Agriculture Development loans: these are long term loans for the purchase of machinery and other components; and (ii) Agriculture production loans: these are small loans offered to the farmers for purchase of seed, fertilizers and pesticides.

Table 2.7.6 shows that there are 36 flour mills operating in Gilgit-Baltistan. These mills provide employment to 720 people and producing more than 2,800 bags (weighing 40 kg each bag) of flour per month which is enough to meet bare minimum consumption requirements of the local population.

Table 2.7.6: District-wise position of flour mills in Gilgit -Baltistan

District	Gilgit	Ghizer	Astore	Diamer	Skardu	Ghanche	Total
No of mills	23	2	2	2	5	2	36
No. of employees in mills	460	40	40	40	100	40	720
Total production per day (flour bags of 40 kg)	1,840	160	160	160	400	160	2,880

Source: Rapid Market Appraisal

The NGOs have taken initiatives, with a lead role of AKRSP, in focusing on the cottage industry. The Dry Fruit Project (DFP) initiated by AKRSP is now working in the private sectors as a company under the name 'Mountain Fruits (Pvt) Limited (MFL), and for the first time has produced dry apricot, apple, and mulberry that are exported to the UK market. The demand for these dry fruits in the UK market exceeds the supply. Of MFL at present is in the process of training local farmers in producing dry fruits that meet international standards to meet the demands. It is worth mentioning here that MFL has added value to the local fruits tremendously. Today the foreign buyers purchase the local apricots for Rs 300 to 500 per kilogram, which the farmers previously sold at the rate of Rs 6 to 7 per kilogram. To illustrate, the Company processes the local apricots, purchased at Rs 40 to 50 per kilogram from the local farmers, and sells it to the foreign exporters at Rs 300 to 500 per kilogram. The AKRSP, after such orientation and experiments, intends to pass on the knowhow and technology of drying local fruits to the local farmers.

The AKRSP has also initiated another project under the name of North South Seed (NSS). NSS was experimented to produce disease-free quality vegetable seeds. This project intends to develop new breeds of seeds and disseminate it to the local farmers. Another project of the AKRSP is working under the name of Shubinak. In this project the locally produced woolen cloth or 'Patti' is refined. This project has improved the quality of 'Patti' to meet international standards and most importantly added value to this local cottage industry.

The other NGOs are also promoting the local handicrafts by giving incentives to the local farmers by helping them to add value to their local products. These handicrafts include traditional jewellery, clothes, carpets, and needlework designing on clothes. One of the leading NGOs working towards promoting the cottage industry in the region is the World Wide Fund for Nature (WWF). WWF is also involved in arranging trophy hunting of the local species of animals like ibex and leopard. The revenues generated from these activities are used towards the conservation of nature.

2.8 Situation of Community Development

In the Gilgit-Baltistan region, several institutions have made a lot of efforts for the development of local communities. These institutions include government departments and non-governmental organizations (NGOs). The Local Government and Rural Development Department is active in the region and working with local communities in the areas of small irrigation development, water supply and sanitation. This Department works through the village councils, union council, and district council members elected by the communities.

Among the NGOs, institutions of the Aga Khan Development Network (AKDN) are functional in the region with the exception of the Diamer district, and work with communities in the areas of rural development, health, education, housing, and culture. They also work through education committees and health committees to transfer the ownership of the planning, implementation, and management of development programs. Apart from the AKDN institutions and WWF, International Union for Conservation of Nature (IUCN) has also been working in the region for the past several years, IUCN worked with communities in the line with conservation and protection of environment, nature and wildlife; and for the last two years. IUCN ceased its presence in the Gilgit-Baltistan.

Among all these NGOs, the AKRSP has been playing a major role for the development of communities of the region since 1982. The AKRSP gears its maximum efforts to mobilize communities through the formation of VWOs and the Local Support Organizations (LSOs) of VOs and WOs (Table 2.8.1). In the Diamer district, the Northern Areas Development Project (NADP) worked from 1998 to 2008 for the development of communities on similar lines of community organization and development. However, this programme was withdrawn from the district in 2008. The programs that AKRSP has implemented in participation with communities include social mobilization, community infrastructure development, natural resource management, human resource development, rural finance, and gender and development.

The AKRSP and NADP fostered organizations for social development. The LSOs are of a particular impoartance as they plan, implement, manage, and own their own the villages' development. They forge partnerships with all the development partners and stakeholders at the local, national, and international levels in order to access resources, projects, and services to meet and solve their devlopment problems and needs of communities and the population they serve. These organizations work in the areas of social organization, community infrastructure development, internal lending, savings, micro-insurance, natural resource management and women's development. It is worth mentioning that these organizations have taken over the majority of the service delivery activities that AKRSP was rendering in the past and have become the custodian of their own local and village development.

Table 2.8.1: No of AKRSP-Fostered LSOs, VOs and WOs

District	LSOs	VOs	WOs	Total
Gilgit	8	439	394	841
Ghizer	5	297	259	561
Astore	3	176	131	310
Diamer*	0	250	120	370
Skardu	6	643	353	996
Ghanche	4	251	217	468
Total	**26**	**2,056**	**1,474**	**3,546**

Source: a) AKRSP database
b) NADP fostered COs and Women's groups in the Diamer district (from NADP project document)

In additions to AKRSP fostered institutions, some active communities and individual community members have taken initiatives and formed Local Development Organizations (LDO) in the region. It is evident from Table 2.8.2 that 146 LDOs had been formed in the Gilgit-Baltistan region by the end of 2001. An overwhelming majority of them were in fact formed in the Skardu district, then followed by the Gilgit District.

Table 2.8.2: No. of Local Social Sector Service Providers-2001

District	Total LDOs	Registered LDOs	% Registered
Gilgit	40	29	73
Ghizer	14	11	79
Diamer(Astore)	2	0	0
Skardu	65	35	54
Ghanche	25	12	48
Total	**146**	**87**	**60**

Source: A Status Report on Local Social Sector Service Providers in the AKRSP Programme Area, Nov. 2001

Of the total, 60 percent LDOs were registered. In the Ghizer and Gilgit districts, again the registration of LDOs was fairly encouraging. The Ghanche and Skardu districts lagged behind. These LDOs listed in the table above work for communities in the areas of education, health, environment, wildlife conservation, and natural resource management.

In addition to the formal village institutions, there are several traditional institutions that play very important roles in development, social, cultural, administrative, and religious affairs (see Table 2.8.3). Mosques, Jamat Khanas, and Iman Barghas are considered to perform religious rituals and impart religious education to boys and girls. Moreover, most of these religious institutions provide work as *Madrasas* to teach Urdu education to children up to age 10.

Table 2.8.3: Non-Formal Organizations and Their Role

Name of Committee	Role
Mosques **Imam Bargah,s** **Jamat Khana's**	• They provide a platform to fulfill religious activities. • They provide Charity to the community in different matters • To make social interaction with others • They work for conflict resolution within the community and in between different sects.
Masjid /Imam Bargah Committee	• To arrange and provide security at religious ceremonies and events. • Administrative responsibilities • Resolution of issues at community level
Conservation Committee	• To look after the conserved area and is royalty. • To conserve natural resources of Gilgit –Baltistan. • To collect royalty of the natural resources, plan and invest in suitable programs for community development.
Development Committee	• To work for the development of village and communities • They work in multiple sectors like education, infrastructure etc
Village Committee	• These committees are generally influenced by the "Numberdars" of the area. • They work to solve the issues of water , electricity etc.
Village Level Social Welfare	• The work for the welfare of community • The provide assistance in education sector and especially to needy students in matters related to education.
Zakat and Fithrah committees	• They help the needy people in the community through collection of Zakat in different forms from the individuals.
Health Org	• Provide health facilities to Community • Provide awareness in health related issues.
Lambardares	• They are local representative to solve conflicts within the village and between the villages. • They liaise between the community and the Government. • They are responsible for ensuring the management of common resources.
Jirgah	• This is village body working under Lambadars. • They are also local representative to solve conflicts within the village and between the villages. • They liaise between the community and the Government. • They are responsible for ensuring the management of common resources.

CHAPTER THREE

3. GOVERNMENT POLICY AND ADMINISTRATION

3.1 Federal and Provincial policy on Agriculture

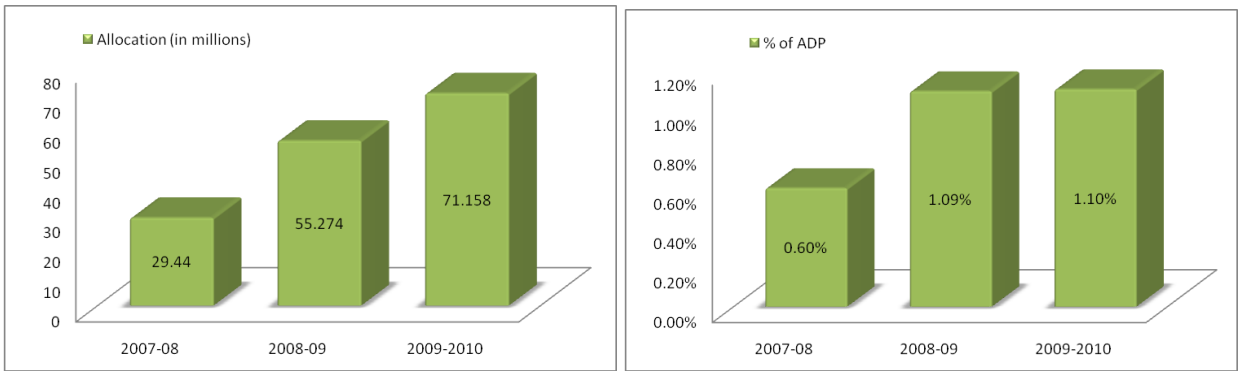
Agriculture remains a vital component of Pakistan's economy, contributing 21.8 percent to the country's GDP and providing employment to 44.7 of all employed workforce[9]. Recognizing this central role of agriculture sector, the ongoing Medium Term Development Framework (2005-10) places greater emphasis on three elements: achieve self-reliance in agricultural commodities; ensure food security; and improve productivity of crops. To achieve these objectives, the framework seeks improvements in key areas including increased crop productivity through adoption of new technologies, inputs, and farm practices; efficient use of water; provision of agricultural credit; improved research and extension services; and enhanced production and export of high value crops.

At the sector level, the Ministry for Food and Agriculture (MINFA) has very recently prepared a draft of National Agriculture Policy 2009-14 which follows closely the strategic areas outlined in the MTDF. The overall thrust of the proposed Agriculture Policy is to boost agricultural growth through actions aimed at increasing the quantity and quality of agricultural produces and improve farm profitability and competitiveness. To this end, the MINFA envisages, following a two-pronged strategy: a) increase agricultural growth through bringing additional area under cultivation at the farm and country level; and, b) modernize agriculture through farm mechanization, crop diversification, value-addition, and promotion of latest agricultural technologies.

At present, Gilgit-Balistan lacks an Agriculture Policy to guide and harmonize the actions of various agencies and stakeholders in the sector. The sector does not seem to feature high on the overall development agenda of Gilgit-Baltistan as it receives less than 2 percent of the funds allocated to the Annual Development Plan (Figure1). Still, it is encouraging to note that there has been a significant jump in the total allocation made to the sector during the recent years. The total allocation to agriculture was increased from 29.4 million in 2007-08 to 97.3 million in the financial year 2008-09. It is crucial that the GB Administration prepares an overall Agricultural Policy for the region, outlining the priority subsectors and guiding principles to engage various stakeholders and direct the spending of public resources in the sector.

[9] Economic Survey of Pakistan 2008-09

Figure1: Annual Allocation to Agriculture in ADP



Source: Annual Development Plans (2007-2010)

3.2 Federal and Provincial Policy on Horticulture

Under the Asian Development Bank (ADB) sponsored project "Agri-business Development and Diversification Project, separate drafts of horticulture and agri-business policies have been prepared for the four provinces and federally administered territories, including the AJK, FATA and Gilgit-Baltistan. These drafts are currently at various stages of approval. The proposed policies seek drastic improvements in existing legislations and the functioning of the Government in the sector to help boost exports of Pakistani fruits and vegetables to world's leading markets. These proposals are aimed at putting Pakistan's horticulture in the footsteps of other Asian countries including China, Malaysia, Thailand and India that have drastically expanded their horticultural exports in recent years. Pakistan's share, on the contrary, has declined due to its low value-added products and its inability to meet the quality demand of the international market set by the World Trade Organization (WTO), particularly in packaging, marketing and production techniques.

In line with the pursuit of other provinces, the draft of Horticulture Policy for Gilgit-Baltistan (attached) also seeks added efforts from the Government and the private sector at the various stages of the value chain. The draft is expected to be submitted to Gilgit-Baltistan Legislative Assembly in May-June 2010 for deliberations and, if endorsed, it will be sent to the Governor for final approval. The draft, in its current form, envisions transforming the horticulture sector into a viable, sustainable, market-driven and export-based horticulture industry in Gilgit-Baltistan. It aims to secure a significant increase in the production and export of horticultural produce through horizontal and vertical linkages and improvement in quality to meet the international standards. In order to achieve these objectives, the proposed policy seeks, among others, to take up the following setps:

- Reorient the existing research efforts to respond to international market needs;
- Improved productivity, quality and competitiveness in horticultural farming;
- Place greater emphasis on the public-private partnerships;
- Increase efforts for market development; and
- Secure regulatory changes to ensure supply of quality inputs.

To follow up on the proposed actions, the policy asks for significant public resources (Rs 2.3 billion) over a period of 5-6 years, from 2009 to 2015. In other words, the average annual ADP allocation to support the proposed actions in the horticulture sector amount to Rs 388 million—a figure that is four times higher than allocation made to agriculture as whole in 2008-09!

In overall terms, the proposed policy is comprehensive in its coverage. Still, there are a number of areas where further emphasis is warranted to strengthen the proposed policy. *First*, there is a need to underscore the importance of national markets and national linkages to boost the productivity and marketing of horticultural produces from Gilgit-Baltistan, as it is already benefiting from such linkages in key cash crops including potatoes. Currently, the focus of the proposed policy is exclusively on export markets, where Gilgit-Baltistan in some cases may be disadvantaged due to its limited scale of production. *Second*, greater emphasis needs to be placed to develop products and find ways to process *existing* horticultural producea which lack standardization and is extremely fragmented in terms of production. Development of processed products that are less sensitive to variation in quality and varieties of fruits will be crucial to add value to the bulk of existing production in GB. *Third*, there is scope for using existing networks of grassroots community organizations in various areas, including the aggregation of horticultural produces as well as consolidating demand for extension services and farm inputs. Provisions for community engagement in the horticultural value chains can be reflected in the proposed policy. *Finally*, branding aspects surrounding natural and organic farming require more coverage in the policy documents, along with inclusion of proposals to legislate on zoning of regions in GB for organic/natural farming.

3.3 Public sector Capacity in Research and Extension.

3.3.1 Department of Agriculture and MIFA funded projects in Agriculture

Agriculture extension services in Gilgit-Baltistan were started by the Government in 1952 with the establishment of Agriculture Extension Department (AED). The mandate of AED was to provide agricultural services to the farming communities in GB through demonstration of improved agriculture management practices aimed at boosting productivity. The AED was upgraded in 1985-86 to Directorate of Agriculture (DoA) by creating the post of Director of Agriculture at the GB level and the posts of Deputy Directors of Agriculture at district level. Currently, Department of Agriculture has over 500 staff with central directorate in Gilgit and offices in all the district headquarters. It is entrusted by the government to deliver the following services to the farmers of Gilgit-Baltistan**:**

1. Provision of disease-free seed potato
2. Provision of high quality fruit plants
3. Provision of cereal & vegetable seeds
4. Research and demonstration of off - season vegetable production
5. Insect pest and disease management (IPDM)
6. Agriculture extension and education
7. Adoptive research for varietal evaluation
8. Improvement of irrigation infrastructure in Gilgit Baltistan

In addition to the regular activities, the DoA also has the mandate to design and implements the projects funded directly by the Federal Ministry of Food and Agriculture (MIFA), Islamabad. At present there are five such projects under execution in Gilgit-Baltistan out of which following four are directly implemented by the DoA:

Sustainable Development of Agriculture. (SDA)

i. Mountain Agriculture Research Systems (MARS)

ii. National Programme For the development of water Courses (NPIWC)
iii. Improvement of water Management practices (IWMP).

A brief description of these projects is given in the table below:

Table 3.1: Description of MINFA funded projects

Projects[10]	Total Budget (million Rs.)	Basic Objectives
Sustainable Development of Agriculture in NAs (SDA-NAs)	97.980	▪ Expended Extension Services (EES) ▪ Integrated Pest Management (IPM) ▪ Agriculture Training and Documentation
Mountain Area Research Services (MARS)	98.673	▪ To establish an independent Agri. Research Wing within the department of Agriculture GB with the following specific objectives:- ▪ Field Crop research section. ▪ Horticultural crop research section. ▪ Pest management and environment protection research section. ▪ Post harvest and food processing research section. ▪ Biotechnology research and development section.
Irrigation Water Management Program (IWMP)	52.986	▪ To increase Agriculture production by utilization of irrigation Water saved through Improvement of Water Management Practices. ▪ To check the erosion and degradation of land and to increase water efficiency. ▪ Capacity building of staff/farmers for participatory water Channels improvement. ▪ To increase Agriculture production to help poverty alleviation. ▪ Equity in water distribution
National Program For Improvement of Water Courses (NPIWC) Project closed in June 2009	415.735	▪ Improvement of 600 existing water courses in GB. ▪ Sustainable irrigation through community practices ▪ Boosting of agriculture production through conservation of existing water resources and efficient irrigation ▪ Capacity building of farmer and staff in conservation of water resources
Agri-business	53.500	▪ Establishment of Human Resource Development Centre in NAs. ▪ Development of Fruit & Vegetable Marketing in GB. ▪ Development of Horticultural crops by Establishing Model Fruit Nurseries in GB.

Source: Agriculture Secretariat, GB

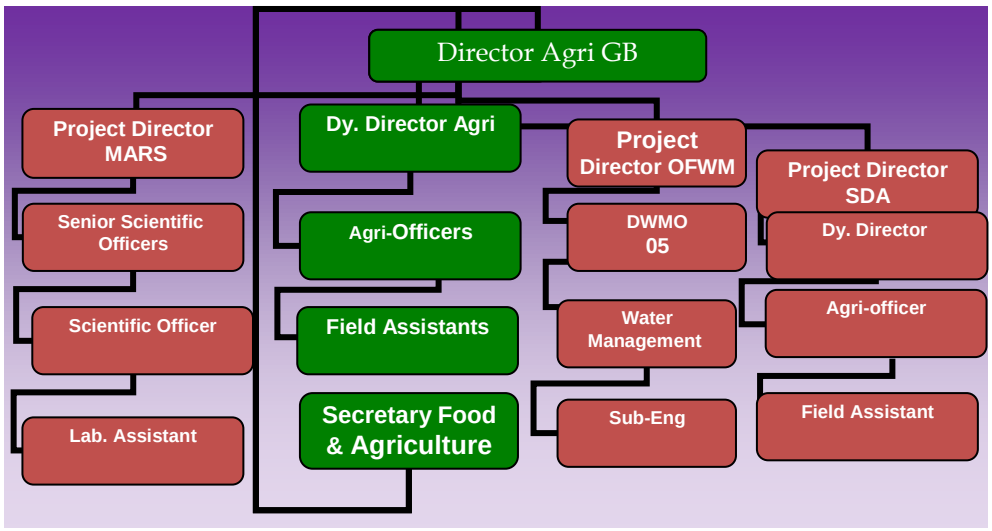
[10] The entire MINFA funded projects have exceeded their project life, which was June 2009 and on extended period of one year up to June 2010.

Of the above listed projects, the five year project entitled "Establishment of Mountain Agriculture Research System in GB (MARS)" (see table 3.1) is of great significance for the future of technology development in the region since it is launched as a step towards establishing an independent Agricultural Research Wing in the region. The project is nearing its conclusion but the intended goal of creating a research wing does not seem to be within reach due to funding constraints and lack of interest from the MINFA in granting a further extension.

3.3.2 Human Resources in the DoA and the MIFA Funded Projects

Curently, the DoA employs 500 personnel, added by another 268 project staff working in various MINFA funded projects, to undertake regular and project work in the sector. A vast majority of the existing staff comprises support and non-technical staff. Moreover, as highlighted in the GB's Horticultural Policy, there is a general dearth of experts in the department, particularly in the field of horticulture. Table 3.1 and 3.2 gives the breakdown of regular and project staff in the DoA by their scale and function.

Figure: 3.1: Organogram of Department of Agriculture



Note: Green boxes represent permanent positions, while the rest are project based.

Table 3.2: Scale wise Staff Strength of DoA GB

Name of Position	Basic pay Scale	No. of Staff	Major Responsibilities
Director Agriculture	19	01	Is responsible to; • Provide strategic guidance on bringing changes in the traditional, low output subsistence farming system towards modern commercial cash crop based production system. • Plan and provide leadership in the execution of development programs of agriculture sector including animal husbandry & fisheries. • Acquire the latest technology in the field of agriculture and arrange its transfer to the growers through all possible and effective means. • Arrange effective training programs, for the staff in service & to be recruited. • Organize effective strategies for the capacity building of the farmers to enhance productivity in the region. • Develop strategies for optimum production of quality planting material and seed of the recommended varieties and ensuring its timely availability to the farmers. • Coordinate with other agencies to build an effective co-operative system for supply of crop inputs & sale of the farm produce.
Deputy Director Agriculture	18	08	• Execution and operation of development schemes pertaining to relevant district under the supervision of Director Agriculture, GB • Act as overall in-charge of agriculture development activates being carried out in his relevant districts besides supervising the activities of field staff. • Preparation and submission of PC-I and other important information required by the Director Agriculture & higher authorities. • Technology transfer through agriculture extension workers besides arranging and supplying agri –inputs like seed, plants, pesticides, agriculture machinery, tools & implements etc. • Capacity building of the farmers in modern agriculture technology to enhance production, with the objective to boost up socio economic condition of the region. • Establish model orchard for demonstration of standard practices through private /public sector resources. ▪ Over all control of administrative financial & operational activities of the relevant district.
Agriculture Officers	17	29	▪ Carry out all agriculture extension /development activates at sub-division level under the supervision of respective deputy director agriculture ▪ Conduct adoptive research, demonstrative plots &

Name of Position	Basic pay Scale	No. of Staff	Major Responsibilities
			experiment evaluate performance of promising verities different crop & fruit & their further selection for multiplication & dissemination amongst the farmers of the area. ▪ Introduce modern agriculture technology to the worker/farmers business advisor. ▪ Assist the deputy director agriculture publications preparation of technical report, peridicioal, & publications containing extension messages for the farmers of their respective sub division. ▪ Supervise all the field staff to establish fruit nurseries ,seed farms ▪ & model orchards at private & public sector.
Field Assistants	6	52	▪ Act as technical and administrative in charge of the fruit nurseries/seed farms and produce targeted quantities of planting material and seeds of various crops. ▪ Carry out extension activities at union council and tehsil level under the direct supervision of agriculture officer of the respective sub-division. ▪ Supervise & distribute duties of budders, malies and spray mans at fruit nurseries and seed farms in the field. ▪ Assist the agriculture officer in transfer of the modern technology to the farmers of the area.
Skilled/ Unskilled Office/Field staff	1-15	444	▪ Maintenance of different sections official record. ▪ Assist in smooth running of official routine work. ▪ Carry out budding /grafting, pruning training. ▪ Assist the field assistant in disposal of day to day agriculture activities at seed farms and fruit nurseries.
Total		**534**	

Table 3.3: Staff Employed under the Development Projects (MINFA Funded)

Basic Pay Scale	SDA	MARS	NPIWC	IWMP	Agri-business	Total
19	01	01	01	0	0	03
18	02	05	06	01	0	14
17	06	18	12	02	02	40
16	0	0	05	0	0	5
14	0	01	06	0	0	7
12	02	0	0	01	02	5
11	0	01	21	04	03	29
10	07	02	0	0	0	9
07	0	01	05	0	0	6
06	50	02	0	0	01	53
05	0	15	0	0	0	15
04	02	07	06	01	04	20
01	12	11	31	03	05	62
Total	**82**	**64**	**93**	**12**	**17**	**268**

Source: DoA, GB

3.3.3 Research and Extension facilities and their functions

Since its establishment, the DoA has made a very good progress in the establishment of physical research and extension facilities throughout the GB. Nonetheless, major efforts are required to to improve the quality and delivery of services rendered by these facilities. The following tables illustrates the list of existing facilities along with their intended functions:

Table 3.4: Physical Infrastructure developed for Agriculture Research in GB

Type of Infrastructure	Number	Functions
1. Fruit Nurseries	49	▪ Act as Agriculture extension centers. ▪ Production & distribution of prototype fruit trees & vegetable seeds. ▪ These nurseries are manged by a person of officer scale and the activities on the ground is supervised by a field Assistant. ▪ At average over one hundred and forty thousand fruit palnts are issued from these fruit nurseries to the farmers each year.
2. Seed Farms	12	▪ Primarily act as adoptive research stations but are extensively used for seed multiplication. ▪ the seed of recommended verities of cereals and fodder are multiplied and distributed in the region for multiplication and dissemination through progressive farmers. ▪ The seed farm is managed by an officer of 17 Grade (mainly an agronomist but is not compulsory). The activities on ground are supervised by a Field Assistant.
3. Tissue Culture Labs	03	▪ Act as center for rapid multiplication of seed potato through tissue culture technology. ▪ The only functional lab at the moment is the Gilgit tissue culture lab which has been a centre of excellence for a while when it was managed by a highly competent potato expert. ▪ The lab is usually managed by an officer of 17 Grade (mainly a horticulturist but not compulsory). He is assisted by lab technicians and Field Assistants. ▪ The lab has a capacity of producing 25000 in vitro plants and 75 MT of pre-basic/basic seed per year. ▪ But from last few years it is operating at a level of 15-20 MT of seed per year
4. Green Houses	06	▪ Cultivation of material produced through TCL and production of pre-basic-1 seed for further multiplication. ▪ These green houses are part of Tissue culture Labs and are used to acclimatize and multiply the tissue culture material under semi-controlled environment.
5. Screen Houses	05	▪ This is also part of tissue culture Lab and is used for the production of mini tuber (Pre-basic seed) in field like situation but under aphid proof conditions. ▪ These screen houses are actually an essential part of tissue culture based production system in which the material produced in tissue culture labs and acclimatized in green houses are multiplied here.

Type of Infrastructure	Number	Functions
6. Fruit Processing Units	02	▪ The facilities are built with the objective to help the farmers in prevention of the post harvest losses and income generation through processing of fruits and vegetables. ▪ These facilities are used to train farmers (women /men) in fruit and vegetable processing and preservation. ▪ The facilities have the equipment and chemicals necessary for product quality testing. Hence if properly trained staff is available this facility can be an important resource for quality testing of processed fruits and vegetables. ▪ Currently no specialized person with the skills needed to operate the available equipment is available. ▪ However, the facility provides training in various fruit and vegetable preservation methods to the farmers mainly women.
7. Soil Testing Lab	01	▪ One partially equipped soil testing lab established with the objective of providing soil testing services is present in Skardu. ▪ There are no technical staff to initiate these services and hence the facility is currently not functional.
8. IPDM Lab	02	▪ Established with the objective of introducing integrated pest and disease management methods for the sustainability of production system in GB. ▪ It has a provision of biological control services for some of the important insects. ▪ It has Provision of plant disease diagnostic services to farmers and provision of training in IPM technology. ▪ The lab is fairly equipped with the required technology but there is serious gap of trained technicians and resources to import important bio-agents. ▪ The facility seriously lacks the linkages with other international research institutions which is pivotal for such facilities

Source: DoA

Table 3.5: Seed Potato produced through Tissue Culture lab, in GB

Year	In vitro Plants (No.)	Sprout cuttings (No.)	Stem cuttings (No.)	Micro tubers (No.)	Pre basic/ basic seed M.T
2000	15,000	8,000	25,000	100,000	13.700
2001	17,600	24,000	28,600	103,000	36.400
2002	20,200	37,000	46,600	110,000	28.800
2003	21,700	---	87,300	207,000	36.500
2004	22,000	9,600	95,000	250,000	55.000
2005	16,000	4,400	32,000	60,000	--
2006	10,000	1000	2000	45,932	2.300
2007	12065	1000	1203	155,000	15.000

Source: GB Government Presentation

Table 3.6: District wise Fruit Nurseries and Issuable Fruit Plants 2009-10

District	No of Nurseries	Area (HA)	No of Fruit Plants
Gilgit	06	10.50	12,742
Ghizer	05	7.75	16,232
Skardu	17	92.75	43,450
Ghanche	07	10.50	35,000
Diamer	10	6.850	26,500
Astore	04	2.65	90,00
Total	**49**	**130.970**	**142,924**

Source: GB Government Presentation

Table 3.7: Establishment of Model Orchards (1998-2008)

Name of District	No. of Orchards	No. of Plants	Area (Kanals)
Gilgit	112	13,240	448
Diamer	245	29,200	980
Ghizer	128	12,200	512
Skardu	85	10,000	340
Ghanche	170	20,200	680
Total	740	84,840	2960

Source: GB Government Presentation

Table 3.8: Insect Pest and Disease Management

Interventions	Number
Fruit fly traps distributed.	635
Fruit fly captured. (Male).	500,000
Bio-agent (Fruit fly) rearing.	1000
Fruit fly baits distributed.	1936
Codling moth traps distributed.	285
Codling moth captured (male).	543
Biological agent procured & quarantined in the lab.	20,000
Released of Bio-agent in the field.	15,304
Plants treated with Neem Oil	1,177
Insects collected for identification.	632

Source: GB Government Presentation

3.3.4 Mountain Area Research Center (MARC)

The Mountain Area Research Center (MARC) is a sub-station of Pakistan Agriculture Research Council (PARC). It was initially established as Mountain Agriculture Station in 1984, later it was upgraded and reconstituted as, Mountain Agriculture Research Institute Northern Areas (MARINA), and then renamed as, Karakoram Agricultural Research Institute Northern Areas

(KARINA). In 2009 it was upgraded as Mountain Agriculture Research Center (MARC), headed by a Director General (DG).

The MARC has a staffing strength of 105 people (including project staff), out of which only 29 people are technical (Table 3.8). The staff is deputed at the research facilities in district Gilgit, Diamer, Astore and Skardu. These research stations have some basic facilities, including a soil testing lab and fruit nurseries covering an area of 7.5ha in Gilgit, 0.5 ha in Ghizer, 0.5 ha in Skardu and 2.5 ha in Diamer. The MARC also owns two seed farms—one each at Gilgit (7.5 ha) and Diamer (2.5 ha).

Table 3.9: District-wise staff strength in MARC, GB

Office	Technical staff		Non Technical staff	Total
	Officers	Field Assistant	Ministerial Support Staff	
GB	**12**	**17**	**77**	**105**
Gilgit	10	10	64	84
Hunza-Nagar	0	0	0	0
Ghizer	0	2	2	4
Diamer	1	3	8	11
Astore	0	1	1	2
Skardu	1	1	3	4
Ghanche	0	0	0	0

Source: MARC Staff

3.4 Public sector capacity in horticulture marketing and promotion.

As highlighted in the forgoing discussion, public sector agriculture set-up is designed to deliver agriculture extension services and conducts adaptive research at the production and to some extent at processing stages of the agricultural value chains. The horticultural promotion and marketing has been one of the least attended part of the value chain in GB. In more recent years, some efforts in this area have been made through short-term MINFA-funded projects such as the Agri-business Support Fund (ASF). The ASF aims to:

- Minimize and avoid the adverse effects of gluts through better alignment of production with the market requirement
- Inculcate the spirit of micro entrepreneurship among the youth and enable them to generate their income
- Train local traders, farmers and extension workers in fruit and vegetable marketing and post harvest handling
- Link the local traders and farmers with the markets in other parts of the country, and,
- Establish a sound marketing system for fruits and vegetables in GB

The on-going efforts notwithstanding, added efforts are needed to strengthen the marketing linkages within and outside the country for horticultural products that originate from GB. In view of this need, the proposed policy rightly emphasizes the establishment of a Horticultural Development Board in GB. Exploring avenues to strengthen GB's brand in horticulture by highlighting unique GB specific aspects such as natural production, fair trade, and healthy food will be key to overcoming scale-constraints and fetching premium prices local produce.

3.5 Policy level issues and Constraint

- Absence of Agriculture Policy to bring focus and effectiveness in the Government's efforts
- Inadequate provision of funds for Agriculture in the Annual Development Plans
- Lack of policy level sponsorship and weak departmental capacity to establish a research system to address the mountain specific agriculture issues
- Lack of a clear incentive system to encourage the private sector to invest in agro-processing and storage systems
- Inadequate efforts to strengthen the GB brand as an ideal area for production of high quality fruits and vegetable seeds
- Poor property rights regime leading to slow resolution of issues surrounding the development of land and irrigation water resources
- Un-planned urbanization and its adverse implications for agriculture in the form of contamination of irrigation water, squeezing of agriculture land, and access issues for crop inputs and farm machinery
- Absence of laws and capacity to monitor the quality of crop inputs

CHAPTER FOUR

4. AGRICULTURE OUTLOOK

4.1 Production Environment

4.1.1 Topography

The geographic characteristics of Gilgit-Baltistan are unique due to its distinctive feature of being home to the three mighty mountain ranges: the Hindukush to the west, the Himalaya to the south and Southeast and the Karakoram to the North and Northeast in addition with the Pamirs. In these mountain ranges exist some of the world's highest mountain peaks like K-2 (2nd highest in the world) and Nanaga Parbat (9th in the world) and some of the longest glaciers like Baltoro (one of the longest outside polar region). This situation makes the topography of the area steep, rugged and mountainous.

4.1.2 Land and the Soil

Out of 72,496 sq km area of GB, only 1% is cultivated and another 1% is cultivable. The cultivated area is predominantly made on alluvial fans. There is also a small fraction of cultivated area (mainly along river banks) which has been reclaimed from old river beds. The soil features vary in structure and texture across the region. In general, the texture of soil is high in silt and sand and low in clay. The soil depth is from 30-120 cms with weak to moderate granular structure at the surface and sub-angular blocky at the bottom. The surface horizon is more pronounced in moist and cooler locations. The organic matter content of the surface mineral horizons has been found to vary from about 0.3% to ≤9%. The virgin soils may contain more organic matter than their cultivated lands. The pH value of the soil ranges from 5.5-7.3 with low cation exchange. The silty and sandy texture and low depth make most of the soils very good in drainage but poor in water retaining capacity. Although there has never been an attempt to thoroughly study the nutritional profile of the cultivated soils in GB, the available limited information and the common symptoms of nutritional deficiencies in major crops indicate that the soils are poor in nitrogen and phosphorus while other major and minor elements are mostly adequate. Most of the soils are subject to active wind and water erosion. The intensity, however, depends upon the vegetation cover and the slope gradient.

4.1.3 Climate

The climate in GB varies widely across the region. In general, its climate is subtropical to temperate with some features of Mediterranean. The overall climate is significantly influenced by the presence of high mountain systems which create rain shadows in some places and high precipitation in others. The Karakoram and Hindukush act as a barrier against the monsoon coming from southeast and do not allow them to enter in this mountanin region. Thus in the south western and south eastern parts of GB where monsoon systems have some access, rainfall are as high as 1000 mm per year, but moving northwestwards the condition changes from arid to semi-arid cold desert with rainfall below125 mm and evapo-transpiration exceeding rainfall in all months. During the winter and spring, the region is influenced by westerly depressions originating in the Mediterranean and Caspian seas which results in rainfall at lower and snowfall at higher elevations.

Within the area, climate varies between the lowlands and valleys and the mountains. The valleys are dry with annual precipitation around 200 mm but totals can go up as high as 600 mm at elevations of 13,000 ft. Glacial studies above 16,000 ft suggest precipitation in the order of 2000 mm annually, mostly in the form of snow (Kreutzmann, 2000).

The river Indus, which originates from Tibetan region in the east cuts through Baltistan and travels towards west to meet Gilgit River at a point where the three mountains ranges also converge approximately 30 kms downstream Gilgit town. As per natural process, all the rivers in GB flow at the base of the valleys therefore they do not contribute much to the local irrigation system.

Agriculture in the area is confined to alluvial fans and terraces on the valley bottoms where irrigation water is available from locally tapped rivers, springs, glacial streams, streams and seasonal snow melt.

4.1.4 Temperature and Sunshine

Temperatures in the valley bottoms vary from extremes of 25-40°C in summer to less than –10-00°C in winter. Thus the range of temperature between summer and winter can be as much as 25C.

4.1.5 Agro-ecological Zones, Cropping Patterns and Schedule

The ecological conditions in GB vary with altitude, aspect and vegetation. The extreme diversity in topography augmented by the altitude and aspect creates dramatic variations in climate within and between valleys. Different classifications have been given by different experts but all such classifications are context specific and donot fully explain the existing patterns in agriculture, as the ecological zoning in agriculture is done on the basis of the life cycle of the main food crops grown in a particular area affected by certain climatic regimes. In fact, it is more than the relation between the climate and the crop; it is also affected by several other factors like timely availability of water and other inputs, timely availability of labor for cultivation, distance of the production area from the market and market demand. For instance, farmers in central Hunza tend to delay the harvest of potato crop if the buyers from down-country do not appear in time. Such events automatically change the overall cropping pattern at least temporarily.

The following ecological classification has been adopted for agriculture after reviewing the earlier documents and the information collected during FGD's with the staff of the Department of Agriculture and other key stakeholders.

Table 4.1: Major Agro-ecological Zones of Gilgit-Baltistan

Zone	Characteristics
Double Cropping Zone	Elevation ≥1900 m: Double cropping zone with typically wheat as a winter crop and maize in summer
Marginal Double Cropping Zone	Elevation 1900 - 2300m Marginal double cropping zone which can be converted into double cropping zone with use of short season crops and early maturing varieties.
Single Cropping Zone	Elevations 2300m - 3000m Single cropping zone. ***Above 3000 m are the alpine pastures with no cultivation.***

Source: IUCN/GoP 2003 and FGDs

The information collected during the districtwise FDGs revealed that majority of the UCs (39) in Gilgit-Baltistan fall under double cropping Zone where two complete crops such as what (from Nov-June) and maize (July-Oct) are grown, while 35 UCs fall under marginal double cropping zone in which farmers grow wheat (Nov/Feb-July) and maize (Aug-Oct) mostly for fodder as the crop doesnot fully matures. During some of the years, however, unexpected climate allows both the crops to mature but the frequency remains very low. Also with change in cropping pattern like Barley (Feb-June) and Maize (July-Oct) or wheat (Nov/Feb-July) and buckheat (Aug-Oct), the farmers manage to harvest two crops. In single cropping zone (28 UCs), farmers grow only one crop: i.e., wheat or barley or maize (May-Sept) due to short growing season.

Table 4.2: District-wise number of union councils falling in various agro-ecological zones*.[11]

District	No. of UCs in Double Cropping Zone	No. of UCs in Marginal Double Cropping Zone	No of UCs in Single Cropping Zone
GB	**39**	**35**	**28**
Gilgit	8	0	0
Hunza-Nagar	5	4	5
Ghizer	7	1	8
Astore	1	0	7
Diamer	9	0	1
Skardu	9	18	4
Ghanche	0	12	3

Source: FGDs

Table 4.3: Major crops grown in different ecological zones in each District.

District	Cropping Zone	UC's	Crops
GILGIT	**DOUBLE**	Haramosh(60%), ,Jalalabad (90%), Osikhandas(60%) Danyor, Rahimabad (80 %), Sai-Juglote, Sakwar, Gilgit-Town, Baseen	Wheat , Mize, Grapes, Pomegranate, Cherry, Almond, Apricot, Tomato, Onion
	MARGINAL DOUBLE	Haramosh (40%), Jalalabad (10%), Osikhandas (40%),	Wheat, Fodder Maize, Barley, Apricot, Apple, Walnut, Almond, Pear
	SINGLE	Baseen (30%), Sai-Juglote (40%), Rahimanad (20%)	Wheat, Maize, Apple, Apricot, Mulberry, Potato, turnip
GHIZAR	**DOUBLE**	Sher Qila, Singul, Bubur, Ghakuch /Mc (60%) Hatoon, Sumal (80%), Gupis	Wheat, Maize, Grapes, Almond, Apricot, Walnut, Pomegranate, Tomato, Cabbage, Chinese Cabbage, Potato, Onion
	MARGINAL DOUBLE	Ghakuch (40%), Chatorkhan, Sumal (20%), Yasin (25%)	Wheat , Fodder Mize, or Buckwheat, Barley, Apricot, Apple, Almond, Potato, carrot, cabbage
	SINGLE	Ishkoman, Pingle, Fundar, Tarow, .Yasin (75%), Sultanabad, Thoui, Silgn	Wheat, barley, Apricot, almond, walnut, Potato

where the area of UC is divided between two zones, the UCs has been put under the zone where higher percentage area of that particular UC falls.

District	Cropping Zone	UC's	Crops
HUNZA-NAGAR	DOUBLE	Nasir Abad, Chalt (70%), .Ghulmet, Sikanderabad, Feker (70%)	Wheat, Maize Apricot, Cherry, Apple, Grapes, Potato, cabbage, Onion, Tomato
	MARGINAL DOUBLE	Ali Abad, Haiderabad, Ganish, Altit, Askurdas (50%) Feker (30%), Chalt, (30%)	Wheat, Fodder Mize, Apricot, Apple, Cherry, Almond, Potato, Cabbage, Carrot
	SINGLE	Gojal – I, Gojal – II, Askurdas, Hoper, Nagar Khas	Wheat or Barley, Apricot, Apple, Cherry, Potato, Pea
ASTORE	DOUBLE	Doyan (70%)	Wheat, Maize, Apricot, Almond, Apple, pomegranate, tomato, turnip, Onion
	MARGINAL DOUBLE	Doyan (30%)	Wheat, Fodder Mize, Apricot, Apple, walnut, Almond, Potato, cabbage, turnip
	SINGLE	Lous, Eidgah, Gudai, Rehman Pur, Ratu, Minimerg, Shakargarh	Wheat or Maize, Apple , Almond, Cherry, Potato, cabbage, Pea
DIAMER	DOUBLE	Goner Raikot (80%), Goharabad (95%), Thakniat (25%), Batoga (65%), Thor (65%), Khanbury (60%) Samigal (95%) Manikal (60%) Guglot (Tangir) , Gabar (Tangir) 80%	Wheat, Maize, Almond, Grapes, Pomegranate, Apricot, tomato, Bell pepper, pea, potato
	MARGINAL DOUBLE	Very small proportion of few UCs	The typical cropping pattern followed in other districts is not practiced in Diamir
	SINGLE	Goner Raikot (20%), Thakniat (25%), Batoga (35%), Thor (35%), Khanbury (40%)) Manikal (40%), Gabar (Tangir) 20%	Wheat or Maize, or Barley Apricot, Apple, Walnut, Potato Pea, Bell pepper
SKARDU	DOUBLE	Shigar , Arkanja, Churka, Alohori, Daso, Nar, Gulabpur, Tissar, Mandi (40%), Gunj (50%), Astak (40%)	Wheat, Maize, Apricot, Grape, Pear, Walnut, Cherry, Apple Potato, Tomato, Pea, Onion , Turnip.
	MARGINAL DOUBLE	Shigri Khurd, Skardu, Shigri Kalan, Chunda, Kawado/kachm Hussainabad, Gole/Sermik, MC Skardu, Gultari, Mehdiabad Katisho, Tolti, Baghicha, Kharmang, Khas, Olding, Brasil, Daso	Wheat, Fodder Maize or Barley, Buckwheat, Almond, Apricot, Cherry Walnut, Apple, Walnut, Potato, Carrot, Cabbage, Turnip, Pea, tomato
	SINGLE	.Mendi (60%), Gunji (50%), Astak (60%), Baraldo, Basho	Wheat, Barley, Apricot, Walnut , Apple, Mulberry, Potato, , Cabbage, Carrot, Tomato
GHANCHE	DOUBLE	None	None
	MARGINAL DOUBLE	Khorkoo, Khaplu A, Khaplu B, Frano, Ghoursy, Mechlu, Thagas, Dumsum, Karis, Kuru/Ghowri, Bara, Dagoni	Wheat, Fodder Maize, Buckwheat, Apricot, Apple, Cherry, Mulberry, Pear, Almond, Potato, Pea, Cabbage, Carrot, Melon.
	SINGLE	Thalley, Kondus, Saltoro	Barley, Maize, Apricot, Apple Potato, Pea, Cabbage,

Source: District-wise FGDs

The cropping patterns in Gilgit-Baltistan have evolved over centuries to address the population's primary need for food security. Local farmers grow a mix of crops which include cereals, fodder, vegetables and fruits. The production system is highly integrated and is mainly of subsistence nature. Cereal production is however the mainstay of all local cropping patterns (See table No 4.3). It includes wheat as winter crop and maize as summer crop in double cropping zone; wheat as spring crop and maize as summer crop in marginal double cropping zone, where and maize do not mature due to short season and hence harvested as fodder for livestock. Farmers in marginal double cropping zone sometimes modify this pattern to wheat-buckwheat, barley-maize and barley-buckwheat. In such cases, farmers harvest two complete crops. In single cropping zone where the season is too short, local farmers in comparatively lower altitude valleys grow wheat or maize as the only crop however, further high in the valleys even wheat does not mature and hence farmers grow barley.

Table 4.4: Sowing Schedule for major field crops

Crops	Zone	Jan	Feb.	Mar	Apr.	May	Jun.	July	Aug	Sep	Oct.	Nov	Dec.
Wheat	D												
	MD												
	S												
Maize	D												
	MD												
	S												
Buckwheat	D												
	MD												
	S												
Barley	D												
	MD												
	S												

Source: District-wise FGD, Key: D=Double cropping MD = Marginal Double Cropping S= Single Cropping

Table 4.5: Harvesting Schedule for major field crops

Crops	Zone	Jan	Feb.	Mar.	Apr.	May	Jun.	July	Aug.	Sept.	Oct.	Nov.	Dec.
Wheat	**D**												
	MD												
	S												
Maize	**D**												
	MD												
	S												
Buckwheat	**D**												
	MD												
	S												
Barley	**D**												
	MD												
	S												

Source: District-wise FGD

Fruit and vegetable production is another important element of centuries old food security strategy in GB at the household, village and valley levels. Every farming household owns mix trees of fruits mainly scattered in and around their farming lands. In double cropping zone, the dominant fruits are grapes, almond, pomegranate, cherry, walnut, apple, mulberry and apricot, while in marginal double cropping zones major fruits include apricot, apple, pear, almond, cherry, peach and walnut. In the Single cropping Zone apricot, apple & aalnut are dominant fruits.

The major vegetables grown in double cropping zone are tomato, onion, bell pepper, cabbage, chinese cabbage, pea and turnip. Tomato, onion, bell pepper are sown in early spring and harvested until late summer. Turnip and cabbage is planted as second crop after harvesting peas. The Chinese cabbage is the most popular local leafy vegetable which is grown round the year.

In marginal double cropping zone potato, tomato, cabbage, pea, carrot and turnip are the major vegetables. Potato, tomato, cabbage, carrot and peas are sown in spring and are harvest till mid to end summer. Turnips are grown after pea, wheat or barley crops. Carrots are also sown after pea or barley crop which do not grow into a marketable size but fulfills the farmers' household needs during winter months. Potatoes and peas are the two significant vegetable grown in single cropping zone. In low altitude valleys of single cropping zone farmers grow mix of crops for household needs only that may include tomato, turnip, carrot and cabbage.

4.1.6 Landholding and Utilization

Land resources in GBC are limited. Only 2% of more than 72,496 sq km area is cultivable, of which about 1% is currently under cultivation and another 1 % is still barren and it can be made available for agricultural production. The following tables give a general overview of land utilization in Gilgit-Baltistan.

Table 4.6: Land Utilization in Gilgit-Baltistan (000 ha)

Type of Land	Area	Percentage
Mountains/Lakes/Rivers/Glaciers	4,810	66
Forest: a). Protected = 65 (1%) b). Private = 219 (3%) c). Social Agro/Farm = 362 (5%) Total forest area =646 (9%)	646	9
Rangeland	1,646	23
Cultivated Area	58	1
Cultivable barren lands	90	1
	7,250	**100**

Source: Background paper on Agriculture and food security NASSD, 2003

Table 4.7: District wise Land Utilization

Districts	Total Land (ha)	Cultivated (ha)	Cultivable waste (ha)
Gilgit	18,324	15,633	2,691
Ghizer	15,897	10,769	5,128
Diamer	12,712	11,652	1,060
Skardu	16,401	13,419	2,982
Ghanche	7,854	7,131	723
Total:	**71,188**	**58,604**	**12,584**

Agriculture Census 2000 Data of new Districts: Astore established in 2004, Hunza-Nagar in 2009 is not available.

The average landholding per household in GB is about 14.75 *kanals* (approximately, 0.73 ha). The Agriculture statistics of 2007 collected by the DoA shows that the highest landholding per household is in Diamir (18.60 kanals) and the lowest is in district Ghanche where it is 12.35 kanals/household. Over the last 25 years, about 9,000 ha of new land in GB has been added to the existing holdings through various land development projects. It is important to mention that in a high mountain environment like GB, it takes years of an arduous process to literally 'create' land suitable for cultivation of food crops. First of all, it is a vertical desert where all agriculture depends on irrigation. The irrigation in turn requires channeling snow melt or glacial water to mountain slopes or alluvial fans, often cutting through sheer rock faces. Once new land is brought under irrigation, a very slow development process is started by individual families who get the share of land. The development process includes terracing through cutting slops and building soils through cultivation of leguminous grasses and trees. Only after several years of meticulous effort, land is made suitable for the cultivation of food crops. It is said in this area that it takes one generation to prepare land for the next, thus every generation must develop land for survival. This is also where the line between the poor and non-poor emerges. Poor people, though having an equal share in new land, are often too slow to develop their land or, increasingly, unable to afford the high costs of labor and capital inputs required for terracing, end up selling their share.

Table 4.8: District-wise Average Land utilization per household

Districts	Total Area	Cultivated Area			Non-Cultivated Area		
		Net Sown	Current fallow	Total	Cultivable Waste	Un-cultivable	Total
Average GB	**14.71**	**7.07**	**0.15**	**7.22**	**2.24**	**5.25**	**7.49**
Gilgit	15.35	7.36	0.11	7.47	2.56	5.32	7.88
Hunza/Nagar	13.80	6.21	0.07	6.28	2.15	5.4	7.55
Ghizer	14.87	6.36	0.23	6.59	2.39	5.88	8.27
Astore	12.67	6	0.07	6.07	3.07	3.53	6.6
Diamer	18.60	10.63	0.33	10.96	1.68	5.97	7.64
Skardu	15.31	7.12	0.13	7.25	2.11	5.95	8.06
Ghanche	12.35	5.79	0.11	5.9	1.72	4.71	6.43

Source: Agriculture Statistic 2007

The figures in the table above indicate that there still exists land under individual ownership which can be developed to cultivate more crops. This kind of land is highest (3.07 kanal/hh) in District Astore and lowest in District Diamir 1.68 kanals/household. In addition, around 90,000 ha of cultivable barren land is also available (see table 4.6) which can be made available for cultivation through developing some mega land and water resource development projects.

Table 4.9: Land Utilization for various categories of Agricultural Crop.

District	Wheat	Maize	Barley	Buck wheat	Potato	Fruits	Vegetables
GB	**18,176**	**17,719**	**4,875**	**947**	**8,421**	**20,901**	**6,526**
Gilgit	4,122	4,334	218	24	4,256	2,835	1,306
Ghizer	2,250	3,333	409	72	679	3,260	785
Astore	652	589	158	85	882	1,337	1,651
Diamer	5,726	8,046	73	0	126	2,970	122
Skardu	4,247	1,417	2,259	245	1,510	7,388	1,651
Ghanche	1,179	0	1,758	521	968	3,111	1,011

Source: Agriculture Statistic 2007

The figures given in the table above shows the total land used for the cultivation of different categories of crop in Gilgit-Baltistan. However, the picture is not that simple as same piece of land is used to grow more than one crop per year (e.g. wheat followed by maize in double cropping zone) and also the fruit trees are inter-cropped with field crops and vegetable. The absence of the system of organized orchards also makes it difficult to collect accurate estimates for the land under fruit production. However, the various tools used to triangulate the information have revealed that the available information is close to the actual situation, if not accurate. Hence, looking at the above information it is easy to understand that Baltistan region (Skardu and Ghanche) at present has the highest area under fruit production, while district Astore has the lowest. District Gilgit has the highest area under potato production but much of this area now is in newly established District of Hunza –Nagar. The highest area under vegetable is in Astore and Skardu, while the lowest is in Diamir.

4.1.7 Access to crop Inputs

Agriculture in Gilgit-Baltistan is largely based on low external input supply system. The highly integrated subsistence farming allows recycling of material within the production units. The use of home-saved seed for cereals and vegetables production is still the major source of seed for growing a new crop in each proceeding year. The analysis of the information collected during FGDs revealed that less than 20% farmers in GB use formal seed and much of the seed that farmers purchase is potato. The potato seed once bought is grown for 2-3 generations before buying new seed again. Only few commercial vegetable growers farming in the peripheries of major towns like Gilgit, Chilas, Ghakuch, Aliabad, Khapulo and Astore use formal seed of improved varieties for growing a commercial vegetable crop. They buy these seeds from the small grocery stores who sell vegetable seed as a seasonal item. It was also noted during the FGDs that the reason for slow transformation from home saved seed to the formal seed sources is the lack of farmers' trust in the quality of seed supplied from the existing sources in GB. During the discussions with the DoA staff and survey of seed market, it was noted that there is no monitoring mechanism in place for checking the quality and price of seed. Most of the people selling seed lack information about the product they sell, as a result the farmers suffer loses for using poor seed. Same is true with purchase of tree planting material, the local and down-country suppliers sell fruit tree saplings during planting season each year without any check and balance. This situation is even more damaging because farmers discover the problem only after spending good amount of time and resources.

The satisfaction level of farmers regarding the quality of chemical fertilizer was higher (86%), while they showed less satisfaction with its availability (43%) and price (0%). The farmers complained about the shortage of fertilizer during critical periods of application and high inflation in the prices of the fertilizers with supply demand gap and seasonality. The price trend of last five years of different fertilizers is given in figure 4 which clearly indicates the tendency in suppliers to react to demand and supply gaps with irrational prices!

The use of pesticides is limited in GB due to significantly low pest pressure but farmers do apply pesticides in case of major outbreaks mainly in vegetables and fruits. The data collected on the satisfaction level revealed that over 50% respondents were satisfied with the availability of pesticides but the satisfaction level on the quality of the pesticides was less than 30%.

Table 4.10: Level of Community satisfaction for various inputs

Input	Availability	Quality
Seed	14%	14%
Fertilizer	43%	86%
Pesticide	57%	29%

Source: District-wise FGD

Table 4.11: District-wise level of farmers' satisfaction on availability and quality of crop inputs

Districts	Availability	Quality
GB	**29%**	**32%**
Gilgit	25%	0%
Hunza-Nagar	25%	25%
Ghizar	25%	25%
Astore	25%	75%
Diamir	25%	25%
Skardu	50%	50%
Ghanche	25%	25%

Source: District-wise FGD

4.1.8 Level of Technology

The farmers of GB are small landholders and resource poor and hence they lack the capacity to adopt new technologies by themselves. During last 30 years, several government and donor funded projects were implemented in region. Under these projects, trails on introduction of new technologies in crop production, processing and marketing, and training of the farmers in use of these technologies have been conducted. This has yielded some important successes. For example, the introduction of potato seed production technology by FAO in early 80's has established the potato as the only cash crop in Gilgit-Baltistan. The investment from AKRSP in dry apricot value chain development helped the farmers to link with high end domestic and international markets.

Table 4.12: Use of standard agricultural management practices by farmers

Type of input	Responses		% Yes
	Yes	No	
Use of certified seed	24	62	20
Use of well rotten FYM	22	66	10
Use of chemical fertilizers	53	33	70
Timely Weeding	62	24	80
Pruning and training	16	70	10
Integrated pest management	44	42	60
Timely harvest	59	27	70
Grading and packing	20	66	10

Source: District-wise FGD

Despite some major successes in introduction of technologies, enormous space for improvement in agriculture management practices at farmer level exists across all districts of GB. For example, the data above shows that the certified seed which is the basic unit of production enhancement is used by less than 20% farmers. Farm yard manure (FYM) is used as primary source for soil fertility maintenance which is good but the method of application is very primitive which results in substantial loss of important plant nutrients. High percentage of farmers reported regular use of chemical fertilizer for cereal and vegetable crop production but very few were aware of the standard doses and optimum timings of fertilizer applications. A high percentage of farmers also reported timely weeding of their crops but the objective of weeding has always been to obtain fodder for the livestock.

Table 4.13: District-wise technical Facilities in Department of Agriculture.

Districts	Extension Offices	TC Lab	Food Processing	Soil Lab	IPM lab	Seed Processing
GB	**7**	**3**	**2**	**1**	**1**	**1**
Gilgit	1	1	1	0	1	1
Hunza-Nagar*	1	0	0	0	0	0
Ghizer	1	1	0	0	0	0
Diamer	1	0	0	0	0	0
Astore	1	0	0	0	0	0
Skardu	1	1	1	1	0	0
Ghanche	1	0	0	0	0	0

Source: Directorate of Agriculture, Gilgit

In GB, it is widely believed that the potential of developing more land and water resources for agricultural production is decreasing day by day due to social, economic and environmental impediments. Also, the use of crop inputs like fertilizers and pesticides cannot be sustained beyond certain limits due to economic and environmental reasons. In this situation, the only option available is to depend more heavily on use of appropriate advance technologies to bring about rapid improvement in agriculture. However, such technological change in the area can only be brought about through strong research and development (R&D) efforts made through public sector institutions. Private entities like AKRSP can contribute to such efforts in GB, to some extent, but eventually it has to be the more permanent government institutions.

Table 4.14: District-wise Horticulture Nurseries and Seed Farms.

Districts	Nurseries	Area (Ha)	Seed Farms	Area (Ha)
GB	**49**	**130.97**	**11**	**63.70**
Gilgit	6	10.50	2	11.00
Hunza-Nagar*				
Ghizer	5	7.75	3	6.00
Diamer	10	6.85	3	21.00
Astore	4	2.65	0	0.00
Skardu	17	92.75	2	41.25
Ghanche	7	69.65	1	12.45

Source: DoA Presentation

The adoption and rational use of new technologies require continuous flow of information, proper infrastructure, quality inputs and regular capacity building of potential farmers. The information given in table 4.13-4.14 shows the current level of research and extension facilities maintained by department of agriculture at district level. The numbers of these facilities are much smaller than the requirement and the technology used in the facilities is obsolete and does not cater the needs of the current day. During the field visits, it was observed that majority of the facilities are not utilized or underutilized due to capacity and funding issues. Moreover, the farmers during the FGDs highlighted access issues to these facilities which is also evident from the data above. For example there is only one soil testing lab for whole of Gilgit-Baltistan and is located in Baltistan. Even this lab is extremely under equipped and lacks trained staff to conduct the soil testing. There is one operational tissue culture lab in Gilgit, the two newly built tissue culture labs one each in Ghizar and Skardu are not fully operational due to capacity and funding constraints. With few exceptions majority of seed farms and fruit nurseries maintained by the

DoA are established on marginal lands. In the absence of ample resources the conditions of these farms give negative demonstration to the farmers.

The use of farm machinery for the cultivation and harvest of crops in GB is limited due to difficult topography and poor economic conditions. The agriculture machinery census of 2004 (see table 4.15) shows 1389 households in GB own 1446 tractors with maximum tractors in district Gilgit. It is worth mentioning here that these tractors are mainly used for transportation of construction material and their use for agriculture is limited to plowing and harvesting seasons. Despite, the need for appropriate agricultural machinery is increasing day by day as a result of scarcity of farm labor. During last two decades, there has been strong emphasis on education of children, consequently majority of the young population now is educated and do not want to get involved in agriculture laboring, even on their own family farms, unless they see a strong economic reason. Cultivation and harvesting equipment currently used by the farmers (see table 4.16-4.17) are too big and too heavy for a mountainous regions and hence there use in GB is not technically and economically efficient. To address this issue there is a need for the introduction of appropriate tools and implements that fit to the subsistence and a very low volume commercial farming system.

Table 4.15 : District-wise Number of Tractors

Districts	Tractors				Total households Owning tractors
	Individually Owned	Jointly Owned	Cooperative Owned	Total	
GB	**1421**	**24**	**1**	**1446**	**1389**
Gilgit	402	8	0	410	377
Hunza-Nagar*					
Ghizer	166	0	0	166	164
Diamer	340	0	0	340	336
Astore*					
Skardu	347	16	1	364	350
Ghanche	166	0	0	166	162

Source: Agricultural Machinery Census 2004
*New Districts

Table 4.16 : District-wise Leveling and Cultivating Equipments

Districts	Blade	Cultivator	Mould Board plough	Chisel	Rotavator	Rider
GB						
Gilgit	6	118	10	0	52	1
Hunza-Nagar*						
Ghizer	1	28	44	1	0	1
Diamer	4	21	10	6	0	0
Astore*						
Skardu	7	151	14	2	0	0
Ghanche	0	162	0	0	0	0

Source: Agricultural Machinery Census 2004
*New Districts

Table 4.17: Harvesting and Threshing Equipment

Districts	Maize Sheller	Thrasher
GB	**12**	**429**
Gilgit	3	123
Hunza-Nagar*		
Ghizer	6	109
Diamer	3	44
Astore*		
Skardu	7	107
Ghanche	0	46

Source: Agricultural Machinery Census 2004
*New Districts

4.1.9 Human Resources

Department of Agriculture Gilgit-Baltistan has the mandate to deliver extension services to the farming communities with the objective of contributing to their economic development through development of Agriculture. To achieve this task it has a staff of 553 people out of which 440 people are purely technical. It has its central directorate in Gilgit and offices in each district headquarter. The district-wise strength is given in the table below.

Table 4.18: District-wise staff strength in DoA, GB

Office	Technical staff			Non Technical staff	Total
	Officers	Field Assistant	Malies/Budder	Support staff	
Directorate GB	11	6	8	15	41
DDA, Gilgit	7	10	76	21	114
DDA, Ghizer	5	8	54	26	83
DDA, Diamer	5	6	40	15	76
DDA, Astore	1	2	10	9	24
DDA, Skardu	5	16	90	27	143
DDA, Ghanche	3	5	54	10	72
Total	**37**	**53**	**332**	**112**	**553**

Source DoA

Federal Seed Certification and Registration Department FSC&RD is another prominent public sector agriculture organization in GB which provides certification and registration services for seed and planting material. It has its head office in Gilgit and a sub-office in Skardu. It has the staff strength of 16 people out of which eight are technical staff. FSC&RD mainly provides certification services to the individual farmers and seed companies who produce vegetable and potato seed for marketing.

Table 4.19 : District-wise staff strength in FSC&RD, GB

Office	Technical staff		Non Technical staff	Total
	Officers	Field Assistant	Support Staffs	
GB	**4**	**4**	**8**	**16**
Gilgit	2	2	7	11
Hunza-Nagar	0	0	0	0
Ghizer	0	0	0	0
Diamer	0	0	0	0
Astore	0	0	0	0
Skardu	2	2	1	5
Ghanche	0	0	0	0

Source: FSC&RD Staff

4.1.10 Agriculture economy

About 95% of the households in Gilgit-Baltistan are directly or indirectly involved in agriculture as the main source of livelihood for the population. In agriculture, cereal crop production has key position in the rural economy, as it the basic source of food for human and fodder for the animals. The following table shows the total quantities of the cereals crop produced and their farm gate value. Mostly, the production is consumed at household level and very little is marketed. The local production is just enough to meet 25-30% needs of the population. The deficit is met through subsidized supplies from down country.

Table 4.20: Total Value of Field Crops (Rs 000)

Food Crops	Production Qty (MT)	Average Sale Price @ Farm gate	Value Rs. 000
Wheat	30193	30	905,790
Maize	35994	25	899,850
Barley	8761	20	175,220
Buckwheat	1798	35	62,930
			2,043,790

Source: Agriculture statistics 2007 and RMA

The agro-ecology of GB is highly suitable for production of a number of deciduous fruits and vegetables. Fruit production has been a vital source of food security in the region since ancient times. Fruits like dried apricots, dried apples, dried grapes, almonds and walnuts have been the main source of nutrition for the population mainly in winter months when food is normally in shortage. The introduction of new marketable varieties and construction of Karakorum Highway has opened a new era of commercialization of agriculture in GB. The improvements in road infrastructure within and among the districts have prompted the trade of agriculture commodities within the region in addition to linking it to the down country markets. The following table gives the details of the volumes and their current worth in PKRs.

Table 4.21: Total Value of Fruits produce in GB (000 PKRs)

Fruit	Production (Tons)	Average Sale Price PKRs@ Farm gate	Value PKRs.
Apricot	108588	5.34	579,860
Apple	19054	21.20	403,945
Grapes	6413	30.21	193,737
Pears	2579	24.45	63,057
Peaches	3308	14.58	48,231
Pomegranate	4287	59.52	255,162
Cherry	2256	94.30	212,741
Walnut	5992	90.00	539,280
Almond	1700	120.00	204,000
			2,500,012

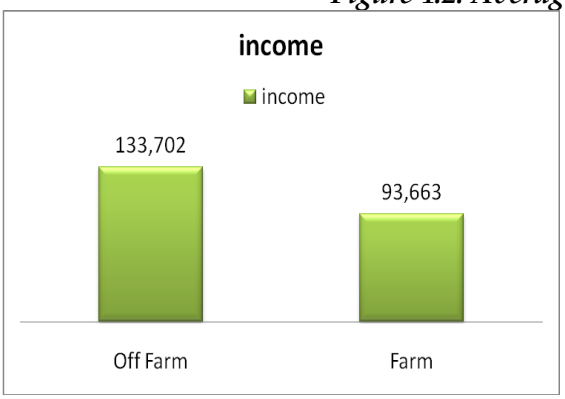
Source: Agriculture statistics 2007 and RMA

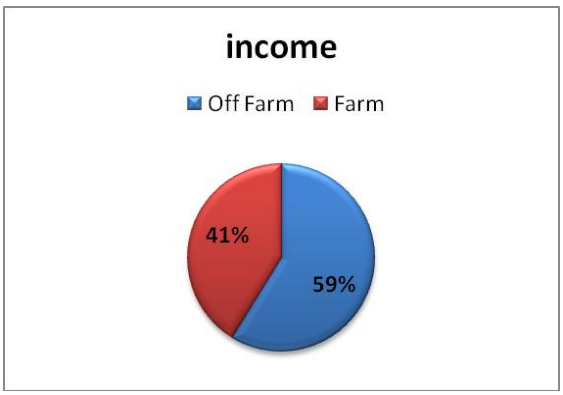
Table 4.22: Total Value of Vegetable Produced in GB (000 PKR)

Vegetable	Production (Tons)	Average Sale price PKRs@ Farm gate	Value Rs. 000
Potato	131275	18.00	2,362,950
Tomato	6168	18.00	111,024
Peas	2190	26.50	58,035
Cabbage	2414	13.00	31,382
C. Cabbage	1790	14.00	25,060
Onion	5511	17.00	93,687
Capsicum	927	34.00	31,518
			2,713,656

Source: Agriculture statistics 2007 and RMA

Figure 4.2: Average per Household income in GB



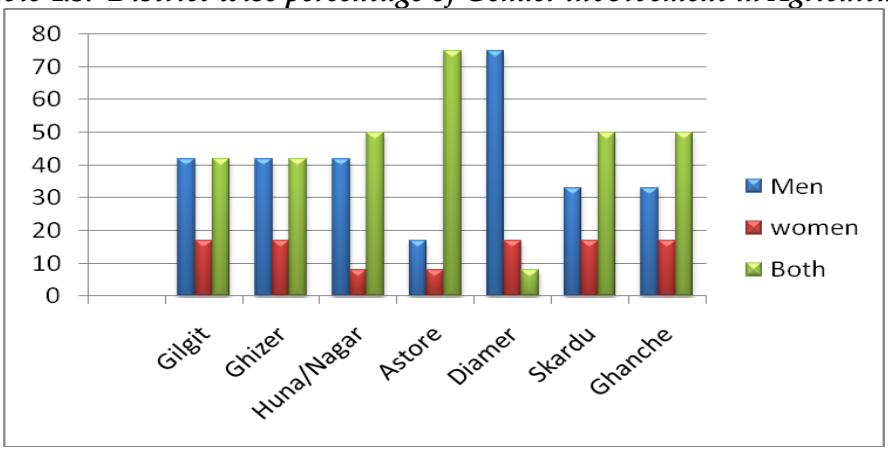


Source: SESNAC AKRSP 2007

4.1.11 Gender role in Agriculture

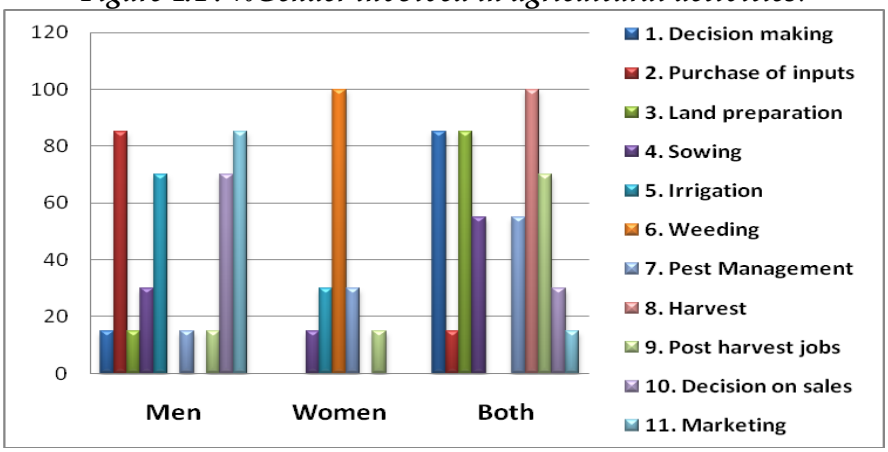
Like all other sectors gender roles in Agriculture across Gilgit-Baltistan are shaped by socio-cultural and economic factors. These factors differ both within and across Districts and households depending on several dynamics. These dynamics include age, economic situation, education, social restrictions and economic returns attached to particular activities. In certain groups of people, the household composition in terms of the number, age and sex of people available for different kinds of labor contributes in determining the gender roles. The data collected on gender role for a list of agricultural activities in different districts of Gilgit-Baltistan are given in the table below:

Table 4.3: District wise percentage of Gender involvement in Agriculture



Source: FGD

Figure 4.4 : %Gender involved in agricultural activities.



Source: FGD

In general, men's involvement is higher in the early stages of cultivation such as field preparation, purchase of inputs and seed sowing. Men also monopolize the mechanical tasks. For example, they carry out mechanical plowing (with animal or fuel-powered machines), while hand-threshing is women's domain of task. Driving tractors and watering the fields are men's job in majority of the cases. Food processing and storage is an area where women's participation is considerably higher than men.

Roles between women appear to depend on several factors, such as the location of the activity, woman's stage in the life cycle (i.e., unmarried, married, widowed) and whether particular women are involved in income-generating work, which leads to a further allocation of household labor among other women. In general, there appeared to be more age differentiation

in activities among women than men. It has also been shown that economic reasoning can sometimes play a larger role than cultural norms in determining the allocation of labor e.g. a widow with no other income resources will also carry out the roles, which are generally allocated to men.
In more conservative southern district (Diamir) where women mobility is restricted to their own villages and in some other cases to their own compounds, their role in agriculture remains limited. Furthermore, lack of ownership of the majority of productive assets by most women in almost all the districts, women role in critical areas of decision-making, and income possession and utilization is less effective.

4.1.12 Issues and Constraints

The major production-related issues and constraints common to all agro-ecological zones in GB are presented hereunder.

4.1.12.1 Small and Fragmented Land holdings

The average cultivable land, which the households own in the area, are very small (1.3 ha/hh) and is scattered. As a result, from centuries the farmers' emphasis has been to secure the food for themselves and their animals from the limited available land. This has resulted in a highly integrated and intensive farming system. This practice still continues in majority of the areas and farmers lack the capacity to make any major shift considering it a risk to their food security. There are, however, some exceptions, as families who own bigger pieces of land and those who have other stable sources of income, have shifted towards commercial production. Such families are termed as the "progressive farmers" and these progressive farmers have often worked as agents of change but still the ratio of change is very low owing to consistent fragmentation of existing lands and low emphasis of government on large scale land development projects.

4.1.12.2 Poor Access to Crop Inputs

Introduction of improved wheat and maize varieties and trails on use of chemical fertilizers during the last two decades have presented a good potential for increasing yield and quality of produce. However, in the absence of a market driven input supply system, the benefits have not yet reached to the majority of the farmers. The main issues are:

- Non-availability of improved seed, fertilizers and pesticides and farm machinery due to absence of mainstream national and multinational seed and fertilizer trading companies.
- Non-existence of a public and private sector farm input supplying system.
- Lack of a public sector basic seed production system and trained seed producers/registered associations to multiply and market that seed.
- Lack of public sector capacity to meet the demand of quality fruit plants.
- Poor private sector capacity to produce quality fruit plants.
- Lack of crop input quality and quantity monitoring mechanism.

4.1.12.3 Lack of Technology

Major advances in agriculture around the globe have been made through technological advances in agriculture. Gilgit-Baltistan with its limited land and water resources is in need of such technologies. However, the area is critically lacking even the simplest production technologies which have been successfully adopted elsewhere in the world. This phenonomenon is due to:

- Lack of R&D institutions;
- Lack of capacity to produce suitable hybrid and synthetic varieties;
- Lack of training for the technical staff;
- Absence of quality seed-testing and diseases diagnostic facilities with trained technicians;

- Poor technical information-base and lack of linkages with the national and international knowledge sources;
- Lack of quarantine services for preventive measures to maintain the existing disease-free status of the GB; and
- High cost of existing technologies.

4.1.12.4 Poor Crop Management

Poor access to quality inputs and improved technology has limited the farmers' access to standard crop management practices which are critical to obtain a good harvest. The major issues in crop management are:

- Low Productivity resulting from use of degenerated home saved seed;
- Improper use of Farm Yard Manure;
- Over/under application of chemical fertilizers;
- Allowing weeds to grow between the main crops to use it as fodder for animals;
- Over/under irrigation;
- Wrong harvesting methods which substantially reduces the quality of produce;
- High cost of seed production and low returns;
- Very high post-harvest losses in fruits and vegetables;
- Uncontrolled/open grazing of animals; and
- Poor storage methods.

4.1.12.5 Poor Infrastructure

The major agricultural infrastructure in Gilgit-Baltistan includes water channels, farm to market roads and the storage facilities. Irrigation channels are the life line of agriculture in Gilgit-Baltistan. Majority of these channels are constructed by the communities without the use of modern engineering structures and hence are prone to natural disasters like flooding, landslides, earthquakes etcetera. The major issues in agricultural infrastructure are:

- Decreasing water delivering capacity of water channels;
- Increasing repair and maintenance costs of the water channels;
- Lack of a centralized system to monitor the irrigation infrastructure;
- Shortage of storage facilities;
- Absence of cold storage; and
- Lack of funding to build, maintain and improve the community road infrastructure.

Major Processing-related issues and constraints common to all three agro-ecological zones are as under.

4.1.12.6 Knowledge Gap Regarding Fruit and Vegetable Processing

The farmers in Gilgit-Baltistan lack the knowledge regarding the possibilities of processing various fruits and vegetables produced in the region. Following hereunder are the main reasons for this gap of knowledge:

- Limited local culture of fruit and vegetable processing;
- Extremely low exposure of the farmers to modern fruit processing environment;
- Lack of opportunities to learn modern fruit processing techniques; and
- Quality issues in the available training opportunities.

4.1.12.7 Lack of Volumes and Quality

At the current scale, fruit and vegetable processing is a household activity and it is likely to remain at household level unless the following issues are addressed:

- Fruits and vegetables are not categories into fresh and processing varieties;
- Marketing strategies of processed products are not developed to minimize the post-harvest losses.
- The fruit and vegetable processing techniques are not standardized and hence critical volumes of a single product are not available;
- The procedures followed for the processing are very primitive and do not qualify for the minimum food safety standards;
- There is no testing laboratory to check the quality and nutritional profile of the processed product; and
- Standard fruit packing techniques are too expensive and the farmers with low volumes cannot afford to use them.

4.2 Horticulture Production and Processing

4.2.1 Crop Mix in Gilgit-Baltistan

Horticulture deals with the production of fruits, vegetables and aesthetic plants but in Gilgit-Baltistan means the production of fruit and vegetables. Production of aesthetic plants and flowers is a hobby of individuals within their compounds. Commercial scale production of aesthetic plants and flowers is negligible in Gilgit-Baltistan. The main fruits grown in GB include but are not limited to grapes, apples, apricots, peaches, plums, pears, cherries, mulberries, walnuts, figs, pomegranate and persimmons. Major vegetables grown in the region include potato, tomato, onion, carrots, turnip, spinach, Chinise cabbage, bell pepper, peas and cabbage.

Over the years fruit and vegetable in GB has emerged as one of the potential sectors in accelerating the growth of rural economy. Its role in the area's nutritional security, poverty alleviation and employment generation has become increasingly important. It offers not only a wide range of options to the farmers for crop diversification but also provides ample future income and employment opportunities through the establishment of fruit and vegetable processing industries. It has therefore always been a need to sift more towards horticultural crops due to its high per unit area income. If done in an organised way Gilgit Baltistan has the prospects of becoming one of the major fruit and vegetable baskets of Pakistan owing to its highly conducive climatic conditions, water resource availability, efficient farming community, increasing market demand and access.

The following table made on the basis of the agriculture survey and the FGDs shows the district-wise fruit and vegetable mix and the list of the prominent fruits and vegetables grown in all the seven districts of Gilgit-Baltistan.

Table 4.23: Crop Mix in GB

District	Horticultural crops (in terms of economic value)			
	Prominent Fruits	% Contribution	Prominent Vegetables	% Contribution
Gilgit	1. Apricot	20	1. Potato	68
	2. Walnut	18	2. Tomato	14
	3. Pomegranate	12	3. Cabbage	6
	4. Apple	10	4. Onion	6
Hunza/Nagar	1. Apricot	43	1. Potato	97
	2. Apple	17	2. Tomato	1
	3. Walnut	15	3. Onion	0.6
	4. Cherry	10	4. Cabbage	0.6
Ghizer	1. Apricot	48	1. Potato	88
	2. Almond	15	2. Onion	6
	3. Walnut	10	3. Tomato	3
	4. Apple	10	4. Peas	1
Astore	1. Apricot	33	1. Potato	93
	2. Walnut	32	2. Onion	4
	3. Apple	17	3. Tomato	1
	4. Cherry	6	4. Cabbage	1
Diamer	1. Walnut	45	1. Peas	50
	2. Apple	11	2. Potato	12
	3. Pomegranate	9	3. Capsicum	11
	4. Grapes	8	4. Onion	9
Skardu	1. Apricot	70	1. Potato	91
	2. Apple	14	2. Onion	5
	3. Walnut	4	3. Tomato	2
	4. Cherry	3	4. Peas	1
Ghanche	1. Apricot	78	1. Potato	91
	2. Apple	9	2. Onion	6
	3. Walnut	7	3. Peas	2
	4. Almond	3	4. Cabbage	1

As evident from the table above the type of crop mix changes with the district and within each district with agro-ecology (See table 4.3) Some fruits look consistent across the districts like apricots, apples and walnuts. Likewise, some vegetables too look consistent across the districts like potato, tomato, and onion. Furthermore, if we go into their proportionate contribution in overall production, apricots have the maximum contribution in production followed by apples and walnuts. Similarly, in vegetables potato has the maximum percentage followed by onion and tomato.

The type of the "crop mix" is dynamic in the current times as the improved linkage of certain production areas with the markets and the market demand for a certain fruit or vegetable has affected the choice of famers for a particular crop. In this regard, the investigations made during the district wise FGDs revealed that Apples and cherries are the fruits that are quickly replacing the bulk of other fruit plants. They further reported that Apricots and walnuts due to their easy management, very high adoption and multiplication rate and due to their multiple roles in livelihood system will remain the highly grown fruits in the region.

Commercialization of marketable varieties of few fruits like apples, cherries and almonds is a good sign but is limited to specific areas with certain climatic and marketing advantages. The data also indicates that the low lying districts like Diamir, Gilgit and lower valleys of Ghizar have major production of grapes, pomegranates and almonds.

4.2.2 Land Usage for Horticulture Crops

At present, approximately 20,000 ha of land is occupied by fruit plants and around 10,000 ha of land is used for vegetables production in Gilgit Baltistan. It is difficult to relate this figure with over all cultivated land because fruits and vegetables are intercropped and also two crops are grown on same land in one year's cycle and hence it is double counted. Nevertheless, the figures given below demonstrate a good comparison between the crops and between districts for each crop.

Table 4.24: District-wise land used to grow major fruits (ha)

District	Apricot	Apple	Grapes	Pears	Peaches	Pomegranates	Cherry
Total	**12,862**	**3,682**	**1,145**	**393**	**516**	**788**	**1,172**
Gilgit	1,194	256	311	43	120	271	145
Hunza/Nagar	1,788	715	77	108	92	19	342
Ghizer	1,462	513	328	65	84	103	147
Astore	557	371	41	18	29	23	48
Diamer	518	597	255	31	158	365	184
Skardu	4,873	993	128	101	26	7	266
Ghanche	2,470	237	5	27	7	0	40

Source : Northern Areas Agriculture Statistics 2007 , Department of Agriculture Northern Areas Gilgit

The data shows that the apricots are grown on maximum area followed by apples and maximum area under apricot is in district Skardu (4873 ha) followed by district Ghanche (2470 ha). Likewise, maximum area under apple plants is again in Skardu (993 ha) followed by Hunza-Nagar (715 ha).

Table 4.25: District-wise land used to grow major Vegetables (ha)

District	Tomato	Peas	Chinese cabbage	Cabbage	Onion	Bell pepper	Potato
Gilgit	132	83	90	35	62	14	4,256
Hunza/Nagar*							
Ghizer	46	12	8	12	22	1	679
Astore	24	6	0	20	5	0	882
Diamer	77	667	3	13	51	85	126
Skardu	34	37	0	32	37	1	1,510
Ghanche	1	9	0	24	9	0	968

Source : Northern Areas Agriculture Statistics 2007 , Department of Agriculture GB

The table above shows the district-wise comparison of land use for vegetables production. Potato is the highest land occupier across Gilgit-Baltistan. This is followed by tomato and onion. The only deviation is in district Diamir where peas and bell pepper are grown on the maximum area as these crops have attained the status of commercial income earning crop in the district.

4.2.3 Cropping Pattern and Cropping Schedule

Cropping schedules for crop vegetable production vary in Gilgit-Baltistan from one agro-climatic zone to the other. In addition, these schedules are affected by the availability of irrigation water, time management for growing other important food crops like wheat and maize. The tables below show the sowing and harvest times for some major vegetables in all three agro- climatic zones. In general there is 10-15 days difference in sowing dates between one zone to the other.

Table 4.26 : Sowing Schedule for Major vegetable crops

Crops	Zone	Jan	Feb.	Mar.	Apr.	May	Jun.	July	Aug.	Sept.	Oct.	Nov.	Dec.
Potato	D												
	MD												
	S												
Tomato	D												
	MD												
	S												
Onion	D												
	MD												
	S												
Cabbage	D												
	MD												
	S												
Pea	D												
	MD												
	S												
Bell Pepper	D												
	MD												
	S**												
Turnip	D												
	MD												
	S												

Source: District-wise FGD

Key: D=Double cropping Zone, MD = Marginal Double Cropping Zone, S= Single Cropping Zone

** Climate doesn't fit for production

Table 4.27 : Harvesting schedule for major vegetable Crops

Crops	Zone	Jan	Feb.	Mar.	Apr.	May	Jun.	July	Aug.	Sept.	Oct.	Nov.	Dec.
Potato	D												
	MD												
	S												
Tomato	D												
	MD												
	S												
Onion	D												
	MD												
	S												
Cabbage	D												
	MD												
	S												
Pea	D												
	MD												
	S												
Bell Pepper	D												
	MD												
	S												
Turnip	D												
	MD												
	S												

Source: District-wise FGD

Key: D=Double cropping Zone, MD = Marginal Double Cropping Zone, S= Single Cropping Zone

As indicated in the table above the vegetable harvest season is extended from April to mid November. Peas are the ones that are harvested first (third week of April) in double cropping zone, mid July in Marginal double and mid August in single cropping zone. Tomato gives the most extended harvest among vegetables (June-Oct) and turnip and local varieties of cabbages are the ones that are harvested towards the end of the harvest season. Some trend of small scale vegetable production in plastic tunnels during winters for home use is practiced in lower valleys of double cropping zone but commercial production is not possible without proper heating arrangement which is not economically viable.

Table 4.28: Harvest Calendar for major fruit crops

Crops	Zone	Jan	Feb.	Mar.	Apr.	May	Jun.	July	Aug.	Sep.	Oct.	Nov.	Dec.
Apricot	D												
	MD												
	S												
Apple	D												
	MD												
	S												
Pear	D												
	MD												
	S												
Cherry	D												
	MD												
	S												
Pomegranate	D												
	MD												
	S												
Grapes	D												
	MD												
	S**												
Almond	D												
	MD												
	S**												
Walnut	D												
	MD												
	S												

Source: District-wise FGD

Key: D=Double cropping Zone, MD = Marginal Double Cropping Zone, S= Single Cropping Zone

** Climate doesn't fit for production

Fruit harvest season in Gilgit-Baltistan commences in first week of May in double cropping zone with cherries which is followed by apricot. Similarly, in marginal double cropping zone again cherries are harvested first in mid June and apricots and early maturing local apple varieties follow. Almost same sequence is evident in single cropping zone. In general, walnut is the last fruit harvested in the season.

Production Volumes and their Utilization

Fruits in fresh and dry form have been the important source of nutrition and food security of the farming households in Gilgit-Baltistan. It still contributes heavily in nutrition and food security of the farming communities but the dynamics are changing. The fruit which was previously wasted or fed to the animals is now saved, processed or dried and marketed to earn the income which is used to cover a number of household expenses, primarily for the purchase of other food items. The crop-wise volumes produced, consumed and marketed are given in the table below. (Cf Annex IV for details) The detailed information regarding the district-wise distribution of these volumes is annexed as Annex IV (Table 4.1-4.8)

Table 4.29: Production Volumes of Fruits and their Utilization (Tons);

Fruits	Production	Consumption		Wastage	Marketed	
		Fresh	Dry		Fresh	Dry
GB	1,632,668	21,862	7,027	55,736	14,428	9,372
Apricot	108,588	2,444	3,514	42,273	2,941	5,149
Apple	19,054	9,120	0	3,968	5,809	0
Grapes	6,413	3,059	0	1,362	2,203	0
Pears	2,579	1,285	0	594	696	0
Peaches	3,308	2,016	0	999	294	0
Pomegranate	4,287	1,673	0	885	1,729	0
Cherry	2,256	1,110	0	362	757	0
Mulberry	9,092	1,154	226	5,144	0	174
Walnut	5,992	0	2,438	143	0	3,243
Almond	1,700	0	849	6	0	806

Source : Northern Areas Agriculture Statistics 2007 , Department of Agriculture Northern Areas Gilgit

It is clear from the data above that apricot has the highest production volumes (108588 T) and also has highest consumption volumes (21862 T fresh and 7072 T dry). It is followed by apple (19050T) and Grapes (6413T). Also, apricot has the highest volumes that are marketed (14428 fresh and 9372 dry). Over 50% of apricot is lost!

According to the information collected from the farmer and market sources, the highest per unit income earning fruits are cherries and almonds. Table 4.22 shows that these two fruits, although at the bottom in terms of production volumes, are toppers in the economic value. Nonetheless, apricots and walnuts are the highest contributors in terms of volume and economic value.

Gilgit-Baltistan has a natural advantage of off-season with the plains of Pakistan. The growing season for major vegetable crops in the plains starts in Sept-Oct and concludes in April-May. While the vegetable season in GB start in Feb-March and ends in Sept-Oct. This creates an important opportunity for the farmers of Gilgit-Baltistan to earn higher incomes through cultivating the vegetables with highest demand. Large number of experiments to exploit this opportunity has been conducted by various public and private sector development projects in the past and had very successful results. With few exceptions, there has, however, not been a significant progress. The table below shows the volumes of the various vegetables produced in GB and their utilization. The more detailed district-wise information is annexed as Annex IV (4.14-4.20)

Table 4.30 : Area, Production and Utilization of Vegetables in Gilgit-Baltistan

Crops	Production (MT)	Consumption (MT)	Marketed (MT)	Wastage (MT)
Potato	131,275	17,491	103,519	10,265
Tomato	6,168	3,217	2,093	858
Peas	2,190	402	614	72
Cabbage	2,414	1,774	338	301
Chinese	1,790	651	937	202
Onion	5,511	4,864	647	0
Capsicum	927	81	840	2
Total				

Source : Northern Areas Agriculture Statistics 2007 , Department of Agriculture GB

It is evident from the table above that potato trumps all other vegetables in terms of production, consumption and marketing. Potato is currently the most widely produced commercial crop in GB and the volumes are increasing. It is the largest income earner and its income and multiplier effect are highly diffused throughout GB. This picture clearly shows the high level dependence of rural economy on a single crop!

The other important vegetables that are produced are tomato and onion. In case of tomato, one third of the total production is marketed but onion is mainly consumed at home with only 10-12% of the total produce brought to the market. Pea and capsicum has attained the value of high value crop and main thrust of these crops is in district Diamir.

Demand and Supply for Agriculture Inputs

The major demand of crop inputs in Gilgit-Baltistan is for seed (mainly potato) and chemical fertilizers. There also exists some demand for pesticides which keep on fluctuating but it has grown substantially during the last few years which may be attributed to outbreak of two major pests.

No data for the volume of pesticides application is available for Gilgit-Baltistan due to un-organized and highly scattered sale of pesticides. There are no formal pesticide stores. Some of the small and big grocery stores sell pesticides too. There is only one formal pesticide store in Gilgit and the following data do not give the overall picture but provides an insight of demand and supply. The data for seed is also not reliable, again due to absence of formal seed supply system. The demand for major crops like wheat and maize obtained on the basis of the cultivated area is given in the table below. However, the demand does not equate the overall requirement because the farmers use seed from their own farms for crops like wheat and maize and same is the situation for all vegetables. The only exception is potato in which an estimated 20-30 percent seed is purchased from the market but that too not necessarily certified seed! Table potato harvested from the plains is brought to Gilgit-Baltistan as seed in the spring (March-May) and farmers cultivate them as seed. This situation has put the potato sector of the area at great risk of inoculation of diseases and pest.

Table: 4.31: Seed required in G-B for cereals and vegetables

Crop	Area sown (ha)	Seed required (Tons)
Wheat	18,176	3,736
Maize	17,718	2,730
Barley	4,874	1,638
Buckwheat	948	150
Cultivated Fodder	8,293	0
Potato	8,422	15,965
Tomato	314	0
Peas	814	207
Cabbage	140	0
Chinese Cabbage	102	0
Onion	187	0
Capsicum	101	0

Source: DoA

The following data has been collected from the main fertilizers dealers supplying different types of fertilizers in GB. According to the survey, Urea, Nitrophos and DAP are the main fertilizers that the farmers of the area commonly demanded . The data also shows the sale of Single Super

Phosphate (SSP) but various interviews suggest that the SSP is sold to the dealers under a quota system and the dealers are compelled to buy it.

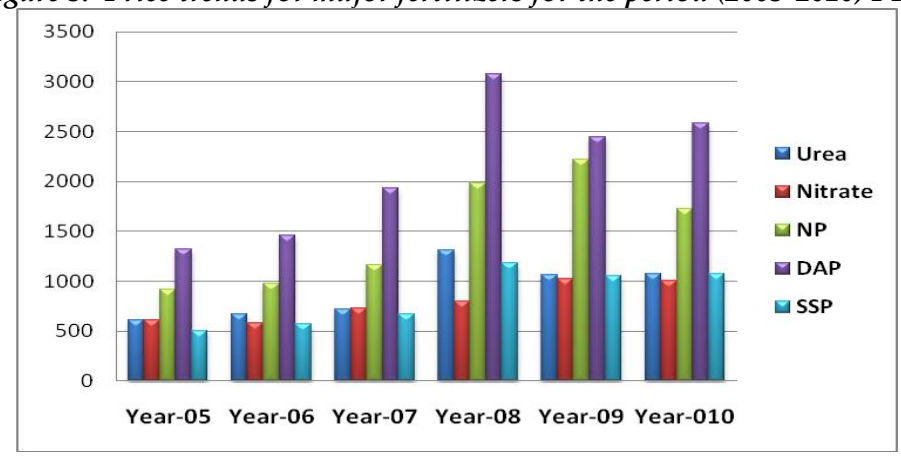
Table 4.32: District-wise Sales of Chemical Fertilizers per annum (Tons)

District	Urea	Nitrate	Nitrophos	DAP	SSP
GB	**3,747.5**	**2,110.5**	**5,049**	**119**	**408**
Gilgit	1,801.5	1,471.5	1,241	72	205
Hunza/Nagar*					
Ghizer	250	15	20	10	0
Astore	255	10	360	0	0
Diamer	380	236	92	0	0
Skardu	785	360	2,140	25	115
Ghanche	276	18	1,196	12	88

Source: Field Survey for Horticulture sector study 2010

The table above shows the volumes of chemical fertilizers sold in different districts of GB. The highest quantity of the fertilizer sold is Urea followed by Nitrophos and Nitrate. According to the fertilizer dealers, the most demanded fertilizers are Urea and Nitrophos. Fertilizers are sold in cereal and potato cultivation season. This clearly shows that the trend of chemical fertilizer use in vegetables and fruits is comparatively less. It was also learned during the interviews with the fertilizer dealers that the demand for different types of fertilizers is also affected by price. The following table shows the sale prices of 50 kg bag during last five years.

Figure 5: Price trends for major fertilizers for the period (2005-2010) PKR



Source: Field Survey for Horticulture sector study 2010

4.2.4 Horticulture processing

Nature has gifted GB with a wealth of temperate fruits. The prospects of processing the fruits and vegetable have always been high but with good communications links and interaction with the national and international markets the potential and need has increased manifolds. Despite, very small portion of the fruits and vegetables are processed and much of what is processed is consumed at home and is not marketed or marketable. The following table was developed during the district-wise FGDs and it clearly shows that lot of effort is needed in developing the horticulture sector in the area.

Table: 4.33: Utilization of major products made from horticultural crops in GB

Fruit/Vegetable	Product	Household Consumption%	Marketed%
Apricot	1. Sun dried Apricot	10	90
	2. Sun dried Apricot Kernels	40	60
	3. Apricot Kernel Oil	25	75
	4. Apricot kernel Cake	100	0
Grapes	1. Dry Grapes	95	10
	2. Grapes Concentrate	80	20
	3. Vinegar	95	5
Mulberry	1. Sun dried mulberry	90	10
	2. Mulberry Concentrate	90	10
Apple	1. Sun dried Apple	100	0
	2. Dried Apple Powder	100	0
	3. Jam	90	10
Tomato	1. Dried tomato	40	60
	2. Tomato Puree	30	70

Source: District-wise FGDs

The data above clearly depicts the overall situation at household level which eventually is translated at GB level. Only dried apricot and other products made from apricot are sold in the markets, while remaining fruits are largely consumed at home. In vegetables only tomato is sold in dry and processed form.

The reason for lack of value addition in fruits and high volume of post harvest losses is due to the lack of capacity of the farmers to produce a marketable product. The common processing technique that is used by majority of the farmers is sun drying. The product loses lot of quality due to improper and unhygienic processing methods. The government and NGOs present a huge numbers for the people who have been trained in fruit and vegetable processing. However, it is a common observation that the quality and methodology of these trainings have been inconsistent which got translated into the products that the farmers made. The details of the fruit processing training-related facilities is given in the table below which shows that majority of the fruit processing units are owned by the private sector but these units are too small and can process a minute fraction of what is available for processing. The financial capacity of these processing units is very low and they lack vital market linkages. A fruit processing unit established and transferred by the AKRSP in Gilgit is the only private sector dried fruit company in GB which has some sort of marketing linkages in the global dried fruit value-chain but again its capacity is not enough to deal with a good volume of what is available.

Table: 4.34 District-wise Fruit processing facilities

District	No of processing units		Cold Stores	No of food testing facilities.	No of training providing organizations.	
	Public	Private			Public	Private
GB	**0**	**8**	**0**	**1**	**8**	**7**
Gilgit	0	5	0	0	3	2
Hunza/Nager	0	0	0	0	0	1
Ghizer	0	1	0	0	1	1
Astore	0	0	0	0	1	1
Diamer	0	0	0	0	1	0
Skardu	0	2	0	1	2	2
Ghanche	0	0	0	0	1	1

Source: Field Survey horticulture Sector Study 2010

Table 4.3.4 gives a general over view of processing related services in GB. It shows that there are only 8 private sector processing units which are engaged in small scale horticultural processing. Keeping in view the huge volumes produced in the region, this figure is negligible. Similarly, there is only one reasonable food testing facility in public sector in GB which presents the typical limitation of public sector services. The training providing organisations are 8 and 7 in public and private sectors respectively.

In Gilgit district, KIU, the DoA and MARC are the public sector organization that have the capacity of delivering trainings on food processing, more specifically fruit processing and preservation. In private sector again two small business organizations namely Mountain Fruit Company (MFC) and Hunza Fruit Processing manage and deliver trainings to their own producer groups mainly women in fruit processing such as dehydration techniques for apricot and juice preparation.

In the newly established district of Hunza–Nagar, only one fruit processing training program is being run by an Australian couple with Nonehal Development Organization (NDO) . The Gilgit based MFC is also covering most of the area of Hunza-Nagar by providing dehydration trainings under different projects/programs. Public sector training facilities are not currently available but with the declaration of Hunza-Nager as a district and due to abundance of fruit especially apricot, the prospects for establishing a good public sector of public-private training and processing facility is very high.

Department of Agriculture is the only public sector organization which is providing training in food/fruit processing in Ghizar district. But, there is however no permanent mandate for such trainings. Mostly the trainings are therefore conducted time to time under different projects.

In Astore district, Department of Agriculture and the AKRSP collaborate to arrange short training sessions for the communities but these are not regular due to low demand. The reason of low demand might be the lack of interest from the market players in the produce from Astore due to poor quality and quantities of fruits compared to other districts.

In Diamer district, the traditional processed fruits like apricot and apple are in very low supply as a result there is very low scale culture of processing of traditional fruits. However, in few areas grapes are sundried under very unhygienic conditions. Department of Agriculture through its district office in Chilas arranges fruit processing trainings for the farmers as part of their routine activities. But such trainings are not demand driven and therefore doesn't create any major impact.

In Skardu, PCSIR and Department of Agriculture act as training institutes for the farmers. PCSIR has invested significantly in building training and lab facilities in Skardu but the facility is under utilized due to lack of qualified staff and provision of funds to run the facility on a regular basis. In addition, the AKRSP and a private company represent the private sector that impart training to the farmers mainly women in apricot and apple drying and preparation of products from sea-buckthorn[12] that grows in wild throughout Baltistan. The products that are prepared from sea-bukthorn are juice, jam, jelly and oil.

Ghanche district, despite of great potential for fruit processing, is lagging behind due to its geographical marginality. DoA and the AKRSP are therefore collaborating in conducting training in fruit processing under different projects but no major success was achieved in developing a commercial processing environment.

4.2.5 Situation of Policy on Horticulture Production and Processing

The Horticulture sector has come a long way to graduate from subsistence to commercial level in GB. Horticultural products at present not only contribute to food security but also to poverty reduction through creation of opportunities of employment and income earning. The sector is now in take-off position. It however requires policy interventions to provide skilled labor force, production inputs, well functioning and competitive markets, and a notable market demand. GB due to its special constitutional status has been kept outside the main policy framework which has created the following important policy gaps in horticulture production:

1. The DoA is mandated to promote commercial horticulture through the introduction of appropriate technologies and crop breeds but the existing institutional system restrict to provide adequate way for such initiatives.
2. Research which is the basis of development in agriculture is conducted at a very basic level (adoptive research) and there is serious lack of investments in research to provide farmers with mountain specific technologies and high quality crop inputs (seeds).
3. There is lack of serious mechanism to monitor the input supply system for the farmers and provide them with the right inputs at right price in sufficient quantity and on right time.
4. No policy exists to define the minimum requirement of technical staff at district office level to provide services in various fields of research, agronomic practices, pest and disease management, and post harvest handling.
5. No policy exists to promote a cadre of crop specialists. For instance, wheat is a major stapple food crop but there is no wheat expert in the DoA.
6. No incentives are offered by the government to the farmers to diversify their crop varieties and their export earning options, and improve the quality of the products they supply to export markets.
7. No production and processing standards and certification systems exist hat are required for promotion of the exports.
8. The procedure for acquiring Agriculture Credit is complicated and often could not be availed within the period of need.
9. No credit facility is available for commercial agriculture production and processing enterprises. The facilities available through other commercial banks have high mark-up rates and do not fit into the season bound nature of agriculture.
10. The government does not offer incentives to encourage private sizeable investments in the processing sector.

[12] Sea-buckthorn *(Hippophae* L.) is a deciduous shrub in the genus *Hippophae*, family Elaeagnaceae.

CHAPTER FIVE

5. MARKETING SYSTEM

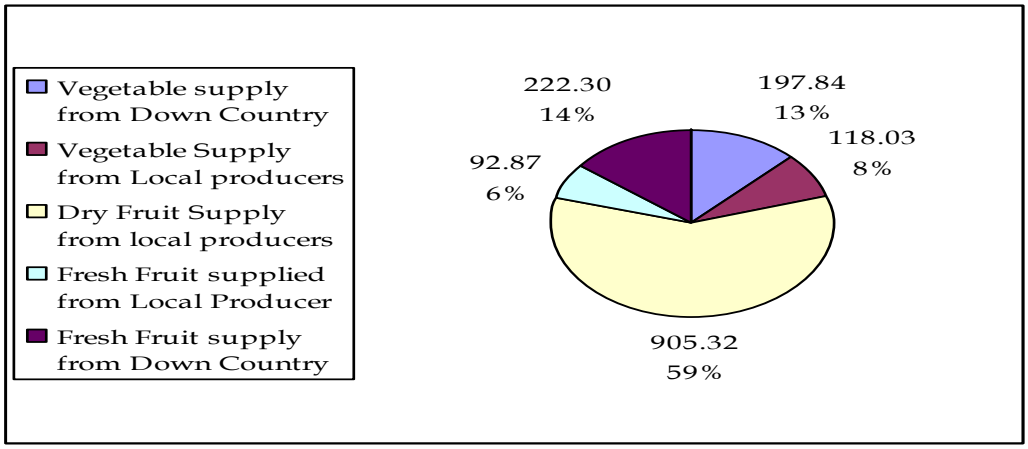
5.1 Market Dynamics of Fresh and Processed Products

Almost for the last two decades, Gilgit-Baltistan (GB) got exposed to the market economy after remaining isolated from the main markets for centuries due to its arduous geographical setting and topography. This isolation embedded strong subsistence practices mainly evolved around agility for survival. With the construction of the all-weather road, the famous Karakorum Highway (KKH), the region (GB) got a link to the main markets of both China and Pakistan. KKH opened new opportunity for the local people to enter into market transaction for the purchase of goods and sale of their surplus farm-produces. The recently improved communication, investment in community capacities to increase their productivity, the access to finance and an increased awareness led to a vibrant micro-economy, primarily around agriculture, particularly in horticulture sectors (i.e., potato, cherry, dried apricot and apple). Increased migration to major towns from the rural areas and cash income from business, employment and sale of cash crops also improved the demand for market-based products and services, mainly fresh vegetable and fruits. Relatively small population in the urban areas and production of fruits and vegetable at household level however made markets of GB less attractive and economical (FGD, 2010[13]) for traders and suppliers of horticulture. During FGDs, a vegetable wholesaler in the Gilgit market, rightly considered the *GB* market *"a subsistence market for horticulture traders where they have to provide too many commodities to a too small population"*

5.1.1 Supply Side of the Horticulture Market

Key markets and business growth polls have emerged mostly in the district headquarters as well as along the KKH, where apart from other commercial activities, agriculture-related produces are also traded. The recent AKRSP RMA 2010 indicates that in GB more than Rs. 1500 million worth of horticulture produces are being supplied to the market annually. Most significantly, out of the total annual market supply is 59% of the produce consisting of dry fruits largely comprised of walnuts, almond, apricot kernel and dried apricot. Second largest supply is vegetable from local producers, as shown in the chart below.

Figure: 5.1



[13] FGD refers to the Focus Group Discussion held in six district headquarters of Gilgit-Baltistan

The figure above shows the supply of the fresh fruit and vegetable to GB, it was noted that Rs. 197.84 million worth of the supply of fresh vegetable comes from the down country market[14] having a total horticulture market share of 13%, whereas local supply of same produce worth Rs. 118 million contributes 8% of total market share. In case of fresh fruit, imported fresh fruit volume is more than double as compared to the local produce; Rs. 222.30 million worth of fresh fruit imported from down country which is 14% of total market size, whereas Rs. 92.87 million worth of local fresh vegetable is in the market which is only 6% of the total market share. The table below illustrate that Gilgit District has a major market share supplying a value of Rs. 694 million of horticulture produces while Astor district has the lowest market share of Rs. 94 million (AKRSP, RMA 2010, cf Table 1 and Annex 7). The district-wise supply of local and down country horticulture produces supplied to the markets of GB has been summarized and presented in the table below.

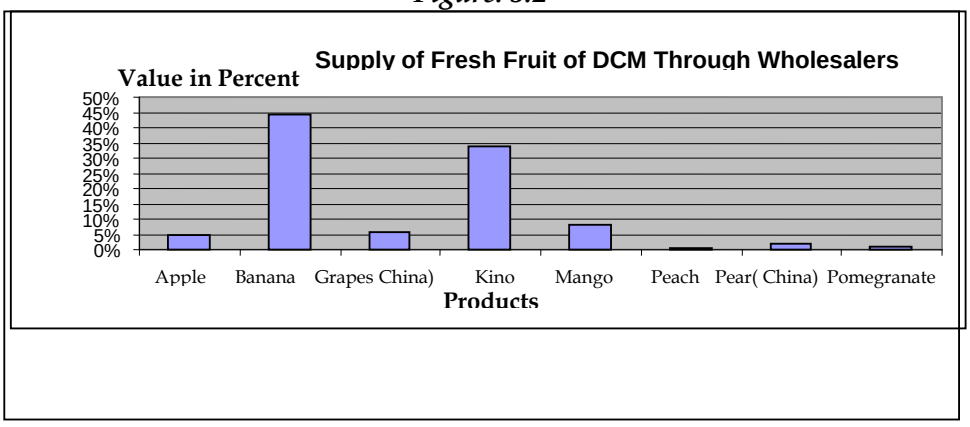
Table 5.1: Summery of Supply of Horticulture Products in GB market

Supply of Horticulture	Gilgit-Baltistan	Gilgit	Hunza	Ghizer	Astore	Diamer	Skardu	Ghanche
Vegetable supply from Down Country	**197.84**	78.05	3.93	13.24	11.37	15.19	49.58	26.47
Vegetable Supply from Local producers	**118.03**	79.04	4.02	2.78	1.71	6.95	15.99	7.54
Dry Fruit Supply from local producers	**905.32**	346.48	102.24	158.33	78.19	40.56	130.20	49.32
Fresh Fruit supplied from Local Producer	**92.87**	62.70	1.51	2.19	0.96	15.69	7.20	2.62
Fresh Fruit supply from Down Country	**222.30**	127.86	1.07	10.35	2.57	23.70	43.00	13.77
Total:	**1536.36**	**694.14**	**112.78**	**186.88**	**94.80**	**102.09**	**245.97**	**99.73**

Source: AKRSP RMA 2010

The product-wise supply to the GB markets from down country indicates that banana is the major fresh fruit of highest value of supply followed by Kinu (Citrus Fruit). The chart below shows other supplies in a percentage value.

Figure: 5.2



[14] Down country market refers to the national market of Pakistan, apart from Gilgit-Baltistan region.

District-wise comparison for the fruits (Table 5.2) shows the major supply in the market from the down country. The major supply market is Gilgit followed by Diamer and Skardu. During FG discussion this was revealed that there are two banana processing units and 90% of banana is re-supplied to the rest of GB market from Gilgit. The district-wise supply of fruit from the down country is presented in the table below.

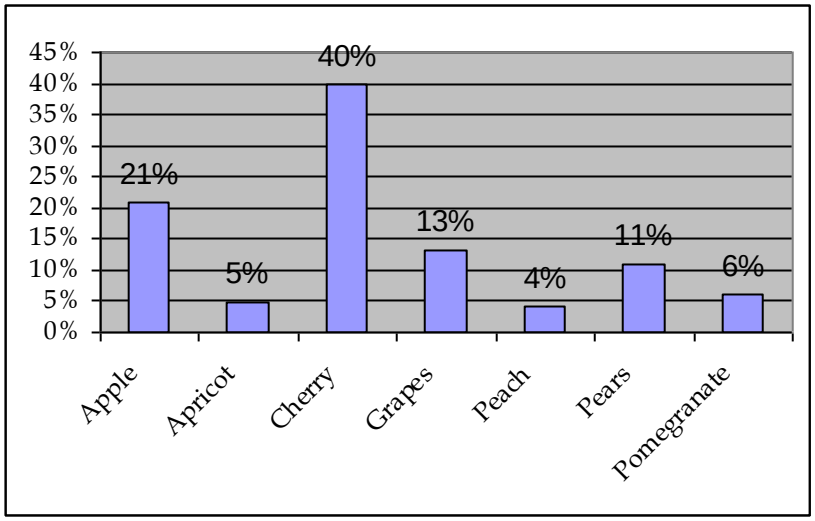
Table-5.2: Total Supply of Fresh Fruit from down Country Market through wholesalers (Rs. Million)

FRUITS	Gilgit-Baltistan Market	Gilgit	Hunza/ Nagar	Ghizer	Astor	Diamer	Skardu	Ghanche
Apple	10.73	4.31	-	0.63	0.62	3.28	1.32	0.57
Banana	98.58	60.72	0.69	3.13	0.51	4.69	23.37	5.47
Grapes China)	12.75	8.40	-	1.04	0.29	2.30	0.47	0.25
Kino	74.91	39.46	0.23	4.24	0.26	8.55	15.45	6.73
Mango	18.29	12.79	0.15	0.51	0.31	2.32	1.46	0.75
Peach	0.76	-	-	-	0.10	0.66	-	-
Pear(China)	3.82	1.84	-	0.10	0.32	1.44	0.12	-
Pomegranate	2.46	0.34	-	0.70	0.16	0.46	0.81	-
Total:	**222.30**	**127.86**	**1.07**	**10.35**	**2.57**	**23.70**	**43.00**	**13.77**

Source: AKRSP RMA 2010

Local fresh fruit products are relatively new in the local markets. Cherry is major produce sold therein followed by apple. The chart hereunder presents the summarized results of AKRSP RMA 2010.

Figure: 5.3



Comparing the supply of fruits from the markets of the down country to that of GB, the supply of local products are almost negligible in all district markets, except Gilgit market, primarily because of production at household level (FGD 2010). The supply of fresh fruits from local producers to district markets is shown in the table as under.

Table 5.3: Supply of Fresh fruits from Local Producers Through Retailers (Rs. Million)

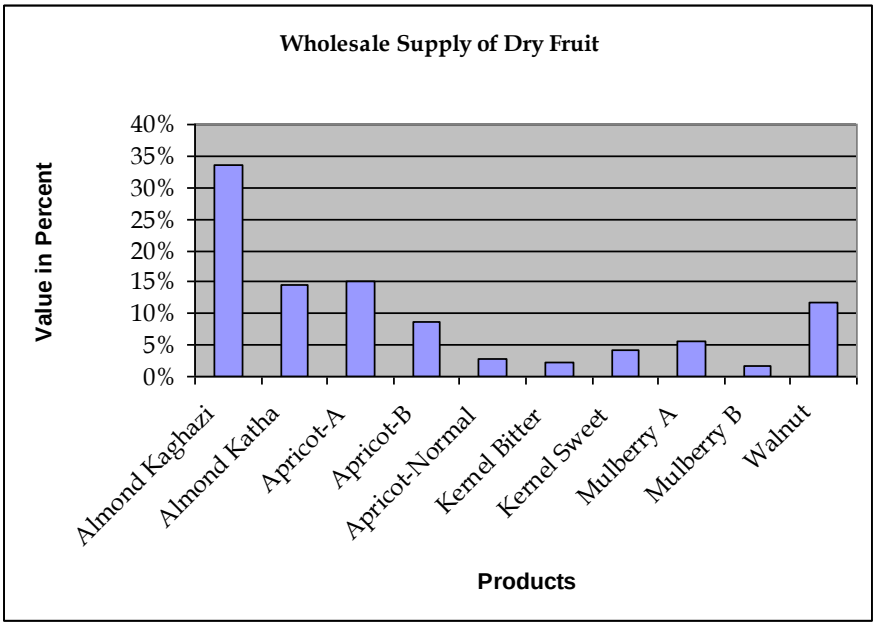
FRUITS	GB	Gilgit	Hunza/ Nagar	Ghizer	Astor	Diamer	Skardu
Apple	19.36	11.43	0.16	0.51	0.28	3.12	2.54
Apricot	4.37	2.35	0.03	0.05	0.04	1.51	0.06
Cherry	37.03	30.19	0.71	0.36	0.31	2.92	1.76
Grapes	12.33	7.25	0.32	0.56	0.15	2.41	1.64
Peach	3.96	1.60	0.06	0.08	0.10	1.60	0.43
Pears	10.09	6.05	0.21	0.46	0.08	2.52	0.69
Pomegranate	5.72	3.83	0.02	0.18	-	1.61	0.08
Total	**92.872**	**62.700**	**1.515**	**2.189**	**0.959**	**15.687**	**7.199**

Source: AKRSP RMA 2010

The Focus Group Discussions (FGDs) revealed that apple is the major produce in terms of volume supplied to local markets in all districts of GB except Ghizer where grape is the major supply among local produces followed by cherry. Peaches and apricots are the fresh fruits with lowest supply to the markets.

The total supply of dried fruit in the GB markets is worth of Rs. 905 million, making this the single largest horticulture market transaction of the area, almost at par with the potato market share. Product-wise comparison in chart below indicates that almond accounts for over 34% of the total value of the dry fruit market followed by Almond Katha and dried apricot, each accounts for 15% of the market share, contrary to this, in terms of production apricot is the single largest product in the region, which accounts for more than 50% of the total fruit production and almond is the lowest around 8% of the total fruit production. The main reason for low share of apricot in terms of value, both as fresh and dry form is its huge wastage which is almost 39%. Only around 8% of total production is available in dry form out of which around 5% is being sold in the market. The wastage in almond is almost negligible, therefore, around 47% of total production is marketed whereas rest is consumed. The product-wise supply of dry fruit has been presented in the chart below;

Figure: 5.4



During the Focus Group discussion people revealed that almond and walnuts are among the first product from GB introduced in the down-country markets. These products are having good demand at wholesale markets.

Mulberry is the third largest produce of GB. It is marketed only in dry form, it claims about 5% of the total supply. Mulberry production is almost abandoned in all over the GB region, being a short shelf-life product and not possible to market as fresh fruit.

Gilgit is the single largest supply center of dry fruits. It accounts for more than 38% of the total supply, contrary to Diamer district which is approximately 4% (Cf: Details at Annex 8 and 9). The FGD ranking reveals that in terms of volume, dried apricot is major trade in the market followed by almond and walnuts. Mulberry was s ranked lowest in terms of volume traded in GB markets but fetches a higher price. The district-wise supply of dried fruits is presented in the table as under.

Table 5.4: Wholesale Supply of Dry Fruit (Rs. Millions)

Fruits	GB	Gilgit	Hunza/ Nagar	Ghizer	Astore	Diamer	Skardu	Ghanche
Almond Kaghazi	304.47	142.94	17.28	26.59	59.60	8.93	40.64	8.50
Almond Katha	132.48	57.86	18.56	28.89	3.28	6.13	13.47	4.29
Apricot-A	136.45	50.97	12.29	25.33	2.30	6.88	24.12	14.56
Apricot-B	78.78	14.75	7.92	26.60	9.94	4.51	9.12	5.93
Apricot-Normal	25.59	5.90	0.25	9.11	1.13	0.00	6.02	3.19
Kernel Bitter	19.43	8.51	1.97	2.67	0.00	0.00	3.62	2.65
Kernel Sweet	37.93	8.53	3.61	9.37	0.00	6.98	5.89	3.56
Mulberry A	49.48	16.56	19.04	8.44	0.00	1.33	3.97	0.14
Mulberry B	14.32	2.62	10.22	1.49	0.00	0.00	0.00	0.00
Walnut	106.39	37.84	11.10	19.85	1.94	5.81	23.34	6.50
Total	**905.32**	**346.48**	**102.24**	**158.33**	**78.19**	**40.56**	**130.20**	**49.32**

Source: AKRSP RMA 2010

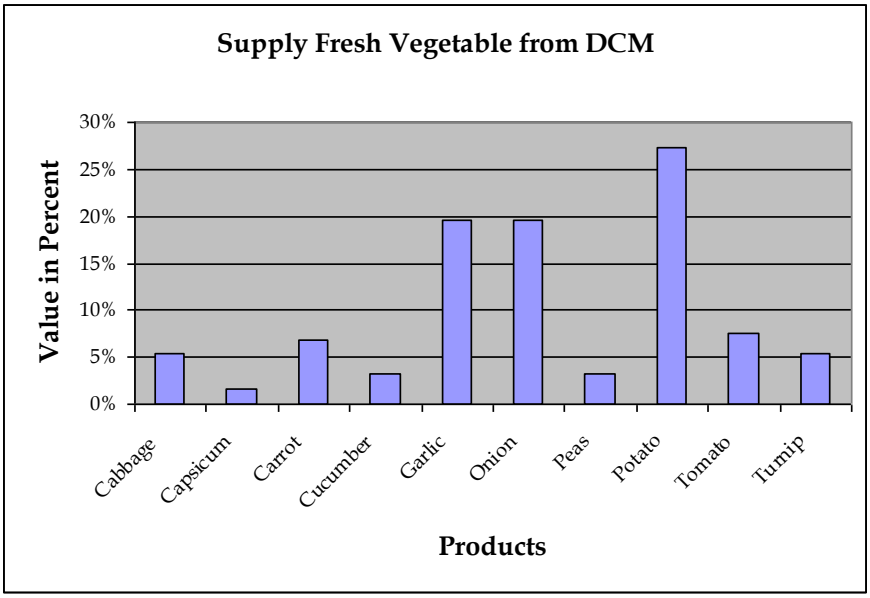
Regaring fruit processing, sun-drying is the only processing activity (value addition) in fruit sector and there is no other processing system in practice like making juices, jam or other by-products. There are however evidences of household level production of jam, juices, vinegar and *kilaw* (a local product of walnut added with grape syrup), but none of these produces are marketed on commercial scale. At the Focus Group Discussions, establishing fruit-processing (e.g. juice, jam etc) were ranked highest demand from the locals for value addition and they considered shortage of power being major hurdle for this purpose.

The supply of fresh vegetables from down-country to the GB markets shows that there are more than 20 different kinds of vegetables supplied from down-country markets to th region primarily from Swat, Mansehra and Rawalpindi regions. Focus Group discussions reveal that GB markets are solely dependent on supply of fresh vegetables from down-country market[15] (95% of the total supply). Following hereunder are the top 10 products sold in the GB markets round the year. Annually, around Rs. 197 million worth of fresh vegetable are supplied the region from the down country.

[15] Southern Market and down country market is used interchangeably for the national market of Pakistan

Potato is the major product of GB in vegetable sector that accounts for more than 70% of the total production and single largest export to down-country markets. Interestingly, potato itself is also the largest imported produce which is supplied from the down-country markets to GB and stands at 27% of the total supply as shown in the chart below.

Figure: 5.5



The major supplies of fresh vegetables from the down-country to Gilgit market accounts for 40% of the total supply, followed by Skardu market as 25% and Hunza-Nagar district only 2%. Interestingly, supply of garlic from the down-country to Skardu is 30% of the total garlic supplied to GB (Detail at Annex 10). During the Focus Group Discussions held in Skardu, people told that garlic is used in many local dishes of Baltistan and traditionally being imported from other areas, such as Kashmir before partition. The district-wise supply of fresh vegetable from down country has been summarized in the table below.

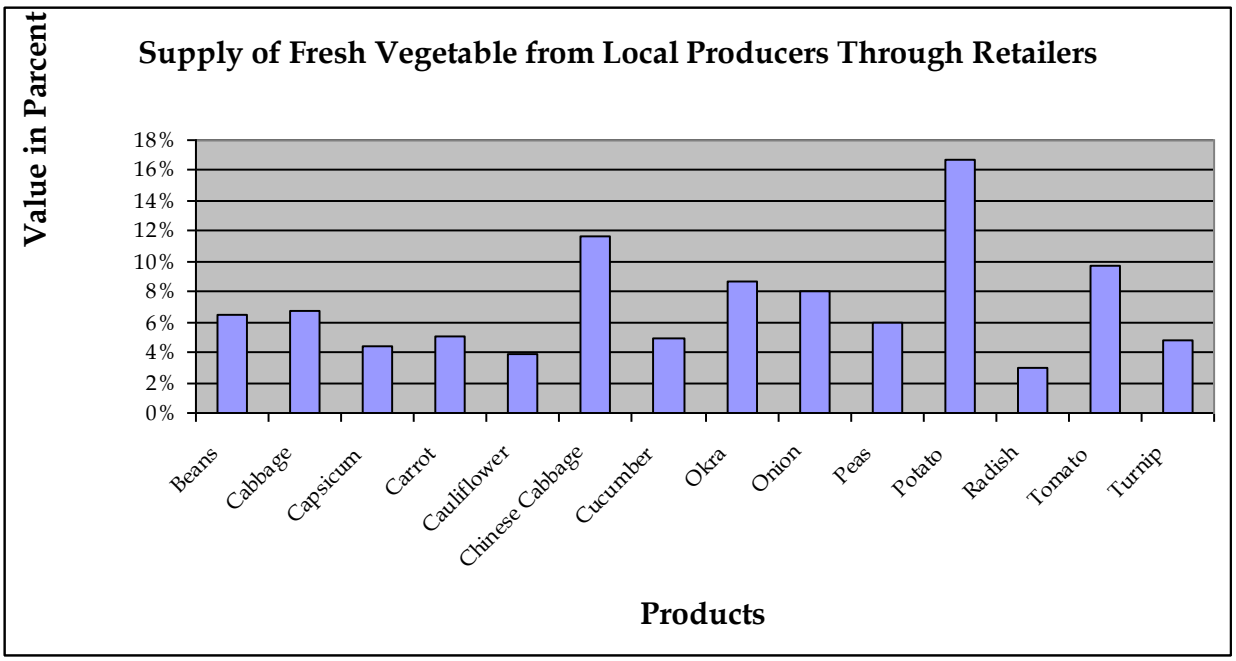
Table 5.5: Supply of Fresh Vegetable from Down Country Market through Wholesaler (Rs. Million)

VEGETABLES	Gilgit-Baltistan	Gilgit	Hunza/ Nagar	Ghizer	Astore	Diamer	Skardu	Ghanche
Cabbage	10.73	4.08	0.13	1.22	0.48	0.89	2.50	1.43
Capsicum	3.31	1.36	0.33	0.27	0.25	0.10	0.74	0.26
Carrot	13.58	7.61	0.13	1.69	0.39	1.09	2.09	0.58
Cucumber	6.43	2.44	0.26	0.49	0.30	0.60	1.91	0.43
Garlic	38.84	13.99	0.85	2.28	2.55	1.08	12.04	6.05
Onion	38.74	18.98	1.05	0.33	2.60	2.94	7.59	5.25
Peas	6.38	2.89	0.13	0.76	1.09	0.24	0.89	0.38
Potato	54.01	17.63	0.51	3.03	2.51	5.88	15.55	8.90
Tomato	15.03	4.28	0.45	1.62	0.50	2.11	4.25	1.82
Turnip	10.80	4.80	0.09	1.54	0.72	0.26	2.01	1.38
Total	**197.85**	**78.06**	**3.93**	**13.23**	**11.39**	**15.19**	**49.57**	**26.48**

Source: AKRSP RMA 2010

Among the local fresh vegetables, potato, Chinese cabbage and tomato are the major local products supplied to the markets. The chart below shows product-wise supply situation in the GB Markets.

Figure: 5.6



In terms of volume, the FDG participants ranked potato a major crop supplied to the market followed by tomato. District-wise share of the supply of fresh vegetable has been presented in the table below.

Table 5.6: Supply of Fresh Vegetable from Local Producers Through Retailers (Rs. Million)

Vegetable	Total	Gilgit	Hunza/ Nagar	Ghizer	Astore	Diamer	Skardu	Ghanche
Beans	7.58	6.56	0.05	0.09	0.00	0.24	0.40	0.24
Cabbage	7.91	6.91	0.22	0.07	0.00	0.01	0.69	0.01
Capsicum	5.20	3.40	0.34	0.10	0.04	0.29	0.75	0.29
Carrot	5.98	4.44	0.17	0.07	0.00	0.00	1.30	0.00
Cauliflower	4.58	2.82	0.12	0.01	0.00	0.00	1.63	0.00
Chinese Cabbage	13.77	9.94	0.64	0.20	0.52	0.84	1.63	0.00
Cucumber	5.74	4.20	0.15	0.11	0.00	0.34	0.89	0.06
Okra	10.17	7.05	0.61	0.17	0.05	1.13	0.99	0.16
Onion	9.50	5.13	0.43	0.34	0.43	1.24	0.97	0.95
Peas	7.04	3.96	0.35	0.12	0.00	0.55	1.43	0.64
Potato	19.76	9.43	0.42	0.89	0.47	1.42	3.23	3.90
Radish	3.59	2.43	0.06	0.07	0.00	0.37	0.23	0.42
Tomato	11.49	8.13	0.39	0.44	0.19	0.51	1.32	0.51
Turnip	5.72	4.65	0.10	0.08	0.00	0.00	0.53	0.36
Total	**118.03**	**79.04**	**4.02**	**2.78**	**1.71**	**6.95**	**15.99**	**7.54**

5.1.2 Demand Side of Horticulture Products in GB

Gilgit-Baltistan is in transition from a subsistence livelihood system to market-based economy. Although, the overall income increased in real term but still it has to go a long way ahead to catch up with the national and international standards. People's priority area is still food security followed by the social sector needs (SESGBC 2008). Off-farm income increased and access to cash also improved. People's dependence on market has increased substantially and migration towards urban areas is tremendously high (SESGBC 2008). All these trends indicate that the local level purchasing power has increased and demand for goods particularly food items is increasing. This also includes fruits and vegetables for daily consumption.

The demand side of horticulture in GB is though multi-faceted, but there are three broad dimensions: a) situation of the local demand; b) current and latent demand and potential down country market demand; and c) international market.

Local demand: Demand for horticulture products at local level is comparatively low for the local produces (vide table 5.3) due to various reason primarily due to household level production. The table below indicates the local consumption pattern, apple is the highest followed by grapes and apricots. FGD relates that due to long shelf-life, people traditionally store apple for local consumption, while grapes are consumed as soon as it is harvested due to their short shelf-life." *Currently we are forced to consume grapes at household level or to sell it for a very low price, therefore major portion is wasted", a respondent* "from Ghizer district narrated with anger. During FGD, people revealed that the demand for local grapes is sharply declining due to supply of marketable and relatively long shelved-life grapes, imported from China at lower price.

Table 5.7: Fruit consumption of local produces

Fruits	Consumption		Marketed	
	Fresh(T)	Dry(T)	Fresh(T)	Dry(T)
Apricot	2,444	3,483	2,941	5,569
Apple	9,120	0	5,809	0
Grapes	3,059	0	2,203	0
Pears	1,285	0	696	0
Peaches	2,016	0	294	0
Pomegranate	1,673	0	1,729	0
Cherry	1,110	0	757	0
Mulberry	1,154	226	0	174
Walnut	0	2,426	0	3,407
Almond	0	849	0	806

Apricot was the major product consumed at household level in dry form. With the passage of time, the household consumption value dimmed due to access to fresh fruits supplied from the south. There was also a tradition of drying apple and grapes for local consumption, "M*arket has also effected our household level consumption patterns. We cannot continue the practice of our good tradition"*, a senior respondent in Hunza narrated. Among the dry fruits, half of the production of walnut and almond is consumed at household level.

Table 5.7 also explained the quantity of fruits marketed both at local and national level. The major product is apple followed by apricot. in response to a question, the people respondents that fresh apricots are sold to down-country traders (Pathan), who buy the whole fruit at pre-harvest stage, locally called "transaction of live fruits on the trees or in the orchard", mainly in Gilgit and Hunza-Nagar districts. There is also an evidence of local marketing groups involved in purchasing the fruits at pre-harvest stage "transaction of live fruits on the trees" to market them in down-country market after harvesting. In Hunza, the respondents transpired that there

were 7 women groups, mainly WO members who would transact the fresh apricots in bulks, "live on the trees or in orchards" and sellthem to the buyers of the down-country market after collective harvest.

Table 5.8: Vegetable demand in GB

Crops	Consumption		Marketed	
	Fresh(T)	Processed(T)	Fresh(T)	Processed(T)
Potato	17,491	0	103,519	0
Tomato	3,217	0	2,093	0
Peas	402	0	614	0
Cabbage	1,774	0	338	0
Chinese Cabbage	651	0	937	0
Onion	4,864	0	647	0
Capsicum	81	0	840	0

Looking at vegetable demand in the region, Potato is highest in terms of both household level consumption and sold in the market. "*We utilize potato in all our food items except for making tea*" a local woman respondent from Hunza describes. The second and third major produce in demand is onion and tomato respectively.

National market: Pakistan being an agriculture-based country provides opportunities and poses challenges for the horticulture produces from Gilgit-Baltistan. The challenges are further added with its distance from the major markets and low volumes. However, due its peculiar climatic condition, providing a comparative advantage for some of horticulture produces from Gilgit-Baltistan, fall in the category of off season in down-country context. Figure 5.7 indicates that in 2009 more than 2000 tons of fresh fruit has been marketed in down country market, apple being the highest, then followed by cherry. There is also a fresh apricot and other fruits sold in down-country but the scale is low as compare to apples. Engaged in marketing of fruit to the down-country markets, the respondents informed that their is huge latent market demand for fresh fruit from GB, particularly apricot and cherry. One of the fresh fruit traders claimed that fresh cherry from the region has almost captured the northern part of Pakistan markets and penetrating to the southern part of the country. They traders added that during exhibitions and trade fairs they always receives huge demands for fresh fruits, but lack of and adequate transportation means are the biggest hurdles to cater these potential demands.

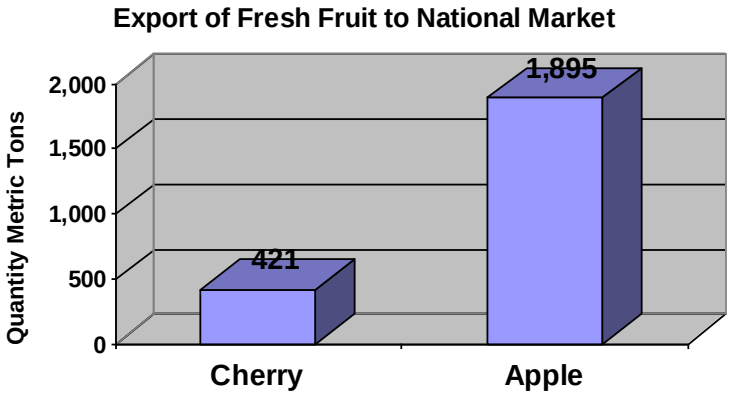
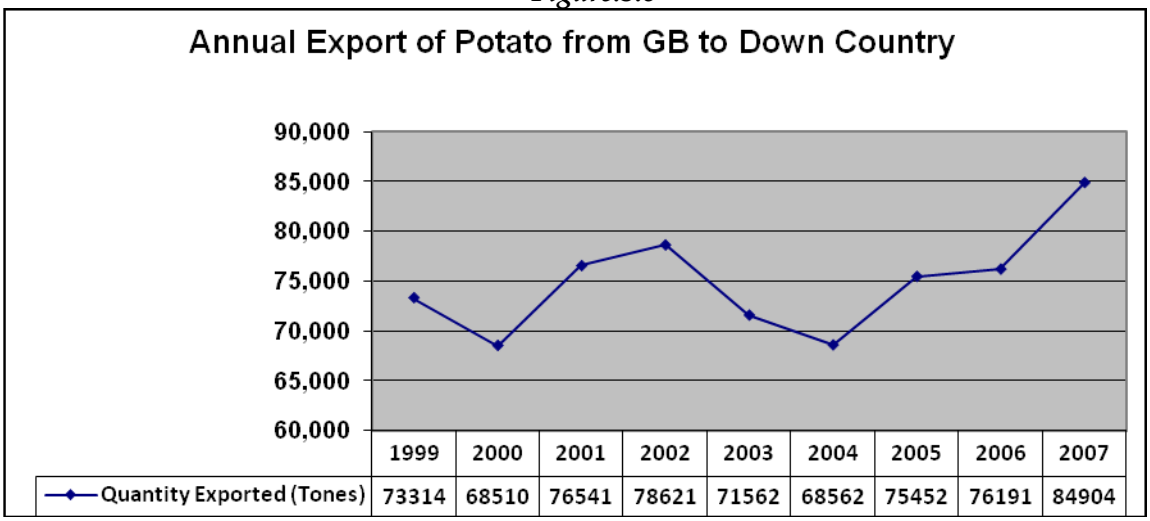


Figure 5.7 Source: Basari Check post DOA, GB 2009

In terms volume, potato (both seed and table-potatoes) is the single largest vegetable produce from GB which has a consistent demand in the national markets. Figure 5.8

indicates the export of seed and table potatoes to the national markets in 2007, which was around 85,000 tons. There is a latent demand for 400,000 tones of potato seeds in the national markets and GB has the potential to cater this demand.

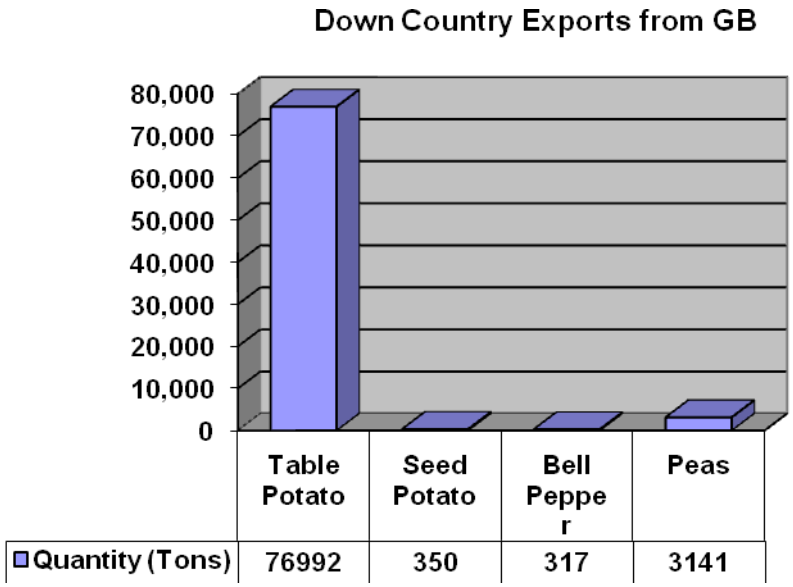
Figure:5.8



Source: Departmental Check posts at Basari, DOA

Apart from potato, peas and bell-pepper has also made their way into the national markets. According to the respondents, from the Diamer district, more than 300 tones of peas are sold annually in the national markets. There is a huge demand for off-season vegetables in the national markets and the current supply is even not enough to cater Rawalpindi markets for few weeks, said the respondents. Figure 5.9 explained the comparison of fresh vegetables' export to national markets.

Figure 5.9



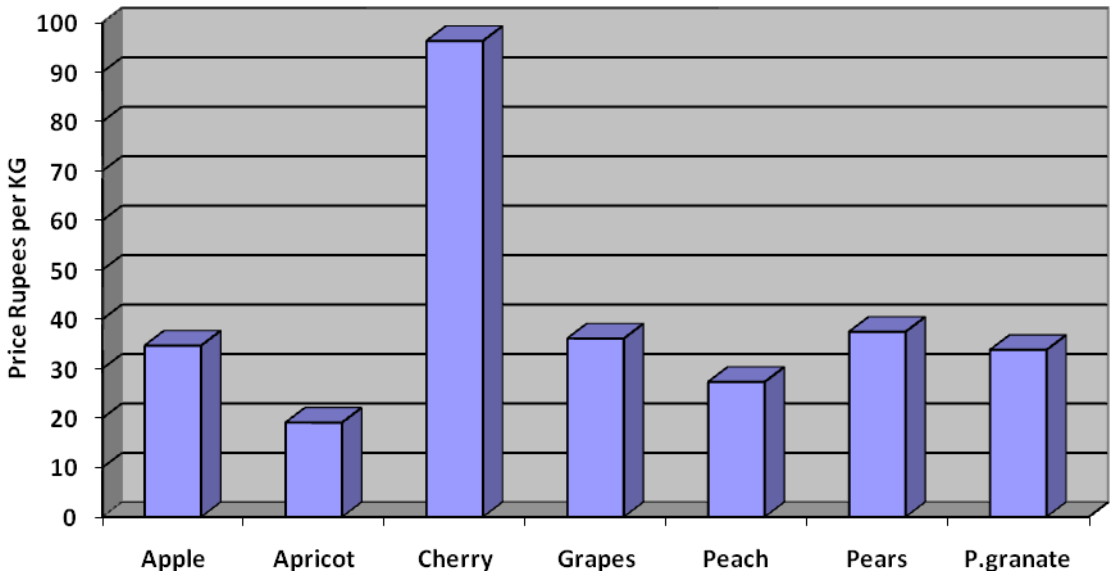
Source: Departmental Check posts at Basari, DOA

International Market: For the last 5 years, the Mountain Fruit Private limited (MF), the only export comnay of GB, exports annually an average 100 tones of dried apricot and similar quantity of almond and walnuts to UK and Europe markets. According to an estimate, Pakistan is the sixth largest apricot producer in the world (Mountain Fruit Annual Report 2008), but its share in international market is almost none. The MF products have received high responses in European markets due to its taste and quality coupled with fair-trade certification. This indicates that high quality ethnic products have potential for the export and local traders have successfully carried out test marketing for dried apricot in Turkey and USA. Test market of fresh cherry to UAE was a success story in 2009 (FGD 2009, Skardu & Gilgit). Though, Xinjiang (China) is the nearest international market for the produces of GB, still the horticulture products of GB have never made inroad to this market due to several reasons primarily certification and quality issues and stiff completion.

5.1.3 Price of Horticulture Product in Gilgit-Baltistan

The Gilgit-Baltistan horticulture market is not formally regulated both in terms of market function and government control. In most cases, market price of a certain product is determined by the trader at the farm gate or at the selling point. FGD discussions revealed that non-existence of formal fruit and vegetable market (locally called Mandi) is the primary reason for a faulty rather exploitive price mechanism in GB. The wholesale market prices of fresh fruit in Gilgit market (cf. figure 5.10) shows that highest price of the fresh fruit is cherry. The local fruit traders explained that higher price of cherry is mainly due to short supply to local markets because of high demand at the national market. Lower price for some of the produces like apricot etcetera is linked to its abundant supply and low demand in the local market. Examining the Government regulated price mechanism in GB, it was found that the local government has no price fixing mechanism for local fresh fruit. Figure 5.11 shows the average retail price of the fresh fruits in GB during 2009.

Figure-5.10: Average price of fresh fruit in GB Market (2008-09)



Focus Group discussion with the traders transpired that the local government has no formal source of market information and always fixes the price after consultation with the local wholesalers, and therefore the wholesalers always keep their margin higher.

Figure-5.11: Average market price of dried fruit in GB, 2009

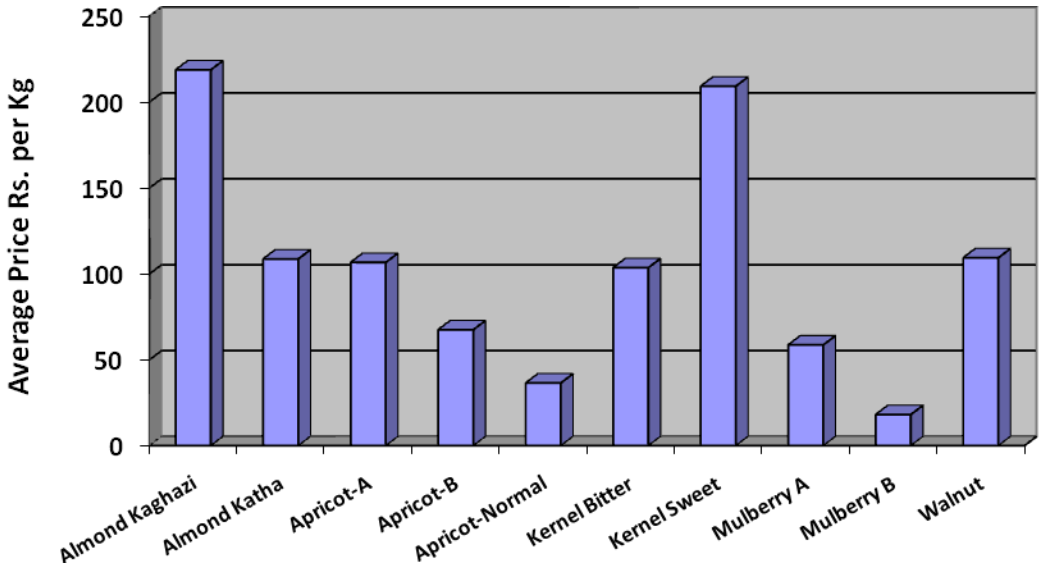


Figure-5.12: Comparison of market sales prices of Vegetables with Government fixed prices in GB

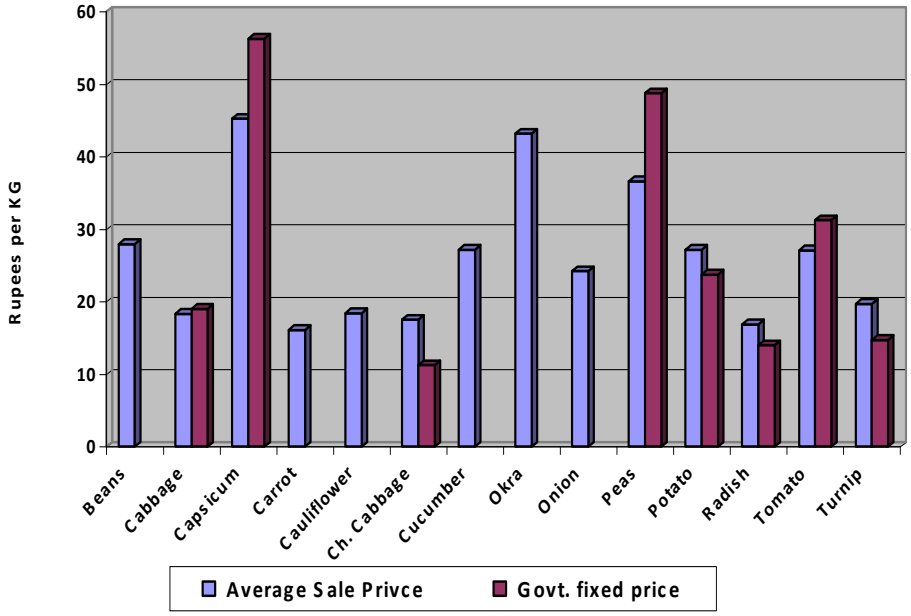
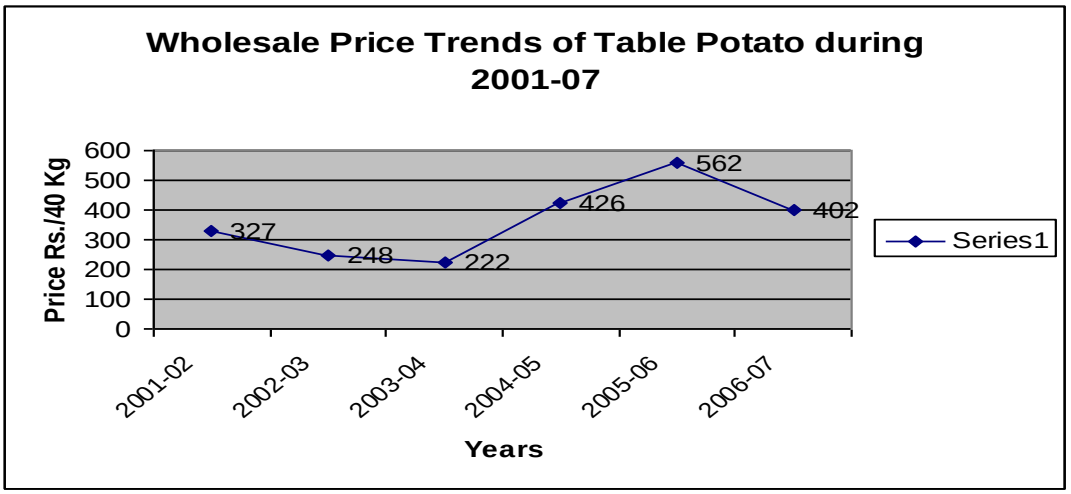


Figure 5.12 above illustrates that the price trend follows the national average but average price indicates a higher trend in GB (e-Mandi 2009/10). FGD with the traders revealed that major factor of price in GB market is the supply. The local supply of vegetable is seasonal with very low volume, while the supply from down-country is hindered by road and transportation limitations. One of the fruit and vegetable wholesaler explained that due to non-existence of formal *Mundi,* prices are determined by few wholesalers based on the supply of the produces from the down-country. Another local fruit and vegetable trader explained that due to small market size and lack of market service (Mundi, storage, transportation) there is always a stiff competition among the wholesalers on a very low margin. For vegetables, there is a government pricing mechanism in place, in figure 5.13 comparison of average wholesale price of both government and market in 2009. The comparison shows that for most of the products, the government-fixed prices are on average higher than the real market price in Gilgit market.

Figure 5.13:



The figure 5.13 shows high fluctuation of wholesale price of potato produced in the national markets. The factors are though various but most of them are related to total production per year and supply in the down-country markets, infrastructure and availability of services.

5.1.4 Market GAP and Issue in Horticulture Market in GB

Apart from the supply situation, production season of fruits has been presented in the table below to understand the gapes that determine the price, and affect the GB markets.

Table 5.14: Supplying Season (Local, China and DCM) for Major Fresh Fruits

Fruits	Zone	Jan	Feb.	Mar.	Apr.	May	Jun.	July	Aug.	Sept.	Oct.	Nov.	Dec.
Apricot	*Local*												
	DCM												
Apple	*Local*												
	DCM												
Pear	*Local*												
	China												
Cherry	*Local*												
	DCM												
Pomegranate	*Local*												
	DCM												
Grapes	*Local*												
	China												
Walnut	*Local*												
	DCM												
Almond	*Local*												
	DCM												

Source: Rapid Market Appraisal (RMA)

China Imports

DCM(Down Country Market) supplies

The harvesting season of fruits vary within the cropping zones of the region. The season starts with ripening of mulberries in the last week of April in the low lying valleys and ends with pears in October in up valleys. The prime season is May to September and during this period local market is generally fed by local crops. During the remaining period, fruit markets are fed by other fruits like banana, mango, citrus and guava which are mainly imported from the down-market of the country. There are few temperate fruits like apples, grapes and pears that are also imported from the outside markets like China. The figure indicating the supplying situation in terms of production season of vegetable is presented hereunder.

Table 5.15: Supplying Season (Local and DCM) for Major vegetable crops

	Zone	Jan	Feb.	Mar.	Apr.	May	Jun.	July	Aug.	Sept.	Oct.	Nov.	Dec.
Potato	Local												
	DCM												
Tomato	Local												
	DCM												
Onion	Local												
	DCM												
Cabbage	Local												
	DCM												
Pea	Local												
	DCM												
Bell Pepper	Local												
	DCM												
Turnips	Local												
	DCM												

Source: Rapid Market Appraisal (RMA)

The typical terrains and climatic conditions limit the growing season of crops in the region. In this regard, altitude plays pivotal role in determining the climate and cropping patterns of the area which classifies the area into different cropping zones i.e. either double, marginal double or single cropping zone. In the low lying valleys, the growing season starts in the mid of February and ends in November; while in high elevated valleys (single cropping zones), it starts in mid April and ends in September. The harvesting season of different vegetables the prime season is during May to November and during this season the market is generally provided by local crops. The supply gap for remaining period is filled through imports from the down-country.

Table 5.16: Ranking of Marketing Issue in GB

Issues	GB	Gilgit	H/Nagar	Ghizer	Astor	Diamer	Ghanche	Skardu
Mandi	50	10	10	7	10	0	5	8
Volume	34	9	9	9	7		0	0
Transportation System	28	0	0	0	9	6	3	10
Market Information	26	7	7	4	0	8	0	0
Storage facility	25	0	0	6	0	10	0	9
Packaging	24	5	0	0	0	7	7	5
Post harvest handling	12	0	0	0	0	0	6	6
Agri Input	19	0	0	0	0	9	10	0
Low local demand	19	0	0	10	0	0	9	0
Distance to Market	19	8	8	3	0	0	0	0

Source: AKRSP RMA-2010

The table 5.17 shows that lack of packaging and non-availability of Mandi (market place) are the most important issues of marketing vegetables in Gilgit-Baltistan, followed by low volume of production to compete in the market. The top ten issues identified and ranked by the respondents are mostly in the supply side. The only demand side issue they identified were low local demand that reflects both lower purchasing power and small population.

Table 5.17: Fresh Fruit Market issues

Issues	GB	Gilgit	Hunza	Ghizer	Astor	Diamer	Ghanche	Skardu
Packaging	57	7	7	9	10	7	9	8
Marketable verities	51	8	8	8	7	4	7	9
Transportation System	35	1	0	0	9	9	10	6
Mandi	30	10	10	10	0	0	0	0
Volume	28	9	9		8	0	0	2
Post harvest handling	28	6	6	4	0	0	5	7
Low local demand	20	0	5	6	0	5	0	4
Distance to market	20	0	0	5	0	10	0	5
No Branding	16	4	3	3	0	0	6	0
Market System	12	0	0	8		3	0	1

5.2 Infrastructure Regarding Processing and Marketing

Compared to the rest of the country, Gilgit-Baltistan has the least and is nascent in provision of infrastructure to support the markets. This challenge is coupled with the peculiar geographic condition of the area, with high mountains, remote valleys, isolated population and scattered production of horticulture.

since in the basic infrastructure like roads, Gilgit-Baltistan has been recently linked with rest of the market through construction of KKH, which is runs along the Indus. Most of the population however resides in the deep valleys and very few have taken advantage of this road.

Table 5.18: Roads and Communications Facilities

Types of Facility	Numbers
Asphalted Roads	
KKH (Km)	616
KKH Skardu (km)	171
Other Roads (km)	574
Non Asphalted Roads	
Shingle roads Km)	3,636
Bridges all types (Nos)	380
Air Ports (Nos)	
Skardu -Boeing jet	01
Gilgit (ATR)	02
Other Communication Services	
Radio Stations(Nos)	02
Telephone and mobile service (No.)	05
T.V.Re-Broad casting Stations	02
Bus Transport Services (Nos.)	12

Source: MTDF (2005-10), P&DD, GB

Besdies the KKH, most of link roads are non-asphalted and are in bad shape as the region is mountainous and rugged hence the cost of transportation is comparatively high and make the local product non-competitive. There is no specialized transportation for fresh fruit to take the produces to bigger national markets. The nearest national market is in Mansehra, around 500 kilometers away from market in Gilgit (center). Most of the respondents, in this connection, opine that the cellular phone services are playing key role both in terms of converge of the area and range of services to market related activities. Access to up-to-date market information is critical for traders to minimize the risk. A trader narrates that his profit margin improved due to his access to mobile phone. "*This is really a magic match-box for the remote and isolated mountain communities to get access to the major markets*", a respondent from Skardu informs the RMA team. Telenor in collaboration with the AKRSP and local community organizations launched a mobile-based agriculture commodity marketing called e-mandi in all districts of GB will provide another opportunity for horticulture marketing.

Table 5.19: Market and Storage Facilities in Gilgit-Baltistan

Districts	Local Markets	Storage facilities	Regulated Market
Gilgit	1	2	1 under process
Hunza Nagar	1	1	0
Ghizer	1	1	0
Diamer	1	1	0
Astore	1	0	0
Skardu	3	1	0
Ghanche	1	1	0

Source: DoA GB

As eviden from the tables above, there is no industrial and export processing zone having state of art infrastructure like building, road, power, water and sewerage system at Gilgit- Baltistan level for processing horticulture produces. There are however some micro level enterprises which deal with the preservation of fruits such drying apricot and kernel oil extraction. At household level, some dehydration tunnels were constracted for apricot drying.

Further,ore, the available storage facilities in few district are mainly government owned and not available for private sector use, but none of these storages have temperature control facility.

5.3 Marketing Systems of Fresh and Processed Fruits

5.3.1 Key Horticulture Marketing Functionaries

The marketing functionaries in Gilgit-Baltitan, involved in horticulture marketing, are as under:

- **Contractors:** They buy crops in the field and in case of fruits (apple, cherry etc) also undertake picking, grading, and packing while in other crops (potato, pease, bell-pepper, tomato etc) harvesting is done by the farmers.
- **Group Marketers**: These are interest-groups of small entrepreneurs and deal marketing as joint venture.
- **Agents or local collectors:** They are seasonal labors that facilitate the buying process on pre-agreed commission at the farmer's field, filling of the bags and transportation of the produce from field to truck road.

- **Commission agents or auctioneers:** They are based in the main markets of the country and auction the produces in wholesale markets on commission basis.
- **Wholesalers:** They sell produces on consignment or commission-basis and they are based in the wholesale market;
- **Secondary wholesalers** who buy at the wholesale market and transport the produces either to sell to retailers or at another wholesale market where prices are higher;
- **Retailers** who sell to the final consumer such as street-hawkers, stall-holders, retailers etc.
- **Processors.** They generally deal in processing and drying apricots and oil extraction of walnut, almond and apricot kernels.

Table 5.20 :Marking Actors in Fresh Fruit

Marketing Actors	GB	Gilgit	Hunza	Ghizer	Astore	Diamer	Skardu	Ghanche
Pre Harvest Contractor	33	10	10	6	1	1	1	4
Group Marketing	35	4	8	4	1	2	10	6
Local Traders	40	6	2	8	6	6	4	8
Commission Agent	33	2	4	2	8	2	6	9
Wholesaler	14	1	1	1	1	1	8	1
Self Marketer	56	8	6	10	10	10	2	10

Table 5.21 : Marketing Actors in Dry Fruit

Marketing Actors	GB	Gilgit	Hunza	Ghizer	Astore	Diamer	Skardu	Ghanche
Firms	16	1	1	10	1	1	1	1
Group Marketing	15	2	2	1	4	2	2	2
Local Traders	40	8	6	2	6	4	4	10
Commission Agent	36	6	8	4	2	6	6	4
Wholesaler	60	10	10	8	8	8	10	6
Self Marketer	54	4	4	10	10	10	8	8

The tables above show the ranking of market actors for fresh vegetables and fruit and dried fruit sectors. The tables reveal that marketing system for all the three areas are almost similar with minor deviation in dried fruit sector. The respondent in the FGD said: there is growing trend in purchasing of pre-harvest crops by both local and national traders particularly in fruit sector.

Table 5.22: Marketing Actors in Fresh Vegetable

Marketing Actors	GB	Gilgit	Hunza	Ghizer	Astore	Diamer	Skardu	Ghanche
Contractors	64	8	10	10	8	10	10	8
Group Marketing	29	1	4	2	4	4	8	6
Local Traders	42	10	2	8	6	2	4	10
Commission Agent	42	4	8	4	10	6	6	4
Wholesaler	7	1	1	1	1	1	1	1
Self Marketer	32	6	6	6	2	8	2	2

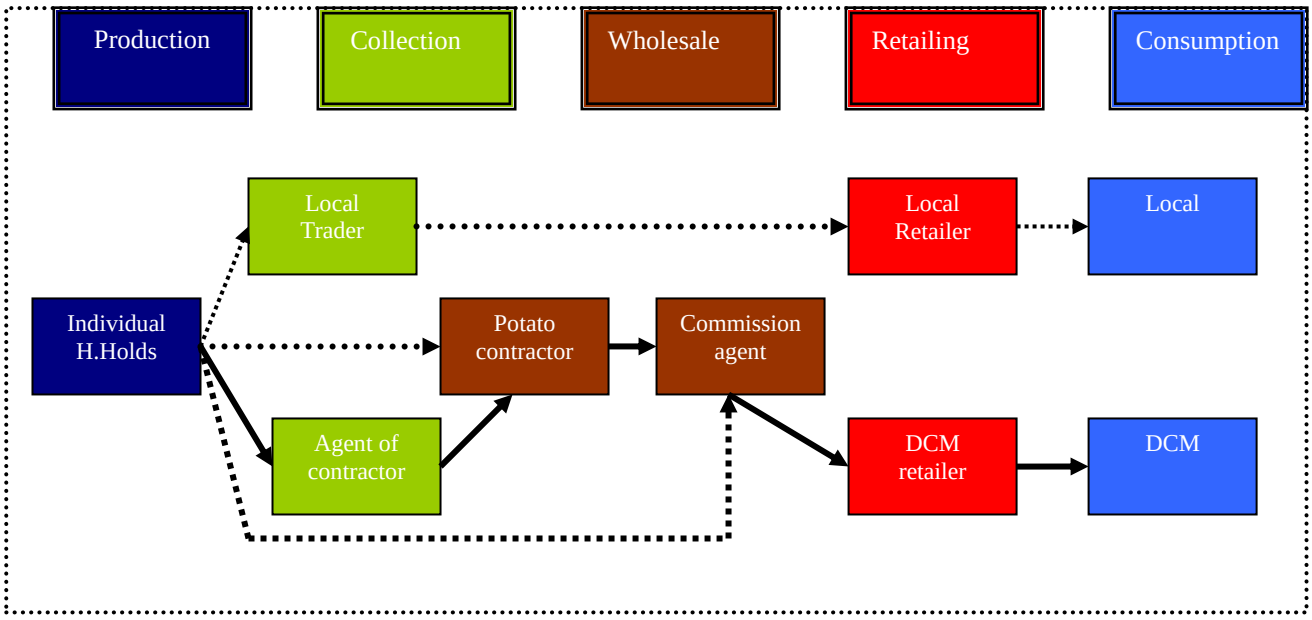
Source: RMA and FGD

5.3.2 *The Market System of Key Horticulture products*

The existing marketing system of fresh vegetables and fruits of Gilgit-Baltistan–though vary considerably on the basis of geographical location, size of local market and attributes of the commodity—still there are commonalities in demand and supply across the region. The demand of fresh vegetables and fruit at village level is minimal as every household produces as per requirement of their household consumption. There is however demand during off-season which is met by imported fresh-vegetable and fruit. Unlike villages, there is demand for local produces in marketing hubs, towns and emerging citie where there are non-local population is living. The trade in such places again is directly related to the market size. with the growth of the market size, the marketing system gets complex where as in small towns and hubs and emerging markets—for instance in Hunza-Nagar, Ghakuch, Ghanche and Astore—the farmers directly sell the commodities to the local retailer. Whereas, in Gilgit markets, some groups are also involved in business of buying from farmers and selling it wholesaler and retailers.

Regarding existing marketing system for fresh fruits mainly apple and cherry, and to some extent fresh apricot, are being marketed mostly by local marketing groups known as marketing associations. Some commission agents of down-country wholesalers also purchase whole orchard at pre-harvest stage. In vegetables, table-potato business attracts both local as well as down-country commission agents, local seed companies and marketing groups. The supply chain of apple, cherry and potato has been highlighted in the figures below.

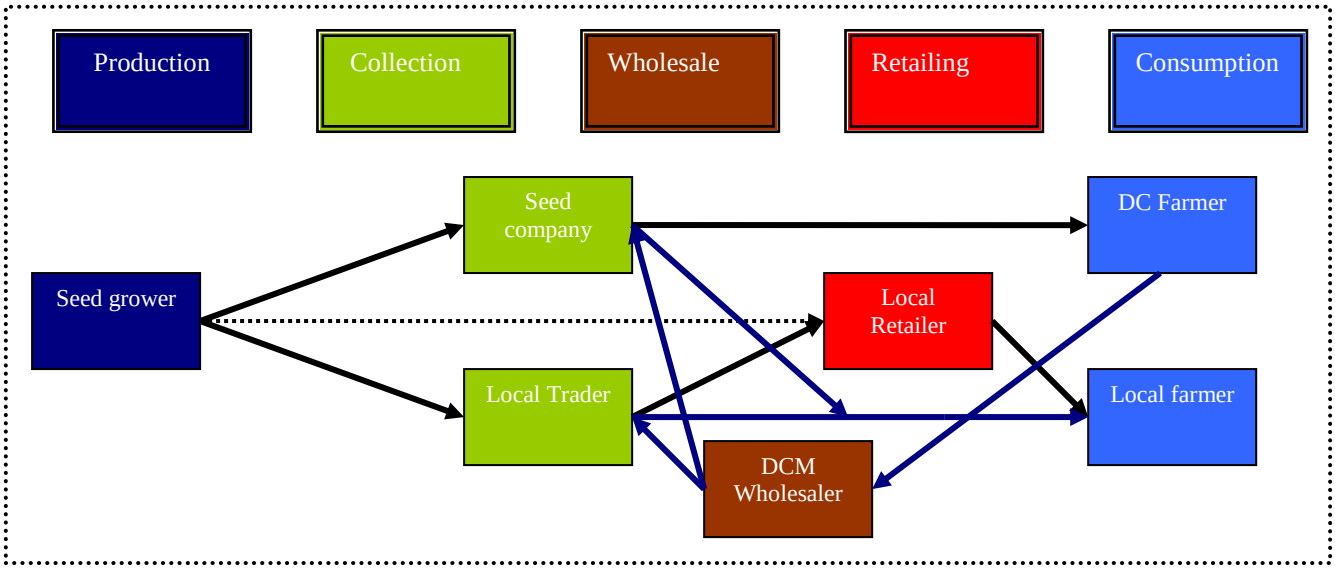
Figure-5.23: Flow-chart of Supply Chain of Table Potato from Gilgit-Baltistan



: Major flow ——→
: limited flow ·····→

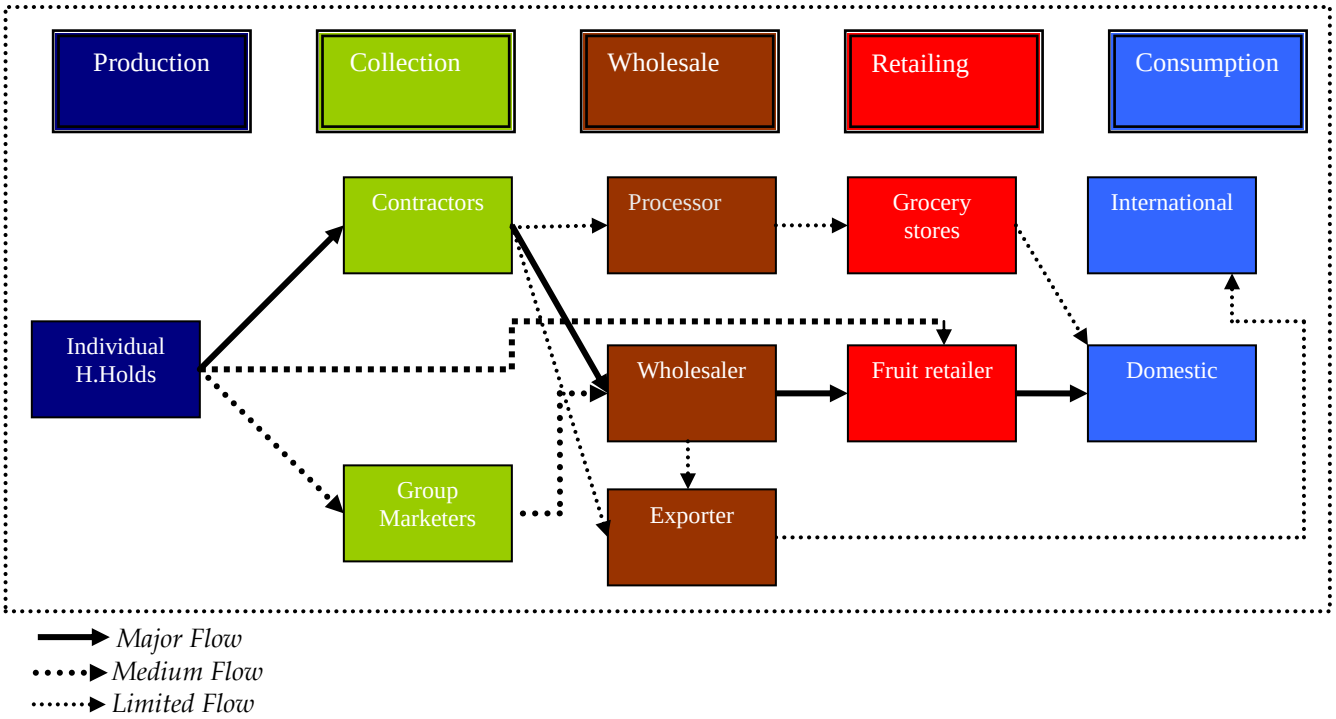
The supply chain reveals that the table potato is generally traded through contractors and fed to the main markets of the country. These are the regulated markets where prices are fixed through demand and supply forces. In Gilgit-Balistan the farmers are small and highly vulnerable to low market prices.

Figure-5.24: Flow-chart of Supply Chain of Seed Potato in Gilgit-Baltistan



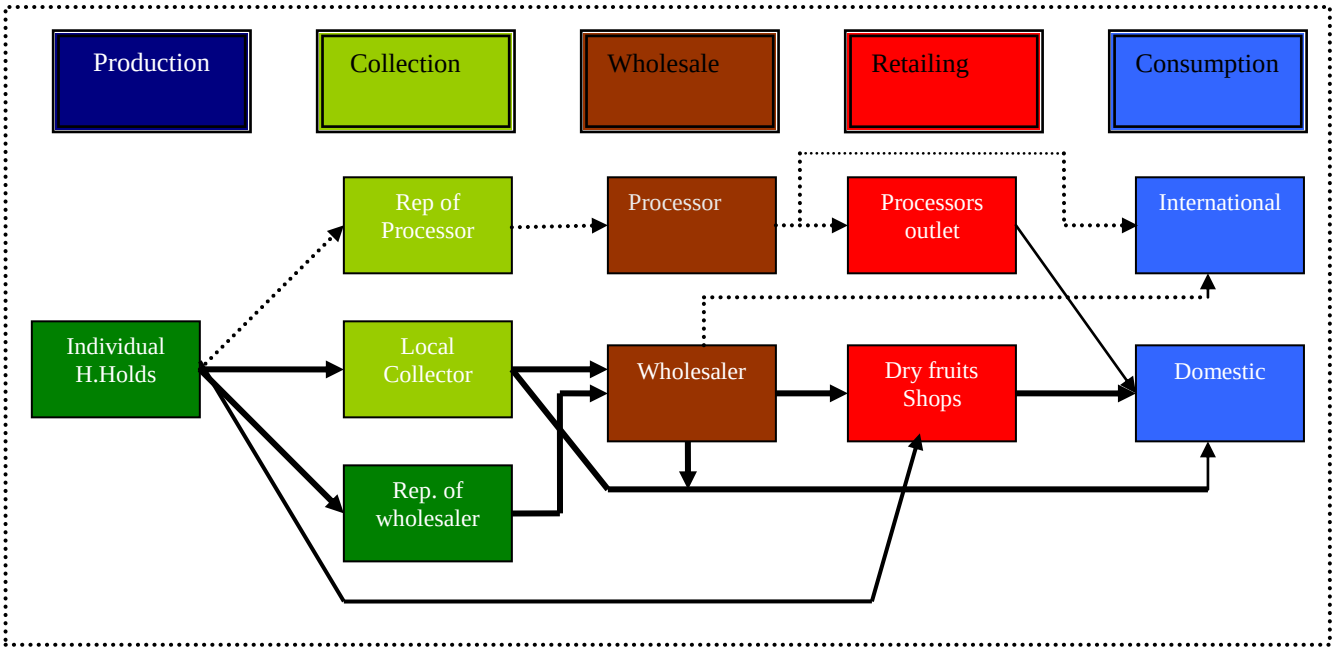
While looking at the seed-potato market scenario at the national level, potato is grown on an area of 154,000 ha. with an average production of 20581,000 MT . The annual seed demand is about 300,000 MT and only 6000-7000 MT (1%) certified seed-potato is imported and rest is met out from informal sources. Gilgit Baltistan has the potential to harness this market potential. Annually, only 600-700 MT certified seed-potato is produced and exported to the plains of the country as compared to 76,000 MT of table-potato production. Similarly, the annual seed requirement for Gilgit-Baltistan is about 15,965 MT which is met from informal seed and seeds from the down-country resulting in low yields and infiltration of seed borne diseases in the region.

Figure 5.25: Flow-chart of Supply Chain of Apple and Cherry and Fresh Apricot in Gilgit-Baltistan



While looking at the fresh fruits supply chain in Gilgit-Baltistan, it reveals that the marketing is mainly being done by the fruit contractors and supplied to the main markets of the country. These contractors procure the fruit on pre-harvest agreement with the farmers and do all the post- harvest operations of the crop. There are some marketing groups who are generally small local traders and do carry out marketing as a joint venture through pooling their resources. Their share in the market is limited as compared to the contractors. The chart also shows that there is very nominal access for fresh-fruit to the international markets. The Gilgit-Baltistan being at the crossroads of China and Central Asia could not export a single kg of fresh fruits due to lack of knowledge about market access requirements.

Figure 5.2 6: Supply Chain of Dried Apricots In Gilgit-Baltistan



By looking at the dried fruits and nuts (almond & walnut) supply chain, it shows that there are three types of collectors operating the area. The collection is mainly done by the local collectors and representatives of wholesalers. These wholesalers generally supply to the local as well as national markets. The role of the processors (dried apricots) is slightly different from others. They go for pre-agreed agreement with the apricot farmers for drying the fruits as per their specifications. They also provide the inputs like drying trays, plastic for sulfur drying tents and sulfur whose cost is deducted from the sale of their produces. The representative of the processors collect the produces from the individual farmers and according to the quality of the produce, the payment is made to the farmers. The produce is then reprocessed (washing, grading and packing) under the supervision of technical hands and supplied to the national as international markets. A very limited portion of the dried apricots are procured by the processors (in limited numbers and capacity) and the rest if supplied to the normal markets.

5.3.3 Stakeholders in the Horticulture Marketing

5.27: Stakeholders in the Horticulture Marketing

Stakeholders	Key Role	Issues
Department of Food & Agriculture, Govt. of Gilgit-Baltistan	• Policy making for agriculture related sub-sectors. • Research & Development (R&D) for new products. • Extension services to producers. • Key services, like storage and seed provision. • Capacity building of producers and marketing groups.	• Low capacity and lack of resources • Role in marketing not defined • No facility and plan for marketing and promotion.
Federal Seed Certification & Registration Department	• Registration of Companies involved in Seed Business, • Certification of crop and vegetable seeds. • Testing and laboratory services. • Implementation of seed policy in GB	• Low capacity and lack of resources • No clear mandate in marketing
Chamber of Commerce & Industries, GB	• Linkage to main marketing actors at national and international level. • Membership for marketing group. • Support to get government subsidy for export and import.	• Low capacity and lack of resources • Member ship are non-agri business people
NGOs and CSOs	• Organizing marketing groups. • Capacity building • Linkage with market. • Support in business planning • Link with financial services in the market. • Help in collective marketing and input supply	• Low capacity and lack of resources • Limited mandate and boundaries • High turn over of human resource
Transporter/communication, inputs, credit institution, input suppliers etc.	• Service provision in their respective sector on market terms. • Major sources of market information • Provide informal linkage with the market players	• Weak infrastructure • Low capacity for investment. • Lack of lead enterprise.
Entrepreneurs/Marketing Associations processors, wholesaler, retailing	• Main actors who under take buying and selling functions • Provide embedded services to market agents and stakeholders. • Main actors to determine the price. • Packaging services to producers and consumer.	• Lake of capacity, entrepreneurship, resources etc. • Lack of linkage, MIS and market access. • Availability of inputs • Scale and quality of the produce • Weak market infrastructure
Producers	• Primary place to grade and packaging. • Effective role in pricing of the produces.	• Lack of knowledge on pre & post harvest management. • Lack of knowledge on market led horticulture production • Lake of entrepreneurship

Situation of Government Policy in Horticulture Marketing: Historically, the Department of Agriculture's main focus was on increasing productivity and improving the supply side of the

horticulture services; while the marketing support was never a priority area by assuming that private sector is primarily responsible for marketing. With the support of FAO and UNDP, there has been limited support for marketing of horticulture products, alhough, for a limited period of time, to national market. Related to policy and regulation of horticulture marketing, there is no evidence of either adoption or development of a horticulture marketing policy.

In result of a FGD and results of RMA, the stakeholders have identified four major areas where the government policies could be affective. Broadly speaking, these areas area are: a) pricing, b) subsidy, c) certification and d) promotion.

There is currently no pricing policy for horticulture products and services in GB—even the national Agriculture Pricing Policies, developed from time to time, have also not been adopted. There is a local government information and pricing authority headed by the local magistrate, who sets the retail price of imported agriculture items. However, there is no formal mechanism and policy in place for pricing of horticulture.

From time to time the Federal Government announces subsidies for agriculture produces purchase, export and input supplies; but none of them became immentable in GB, except the wheat subsidy provided nationally. During FGD, one of major demands from producers and marketing groups were that government should provide subsidy for sales and marketing of horticulture produces after assessment of the market in line with national policy.

Certification and standardization policy is the most priority area, which the respondents identified to promote. Apart from Seed certification, there is no certification and standardization policy, protocol and services available in GB. After WTO regime, there have been efforts at national level to develop certification and standardization policy, but because of peculiar climatic condition of GB and its mountain specific arrangements for GAP (Good Agriculture practices), the region remains out of the national certification and standardization policies and services.

Recently the Department of Agriculture, Gilgiit-Batistan, with the support of ASF (Agri-support Fund) has developed a Draft Horticulture Policy for the region. This policy primarily focuses on the production side, but there has been general reference for promotion, certification and subsidy for marketing of horticulture produces.

CHAPTER SIX

6. DEVELOPMENT PARTNERS IN HORTICULTURE DEVELOPMENT

6.1 Current and Past activities by the Local NGOs

Non-Governmental Organizations' initiatives played important role in overall economic development of Gilgit-Baltistan. This role is more prominent in the field of agriculture. Over the years, some of the large NGOs such as the AKRSP, IUCN and WWF-P have played a key role in mobilizing technical, financial and institutional resources to support the social and economic development processes. The AKRSP played a critical role in mobilizing communities and generating local resources. As a result, today, the value of community partnership has become a widely recognized concept, practiced as a highly effective and sustained model of rural development not only in Gilgit-Baltistan but also in and outside Pakistan.

In GB, the momentum of this movement is now primarily driven by thousands of community activists that are creating a growing diversity of local village and women's organizations (VWOs) and Local Support Organizations (LSOs), which provide a range of services to their communities, including physical infrastructure, management of natural resources, micro finance, social services, small business development, cultural activities and local governance. A total of 40 LSOs (of which 36 are registered under companies Ordinance 1984) are actively involved in Agriculture and horticulture development activities. They do not only work as significant partners of the AKRSP and other NGOs but also act as important partners in public sector programs by providing an institutional base for local implementation of sectoral initiatives. These partnerships are enabling the public sector in more equitable distribution of resources to the actual beneficiaries.

IUCN and WWF got involved in the environmental conservation activities in Gilgi-Baltistan. Their main focus although never remained agriculture development but they involved in a number of capacity building and input delivery services to leverage the core conservation initiatives. Some activities like watershed and biodiversity management played important role in improving the agriculture in the area on sustainable basis.

In addition to the large NGOs, there are several small registered NGOs that provide capacity building and business development services to the communities in GB. The most prominent ones are: Karakorum Area Development Organization (KADO)—based in Hunza valley; Baltistan Cultural Development Foundation (BCDF)—based in Baltistan; and Nunehal Development Organization (NDO)—based in Nagar.

KADO is a partner of the AKRSP and other donor organization in a range of agriculture development activities in district Hunza-Nagar. BCDF is specifically working on Apricot kernel Oil and honey value chain development in district Skardu and Ghanche of Baltistan. NDO is working with women on small scale fruit processing in district Hunza-Nagar. Hashoo foundation helped women in bee keeping and small scale food preservation.

6.2 Current and Past activities by the Donors

Donor's activities through Public Sector: The list of the projects funded by various donors and implemented through public sector over the last few years is given in the table below:

Table 6.1 Foreign Funded Agriculture Development Project

Name of Project	Plan Period	Funded By	Project Scope	Areas of Implementation
Integrated Rural Development Project (IRDP)	1983-87	UNDP	Integrated Rural development	GB
Production of Seed & Planting Material in NAs (FAO/UNDP/Pak/86/001	1988-93	UNDP	Agriculture Development	GB
Participatory Agriculture Development Project FAO/UNDP/PAK/96/006	1996-97	UNDP	Agriculture Development	GB
Fruit & Vegetable Marketing Improvement Project (FAO/TCP/8924	2000-2001	FAO	Horticulture marketing Development Mar	GB
*Northern Areas Development Project (NADP)	1998-2005	IFAD, UNDP & GoP	Integrated Rural Development	GB

*Source: Agriculture Secretariat, Gilgit *Major Focus was district Diamir*

Major achievements:

1. ***Integrated Rural Development Project (IRDP)***
   - Construction of irrigation water channels at different location in GB.
   - Introduction of various improved varieties of apples, cherry, peach and pears in the region.
   - Introduction of commercial vegetable varieties especially seed potato.
   - Establishment of germplasm unit of fruits plants in Yasin valley of Ghizar district and mother fruit nursery in t Murtazaabad in Hunza-Nagar district.
   - Introduction of high yielding wheat varieties like Pak-81.
   - Training of farmers (both men & women) in crop management and post harvest handling techniques, especially in apricot drying.

2. ***Production of Seed and Planting Material in GB.***
   - Introduction and commercial cultivation of improved varieties of apples and cherry in GB
   - Introduction of vegetables seed and off-season fresh vegetables production technology.
   - Establishment of germplasm unit of fruit plants in t Yasin valleyGhizer district, Jalalabad village of Gilgit district, Murtazaabad village Hunza-Nagar district, Goharabad of Diamir district, Skardu of Skardu district and Guwadi of Ghanche district.
   - Remodeling and strengthening of fruit nurseries.
   - Establishment of potato tissue culture laboratory in t Gilgit and commercial cultivation of seed and table-potato.

- Capacity building of extension field staff and farmers (both men & women) in orchard management, vegetables seed production and seed potato production.
- Introduction of post-harvest handling technology and marketing fruits and vegetables.

3. Participatory Agriculture Development Project

- Introduction of improved wheat, maize and winter active fodder varieties.
- Marketing extension of fruits and vegetables in the main markets of the country
- Development of improved packing material for fruits and vegetables.
- Post-harvest handling of fruits and vegetables
- Trainings of staff and farmers in orchard management, marketing extension, post-harvest handling of fruits & vegetables .

4. Fruit & Vegetable Marketing Improvement Project

- Marketing trials of fruits and vegetables in the main markets of the country using improved packaging.
- Development of linkages between local traders and main markets of the country and packaging industry.
- Rapid market appraisals of selected fruits and vegetables in the main markets.
- Delivered trainings on agricultural marketing extension, post-harvest handling and food processing
- Development of proto-type solar dryers for apricots.
- Development of Agriculture Statistics for Gilgit-Baltistan.

5. Northern Areas Development Project (NADP)

- Construction of valley roads.
- Construction and improvement of water courses.
- Commercial cultivation of fruits and vegetables at farmers' fields.
- Replacement of degenerated local cultivars of cereals with high yielding ones.
- Breed and feed improvement of livestock.
- Strengthening and capacity building of all line departments.
- Capacity building of extension staff and farmers in agriculture management, livestock management, forest nursery raising and afforestation.
- Community mobilization and capital resource generation.

Donor Activities through NGOs: The projects implemented in GB by various donors through NGOs in development of agriculture are described in the table as under:

Table 6.2: Donor Funded Projects implemented by AKRSP during 2004-2009

ROGRAM/PROJECT	Project period	FUNDING AGENCY	Project Scope
Institutional Development for Poverty Reduction Program (IDPR)	2004-2009	Canadian International Development Agency(CIDA)	Institutional development
Community Physical Infrastructure (CPI)	2004-2009	Pakistan Poverty Alleviation Fund (PPAF)	Construction of irrigation channels, farm to market roads, micro-hydels power stations.
LSOs Capacity Building	2006-2007	Rural Support Programme (RSPN), Pakistan	Institutional development
Sustainable Development Initiatives	2006	Ev-K2-CNR Committee (Association of Italy)	Livelihood development
Infrastructure Project in Hushey, Baltistan	2006-2008	Sarabastall (Spanish NGO)	Livelihood development
Agribusiness Support	2007-2008	Government of Pakistan & Local Government.	Technical and financial support to small agri-businesses
Self Employment Project for Women (SEPW)	2006-2007	Government of Pakistan & Local Government.	Women Development
Livestock Initiatives	2007-2011	Government of Pakistan & Local Government	Improvement of livestock productivity
Women's Economic Empowerment in Baltistan	2006-2007	Norwegian Fund for Women's Economic Empowerment in Baltistan	Women Economic empowerment
Gems Cutting and polishing	2006-2007	World's Gold and Diamond inc. USA	Economic opportunities for women

Source: AKRSP Annual review 2007

The description of some of the projects implemented by the AKRSP with the significant contribution to agriculture directly and indirectly is as follows:

Institutional Development for Poverty Reduction Program (IDPR)*:*

This project was carried out in GBC at the cost of 5,705,104 through funding from CIDA during Oct 04 to Mar 09. The o*verall goal was* to contribute to equitable and sustainable human development and the reduction of poverty. Its *purpose was* to achieve equitable and sustainable improvements in the livelihoods of people, particularly women and the poor, by increasing capacity, expanding economic opportunities, and creating an enabling environment for policy

dialogue on human development in the Gilgit-Baltistan and Chitral. The projects had three specific objectives included:

1) Increasing the institutional and human capacity of GBC communities to plan and manage their own development,
2) Enhancing women's social and economic status in the GBC, and
3) Promoting development policies and practices that are responsive to the needs of communities in the GBC.

Results so far:

The Mid-term Evaluation of the Project took place in 2008. Following are some of conclusions, directly taken from the Mid-term Evaluation Report commission by CIDA HQ :

> "0.25 IDPR can be considered a highly successful project, building on past experience and achievements and responding to changing circumstances, with a new strategy for community-based development that strengthens gender equality and contributes to policy dialogue and building partnerships.
>
> 0.26 In each of the project's three principal components, the Evaluation has found significant results, as well as a recognized contribution to the project goal of equitable and sustainable human development and reduction of poverty and gender inequality.
>
> 0.28 IDPR has been a timely intervention, and has allowed AKRSP to adapt its role and strategy to new circumstances, including widening social and economic horizons, and to support concurrent developments in the GBC, as with respect to the governance context for the Northern Areas. The LSO concept fits well with the changing governance context and challenges, and the initiative should be consolidated and extended. The gender equality elements of IDPR have also been very timely, with significant outcomes as a result, and are likely to continue to be timely in the period ahead.
>
> 0.29 IDPR contributes to stability in a highly strategic region and to containing the spread of political dissent and extremism. AKRSP has been able to overcome sectarian and ethnic differences to reach out to diverse communities and to contribute to sustainable development. Some elements of the IDPR formula also provide a model that can continue to be drawn on in social and economic development elsewhere in Pakistan."

Comunity Physical Infrastructure (CPI):

Thisoject was carried out by AKRSP in GB at the cost of 3,322,390 funded by Pakistan povertAlleviation Fund during July 2000 to Jun 2009. The objective was to create micro economic infrastructure in GBC, with a particular focus on irrigation channels, farm to market roads and clean energy from small streams and rivulets. In the past, this programme was also funded by EC.

The Results: So far, 512 projects have been implemented, of which 60% are irrigation schemes and 48 micro hydro power unit, These projects are identified and implemented by organized

communities or VOs, with technical and financial support from the AKRSP, and they are maintained by them. AKRSP has also received two international awards for its work in clean energy development through community management, the Ashden Award or Green Oscars from Prince Charles in 2005 and the Japanese Award for Most Innovative Project in 2006. Unlike many public sector projects in Pakistan, these community owned productive infrastructure projects are religiously maintained by the users as they generate immediate benefits in terms of much needed irrigation water, hydroelectricity (in Chitral for instance, 40% of the rural population uses community electricity), and access to markets through farm to market roads.

Seed Renewal for Food Security:

The AKRSP is working on a swift cereal-seed renewal for food security across its program area since September 2008 with the financial support of AKF/Geneva. This project was developed on the realization that most of the commonly grown cultivars of cereal crops in GBC specially in remote valleys are very old, low yielding and susceptible to pest and diseases and they are likely to worsen the quickly approaching food crisis. This project is being implemented by LSOs with the technical backstopping of the AKRSP in GBC. The objective of this activity is;

- To introduce early maturing and high yielding wheat, maize and barley varieties in GBC.
- To develop seed system at LSO level for the production of quality seed for local farming communities;
- To train farmers in improved agronomic methods;

The Results**:** Under this project 14 wheat/maize trials and demonstration plots were laid on farmers' fields in collaboration with the LSOs and line government departments. The federal seed certification & registration department was also involved in inspection and certification of the varieties.

The LSOs were supported in organizing 18 farmers' field days / extension campaigns and participatory workshops, 428 farmers participated in these field days, which included 328 farmers from different villages of the participating LSOs. The project staff also organized 23 training one-day workshops on "seed production technology" for 615 farmers from 23 LSOs in GBC. Furthermore, the project distributed 12**.**2 tons (12200 kgs) certified seed of previously selected varieties in the target LSOs for multiplication and further distribution within the LSOs. The production received from this improved seed is 25-30% higher compared to the local seed with all other conditions remain the same

Integrated Hushe Development Program:

This project was implemented in Hushe valley of Baltistan and was funded by ARABASTALL, which is a Spanish NGO. The project started in April 2006 and concluded in Aug 2009. The objective of the project was to overcome the economic and social destitution of the people:

1. Through providing improved crop inputs mainly seed and improved breeds of sheep.
2. Through constructing tourism infrastructure projects and;
3. Through reducing workload of women by constructing washing places.

Results: The project constructed a beautiful guest house which is used by the mountaineers who visit this place for mountaineering and is now a permanent source of income for the community. The project has renewed the seed-base of the valley by distributing seed to 120 households. It constructed a centralized washing place with hot water facility which significantly reduced workload from the women who used to go to the river at the base of the valley for washing clothes. The project has also constructed a road in the valley to link various villages.

Self-Employment Project for Women:

The AKRSP initiated this project in Gilgit and Baltistan with the financial support from the Government of Pakistan (the Northern Areas Administration) in 2006 and ended in June 2007.

The main objectives were:

1. To empower women through promoting women led enterprise culture.
2. Support local women to initiate new businesses,
3. Build capacities of women in better utilization of their business skills.

Major activities included 1) organization of awareness and sensitization workshops on business opportunities for women, 2) provision of support to women in business creation and development, 3) development of value added businesses for women at the village level, and 4) organization of training and technical support to women to take up the marketing and processing initiatives.

Results: Under this project, the AKRSP trained 3,361 females in business management, 3,879 in product development, and 193 in technical skills. In addition, the Program organized 237 business sensitization workshops, arranged five product exhibitions, developed 176 business plans for the potential women entrepreneurs, and established 29 women-only markets where 121 women have started their businesses.

Women Economic Development in Baltistan:

The project was implemented in Baltistan by AKRSP in 2007 through funding from the Royal Norwegian Embassy, Islamabad Pakistan. This project focused on economic development of women especially resource poor women in remote villages. Under this project grants were provided to poor women for the conversion of an average of one kanal of their barren lands into cultivable land. The objective of this project was to economically empower women in Baltistan by increasing their asset-base through expanding cultivable agricultural landholdings for increasing agricultural production and women's access and control over income.

Results: The results of this project includes 100% land increase for the target women who started cultivating the land immediately which further doubled their available food resources.

Agri Business:

Introduction AKRSP started this project in Gilgit, Chitral and Baltistan regions in January 2007, with the financial support from the Government of Pakistan through the Agribusiness Support Fund which still continues. The focus of this project is the economic development of small farmers through helping them in getting into agri-business activities. This is done mainly through; 1) organizing farmers into Agri-business Groups, 2) providing support to the groups in developing business proposals, and 3) extending financial grants to the selected farmers' groups for starting small Agri-based businesses. The objective of this project is to create income-earning opportunities for the small farmers and entrepreneurs.

Results: Under this project, AKRSP has so far facilitated farmers to form 188 Agri-business Groups, technically supported in the development of 162 saleable agri-business plans, and linked 128 Farmers' Groups to the grant facility provided by government of Pakistan through its Agri-business Support Fund.

CHAPTER SEVEN

7. DEVELOPMENT CONSTRAINTS AND OPPORTUNITIES

7.1 Advantage of GB in Horticulture Sector (based on geographical, climatic and social features).

In the preceding chapters of this study, very comprehensive information regarding the comparative advantage of Gilgit-Baltistan in horticulture sector was provided. The information is however scattered in various chapters and hence needs to be consolidated to give a clear picture of the various constraints and the opportunities. The following matrix has been used to consolidate the various element and aspects of comparative advantage.

7.1.1 Comparative Advantages of Gilgit-Baltistan in Horticulture

GB competes with the valleys of Swat and Kaghan of Khybrer-Pukhtunkhwa province and Neelum valley of AJ&K, but it has clear edge over these regions in many ways. The various factors that make GB more suitable for horticulture is described as under.

Table 7.1: Comparative Advantage Matrix

Factors	Characteristics of GB	Other competing regions
Geography	1. Cross-road to Central Asia, China and South Asia. 2. Distinct Agro-ecologies that support diversity of vegetation. 3. Ample availability of irrigation water. 4. Well drained soils. 5. Natural Pockets of isolation due to high mountains that support commercial production of cross pollinated seeds. 6. Close proximity to huge Chinese markets for specialty products like cherries and almond. 7. Natural farming conditions due to low introduction of chemical inputs that support natural/organic production.	1. Are in close proximity to main markets but not to any exporting country. 2. Often no distinct agro-ecologies. 3. Much of the agriculture is supported by chemicals no natural condition exists.
Climate	1. Diversity of climate that supports production of diverse range of crops. 2. Off-season advantage with in the region and with down-country production areas. 3. Climatic extremes prior to sowing and after harvest that keep the pest under natural balance. 4. Long sunny days and cool nights during production season that provides excellent conditions for plant growth more so in production of potato and vegetable seeds. 5. Low rain and low humidity during production season that minimizes the possibility of physical and pest induced quality losses particularly in fruits	1. Not much diversity in climate across the region. 2. Off-season advantage exists with the down-country but not with in region. 3. Few sunny days because the area falls in the monsoon zone and receive lot of rain in growing season. 4. High humidity due to which high pressure of pest and diseases.

Factors	Characteristics of GB	Other competing regions
Social	1. Organized communities due to long tradition of collective action and also due to three decades of social mobilization support extended by AKRSP to the communities. 2. Developed community institutions at village and valley level that provide platform for efficient and low cost extension service delivery and marketing services. 3. High women involvement in horticulture sector that provides an opportunity to improve their work environment and to channel some of the income directly to women. 4. The culture of resource pooling during sowing and harvest which decreases the wastages occurring from shortage of labor. 5. Different safety nets to provide food security to the poor households.	1. Communities are not organized and farming is done on individual basis. 2. No or less developed community institutions. 3. Women involvement is restricted to compounds in some areas particularly Swat valley and also in other some tribes don't allow their women to work in public. 4. Very less culture of resource pooling again due to cultural issues.

The detailed description of the above factors and their characteristics is given as follows:

Geography: Geographically, Gilgit-Baltistan is located at the cross road of central Asia, China and south Asia. The construction of Karakorum highway in late 1070's which linked Pakistan with western China dissecting through GB has ended the centuries old isolation and opened up many doors of opportunities. Since then, the government of Pakistan has spent substantial resources to build roads networks with in the region which has connected almost all the valleys of GB with this important highway. This improvement in road network has opened enormous opportunities for marketing of agricultural products from GB to both Pakistan and China. The immediate outside market for GB horticultural products is Rawalpindi/Islamabad where it competes with the production from Swat, khagan, Muree and AJ&K. These regions have advantage of close proximity but this advantage is off-set by the low cost of production in Gilgit-Baltistan owing to low management costs (mainly pest management) as a result of low humidity/rains.

The other most important opportunity (yet not been exploited) is the possibilities of exports to China. The traditional exporters of agri-produce in mainland Pakistan and GB is focused exclusively on their established export destinations (Middle East, Western Europe and North America) and makes hardly any serious effort to explore other areas and regions for enhancing the range and volume of their exports. This focus on established markets has probably influenced other stakeholders, who have also never made any significant attempt to explore the large neighboring Chinese markets. There appears to be no reason why cross-border trade with China should not be feasible; in fact, the Karakorum Highway has been built for easy road access between China and Pakistan and is currently being broadened and shortened with the help of Chinese engineers. Pakistan's trade relation with China, which started in 1953, has now been further boosted through the signing the Pakistan-China Free Trade Agreement in the last

quarter of 2007[16]. Yet, throughout this time, Pakistan has had a chronic trade deficit with China. Imports from China during 2006-07 amounted to over $25 billion compared to $4 billion from Pakistan to China. GB is geographically attached to south-western China, and there are potential export markets for high value fruits, especially cherry, in and around the city of Kashghar. Kashghar (China) and Islamabad (Pakistan)—the existing wholesale market for cherry–are at a similar distance from Gilgit, but the road to China is in a much better condition and lies at a higher altitude and latitude (i.e. falls into a colder climatic region which reduces heat-stress during transportation). Acess to Kashghar is therefore both faster and more conducive to the marketing of perishable fruit. At the moment, cherry is being smuggled to Kashghar by individual small-scale traders and fetches a black market price of up to 150 yuen (10 USD) per kg as compared to 120 rupees (1.5 USD) at Gilgit and 250 rupees (3 USD) at Islamabad markets[17]. The only trade barrier to fruits entering China legally and on a large scale is the absence of an SPS protocol and certification of a recognized GAP standard by a registered agency in the exporter's home country.

Climate feature

In GB, the diversity in altitude and aspects create a distinctive network of agro-ecologies across the region. These differentiated agro-ecologies allow the production of a range of crops for an extended period of time in a seasonal cycle across the region. The information regarding the unique features of each climatic zone and the range of the crops that it supports is given in table 4.1-4.6. It clearly shows that the diversity in agro-climate creates opportunities for diversity in crops, diversity in sowing and harvesting dates and diversity of options for value addition and marketing.

In general, the growing season of GB is almost opposite to the down country season for all horticultural crops. For instance, potato, in down country is sown in Sept-Oct and harvested in Jan-Feb. while same crop in GB is sown in Feb-March and harvested in August-September. Similarly, tomato, bell-pepper, onion etcetera in down country are sown in Oct-Nov and harvested in March-May while same crops in GB are planted in March-April and harvest in July-Oct. The harvesting and sowing dates of various important horticultural crops is given in tables 4.26-4.28

The semi-arid and arid conditions (less than 125 mm of rainfall) in GB, with the provision of ample irrigation water offer a unique combination of two extremes. These extremes are further augmented by long sunny days and cool nights that offer excellent conditions for the germination, growth and development of a number of horticultural crops. For instance, vegetables' seed production which has been exploited to a very lower degree in GB gives a comparatively higher per unit production in GB due to high degree of photosynthetic activity during long summer days and low decomposition of carbon as a result of low soil temperature at night. Experiments conducted by North South Seeds[18] (NSS) company shows huge differences in yields between GB and down-country. An experiment conducted on *Hazara variety* of onion recorded an average seed yield of 25-30 kg per acre while similar average yield was achieved on an area of 0.1 acre in GB. This was attributed to the low average humidity (< 45%

[16] FTA 2007

[17] Approximately USD 25.00, USD 1.50 and USD 3.00, respectively.

[18] North South Seeds was a seed company initiated by AKRSP in GB and Chitral as a subsidiary to demonstrate vegetable seed production and marketing is now transferred to private sector and operating as Mountain seed Leaders in GB and Mountain Seed Company in Chitral.

round the year) coupled with climatic extremes during ,prior and after the cropping season that plays major role in keeping the pest population under natural balance.

Social dimension: Under the harsh mountain environment and in absolute physical isolation, people of Gilgit-Baltistan have learned the art of survival through sharing resources in normal and emergency situations. As a result, in GB, collective resource management, resource pooling and collective action are part of local tradition and culture. The AKRSP built its rural development model on these traditions almost three decades ago and exploited these features for collective marketing of farm surpluses, which needed a certain level of mutual trust that was already present in the existing social system.
To further strengthen these traditions in GB, the AKRSP and other development organizations supported the communities to organize into over 4500 village and women organizations (VWOs) and some of them have clustered together and formed Local support organizations (LSOs), which are more formal or legally registered community-based institutions with the capacity to independently plan and implement community development projects . The presence of organized communities provide ideal platform for the delivery of extension services, collective purchase of inputs and collective production, processing and marketing of agricultural and non-agricultural products. It also minimizes the transaction costs both for the producers and for the buyers.

In GB, women involvement in agriculture is significant and is particularly high in horticulture. This gives an advantage in the production cost (because of low opportunity costs). Horticulture also provides income and employment opportunities for women compared to any other sector in agriculture. For instance, no income opportunities exist in cereal production as the cereals (mainly wheat and barley) are recycled inside the farm and nothing is sold.

The culture of resource pooling during sowing, weeding and harvesting is an exclusive characteristic of farming in GB which decreases the wastages occurring from shortage of labor. The tradition of labor pooling at the time of crop harvest is an important part of the various safety nets for food security of poor households. During these occasions, food is served by the host farmers and in some cases some portions of weeds, straw (animal feed) and grain is offered to the poor families as a religious obligation.

7.1.2 Comparative advantage of various horticultural crops within Gilgit-Baltistan

There are a range of horticultural crops that are grown in Gilgit-Baltistan. These include both fruits and vegetables. In fruits, the prominent ones are apricot, apple, almond, cherry, grapes pomegranate, walnut and pear. These fruits are distributed across the various agro-ecological zones and some of these are more intensively grown than other on the basis of the suitability of the climate, availability of production resources and opportunities for marketing of fresh or processed products. (see table 4.3 and 4.23) According to the survey conducted by DoA, the total estimated number of fruit plants in GB is 2307, 800. The average number of fruits per household is 30 trees which give a production of 2280 kg much of this is consumed as fresh in the households and some of it is marketed mainly apples and and cherries. An average of 130 kg of fruit is dried which is mainly apricot. A huge quantity of fruit is also wasted 55773 tons due to improper post harvest handling and due to lack of processing and marketing opportunities.
There are 49 government fruit nurseries which produce an average of 100,000 fruit trees every year and there are over 50 fruit nurseries established through the support of AKRSP which are an important resource for the availability of fruit plants.

Similarly, a range of vegetables are produced on an area of approximately 10,745 ha in GB. The prominent ones are potato, tomato, onion, cabbage, Chinese cabbage, bell-pepper (Capsicum) and pea. The most intensively grown crop is potato which is grown at an area of 4256 ha followed by tomato and China cabbage 132 and 90 ha respectively. However, in vegetables too, the intensity of various crops varies with the climatic zone and the marketing niches. The following matrix gives a comparison between the prominent fruits.

Table 7.2: Comparative analysis of fruits in GB

Factors	Apricot	Apple	Almond	Walnut	Grapes	Pomegranate	Cheery	Peach	Pear
Geography and Climate									
Geo-distribution	H	H	M	H	L	L	H	M	M
Resource base	H	M	M	M	M	L	L	L	M
Off season	M	N/A	N/A	N/A	L	L	M	L	L
Economic									
Multiplier affect	H	M	L	L	M	L	M	L	L
Income	M	M	H	M	M	H	H	L	M
Processing/Value Addition	H	M	M	M	L	L	M	L	L
Market demand	H	M	H	M	M	H	H	M	H
Employment generation	H	M	M	M	L	L	M	M	L
Food Security	H	M	M	M	L	L	L	L	M
Social									
Collective action	H	L	L	L	L	L	L	L	L
Women involvement	H	M	M	M	L	L	L	L	L
Youth involvement	M	M	L	L	L	L	L	L	L
Poor involvement	H	M	M	L	L	L	M	L	L
Environment	H	L	M	M	M	M	M	L	M

Key: H= High, M= Medium, L=Low N/A= Not Applicable

The matrix (see table 7.2) used as a simple tool to give comparison between the various fruits grown in GB shows that the fruit with highest ranking in terms of agro-ecological, economic and social advantage is apricot. It has the largest geographical coverage (is grown in all the districts of GB), broader climatic suitability (grown in all the agro-ecologies: Double , Marginal Double and Single cropping Zones), highly defused economic impact (apricot is grown by hhs of all income levels), current and future contribution in food security and income generation stands at the top for development. Apricot has long been part of the local food security system due to the high level of nutrition it provided during food deficient months of winter and early spring. It has not only been the source of food security in a particular season for humans but some varieties are fed to the animals to maintain their dairy output during dry winter season.

Apricot processing has a potential of creating a lot of season employment particularly for women. Also, the educated youth, distant themselvesfrom farm labor, tend to take part in value addition activities and hence apricot drying provides healthy activity for youth and if done on scientific lines it has the potential of engaging them in seasonal income generation activities. Since, the apricot harvest especially in Marginal double cropping zone coincides with the summer vacation in colleges and universities; the youth coming to homes for summer vacation from cities will be delighted to be involved in modern high income apricot processing activities. In most areas apricot harvest coincide with the wheat harvest which creates the need for labor

pooling which is an old tradition in the region. This helps in promoting the culture of collective action.

The next crop that follows is the apple. Apple too is grown in all three agro-climatic zones. In fact, it is the most widely cultivated commercial fruit crop besides apricot, which is native to this region of the world. The resource base for apple too is comparatively wide due to continuous investments from various projects. It creates seasonal employment opportunities in harvest, packing, grading and transportation. Depending on the variety the income is comparatively higher than other competing fruits. There exists potential for value addition both in fresh fruits (grading and good packaging) and in processing of apples. Apple because of its low perishability has been part of local food security system during food deficient months. Like apricot apples trees too are widely distributed across income groups and so is one of the income earning fruits for the poor households. Apple however is prone to a number of pests and diseases and therefore needs intensive pest management; although, due to climatic extremes, the pest cycles are fewer than other apple growing regions in Pakistan, which substantially reduces the crop management costs and the health and environmental risks related to use of pesticides.

Apple is followed by cherry which is grown in almost all agro-ecological zones as a high value fruit but is more concentrated in Double and Marginal Double cropping Zones. Cherry is easy to grow and has very short gestation period. It is one of such crops that give very high income per tree in GB i.e. average net revenue of PKR 4000-6000 per tree. Cherry is less management intensive during most stages of production but needs substantial effort at harvest grading and packing. Cherry has a growing demand and bright prospects of export to China and other South East Asian countries through China.

Almond and walnut have a similar degree of comparative advantage. Both are grown in almost all the agro-ecological zones but commercial varieties of almond are more suited to the double and lower areas of Marginal Double Cropping Zones. Gestation period and land resource requirement of almond is however lower than the walnut.Walnuts are therefore normally grown outside the cultivated lands. The income from almonds is 3000-5000 per tree which is higher than the walnut. It creates income opportunities at the processing stage where almonds and walnuts are de-shelled. Sometimes, farmers tend to prefer almond over other stone fruits due to less intensive management at production, harvesting and marketing stages.

In addition to the above, there are some fruits, which are more suited to a certain agro-ecological zones than others and serve important market niche. Grapes and pomegranates are such important examples for double cropping zones. However, the current resource-base in term of marketable varieties and capacity of farmers in using the improved crop management techniques for the production of these fruits is low.

Table 7.3: Comparative analysis of Vegetable production in GB

Factors	Potato	Tomato	Onion	Cabbage	Pea	Bell Pepper	China Cabbage
Geography and Climate							
Geo-distribution	H	H	M	H	H	M	H
Resource base	H	M	M	M	M	L	H
Off-season	H	H	M	H	H	H	L
Economic							
Multiplication affect	H	H	L	L	L	L	L
Income	H	H	M	M	H	H	L
Processing/Value Addition	L	H	L	L	L	L	L
Market demand	H	M	M	M	H	H	L
Employment generation	M	M	L	L	L	L	L
Food Security	H	M	L	M	L	L	M
Social facet							
Collective action	M	L	L	L	L	L	L
Women involvement	M	H	H	H	H	H	H
Youth involvement	L	L	L	L	L	L	L
Poor involvement	H	H	L	L	H	H	L
Environment	L	M	M	M	H	M	M

Key: H= High, M= Medium, L=Low N/A= Not Applicable

In GB, potato has a clear edge over all other vegetables. Potato is grown in almost all the agro-ecological zones. The climate is highly suitable for the production of potato that requires long sunny days and cool nights, which are in abundant during growing season in the region. Potato season in GB coincides with the off-season in main production areas of Pakistan; therefore, the huge demand and supply gap brings substantially high income to the farmers in the beginning of the season i.e. July and August which tends to decrease towards the end of the season (Oct-November) when huge volumes are harvested, at once, in the high altitude valleys to ovoid frost injuries to the crop from approaching winters. Farmers, store some portion of harvested potatoes for household consumption and use it as part of every meals till the end of April. Hence, it has a major role in household food security especially in poor households. The income from potato is highly defused in all income groups and it is highest contributor of farm income in GB. Collective action and involvement of women and youth is high in potato production because much of the income earned from potato is spent on the education of the children especially in high altitude villages where landholdings are bigger and farmers cultivate potato on most portions of their lands.

Potato however, carries some environmental risks as it has completely replaced other important food crops. The soil health in potato production areas is affected due to mono-cropping and total diversion from crop rotation which was an important practice in centuries old cropping system.

In the current situation, although, potato outclass all other vegetables in most of the aspects but there are few other potential vegetable crops that have competitive edge over other crops in and outside GB. The most prominent one is tomato which is followed by pea. Tomato and peas are grown in all the agro-ecological zones. The productivity of tomato is high in double and marginal double cropping zones. Both the crops have the advantage of off-season with main

land production areas of Pakistan and hence fetch comparatively higher prices. Peas grown in single cropping zone is harvested in August-September, which is the period in which nowhere else in Pakistan are the peas available and hence gives a very high income to the farmer. Since the poverty is comparatively high in high altitude valleys and the population is heavily dependent on potato production. Pea can therefore be a very good alternate in single cropping zones where with pea's two crops can be harvested: i.e. peas followed by turnips.

Tomato has the prospects of processing which can then create employment opportunities for women. During the FGD it was noted that the income from big crops like potato directly goes to men but the income from other surplus vegetables like tomato is kept by women. This may be due to the fact that the current contribution of tomato in family income is not very high and is not taken serious in family income accounting. However, when tomato is scaled up it has the potential to increase the share in family income substantially even in that case the tradition may follow and women will manage the income from tomato.

The role of tomato is also high in family food security because tomato is one of the ingredients of every recipe and is used many times each day in addition with its prominent share with the salad.

7.2 Product with Greater Potential for Value Addition

The section above identifies the fruits with the potential for value addition and therefore the following matrix has been used to further elaborate on that potential and its economic impact.

Table 7.4 Potential Analysis for value addition in different fruits in GB

Factors	Apricot	Apple	Almond	Walnut	Grapes	Mulberry	Cheery	Peach	Pear
Production volumes	H	H	M	M	M	L	M	L	L
% pre/pos tharvest losses	H	M	L	L	M	L	M	M	L
Current processing capacity	M	L	L	L	L	L	L	L	L
Potential for drying	H	M	L	L	M	L	L	L	L
Potential for juice making	L	M	L	L	M	L	L	L	L
Potential for improved packing	M	M	L	L	L	M	H	M	H
Incremental value	H	M	L	L	M	M	M	M	M
Increase in average hh income	H	M	M	M	M	L	M	L	L
Input/output ration	H	M	L	L	M	L	M	L	L

Among fruits apricot is the highest contributor in over all production with 108,588 tons of fresh production out of which 42,273 tons is wasted due to absence of dehydration equipments at individual farmer's level in GB. In addition, the un-predictable rain pattern and in some parts dust storm during drying season are potential hurdles in scaling-up of open air drying. Despite apricot has achieved the status of 2nd most important cash crop of GB with consistently growing farm-gate prices for the dried apricots.

According to the surveys conducted by the AKRSP[19] and DoA, over 50% of total fruit trees (30 trees) owned by farmers of all level are apricot trees and hence is a major contributor of farm income. For instance,if an average household in GB owns 30 trees, out of which 50% (15 trees) are of apricots; then the average productivity per apricot tree is 100-120 kg. Hence, from the 15 trees, the average production can be within the range of 1000-1200 kg. According to the survey,[20] at average 40% of the crops is wasted at different stages of production and the marketable quantity available is 600-800 kg. If sold, as fresh, it fetches an average price of PKR 4/- to 5/-; and earns an income of PKR 2400-3000 for the household. If same quantity is dehydrated using improved Turkish method of whole apricot then the quantity recovered after dehydration at the conversion ratio of 6:1 from fresh to dry is 100-120 kg and it fetches the price of 100-120/kg at the farm-gate. In addition, the apricot kernel is sold separately and average price of one kg of apricot kernel is PKR 250-300.

Introduction of aggregate processing level by the AKRSP and other development projects like UNDP with the provision of appropriate tools, equipments has paved way to standardization of apricot processing. For example, the apricot drying on Turkish style involves: sun drying, grading, washing/re-hydrating, controlled dehydration, oiling and packing. Such apricots fetch a price of PKR 250-300/kg. The standardization of apricot processing procedure has given a level of confidence to the practitioner and small producers. It has also increased the confidence of buyers on the quality of processed product. In spite of this, the current volume of export from GB is only 1-2% and is targeting only the UK dry fruit market. The scaling-up of apricot drying activity through establishment of aggregate level processing at potential locations and exploration of other potential national and international markets can produce a large economic impact in the region.

The fruit that stands next to apricot for value addition is apple. The potential exists both in fresh and dried apples. Out of 19,045 tons of apples, 9125 kg is consumed within the household, 3948 tons (21%) is wasted before and after the harvest and 5809 tons are marketed. Apple contributes significantly to household food security but high percentage of household level consumption is also attributed to the high percentage of local varieties with low market demand. Also the 21% wastage is mainly due to poor shelf-life of local varieties. Apples are currently being sold locally and in the down-country markets. Apples to the local markets are supplied in loose packs without grading. The apples sold in the down-country markets are packed in cardboard boxes. The type and quality of these boxes vary significantly as no standards for packaging is established. Roughly, 70% of the apples are marketed in loose packing locally which are further graded and packed by the traders and supplied to the down-country markets. The remaining 30% apples are directly packed at the farmer field and supplied to the market with a brand name that normally reflects the the products' geo-graphical origin. For instance; *Yasin Apples, Hunza Apples, Baltistan Apples, Kachura Apples et cetera*.

During the FDGs, the framers in districts of Gilgit, Ghizer, Hunza, Skardu and Ghanche reported that the properly graded and packed apples of commercial varieties like Red Delicious, Stark Crimson, Kala Kulu, Golden Delicious fetch almost 100-120% higher prices compared to the loose packed apples. The farm-gate price of apple is about PKR 25-30, whereas the price of properly graded and packed apple is PKR 60-70. According to the AKRSP's Socio-economic survey 2008, the average number of apple trees per household is six. Each tree produces an average of 50kg apples and hence the average apple per household is 300 kg . Assuming that 50% of this is available for marketing, then the total apple available is 150 kg and if it is sold at an average price of PKR 50/kg, the average income per household will then be PKR 7500. It was

---

[19] *AKRSP Scio-Economic Assessment of Gilgit-Baltistan and Chitral 2008*

[20] *Northern Areas Agriculture Statistics 2007*

also learnt during from the respondents that some traders from some regions buy premium quality apples from GB at a comparatively low price and sell it in down-country with other regional labels. The farmers complained about such practices and narrated the stories that how they confiscated the boxes in Hunza labeled as "Swat Apples" and compelled the trader to re-pack them as "Hunza Apples."

Since the packing material is supplied from down-country, therefore the southern traders exercise control on the packing material and exploite it in their own favor. Building the capacity of the farmers in post harvest crop handling and improving their access to the packaging material through providing support for creation of local packaging enterprises can hence double the current income which is highly defused across the region and the income groups.

A negligible quantity of apple is also dehydrated and some of the dehydrated apples are further grinded to make apple powder and used as a nutritious drink by mixing it with water or milk. This is however a household level activity and has not been tested and used for commercial purpose. The experiments conducted by various projects on improved apple dehydration techniques have shown promising opportunities for the export. For instance, Mountain Fruit Company has successfully exported a product of dry apples with the brand name "Hunza Red Apples" and was liked by the buyers in export market and the price offered for one kg was PKR 325. It is also worth mentioning that the suitable varieties for dehydration are the local varieties due to their low water content and high color and flavor retention quality. But this product could not be taken to scale due to supply issue and lack of technical and financial capacity of the small farmers to follow an internationally accepted processing protocol.

Followed by apple are grapes and cheery. Grapes are commonly grown in double cropping zone and they are either dehydrated or processed into concentrate. Most of the grape varieties grown in GB are with seeds; therefore, they don't fetch good market price and not very popular in market. Owing to the abundance of grapes in some pockets of double cropping zone and the potential for increasing the population of plants, grape is therefore an important fruit for processing.

Processing cherries have not yet been tested for marketing purpose but small scale drying at household level has been carried out which has shown mix success trends. But the potential for dehydration exists because there are 16% post harvest losses, much of this is attributed to over ripening on plant due to delay in harvest. Cherry is the most popular and rapidly growing sub-sector and likelihood of need for processing in the future to minimize the effects of market fluctuations and communication-related risks (like road blockages due to landslides) is very obvious.

7.3 Mode and system of local processing and high value addition at the area of production:

In fresh fruit marketing, *local processing,* includes grading and packing. Different methods and materials are used in GB for grading and packing depending on the availability of resources. Farmers normally sell the produce to middle-man or trader who then manages grading and packing. The premium packing material currently used are cardboard boxes; however, there are several other kinds of inferior type of packing materials depending on the type and destination of fruits and vegetables like nylon sacks, wooden-boxes, empty hardboard-boxes of 25 kg and old tin containers. None of these are considered suitable and play major role in deterioration of the quality of produce during transportation and marketing.

The next level of *local processing* is the dehydration, which is considered the most appropriate method of preservation for a number of fruits and vegetables and is being practiced for centuries in this region. The climatic conditions are extremely suitable for dehydration due to long and

dry sunny days and low relative humidity during fruit ripening season. Hence, the cost of traditional dehydration is negligible and is easily managed by even very low income groups. The main fruits and vegetables dehydrated includes apricot, apple, grapes, tomato, green-beans and spinach. But the major in fruit is apricot and in vegetables is tomato. In apricot, the whole apricot drying which is commonly known as "Turkish" apricot has become very popular and has successfully set benchmark for quality and farm-gate prices and is now in high demand in premium markets.

The third type of *local processing* involves preparation of concentrates by simply boiling the fruit pulp/juice. This is done mainly in the case of mulberry and grapes at a very small scale at household level in few selected villages. The information collected during the FGD given in table 4.33 shows that much of this concentrates is consumed in the homes and only 10-20% is marketed locally.

The final and the NGO driven type of *local processing* is the preparation of jam, juices, tomato catch-up, tomato puree, pickle etc by women for household use and for marketing. Currently, there are at least 15 (8 public and 7 private/NGO) organizations/enterprises in GB that arrange fruit and vegetable processing trainings for men and women, independently and in collaboration with each other. These organizations have so far trained over 8000 people in fruit processing, of which 90% are women. The objectives of these trainings have been to scale-up the activity to the commercial level. But this couldn't be achieved mainly due to 1) lack of standard procedures required for the uniformity and safety of the products processed at individual level and 2) lack of resources and skills needed for marketing. Resultantly, this type of processing couldn't go beyond homes, despite of availability of training imparting organization (DoA, AKRSP, MARS) and certification facilities PCSIR (which has a sub-station in Skardu). However, the role of this activity in household food security through prevention of post-harvest fruit losses has been significant.

Out of the thousands trained, some entrepreneurial minded individuals are continuing the activity as a business on small scale. If these people are provided further encouragement through providing R&D support in developing differentiated products they have the capacity to make their place in the market. However, to create the economies of scale aggregation of the product at the community and traders' level could be a better strategy and will reduce the marketing cost of the individuals.

Processing/value addition in the production area can either be done at household level or as an aggregate in the form of a cooperative or company but each has its own opportunities and challenges. The following table highlights some of the opportunities and challenges for an apricot dehydration business.

Table 7.5 opportunities and challenges in various processing models

Processing Models	Opportunities	Challenges
Household level	• Dehydration is easy and ancient technology and hence individuals in the household are well informed of the process. • The current demand of quality product in national as well as international market has motivated small producers to allocate time and resources to benefit from this produce.	• Individuals can't afford to implement improved drying techniques which often need new technologies and infrastructure to maintain hygienic conditions. • Can't afford the cost of certification as an individual. • At household level it is difficult to maintain the two essential

Processing Models	Opportunities	Challenges
	• Family labor is either free if not the opportunity cost is low. • Volumes at household level are small therefore, easily manageable i.e. Av. 500-600 kg. • Training to the individuals is available free of cost.	things; uniform quality and volume both of these are crucial to engage and sustain a potential market/buyer.
Aggregate level	• This is carried out at a central place with hired labor therefore it creates seasonal employment opportunity especially for the non-literate or less educated women • Centralized quality assurance system ensures product consistency and consumer/buyer's trust • This model is normally created as a joint venture hence it empowers the stakeholders especially primary producers (farmers) and processing workers • Resources are pooled and risk is diversified • Easy to adopt technology and get certifications.	• If aggregate model is owned by an individual it can cause exploitation of workers and household level processors. • Joint venture may cause administrative issues due to conflicting interest and different wavelength among stakeholders • Processing is a seasonal job but the resources needed for the processing like infrastructure, equipment some essential staff are needed to be maintained round the year which increases the cost of the business.

Joint venture R&D

In Agri-food industry the life of a product is sometimes very short due to many reasons such as rapid innovation in product development and changing consumer preference etc. Product improvement and development as a continuous process is therefore essential for sustainability. This is provided by R&D institutions working in public or private domain.

Gilgit-Baltistan is in a dire need an R&D center/institute for product development and product diversification, which should also serve as product incubation center. In the present context, a joint venture to establish an R&D body/institution is more practical, in which professionals from public sector institutions (like food processing department, KIU, food technology wing DOA, and PCSIR), NGO's like AKRSP, KADO, BCCDF and private business line Mountain Fruits, North Pole Traders, Hunza Fruits etc can join hands to develop a mechanism of R&D. This R&D institution should feed the private sector continuously on new product idea development, product improvement and process design improvement. They should work more on innovative ideas keeping in view buyers' preference, niche in market and comparative advantages.

7.4 Development of Brand in Connection with Tourism

Generally, fresh fruits and vegetables in Pakistan are being marketed in non-packed form at consumer level; but, at wholesale level, packaging in bulk, for example, 20, 40, 50 and 100kg is commonly practiced. Such packaging is not standardized both in terms of quality of the product and the quality of packaging material. Since brand is linked with packaging, most of the horticulture products have therefore no brand especially in fresh vegetable. In fresh fruits, the gap, to some extent, filled by the variety name in national market, for example, well known mango varieties are "Langra and well known Mandrine "Kinno." In GB, the fruit varieties have been named after the person who brought the variety to the area, still this is limited to some varieties in fresh fruits, but most varieties have no common name across GB, although they may have local names in local dialect. Some fruits like apples and dried apricots are being marketed from GB with a geographical label, which serves as a brand name like; "Hunza Apples" , "Hunza Apricots" . Also, the brand name of North South Seeds is established in the market for vegetable seeds.

There are numerous possibilities of developing brands in connection with tourism. This can be done in the following ways;

1. Through celebrating "annual fruit festivals" or by sequencing the various events related to major fruits under one major event. For instance, it may be called "The Mountain Fruit Festival" and under this a number of a calendar of events can happen, such as:

    a. Apricot Blossom (March-April): could be organized during apricot blossom season in which apricot and apricot products can be marketed.
    b. Cherry Week (May-June): could be organized during cherry harvest and cherry and the cherry products could be sold.
    c. Autumn Apple Harvest! (Sept.– Oct): could be organized to coincide autumn colors with the apple harvest.

2. Another way of promoting brand in connection with tourism can be through associating the products with the areas that are widely known for their tourist attraction. This is already happening in some areas but not in organized way and has been counterproductive due to lack of standards and quality control mechanism. For instance, "Hunza Apricot" and "Hunza Apple" has been successfully used for apple and apricot marketing and actually became popular in down-country market. To cash the situation, traders from other regions in the country have used the same name especially for apple and the popularity couldn't be maintained due to quality issues coming from other regions. Hence, a better approach is needed to revive such branding with first development of standards and then mechanism of monitoring to ensure the compliance on the standards.

3. The brands can also be developed for the products which are having distinct attributes and can be associated with particular areas: for instance, "Chilasi Walnuts. The branding of horticulture in this way will complement the promotion of area as well as the particular product.

4. Finally, GB--being an environmentally friendly place—has a great potential of producing premium natural/organic fruits and vegetables. These products can be marketed locally during tourist season in the form of blend of different products. For instance, energy bars, in the form of local recipes developed for tourists only which can be offered in breakfast, lunch and dinner: e.g., organic salad was very popular among tourists in one of the tourist

restaurants in Skardu; walnut-cake is a popular item for tourists in Hunza. Brand is developed on similar lines that will substantially decrease the marketing costs and fetch premium price for the producers at their farm-gate.

Opportunities:

1. GB is known to the world for its tourist attraction.
2. There are some established connections of horticulture with tourism, like apricot and almond blossom is an attraction for Japanese tourist.
3. Traditional farming practice are almost inline with organic production, therefore, organic certification, branding and marketing organic products can be another attraction for tourist.
4. Some areas in GB, for instance, Hunza is known for longevity of the inhabitants' age; therefore, health related local products can be made part of the brand and promoted to attract national tourist, senior citizens and business executives.
5. Branding of products and linking with fair trade and ethnic products can be another area where GB brand can be promoted.
6. Pakistan, being the 6th largest apricot producing country where GB has its share of 90%) can be promoted as "Home of Apricot" and apricot blossom and apricot ripening season linked with tourism promotion to attract domestic and national tourist.
7. It is interesting to note that some of Hunza's dried apricots have been exported to European health food shops. They are in demand because they have been grown under natural conditions without the use of either chemical fertilizer or pesticide.
8. Fruits and vegetables are universally considered as vital element in a healthy diet. Not only they provide crucial vitamins and proteins, but an increasing rate of medical evidence is demonstrating broader health giving qualities. So health related local products can be promoted through branding.
9. Horticulture products such as flowers, house and garden plants which are sold for purely aesthetic reason. These products are rarely produced or marketed at local level in GB. These products also can be made part of brand to attract interested tourist.

Constraints:

1. Tourist influx does not remain the same throughout the year; hence, tourist market can be categorized as seasonal market. Moreover, current turmoil in Pakistan has resulted in sharp declination in tourist inflow to GB.
2. There an is issue of uniform variety fruits as there are 17 varieties of apple, 28 of apricot, 13 of cherry and so on. It is difficult to invest in brand that can be marketed widely (FGD, RMA)
3. Need long term and committed investment from public and private sector which is lacking.
4. Business and market culture are not sensitized about brand and quality.
5. Tourists prefer products from multinational than local produces due to food safety concerns (FGD).

7.5 Livelihood improvement of subsistence farmers through enhancement of marketing, storage and distribution system

Livelihood improvement of subsistence farmers need substantially diversified set of activities on value chain development approaches, as the ground realities significantly differ from area to area depending upon the agro-ecological zone and the distance of production area from main road and markets. The subsistence farmers living near the main markets have some sort of marketing and distribution system in place, though very fragile. For the farmers, at longer distances from the main roads and markets, the distribution system is highly fragmented and meager. Finally, the marketing systems disappear for the farmers living in remote and far flung areas mainly those at high altitude and are in single cropping zone.

The main actors in marketing and distribution system as mentioned in the figure 3, 4, 5 and 6 of *Chapter 5* are: **contractors, group marketers, agents or local collectors, commission agents or auctioneers, wholesalers, secondary wholesalers, retailers** and **processors.** There has always been an argument in rural development practitioners regarding the role of middle-men/local collector in supply chain. Some of the expert see their role as exploiters as they buy the product at very low price from the farmers and pass it to the market by keeping a big margin for themselves. While the others argue that the middle-man adds value in the supply chain especially in the market marginalized far-flung areas. They bring new technologies, new seeds to the farmers and buy the produce. Both the arguments have some important substance but the core issue seems access to technology and market information. Access to market information has greatly increased in almost all the valleys of GB due to arrival of mobile phone. The local support organizations have thus already started a mobile-based market information system in partnership with Telenor. This facilitates the follow of information about various agricultural and non-agricultural commodity prices on daily basis. In such an environment, the chances of exploting farmers decrease significantly. The fragmented nature of longer supply chains however makes the market information in relevant for far-flung production areas and the middle-man/local collector tend to control the price. Also, in such circumstances, middle-man/local collector takes the maximum risk of price fluctuations in the market.
The best possible solution in this situation is the promotion of community-based input supply and product marketing companies which should get some technical and financial support from the public sector for the establishing a mechanism which should later work on a business model but monitored by the government. Such facilities will not only create employment opportunities for the local people but will also decrease the cost of input procurement and marketing.

The opportunities and constraints regarding livelihood improvement of subsistence farmers are being discussed hereunder.

Opportunities:

1. Organize communities to carry out collective marketing and create economies of scale. (RMA, FGD)
2. Public and private sector development institutions are available to play their role
3. Capacity building of existing marketing actors and linkage development with groups of the farmers has been successful experiment by the AKRSP in horticulture sectors: for instance, formation of apricot marketing associations, creation of commission agents and master trainers, creation of processing marketing company such as " Mountain Fruit Limited."
4. Big population of un-employed educated youth that can be mobilized and trained to get into marketing of horticulture produces.

5. Climatic conditions are feasible in high altitude areas to develop simple natural air conditioned storages.
6. Possibility of establishing small processing and storages facilities with community-based micro-hydel unit for supply of energy.
7. Construction of high tech cold storage at Sost Dry Port to facilitate both import and export of horticulture products from China.
8. Completion of the on-going KKH widening project will decrease the distance and time between GB and mainland markets and increase the competition for supplies in the distribution channel.
9. As the climatic conditions of the area suits to grow high value vegetable seed, corporate sector dealing in seed can therefore be linked with local privates sector. For example, a GB-based local seed company "Mountain Seed Leaders" started contract production of seed-potato for the Lays Brand Chips in Pakistan, owned by Pepsi.

Constraints

1. Local demand for the horticulture produces is low in rural area (AKRSP RMA 2010) as the households produce their own consumption requirements on their own farms except in main towns of GB like Gilgit, Ghakuch, Chilas and Skardu. Consequntely, the agricultural lands are shrinking and a number of non-local residents and hotels is rising high, and the demand is comparatively high for local produces.
2. Due to absence of major regulated market places in all Districts of GB, the market transaction is non- competitive resulting in un-necessary price fluctuations.
3. Lack of processing and storage facilities result in wastages of both fruits and vegetables.
4. The market channels are not very developed. In most cases, intermediary services are missing—mainly transportation and market services.
5. Commercial high tech storage doesn't seem feasible to address the scattered and highly seasonal storage-needs in GB, except for the major cities and at Sost Dry Port. Therefore, promotion and improvement in the use of small to medium size indigenous storage facilities at traders' level and larger storage facilities under Public Private Partnership for fruits and vegetables at district level.

7.6 Enhancement of employment opportunities and livelihood, especially for non-farmers through expansion of the processing of the horticultural products.

Recent studies[21] have shown that agriculture is the main source of income for 86% of the rural households in Gilgit Baltistan. Among them, horticulture remains to be the major source of income for 74% rural households. Off-farm employment is the secondary source of family cash income for the horticulture farmers to fulfill their household consumption needs.

"This is an alarming situation, there needs to be a mechanism to attract youth towards this sector". Shoaib Sultan Khan wrote in his book "A Journey to Grassroots Development:the Aga Khan Rural Support Programme" Mr. Khan has shared his experience from Japan and Sri Lanka, where governments had provided special packages for the youth to initiate farming and agriculture related businesses, especially for young graduates of agriculture universities. Agribusiness Support Fund has taken such initiatives in Pakistan and GB, but there needs to be more efforts to put in place. Government and social sector development institutions can handhold the youth to start agriculture based enterprises.

[21] Source: "*Baseline Survey of the Horticulture Farmers in six districts of Northern Areas"; Agribusiness Support Fund Project, Gilgit; June 2009.*

The traditional farming system prevailing in GB is comprised of mixed farming on small landholdings: i.e., less than one hectare farm size per household. The climatic conditions of the GB are generally most suitable for horticulture production as the villages and settled communities are settled over altitudes ranging from 4000 to 12000 feet above sea level. The farmers allocate largest proportion of their farm to grow vegetables and fruits that bring cash incomes which carry a very high market value as compared to other agriculture produces such as cereal and fodder crops etc. Within the horticulture sector, potato among vegetables and apricot among the fruits are produced in largest quantities which are considered high value cash crops.

The dwelling situation of the farmers is well in conformity to the special social and cultural settings of the rural areas of GB where there is no culture of tenancy. Generally, the horticulture farmers have their own houses with small pieces of land where they practice mixed farming to sustain their livelihoods and hence can be termed as small production and consumption units.

The studies have found that the horticulture farmers are well-off as compared to the households in other farm and off-farm professions in terms of their dwellings. Their houses are bigger in size, have relatively better facilities, and the construction material include non-local material e.g. cement, GI sheets, pipes, etc. The percentage ratio of potato growers living in "Paka[22]" houses is the highest as compared to rest of the farming categories which implies that they earn higher incomes from the potato production and marketing. This depicts the level of farmers' overall well being. The horticulture farmers have been noticed to have relatively better access to credit, health and education facilities. Also they have a higher rate of nutritional value in their dietary patterns.

Although, the horticulture farming brings high amounts are cash income to the farmers besides meeting their household consumption needs, it has the highest ratio of production losses and value-addition problems: thus, the potential cannot be exploited fully.

The number of non-farmers in GB is limited to main urban settlement. The other type of non-farmers living in the region are the nomadic group called "Soniwals". The "Soniwals" is a community that doesn't own any land and does not belong to a particular area, they keep on traveling along the rivers, starting from the high altitude in summer and ending up in the plains in winter. Their livelihood is on gold collection) separation of Gold from sand through a traditional process of distillation). This segment is neither interested in agriculture nor seeks employment in any other profession.

Another category of non-farmers is that of the non-local community engaged with their formal businesses and employment in the public or private sector organizations/institutions. These outsiders (out of GB) are generally concentrated in the urban or town areas.

Among the village inhabitants, the population of non-farmers is almost nonexistent. For the last couple of years, it is being observed that youth especially the educated cadre does not feel attracted toward the farming and agriculture sector. This segment of population may find processing and value addition of horticulture products interesting adopt it as a career.

Key opportunities and constraints are being discussed as under.

---

[22] *The term "Paka" houses is used for the houses constructed using modern construction material, e.g., cement, GI sheets, pipes, electricity fittings, bath rooms etc.*

Opportunities:

1. 56% of the population in GB is below the age of 30 and hence a big number of educated and un-employed youth, both men and women are available across the GB.
2. The educated youth is in search of employment and among them the individuals having entrepreneurial abilities would like to start a venture related to processing of horticulture products.
3. By introducing value-addition, processing centers in partnership with corporate and private sector in rural setting, employment opportunities particularly for the less educated young women will increase.
4. Introducing small enterprise at all level of the value chain will open up self-employment opportunity for the youth.
5. Young educated women can also be engaged in home cottage industries like jam and pickles making and in developing organic products.
6. By introducing new technologies and techniques to make horticulture an interesting and profitable enterprise, the youth can be attracted to horticulture sector which will also be a value addition in horticulture as it will pave a way to innovations.

Constraints.

1. There is lack of entrepreneurship culture and the agriculture is considered as the job of uneducated persons. Most of the youth therefore want a job other than farming.
2. In GB, the farm size is too small and fragmented which limits the possibility of thinking horticulture as a long term business prospect.
3. There is a huge difference in return from agriculture compared to other sectors.
4. No support mechanism and incentive for youth to participate in farm-related activities.
5. People move from their rural setting to the towns, probably mainly due to high relative incomes that could be earned in the towns through regular employment opportunities.

7.7 Infrastructure development such as small scale processing equipment and facilities, storage and market.

Fruit and vegetable processing in GB is comparatively a new activity which gradually increased during the last two decades. Large public and private sector investments in processing facilities is lacking despite visible potentials. As a result, fruit and vegetable processing is still a home-based activity and the small farmers lack the capacity to invest in processing equipment. Much of the processing even today is limited to drying apricots. No other processing and value addition with respect to horticulture product is taking place anywhere in GB. There is lack of public and private sector packaging and storage facilities across the region. As far as market facility is concern, there is no exclusive market place for agriculture commodity trade which is regulated by the government. In Skardu district, a market place was however developed by the government but it is functional as not regulated market place; while in Gilgit, an infrastructure for the market place is under construction. On the other hand, the government is planning to invest huge funds for power generation (ADP 2009-10). It is anticipated that some of the infrastructure related issues will be solved in near future including increase in power supply. However, the long term solution to the infrastructure issues is a public-private driven

comprehensive strategy in which public sector should invest in communication and energy sector and offer incentives to the private investors from outside GB to invest in processing and storage facilities. The opportunities and constraints in ths regard are being highlighted as under:

Opportunities

1. Availability of raw materials for processing.
2. Potential for establishment of collection, grading and processing facilities in partnership with the local communities at valleys level.
3. Establishment of markets at district level.
4. Increased literacy and high demand for technology.
5. With increase in demand for GB horticulture products specialized and dedicated transportation service can be a new opportunity for investment.
6. Prospects for establishing seed processing plants are very high due to highly suitable conditions for seed production.

Constraints:

1. Lack of a pool of skilled labor.
2. Shortage of financial and non-financial services to establish processing business.
3. Lack of incentives and support from the government to private sector in establishing processing plants.
4. Unreliable power supply and acute shortage during winter months.
5. Ambiguous government policies on public-private partnership and on promotion of horticulture sector.
6. No fruit and vegetable markets where the raw materials in scale are available for processing.
7. Lack of reliable transportation vehicles for processed materials.

7.8 Role of the government and public sector in creating enabling environment

The government, being the most important and resourceful player in development, has the most crucial role in overall development of horticulture and agricultural development in GB. From policy making to implementation, the government interventions in various fields such as technological development, extension/strengthening of market system and development of producer friendly laws and regulations could bring enormous changes.

Keeping in views the wide spectrum of the agricultural sector, the government of GB can play a crucial role in many areas. Some of the key suggestion would include:

- Risk sharing to encourage private sector interventions;
- Creation of product specific extension and marketing services for essential food and commercial crops;
- Provision of funds for extension and scaling up of existing services;
- Provision of subsidy/grants for R&D and market development;
- Sign protocols with international markets; and
- Encourage youth towards opting agriculture initiatives.

7.8.1 Risk sharing to encourage private sector interventions

One of the major reasons of hesitation by the privates sector to enter into a new area like horticulture business in GB is the huge capital requirement both setting up production and

processing units along with the risk of failure. The mountainous region of GB, although has less than 2% land available for agriculture, has a great potential in many areas, such as seed production for its highly favorable climatic conditions, organized orchard farming, organic farming, and fruit and vegetable processing etc. With few exceptions like vegetable seed production, fresh apple marketing and dry apricot marketing, there is no adequate practical knowledge at commercial scale, which ultimately scares or absitains the potential investors to entering into horticulture business.

The government, having large resources, can provide a helping hand to share the risk of new entrants. This could be done through public private partnerships, introducing tax-free zones, providing soft-loans for industrial development (focusing on agricultural value chain development), developing human resources and subsidizing/financing exposure visits to the international markets.

7.8.2 Creation of product specific extension and marketing services for essential food and commercial crops.

One of the basic issues with the existing public sector extension services is the lack of product specialist. In DoA, staff are assigned to offices but not to the crops/products which has developed the culture of jack of all master of non. To compete in the globalized markets it is imperative to have specialists consistently working on ideas both on production as well as marketing side. Therefore, the culture in the agriculture research and extension is needed to be transformed into crops specific assignments and the capacity of the staff involved on a particular crop should be enhanced through the opportunities of trainings and exposure at national and international level.

7.8.3 Provision of funds for extension and scaling up of existing services

The government of GB in the past has taken many initiatives to scale up and improve the existing extension services, which could have brought wonderful results if continued to the logical end. However, due to lacking capacity and unforeseen issues related to regular provision of fund, the intended results couldn't be achives. For instance, there are three tissue culture labs, two fruit processing centers and only one soil testing labs in GB, but apart from insufficient physical structures, these available units do not offer complete range of services. The facilities where machinery is available, there is deficiency of skilled manpower to operate the equipments, and where skilled technicians are available there is lack of basic machinery. This mismatch of men and machines often results in wastage of investment. Therefore, the government should provide a balanced mix of skilled manpower and necessary equipments to enhance the productivity of agriculture sector. For this government can extend their support to the private sector and NGOs for the optimal utilization of existing structures and scaling it further to the commercial levels.

For the last couple of years, the trend of public private partnerships (PPPs) in GB has given some encouraging results in the sectors like women development. Buidling on these successful experiments, there is a need to promote the culture of public-private partnerships in the field of horticulture, especially in the areas where either side has a competitive edge. For instance, the physical structures for horticulture available with DoA in different districts can be used by private sector which can bring management expertise to these facilities from the private sector.

Hence it is now crucial that the government should develop a clear policy for the promotion of public private partnerships in horticulture and allocate ample funds each year to offer incentives to the private sector through the provision of matching grants.

7.8.4 Provision of subsidy/grants for research & development

Research and development plays a vital role in identifying area-specific solutions for various issue. However it requires long term investments both financial and technical, which the weak private sector in GB cannot afford. The government, in this regards, should either carryout demand-driven R&D on its own or provide subsidy/grants to the private sector to test new processing technologies and develop indigenous solutions.

7.8.5 Sign protocols with international markets and facilitate basic requirements

The governments of developed countries often support their producers through signing various protocols with consumer countries and attract customers in international markets for their producers. This could be done through entering into bilateral / multilateral trade agreements or through attracting special discounts for the country through goodwill exchange with friendly nations. The Government of Gilgit-Baltitstan in this regard should influence the central government to sign protocols with the friendly countries to ensure the access of quality agriculture products to the international markets.
Second, in many cases, the governments of the importing countries impose various safety measures to avoid access of inferior quality goods into their countries. This requires the development of standards and provision of internally accredited certification services. In GB, absence of such services restricts the local producers to access neighboring international markets. For instance, even the premium quality cherry (having a great demand in China) cannot be exported to China because it requires a protocol signed between Pakistan and China and provision of certification services in compliance with the standards establish in the bilateral protocol. The government is, therefore, required to facilitate its producers by establishing such technological services at production, processing and the exit points.

7.8.6 Initiatives to encourage youth towards opting agriculture

It has been observed that the youth, and especially educated youth, avoid entering agriculture sector as their careers. One of the major reasons observed is the lack of attraction for youth in this sector in terms of working environment and the incomes. The governments in various countries introduce attractive packages for the youth to opt agriculture sector as career. Washington County in the USA organizes annual Agriculture and Youth Fairs, in Canada th government organizes agriculture competitions among youth; and in other countries, the governments offer many other attractive packages for agriculture graduates.

The public and private sector institution, especially the NGOs, in GB can introduce similar kind of packages for the youth to attract them towards the value added agriculture sector. The packages would include agriculture related business loans for young professionals, scholarships in agriculture universities, short trainings in agriculture for youngsters abroad and so on.

Opportunities:

1. Organized communities that are willing to change.
2. Growing potential for horticulture owing to increasing global demand for food.
3. Best time for restructuring public research and extension services owing to ongoing transformation in over all governance system in GB.
4. Huge public investments in energy sector that is likely to create provision for cheap electricity which will attract investors in GB.
5. A big population of youth who can be used in agriculture extension.

Constraints:

1. Due to subsistence farming agriculture/horticulture is currently at the bottom of government priorities.
2. The government considers market development for agriculture outside their domain.
3. Lack of product specialists in DoA and lack of research priorities and necessary funding.
4. Communication and energy issues are hurdle in attracting private investments in processing and marketing of horticulture.
5. Lack of marketing infrastructure and efficient marketing channels.

CHAPTER EIGHT

8. DEVELOPMENT STRATEGY AND ACTION PLAN

8.1 Introduction and objectives

Rapid development of horticulture sector in GB is need of the day but it can only be achieved if all the stakeholders of horticulture sector agree on certain objectives, and strategic principles; and set short, medium and long term priorities with the ultimate goal of economic well being of the people. The following objectives in line with the given draft of horticulture policy are are being suggested for the development of horticulture sector in Gilgit-Baltistan.

1. Establish a task force at GB level for the development of horticulture sector that should include representatives from the concerned government departments, NGOs, private sector and the producers.
2. Encourage public and private sector investments in market-led, competitive R&D, in production, processing and marketing of horticultural crops.
3. Strengthen the agriculture extension system through creating the crop-specific, competitive extension services and improving its outreach to union council level.
4. Identify the potential sub-sectors in horticulture through detailed sub-sector analysis and pooling available public and private resources to develop the identified sub-sectors on value-chain approach.
5. Capacity building of public and private sector value-chain actors.
6. Encourage public and private sector investments in infrastructure needed for the potential sub-sectors.
7. Develop agriculture marketing unit in DoA with primary mandate of delivering business development and market information services to the farmers and enterprises.
8. Support supply chain development for timely availability of quality inputs.
9. Increase productivity through participatory technology development (PTD) to prevent pre- & post-harvest losses.

To achieve the above common objective, the following strategic guiding principles will be followed that are discussed hereunder.

1. Food Security

The rough estimates given during FGDs indicated that majority of households suffer from food deficit for 3 to 9 months each year. Inaccessibility in winter and general remoteness of the valley make the communities vulnerable to food shortages and to recurrent crises. To a certain extent, such shortages are compensated by seasonal out-migration of men. However, insufficient nutrient intakes persist and, amongst other things, is negatively impacting the labor productivity which, in turn, is limiting the earning potential of households and communities. Through improved management of vital food crops and appropriate marketing of local surplussess, the communities can be made to better feed themselves in their environment.

2. Promotion of High Value Crops

Diversification of the marketable products' base and adding value to existing options/products are viable and necessary components of strategies that seek to generate additional economic benefits. These strategic components can be utilized to promote individual and collective action for exploiting horticultur development options in GB.

3. Promotion of demand-led and comparative advantage oriented horticultural activities

Selection of resources for investment should be based on assessments of demand and comparative advantage. The activities in each sub-sector should be selected by assessing their relevance to broad economic development for the communities and their comparative advantage. For example, investment in dried apricot value-chain development, high quality cherry and apple production, and development of certification standereds for GB are all activities that derive from the inherent potential for growth and which can be sustained over the longer term due to comperative economic advantages.

4. Strong and competitive R&D

Research and development is an important component of any development strategy. In agriculture, it is an important interface between research and farmer. Hence, involvement of a wider range of actors in R&D is fundamental to find sustainable solutions to horticulture development issues. To develop a workable and competitive model of R&D capacity building of private sector together with public sector in R&D is crucial.

5. R&D-led scaling-up

An R&D based scaling up approach is a key to reduce risk of failure and to avoid resource wastage. NRM section will ensure the correct sequencing of different steps before scaling up any new interventions. This sequence will entail carry on R&D: piloting the new intervention in a selected space, incorporating the lessons, and then scaling up.

6. Collective action at community level

Collective action is essential for the sustainable development of horticulture sector. Examples of such action include efficient utilization of irrigation water sources and joint investment by small farmers for the purposes of mechanization, dissemination of technologies, and collective marketing of farm products. The community based organizations created as a result of almost 30 years social mobalization work of AKRSP in GB are the most viable platform for promoting such collective actions in horticulture development.

7. Public-private partnership

Promotion of public private partnership (PPP) both at production and market levels are important means of filling the knowledge and resource gaps in public and private sector. Such partnerships which are mainly based on mutual intrest are more sustainable and economically rewarding for the over all sector.

8. Environmental conservation and sustainability

The livelihood systems of the majority of households in GB often combine a variety of activities such as crop cultivation, forestry, animal husbandry, and seasonal out-migration of select household members in search of complementary incomes. With an increase in population, it appears that the tendency towards over exploitation of natural resources has increased to compensate for ever-growing food and shelter needs. In this context, it is important to introduce such economic activities which could promote the conservation and preservation of limited resources while simultaneously producing economic benefit for communities. For example, promotion of organic farming, eco-tourism and rivival of environment friendly high value crops like buckwheat/faba-beans can be one of the important components of such strategies.

9. Involvement of women and youth

Women represent almost 50% of GB population and youth represent more than 50% of the population. This situation offers a great opportunity for using the important resource in economic development of the region. Involvment of youth in agriculture significantly decreased over the last few decades in GB due to the fact that agriculture is generally considered the non-

literate persons' job. This perception can be changed through creating attractive income driven oppertunities for women and youth in agriculture and especially in horticulture processing and marketing.

8.2 Overall Strategy

In order to develop horticulture on sustainable basis, a two pronged strategy needs to be undertaken that are for the short and long term. The short-term strategy should focus on extending support to production and marketing efforts for existing potentials in fresh and processed fruits and vegetables such as apples, cherries, dried apricots, potatoes and so on. The long term strategy ought ot focus on re-orienting the horticultural sector to the current market needs—keeping in view the long-term social, economic and environmental sustainability. Both the short and long term strategies and strong public private partnership will be the key to success. The framework for this collaboration is given in the figure below.

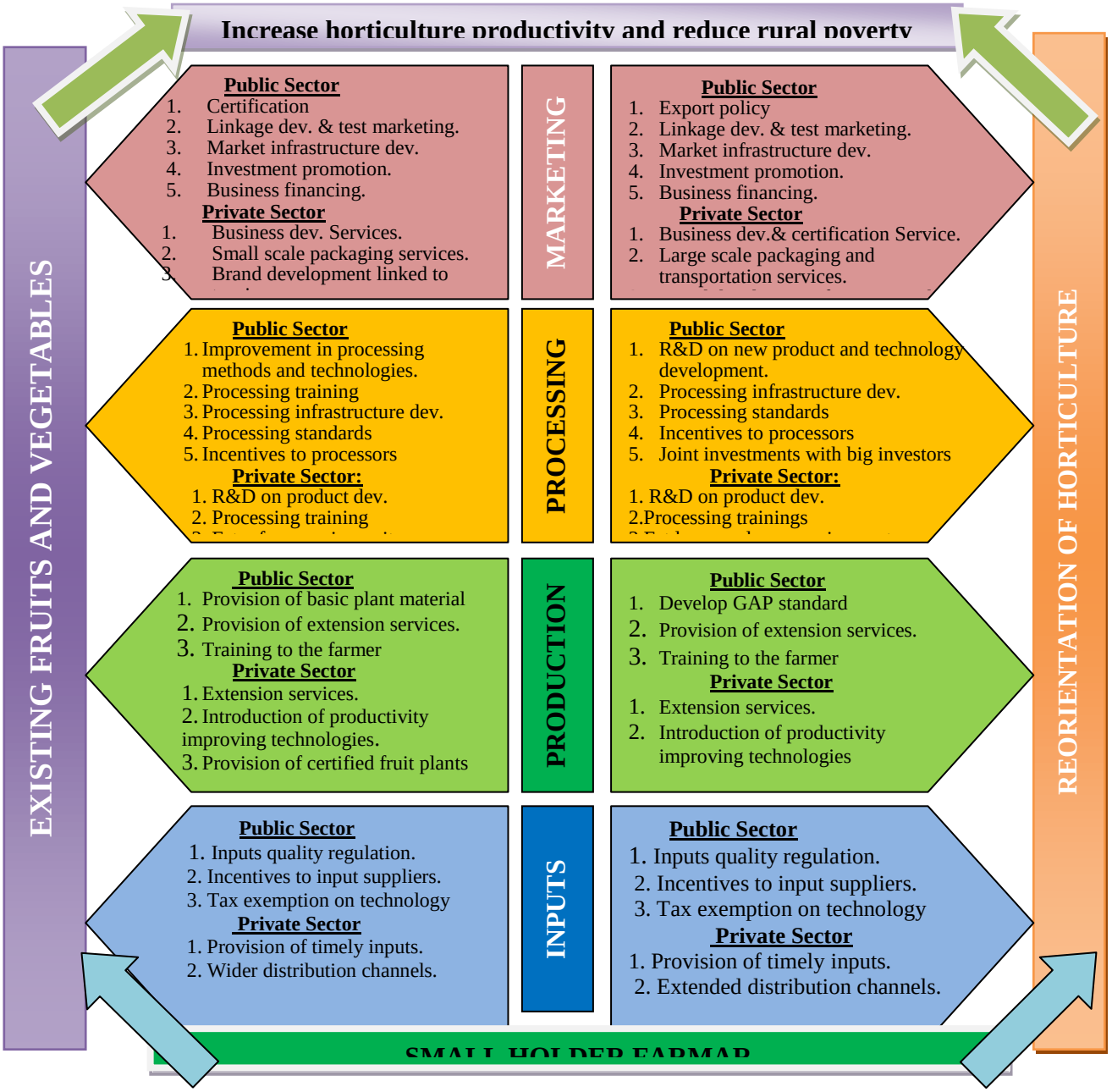


Figure: 8.1 Horticulture Development Strategy Framework.

As illustrated in the above figure, the short term strategy will work in vertical integration on value-chain approach. It will provide support to the small farmers of GB in linking with the potential markets through the integration of the public and private sector efforts. It will stream line the input supply mechanism as it is the basis for the start of the development process and will support participatory technology development (on farm training) for the outstanding production and processing related issues. It will encourage value-addition in production and processing technologies by private sector and encourage private sector investment in small scale fruit, vegetable and vegetable seed processing units and support market linkages and provide certification services needed for domestic and export markets.

The long term strategy will re-orient production according to high end domestic and export market requirements and encourage the introduction of new varieties, establishment of certified nurseries, establishment of model farms, provision of private value added extension services, regulation of crop input quality, and extension of input supply networks to the areas of demand and adoption of GAP. It will encourage both public and private sector led R&D in production and processing before scaling up and will encourage public private partnerships through policy intervention and provision of funding for the development of processing infrastructure such as value addition centers, cold storages, packaging houses (grading plants) and the capacity building of processing labors, technicians, and professionals. The efficiency of the support services like logistics, business financing and certification will be improved through private sector initiatives.

8.3 Horticulture Marketing Strategy

Since, marketing is the most important part of this development strategy, the horticulture marketing is therefore further elaborated by categorizing it into three broad levels in the figure below.

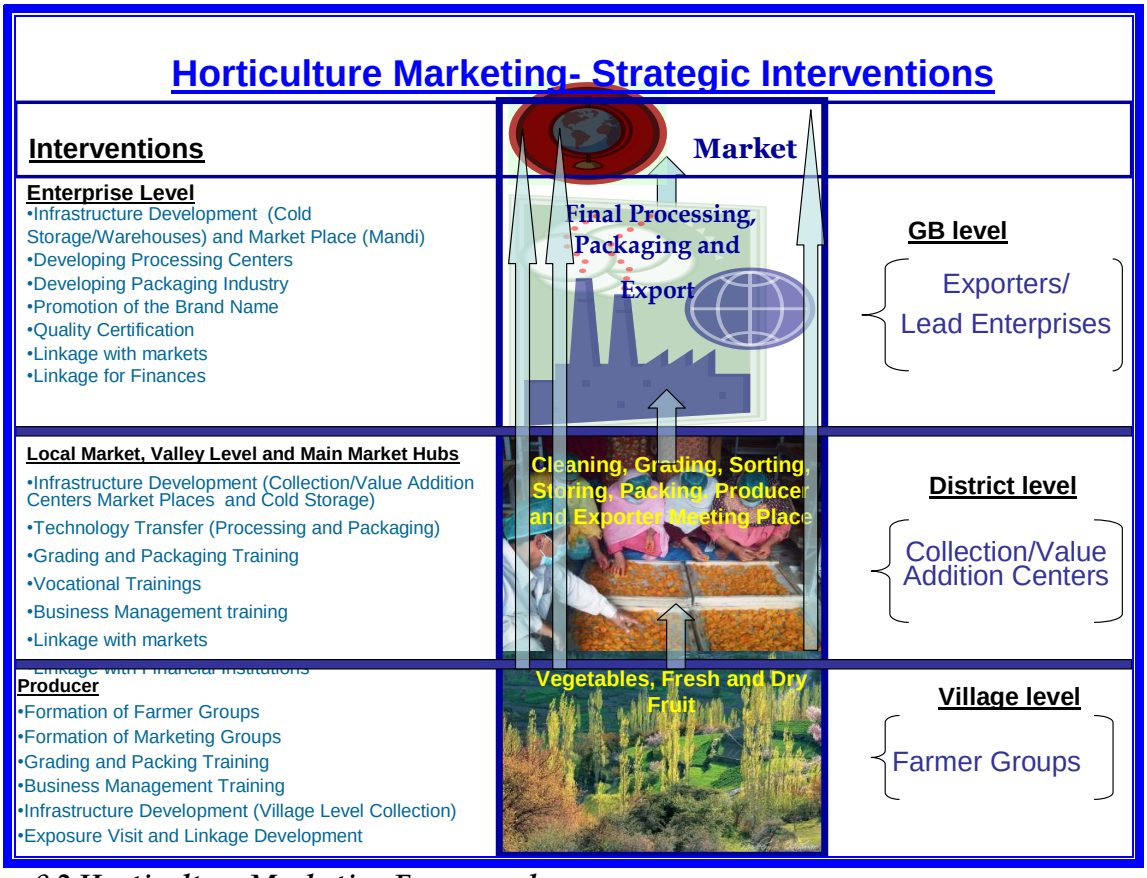


Figure 8.2 Horticulture Marketing Framework

At Village-level: Producer/ Farmer
The major marketing problem that lies at the farmers'/producers' level is the scale of marketable producea: the small farmers having a little surplus to market, which doesn't make its a viable business preposition. Therefore, the farmers usually wait for a buyer or in a compelling situation and act on speculative market information. The focus at this level would be on bringing scale in production through collective mechanism by formation of farmer groups. At least ten farmers having interest in collective marketing will join hands and combine their produces. Depending on the existing capacity of group, it can enter into grading, packaging and trading directly or after training in business management and basic marketing skills. This kind of arrangement can be started simply through construction of collection center where and individual farmer brings his/her produce and after sorting, grading and packing, transports to the market by group representative or the buyer comes to this point to purchase the produce.

Tehsil/District Level: *Interventions at Local Market, Valley Level and Marketing Hubs*
A critically identified obstacle hindering marketability of the horticulture sector is the geographical barriers and access to markets. To address this constraint, infrastructure development in collaboration with community, private sector, local support organization and non-government organization is crucial for collection and value addition at all levels but particularly at district level which are currently serving as marketing hubs. At this level, construction of market place (Mandi with Cold Storages/Warehouses) and value addition centers will provide signficnt reference and transaction point for local producers and entrepreneurs that will also serve as business development centers, and will facilitate training, packaging, storage etc on permanent basis. The following additional interventions are proposed at this level:

- These centers will have an organizational structure that is legally and technically suitable for managing the centers as businesses;
- Farmers, buyers and entrepreneurs will be facilitated to exchange services and goods at the centers;
- Strategic business facilities, like storage, communication, transport, packaging and grading facilities will be provided in these centers though public private partnership; and
- Quality control and certification facility will be provided.

GB Level- *Support to the Lead Enterprises*
The critical factor in developing horticulture value-chain in GB is developing strategic lead-enterprises in three critical areas: a) fresh-fruit marketing, b) dried-fruit processing, and c) processed fruits like juices, concentrates and by-products. As the information collected during FGD for the current study repeatedly highlighted the lack of value-addition in horticulture products which result in low-turnover and hence low return in terms of profit. In normal situation, during the production season, the supply overwhelmingly surpasses the demand for most of the fresh produce. Due to lack of storage and processing facilities, much of the production is lost. Having established the district level lead-enterprises momentum in GB horticulture can't be created unless there is an outside private or public private investment of industrial scale. If that happens it will turn the wheel and multiplier effects will the produced along the value chains. For instance,the fruits of A and B grade can be marketed fresh as it always fetches higher price than anything. The fruits of grade C from the village and district level processing centers in addition to the fruit coming from individual producer can be supplied to the big industries for making juices, concentrates and other products.

ACTION PLAN:

The following action plan was developed in consultation with the main stakeholders of horticulture sector in GB. In this process, the Department of Agriculture Gilgit-Baltistan fully participated in the development of the priority list which was further explained under JICA provided Project Development Matrix (PDM).

Table 8.1 Action plan

PDM Ver.0 (As of 6 April 2010)
Target groups: Rural Communities of all Districts of Gilgit-Baltistan
Project duration: 3 years

PROJECT TITLE: UNION COUNCIL-BASED PROCESSING UNITS (3 units in each district subject to potential)

Narrative Summary	Verifiable Indicators	Means of Verification	Important Assumptions
Overall Goal Increased share of horticulture in farm incomes	Sustainable increase by 15% over the baseline in share of income from horticulture in the target communities by theend of project in Gilgit-Baltistan	Survey and case studies (baseline, mid-term and end of project)	Sectarian tension do not breakout in the target areas. Natural calamities do not occur in project area
Project Purpose Minimized wastage of apricot and maximize marketable volume	70% decrease in wastage volume of apricot in target communities over the project period. 70% increase in quantity of apricot marketed by target communities over the project period.		Communities willing to participate and own the project. Private sector is willing to invest in fruit processing at a commercial scale. Natural calamities do not occur in target areas.

Narrative Summary	Verifiable Indicators	Means of Verification	Important Assumptions
Outputs 1. Increase in marketable produce. 2. Improved access to Market. 3. Product aggregation and Apricot Value Chain Development.	At least 30% increase in farm-gate price of processed products. Increase in quantity and types of value added products produced. 30% increase in marketable processed volume. At least 20 processing units established and functional in selected UC by end of project in GB		Community is willing to contribute land and local material for the processing units. Private sector investment is accessible. Public sector is willing to frame policies responsive to project needs.
Activities: **1. Capacity building of the farmers in improved Apricot processing technologies.** ***Sub.Activties:*** 2.1 Improve / replace existing Apricot drying practices with more efficient technologies. 2.2 Introduce international food safety standards.	**Inputs** (Japan side) Equipment and machinery Building/shades Training Consultancies (Pakistan side) Personnel Overhead budget contribution		**Pre-conditions**

Narrative Summary	Verifiable Indicators	Means of Verification	Important Assumptions
2.3 Research and development on improved control environment dryers. 2.4 On-farm training in post-harvest fruit handling and fruit processing for the farmers and the staff of DoA. **2: Apricot value Chain assessment and market development.** *Sub-Activities:* 3.1 Conduct dry/processed Apricot Value Chain assessments and identify the potential products. 3.2 Involve private sector for marketing of finished products. 3.2 Introduce improved packaging, Certification and branding 3.3 Develop linkages with national and international market agents. **3: Establishment of product aggregation and quality control units.** *Sub-Activities:* 1.1 Feasibility study to identify potential villages/valleys/UCs for the establishment of aggregation units. 1.2 Creation of producer groups at sub-village, village, and UC level. 1.3 Training of the producer groups in fruit			

Narrative Summary	Verifiable Indicators	Means of Verification	Important Assumptions
processing. 1.4 Capacity building in fruit processing and preservation (farmers and DoA staff) • Impart on-farm training to the farmers. • Provision of basic processing kits for the successful trainees. 1.4 Infrastructure development for processing units at potential locations. - Land acquisition - Construction of building - Procurement of machinery/ equipment. - Procurement of inputs - Installation of equipment.			

PDM Ver.0 (As of 6 April 2010)
Target groups: Rural Communities in all Districts of Gilgit-Baltistan
Project duration: 3 years
PROJECT TITLE: APPLE AND CHERRY CULTIVATION

Narrative Summary	Verifiable Indicators	Means of Verification	Important Assumptions
Overall Goal Increased farmers income from Apple and Cherry cultivation	20% increase over the baseline in share of income from fruit farming in target communities by end of project in Gilgit-Baltistan	Survey/ monitoring reports, case studies (baseline, mid-term and end of project) and research papers	Govt policies remain unchanged Peace and tranquility remains in the region. Natural calamities do not occur in project area
Project Purpose Increased productivity of apple and cherry fruits in GB	50% adoption of improved orchard management techniques and improved quality by target communities over the project period. Increased trend in commercial cultivation of the fruits in the area.	--do--	Communities willing to participate and own the project Natural calamities do not occur in target areas

Narrative Summary	Verifiable Indicators	Means of Verification	Important Assumptions
Outputs 1. Availability of disease free improved quality planting material in GB ensured. 2. Commercial Orchards with improved management and Good Agricultural Practices (GAP) established. 3. Vibrant market driven R&D system for fruit sector development Established.	04 model commercial fruit nurseries with private sector established in each district. 01 Mother fruit nursery with improved germ-plasam of cherry and apple established in public sector in each district. 4 new marketable varieties of apple and 3 marketable variety of cheery tested. 7 horticulturists from Public and 5 from Private/NGO sector imparted advance training in improved fruit production technologies. Linkage of DoA and private institutes/NGOs established with at least 2 research institutes of Japan through professional exchange program.		

Narrative Summary	Verifiable Indicators	Means of Verification	Important Assumptions
Activities: **1. Establishment of Certified Nurseries.** ***Sub-Activities:*** 1.1 Introduction of improved fruit nursery management technology. 1.2 Import of promising marketable apple and cheery germ plasm 1.3 Establishment of certified fruit nurseries at public and private sector. 1.4 Provision of inputs (planting material, fertilizers) **2. Promotion of Commercial scale Orchards.** 2.1 Economic and technical assessment of the existing orchards. (Need Assessment) 2.2 Establishment of model commercial orchards at farmers' fields. 2.3 Introduction of GAP standards in orchard management. 2.4 Capacity building of farmers in commercial approaches of orchard management. **3. Strengthening of public and private sector R&D.** 3.1 Capacity trainings for the existing horticulturists of DoA and private sector R&D institutions. 3.2 Creation of a cadre of fruit specialists in DoA through specialized training and re-organization of the departmental structure.	**Inputs** **Japan side** 1 Import of improved germ plasm 2 Capacity building trainings for farmers. 3 Capacity building trainings for the horticulturists. 4 Provision of inputs (planting material, fertilizers and tools/implements) 5 Technical experts. **Pakistan side** 1 Personnel 2 & M cost		**Pre-conditions**

Narrative Summary	Verifiable Indicators	Means of Verification	Important Assumptions
3.3 Facilitate linkage development with national and international research institutes/ development organizations. 3.4 Encourage the participation of private sector in R&D through outsourcing the R&D projects.			

PDM Ver.0 (As of 6 April 2010)
Target groups: Rural Communities in all Districts of Gilgit-Baltistan
Project duration: 3 years
PROJECT TITLE: ESTABLISHMENT OF CERTIFICATION SYSTEM IN GILGIT-BALTISTAN

Narrative Summary	Verifiable Indicators	Means of Verification	Important Assumptions
Overall Goal Increased share of horticulture in farm incomes of farmers.	Sustainable increase by 15% over the baseline in share of income from horticulture in target communities by end of project in Gilgit-Baltistan	Survey and case studies (baseline, mid-term and end of project)	Sectarian tension don't breakout in target areas National and International Policies do no change
Project Purpose Improved quality and acceptability of local horticulture products in national and international markets.	Initially 30% of the trade able apple and cherry certified/registered in target communities over the project period 50% increase in the farm prices of apple & cherry by target communities through access to high valued markets over the project period.		Communities willing to participate to adopt the new technology Natural calamities do not occur in target areas

Narrative Summary	Verifiable Indicators	Means of Verification	Important Assumptions
Outputs 1. Agriculture product certification/registration system established 2. Tracking and Traceability (T&T) system of agriculture products in place. 3. Adoption of Good Agriculture Practices (GAP) in GB 4. Product standardization system in place.	One product certification and certification laboratory established and functional in Karakorum International University, Gilgit. At least 30% increase in farm-gate price of processed products. Increase in quantity and types of value added products. 30% increase in certified marketable processed volume.		Community is willing to adopt the new technology Private sector investment in getting certificates of the products Public sector is willing to frame policies responsive to project needs

Narrative Summary	Verifiable Indicators	Means of Verification	Important Assumptions
Activities **1. Establishment of GB quality standards for key fruits.** ***Sub-Activities:*** 1.1 Development of GAP for key fruits in GB. 1.2 Establishment of certification and registration facility for Agricultural products at KIU, Gilgit 1.3 Emplacement of necessary legislation and policy frame regarding product certification and registration for GB **2. Capacity building of Value Chain Actors of key fruits in GAP** 2.1 Capacity building of producers, traders/marketers and consumer regarding products quality standards. 2.2 Provision of subsidies on certification for small producers. 2.3 Introduction of Good Manufacturing Practices (GMP) among the farmers, traders and processors. 2.4 Awareness/ skills improvement of farmers, traders and processors in GAP and GMP	**Inputs** **Japan side** 1. Technical experts to draft GAP. 2. Lab. Equipment's/machinery for quality testing. 3. Training of GAP inspectors. 4. Training of GAP certification staff 5. Linkage development with Japan based GAP certification agencies. **Pakistan side** 1. Personnel 2. O & M cost		**Pre-conditions**

PDM Ver.0 (As of 6 April 2010)
Target groups: Rural Communities in all Districts of Gilgit-Baltistan
Project duration: 3 years

PROJECT TITLE: IMPROVEMENT OF SEED POTATO MULTIPLICATION SYSTEM

Narrative Summary	Verifiable Indicators	Means of Verification	Important Assumptions
Overall Goal Increased farm income	Sustainable increase by 15% over the baseline in share of income from horticulture crops in target communities by end of project in Gilgit-Baltistan	Survey and case studies (baseline, mid-term and end of project)	Sectarian tension do note breakout in target areas Natural calamities do not occur in project area
Project Purpose Significant increase in quality seed potato production and productivity in GB	40% decrease in the cultivation of uncertified seed potato in target communities over the project period 30% increase in the yield of potato in the target communities over the project period		Communities willing to participate in and own the project Private sector is willing to invest in seed potato at a commercial scale Natural calamities do not occur in target areas

Narrative Summary	Verifiable Indicators	Means of Verification	Important Assumptions
Outputs 1. Availability of disease free improved seed potato 2. Introduction of improved potato crop management technology 3. Sustainable use of agricultural resources base and minimized insect pest and disease incidence for sustainable crop harvest.	Strengthening of the 3 three tissue culture labs and green houses by end of project in GB 50% increase in the existing certified seed potato production capacity through strengthening and introduction of new technologies Import and introduction at least 03 high yielding marketable potato varieties and its replacement with the degenerated existing varieties. Introduction of improved potato crop management technologies Awareness raising in optimal uses of certified seed potato, fertilizers, IPDM and crop rotation practices in the target communities		Continuous flow of funds over the project plan period Project implementation as per plan

Narrative Summary	Verifiable Indicators	Means of Verification	Important Assumptions
Activities **1. Introduction of improved potato varieties.** 1.1 Assessment of farmers demand 1.2 Import and testing of new marketable varieties. 1.3 Strengthening of the existing tissue culture laboratories for the production of disease free basic seed. 1.4 Procurement of inputs (seed, fertilizers) and lab/green house equipment, chemicals etc **2. Introduction of improved potato production technologies.** 2.1 Demonstration of pre-harvest technologies. 2.2 Demonstration of Post-harvest technology 2.3 Creation of a cadre of potato specialists. 2.4 Training of Farmers in efficient techniques of potato production. 2.5 Marketing trials in the plain of the country 2.6 Study tour and field visits of the framers and technical staff in major potato growing areas of the country **3. Introduction of Soil management system.** 3.1 Assessment of soil profile of different localities. 3.2 Calculation of location wise recommended fertilizer package for potato. 3.3 Introduce crop rotation techniques to	**Inputs** **Japan side** 1. Lab equipment/machinery 2. Technology 3. Planting material 4. Training 5. Consultancies **Pakistan side** 1. Personnel 2. O & M Cost		**Pre-conditions**

Narrative Summary	Verifiable Indicators	Means of Verification	Important Assumptions
discourage mono-cropping. 3.4 Introduce competitive crops 3.5 Awareness raising campaigns on conservation and improvement of soil fertility and pest and disease control 3.6 Strengthening of existing Quarantine system			

PDM Ver.0 (As of 6 April 2010)
Target groups: Rural Communities in all Districts of Gilgit-Baltistan
Project duration: 3 years

PROJECT TITLE: INSECT, PEST AND DISEASE MANAGEMENT

Narrative Summary	Verifiable Indicators	Means of Verification	Important Assumptions
Overall Goal Increased production and productivity of horticulture	Disease free production of Seed and Planting Material. Healthy & Marketable Fresh Fruits and off season Vegetables. Establishment of new orchards/Nurseries.	Sale Proceed/crop registers. Farmer's annual Income statement. Survey reports. Public opinion.	Continuity of Govt. Policies. Favorable climatic conditions. Sectarian Harmony.
Project Purpose Reduced Losses through IPDM	20-30% increased production of Horticulture Crops. Adoption of good agricultural practices and disease diagnostic services at farmer's field level.	Market Survey Reports. Farmer's Income index. General public polling.	As above.

Narrative Summary	Verifiable Indicators	Means of Verification	Important Assumptions
Outputs 1. Decreased incidence of pest/ disease attack on horticulture crops 2. Improved crop management practices 3. Increased linkages with public and private sector service providers	Production of Healthy Horticultural crops. Establishment of IPDM Laboratories at district HQ. Increased interaction with farmers and service providers.	Market reflection. No of Labs established. Minutes of meeting with communities	As above.
Activities **1. Introduction of IPDM measures.** 1.1 Establish viable quarantine system. 1.2 Awareness campaigns 1.3 Control measures to curb attack of invasive species 1.4 Introduce measures, incentives, subsidies to reduce the cost of pesticides, and insecticides 1.5 Introduce alternate and environment friendly control measures (biological control etc.) **2. Capacity building of farmers and staff in IPDM.** 2.1 Awareness campaigns. 2.2 Capacity building of DoA staff to create a cadre of plant pathologists and entomologists. 2.3 On filed farmer Training/Community IPM through FFS Approach	**Inputs** **<u>Japan side</u>** 1. Lab equipment/machinery 2. Capacity building of DoA staff and private/NGO sector persons 3. Pest Management experts 4. Import of bio agents and bio insecticides **<u>Pakistan side</u>** 1. Personnel 2. & M costs		**Pre-conditions**

Narrative Summary	Verifiable Indicators	Means of Verification	Important Assumptions
2.3 Participatory research and Development at the farmer's field. 2.4 Introduce improved agriculture extension methods for pest monitoring and reporting. **3. Strengthening of public and private sector plant protection services.** 3.1 Establishment of diagnostic lab in DoA. 3.2 Encourage/ increase involvement of private sector in pest management. 3.3 Capacity building of DoA and Private/NGO staff in pest identification and integrated pest management 3.4 Linkage development with sources of knowledge in Japan and elsewhere.			

ANNEXES I: PROFILE AND TOR OF THE STUDY TEAM

Name	Muhammad Saleem as Team Leader
Date of Birth	15.05.1957
Academic qualification	M.A Economics
Experience (years)	22 years
Areas of expertise	Monitoring, evaluation, research, and general management
Brief summary of experience	Currently heading the Monitoring, Evaluation and Research Section at the AKRSP. Worked on socio-economic surveys, monitoring and evaluation of development interventions, impact assessment etc, played a central role in designing and supervising fieldwork and documenting the socio-economic and institutional development surveys carried out by AKRSP in the Gilgit-Baltistan. Also worked with the Aga Khan Health Services, Pakistan on a Research Project on the Management of Community-managed Water Supply and Sanitation Systems and worked with the Gilgit-Baltistan Administration on the Northern Education and Northern Health Projects
Key Achievements	Have produced nearly **70** research, monitoring, evaluation, and annual reports on various topics. Have presented more than **10** research papers at the international workshops. **Two** articles have been published in the magazine 'Boiling Point'.
Contact address	Programme Manager Monitoring, Evaluation & Research, P.O. Box 506, Babar Road, Gilgit-Baltistan, Gilgit. Office Phone: 05811452480; Mobile: 03455566224

Name	Melad ul Karim
Date of Birth	April 30, 1973
Academic qualification	M.Sc (Hons) in Horticulture
Experience (years)	12 years
Areas of expertise	Horticulture development 2. Rural enterprise development. 3. Agri-based value chain development.
Brief summary of experience	Conceptualized, strategized and implemented projects on 1) fruit and vegetable production and marketing 2) vegetable seed production, processing and marketing, 3) Agri-based value chains development 4) Rural enterprise development 5) community based food security in mountain areas working at various managerial position in AKRSP, AKDN-MERP and FATA Livelihood Development Programme.
Key Achievements	Played important role in the establishment of a vegetable seed company in Gilgit-Baltistan as key role in production, processing and marketing of vegetable seeds, established first organic village in Skardu, Baltistan and linked it with the eco-tourism, working with Aga Khan Development Network Multi-input earthquake reconstruction programme in Kashmir strategized and implemented NRM based livelihoods rehabilitation activities and supported establishment of over 300 viable micro and small enterprises.
Contact address	Melad ul Karim, NRM Specialist, AKRSP, House No 51 A, Street 26, F-10/1, Islamabad, Pakistan cell: +92 302 5430003, E-mail: melad@akrsp.org.pk

Name	Muzaffar Uddin
Date of Birth	June 21, 1968
Academic qualification	MBA, MSc (Business and Enterprise)
Experience (years)	15 years
Areas of expertise	1. Market development. 2. Institutional develpopement,3). Strategic planning and project management 4) microfinance
Brief summary of experience	Currently working as Programme Manager Market Development. Started as microfinance monitor, conducting field survey research and studies on savings and credit during working with UNDP led a team of developing Islamic mode rural finance. Later involved in developing small enterprise in the field, engaged in developing business plan, capacity building, market linkages and product development. Leading enterprise development team, this include developing enterprise and market developing strategy and engaged in developing key sectors or subsector. Currently, leading a multi-sector team in rural development.
Key Achievements	Leading research and survey on Microfinance and enterprise. Value chain analysis and development plan for key economic sectors. Designing and developing social enterprise.
Contact address	Programme Manager, Economic development, Babar Road Gilgit, Gilgit-Baltisan. Tele: +92 5811 452480. E-mail: muzaffar@akrsp.org.pk

Name	Abdul Malik
Date of Birth	14 April 1973
Academic qualification	Masters in Development Studies
Experience (years)	10 years
Areas of expertise	Project management, Monitoring & Evaluation, Socio-economic data analysis and quantitative and qualitative research, proposal writing and gender budgeting, policy analysis, livelihoods
Brief summary of experience	Nine years of work experience as a practitioner as well as a policy analyst in development themes surrounding community driven development, livelihoods, rural infrastructure, and social development in Pakistan. Most recent professional experience includes contributing to a World Bank Economic Report and a research study on economic growth in South Asia. Other recent policy related experience includes research work on aid effectiveness at the Brookings Institution and training in Public Administration from the Kennedy School of Government.
Key Achievements	Proposal writing, Project implementation, Conducted various evaluation and impact studies, supervised many research studies, Conducted economic survey of Gilgit Baltistan as member of world Bank team
Contact address	House no 1159, st 41, Gali 64, G-10/4 Islamabad. Cell# +92 343 5594934 E-mail maallic@gmail.com

TOR OF KEY MEMBERS OF STUDY TEAM:

ToR of Mr Muhammad Saleem team Leader and consultant Natural environment and local resources, socio-economic situation and stakeholder analysis:

As team leader:

1. Overall management of the study and coordination with the JICA and the Japanese consultant.
2. Design the study and developing sampling strategies (sampling frame, sample size and sample selection) to include multiple parameters.
3. Develop the questionnaires and FGD formats with other team members and pre-testing.
4. Develop the implementation plan, hiring enumerators and allocate resources consultation with other team members.
5. Lead the team in delivering the inception report, interim report, draft report and the final report.

As Consultant Natural environment and local resources scio-economic situation and stakeholder analysis

1. Collect and analyze the basic information pertaining to the history, culture, tradition and ethnic and religious classifications of Gilgit-Baltistan.
2. Collect the information related to geography, land, climate and physical condition of cultivated and cultivable land.
3. Collected information of local irrigation system, seasonal availability irrigation water, water distribution system, water rights etc.
4. Assess the status of physical infrastructure and social services in access of general public in various geographical and administrative divisions in Gilgit –Baltistan.
5. Analyze the scio-economic situation in the area using the key indicators like land holdings, moveable and immoveable assets, income sources, food availability, access to food etc
6. Identify the major livelihood sources including the small, medium and large industries that create demand for local production and provide employment to the population.
7. Identify and categorize the vulnerable segment of the society and its distribution across the area and explore the kind of disparities that is created in the population as a result.

Using the information above;

1. Create an inventory of natural resources that can contribute to the development of horticulture sector and ultimately to the economic development of communities in Gilgit-Baltistan.
2. Identify the economically and socially vulnerable segment of the population and suggest the interventions for strengthening their livelihoods through development in agriculture/horticulture
3. Identify and estimate the level of investment that will be required to uplift the socio-economic condition of the population that lives below poverty line.

Qualification: 1) Advance degree in economics 2) 5-6 years work experience 3) strong Knowledge of statistics 4) High level of communication and analytical skill.

(b) ToR of Mr. Melad ul Karim consultant Agriculture/horticulture Management production and processing

1. Design and implement the study in collaboration with the team leader.
2. Undertake mapping of horticulture commodities produced in Gilgit-Baltistan clearly indicating types of commodities and geographical dispersion.
3. Review trends in area and production of horticulture commodities in general (land usage, cropping pattern, cropping schedule) over the past 10 years.
4. Examine crop productivity (yield per unit area) vis-à-vis national/international benchmarks and identify causes for low productivity if any.
5. Study access to inputs i.e. seed, fertilizer, pesticides, irrigation water and credit in terms of availability, quality, price and associated extension advice, its source and quality.
6. Determine the role agriculture/horticulture in securing livelihoods of the farming communities and its contribution in household income.
7. Identify the role of gender in agriculture/horticulture and their contribution to household income.
8. Identify production and management constraints including technological gaps, human resource, access to quality inputs, irrigation and climate change related issues, access to market etc.
9. Estimate the consumption patterns for the major horticultural crops, farm surpluses, produce losses.
10. Identify the causes of wastage at farm, market, storage, transportation and other levels along the supply chain.
11. Estimate local consumption and commodities inflows and outflows indicating type of commodities, volumes, origin/source (for inflows), and destination (for outflows).
12. Estimate potentials for value added processed products, currents status, future scope, needs for improved technology, training, technical assistance, infrastructure, testing and certification.
13. Identify and enlist the main stakeholders in the horticulture production and processing.
14. Contribute in developing questionnaires and FGD formats, recruitment of data enumerators, data collection, punching, and analysis and in final deliverables.

On the basis of the above:

1. Prioritize the horticulture products for value addition potential for greater and wider economic impact in Gilgit-Baltistan
2. Suggest the mode and system for local processing and value addition.
3. Identify the comparative advantages at production and processing levels caused by factors that may include climate, geography, social features etc
4. Identify needs for trained/skilled human resource and associated orientation trainings, inland & overseas, technical assistance (national & international) for strengthening the production base of horticulture sector in Gilgit-Baltistan and to develop potential value chains.

Qualification: 1) Advance degree in horticulture 2) 6-8 years experience of working on horticulture development in mountainous areas 3) strong knowledge of issue and opportunities in seed and fruit processing sectors.

(c) ToR of Muzaffar Uddin consultant Agriculture/Horticulture marketing

1. Design and implement the horticulture marketing study in collaboration with the team leader.
2. Determine supply and demand gaps and marketable surplus for fresh and processed horticulture crops and estimate time window (harvest calendar) for main horticulture commodities.
3. Identify production strengths and market niches, for instance, organic horticulture products, fresh and value added; seed production, flora products etc.
4. Study marketing systems including exports if any, distribution channels, role of different intermediaries, associations, middleman, retailers etc.
5. Study status of marketing support facilities like farm to market roads, wholesale markets, rural assembly markets, cold storages, packing facilities, mode and means of transportation, value addition etc.
6. Examine role of the major stakeholders in horticulture marketing, extension services, private sector service providers, lending institutions and determine gaps between demand and supply if any.
7. Contribute in developing questionnaires and FGD formats, recruitment of data enumerators, data collection, punching, and analysis and in final deliverables.

On the basis of the above

1. Suggest strategies/interventions for market driven horticulture production and processing to create income and employment opportunities especially for the vulnerable segment of the society.
2. Propose a sequence of actions which should lead to development of a brand that eventually would become an identity of the region in horticulture and tourism industry.
3. Prioritize the horticulture produce of Gilgit-Baltistan for value addition and develop a road map for expansion of fruit and vegetable processing activities and their integration with the demand in and outside the region
4. Identify and estimate the level of investment that will be required to develop small scale fruit processing, storage and marketing facilities at various locations in Gilgit-Baltistan

Qualification: 1) Advance degree in agri-economics/business management/marketing/enterprise development 2) 6-8 years experience of working on market development activities in market marginalized areas 3) strong knowledge of agriculture value chains: issues and opportunities 4) strong communication and analytical skills

ToR of Mr Abdul Malik consultant agriculture Policy and Administration

1. Design and implement the study on agriculture policy and administration in collaboration with the team leader and other team members.
2. Review the federal and provincial policy on Agriculture/horticulture development.
3. Assess the capacity of public sector to deliver; updated technology, quality extension and capacity building services in horticulture sector through analyzing the existing institutional set-up, capacity of human resource, financial sources to deliver the key services etc.
4. Assess the capacity of the public sector services in marketing and promotion of the horticulture sector.

5. Review the work done by various NGOs in horticulture sector, their current activities and future plans.
6. Review the past role of the donors in horticulture development in Gilgit-Baltistan also their current and prospective activities.
7. Identify the major livelihood sources including the small, medium and large industries that create demand for local production and provide employment to the population.
8. Identify and categorize the vulnerable segment of the society and its distribution across the area and explore the kind of disparities that is created in the population as a result.
9. Contribute in developing questionnaires and FGD formats, recruitment of data enumerators, data collection, punching, and analysis and in final deliverables.

Using the information above;

10. Together with other members of team identify the role of public sector in strengthen the horticulture sector through intervention in production, processing and marketing of potential horticulture crops. (fruits, vegetables, seed and ornamentals).
11. Suggest policy interventions/changes if any for creating an enabling environment for the proposed role of public sector and active participation of various stakeholders particularly the farming communities and the vulnerable population.
8. Together with other team members develop road-map and operational strategy for the development of horticulture in the short, medium and long term perspective in Gilgit-Baltistan keeping in view the expanding domestic and international market demand, food quality & safety issues and other international compliances with respect to exports, clearly defining the role of public and private sectors.

Qualification: 1) Advance degree in economics/Policy/Public Administration 2) 5-6 years work experience 3) strong Knowledge of statistics 4) High level of communication and analytical skill

Questionnaires: (other sections to be attached!!!)

Horticulture Production and Processing

1. **Cropping pattern**

How many agro-ecological zones exist in the district?

Which UCs are located in each zone? / What are different crops grown in each ecological zones? / What are the main horticultural crops?		UCs	Climatic Zones	Crops/fruits grown	Main horticultural Crops
	1				
	2				
	3				
	4				
	5				
	6				
	7				
	8				
	9				

What is the cropping schedule for main crops?		Crop	Double CZ		Trans CZ		Single CZ	
			DoS	DoH	DoS	DoH	DoS	DoH
	1	Wheat						
	2	Maize						
	3	Buckwheat						
	4	Barley						
	5	Potato						
	6	Tomato						
	7	Onion						
	8	Pea						
	9	Spinach						
	10	Turnip						
	11	Carrot						
	12	Cabbage						
	13	Cucumber						
	14	Bell Pepper						
	15	Plantation						

2	What are the harvest months for major fruits? Give the harvest calendar for Double, Transitional and single cropping Zones.		Fruit	Double	MD	Single	Remarks
		1	Apple				
		2	Pear				
		3	Cheery				
		4	Almond				
		5	Apricot				
		6	Grapes				
		7	Pomegranate				
		8	Walnut				
		9	Mulberry				

3	**Fruit Processing?** Which fruits and vegetables are processed? What kinds of products are made? What percent of processed product is consumed and what percent is marketed? Why people don't process the fruits and vegetables.		Fruit / Vegetables	Products	Household consumption	Marketed
		1				
		2				
		3				
		4				
		5				
		6				
		7				
		8				
		9				
		10				
		11				

4	**Agriculture**		

	Management: Level of agriculture management practices?		**Crop**	**yes**	**No**	**Remarks**
		1	Use of certified seed.			
		2	Use of well rotten FYM.			
		3	Use of balanced Chemical Fertilizer.			
		4	Timely Weeding.			
		5	Pruning and training.			
		6	Integrated pest management.			
		7	Timely harvest			
		8	Grading and packing			
	Provision of agriculture Services?	1	Access to crop inputs			
		2.	Access to advisory services			
		3	Access to marketing services			
		4	Access to farm credit			

5.		**Parameter**	**Seed**	**Fertilizer**	**Pesticides**	**Credit**	**Ext. Serv.**
		Availability					
		Quality					
		Price					
In your opinion, how the quality and cost of the above mentioned inputs can be rationalized.	1						
	2						
	3						
	4						
	5						

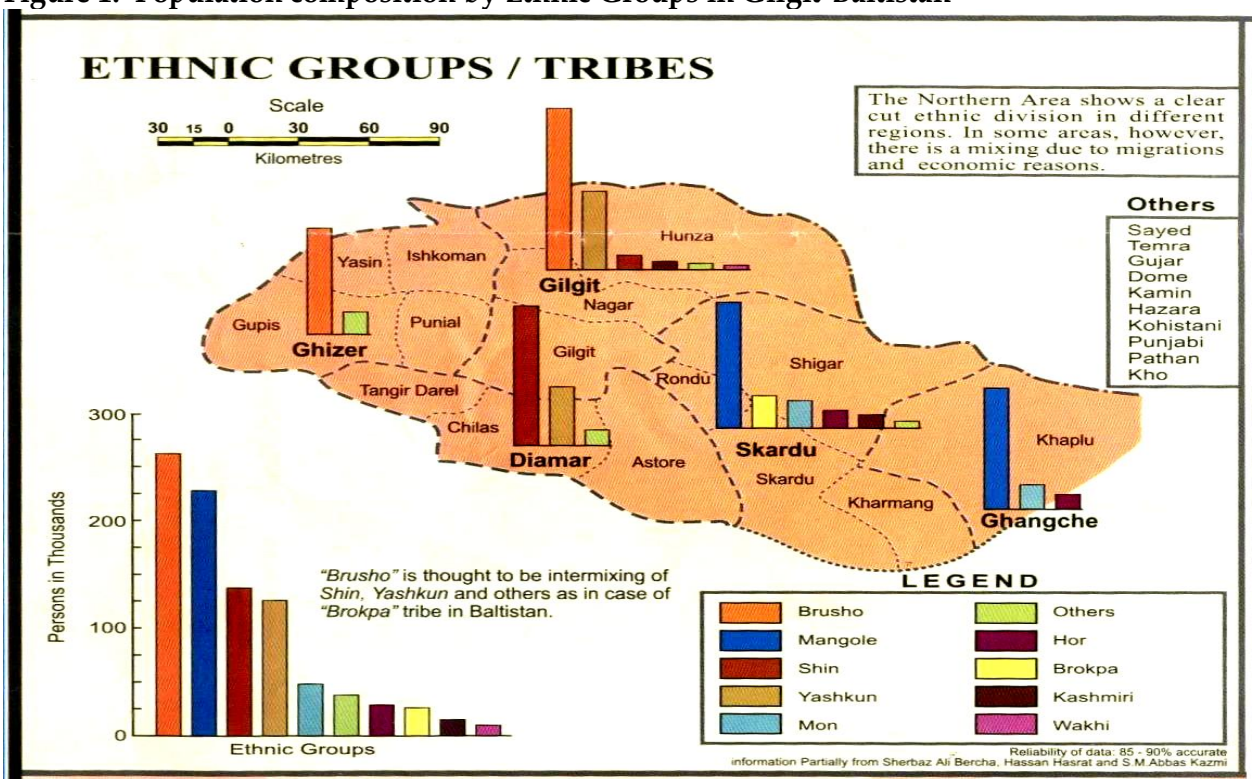
ANNEXES II: SOCIO-ECONOMIC FEATURES OF GILGIT-BALTISTAN

Table-1: Abstract of District-wise Clans and their Languages in Gilgit-Baltistan

Gilgit	Sheen, Yashkun, Kashmiri, Pathan, others	**Shina, Brushisky, Wakhi**
Ghizer	Sheen, Yashkun, Khowar,Tajik, others	**Shina, Brushisky, Khowar, Wakhi**
Astore	Yashkun, Sheen, Kashmiri, others	**Shina**
Diamer	Sheen, Yashkun, Pathan & others	**Shina**
Hunza-Nagar	Brusho, Sheen, Yashkun, Tajiks, others	**Brushaski, Wakhi, Shina**
Skardu	Balti's, Kashmiri, others	**Balti, Shina**
Ganche	Balti, Kashmiri, others	**Balti**

Source: P&D department

Figure 1: Population composition by Ethnic Groups in Gilgit-Baltistan



Source: Atlas of Northern Areas; Prof. Manzoom Ali, Revised Edition 2004

Table 2: List of Major Festivals Celebrated in the Gilgit-Baltistan Region

Festivals	Description
Thum-i-Shilling	This festival started after the murder of the last non-Muslim king Sri Badat whose murder was arranged by his daughter with the help of the local villagers because he became legendary on account of his reputed cannibalism (he used to eat the flesh of young children. Tum-i-Shilling is now celebrated in a proper manner in Hunza only, it is better described here than with the festivals common to the districts generally. It takes place in the middle of December. Early in November every household kills a goat, sheep or bullock; the head and the stomach are kept in the house, uncooked, till the time of festival. On the night of the Tum-i-Shilling (the word means tree scattering) the stomach of the animal is filled with flour made from buckwheat (jokish in Hunza) and the smaller stomach filled with little pieces of meat and fat (shopan). Then both stomachs with the heads are placed with turnips in a large pot and cooked all night. In the morning every male in the house takes a piece of wood a few inches long, which has been kept for two months previously to dry. A drum is then beaten and all go out of the house simultaneously after lighting the wood, and holding it in their hands. If by inadvertence anyone goes out too soon, the others who come behind throw the wood at him. When they are all outside the burning wood is thrown on the ground with shouts. As soon as the wood is burned out, the women, dressed in their best clothes, emerge, and everyone dances. They then go and have some food at the house of some relative. The householder goes out with them, makes a round of all his relatives and tribesmen, and if there are any quarrels or outstanding cases to be settled they are all made up on that day. The mullahs of Nagar and neighboring states discourage this relic of Hindu superstition.
Polo	**Polo** is the national game of Northern Areas, and is being played for a very long time. This game was introduced in Gilgit from Chitral, and in baltistan it was introduced from Tibet, but its main origin is from Iran into this area through Chitral (800-900 AD). 4 Polo festivals takes place every year between the local teams (including Chitral and Baltistan). According to J.Budlafh (British Political Agent, 1878-1881), the Polo played in this area has no rules and regulations as such, and is played in a very dangerous manner.
Shaap	**Shaap** is a word of Shina language which means pray for goodness and success (benediction). It is a very old festival and this festival takes place in all parts of Northern Areas in different shapes and ways. This festival is celebrated in the last week of December by the youth (male and female), it is basically a drama/ play with local music played by the musicians, the two main performers wear masks of an old man and an old lady along with their grandsons and granddaughters and they visit every house and firstly they wish them good for future and then they ask for permission to perform a little show in which the old lady and the old man dance with the music and in the end the old man acts to have fainted, when he is brought to his senses, he demands for money, and exclaims that he is a poor old man and has many grandsons and granddaughters whom he has to raise. Some people give them money and a few give them food items like dry meat, grains, flour etc.
Ganoni	**Ganoni** is still celebrated. Curiously enough it has disappeared in Gilgit itself, though universal elsewhere, and it is perhaps the chief festival of the year. Ten days before the barley is cut, when it is yellow but not ripe, every household collects curds, butter and other milk products such as cheese, but chiefly curds, milk and lassi (butter milk). Bread called kamalli is made, with butter in between

Festivals	Description
	each layer, and is placed on a plate. Then all the men, but no women, go with this bread to the fields, ask a blessing on the harvest and land, and also pray for good health. A handful of barley is taken from thefield and all return to the house. They then put five or ten stalks of the barley on the beams of the house, on the right side as they enter. The rest is then parched, and a little lassi taken in a spoon and eaten with the barley.
Piyakmar	In Hunza only, the festival of **Piyakmar** is held on the third day after Ganoni. Wine is drunk, there is much dancing, but the four tribes celebrate this apart. The festival is not observed in Gojal, the Wakhi part of the country.
Bazono	At the **Bazono festival**, held when the first green corn appears, a lean sheep is sacrificed on the polo ground. This is not observed in Hunza or Nagar, only in Gilgit and Punyal.
Doman Khiya	**Doman Khia**, celebrated at the end of the harvest, is apparently obsolete. The ceremony of the sowing is known in Gilgit as Bipow, in Gojal as Shahgun, and in Hunza and Nagar and everywhere else as Bopow. The name Chili now appears wholly unknown. The Bopow consists of the Mir personally laughing the ground in Hunza, thus inaugurating the opening of the agricultural year, usually in February. It is interesting to note that on this occasion the Mir wears a turban, the ceremonial headdress reserved for durbars, New Year's Day, and other official occasions. A Diramitting has to be present to scatter the first handful of the new grain into the furrow ploughed by the chief.

1. Between The Oxus and The Indus by Colonel R.C.F. Schomberg.

2. Shinology by Usman Ali.

Table 3: Administrative Set-up of Gilgit-Baltistan

Names of Districts	Name of Sub-divisions	Number of sub divisions	Name of Tehsils	Number of tehsils
Gilgit	Gilgit	01	Gilgit, Juglote,	02
Ghizer	Punial/Ishkoman, Yaseen/ Gupis	02	Punial, Ishkoman, Gupis, Yasin.	04
Astore	Astore, Shonter	02	Astore, Shonter	02
Diamer	Chilas, Darel/Tangir	02	Darel/Tangir, Chilas	02
Hunza-Nagar	Hunza, Nagar	02	Hunza, Gojal, Nagar-I,Nagar-II	04
Skardu	Skardu, Kharmang, Shigar	03	Skardu, Rondu, Gultari, Kharmong, Shigar, Gamba	06
Ghanche	Khaplu, Mashaburum	02	Khaplu, Daguni, Mashabrum	03
	TOTAL	14		23

Source: Chief Secretary Office

Table 4: District-wise Government Schools in Gilgit-Baltistan

Types of Schools	Gilgit-Baltistan	Gilgit	Ghizer	Astore	Diamer	Skardu	Ghanche
Boys Primary Schools	504	57	43	44	136	170	54
Girls Primary Schools	217	49	15	19	20	85	29
Co-Primary Schools	569	113	122	53	26	138	117
Total	**1,290**	**219**	**180**	**116**	**182**	**393**	**200**
Boys Middle Schools	148	30	11	22	20	47	18
Girls Middle Schools	66	21	4	11	0	19	11
Co-Middle Schools	33	16	2	1	0	12	2
Total	**247**	**67**	**17**	**34**	**20**	**78**	**31**
Boys High Schools	100	27	16	11	8	19	19
Girls High Schools	37	20	2	2	1	9	3
Co-High Schools	5	1	0	0	0	2	2
Total	**142**	**48**	**18**	**13**	**9**	**30**	**24**
Boys Schools	752	114	70	77	164	236	91
Girls Schools	320	90	21	32	21	113	43
Co-Edu. Schools	607	130	124	54	26	152	121
Total	**1679**	**334**	**215**	**163**	**211**	**501**	**255**

Table 5: District-Wise Number of Private Schools by Level And Gender

Types of Schools	Gilgit-Baltistan	Gilgit	Ghizer	Astore	Diamer	Skardu	Ghanche
Boys Primary Schools	24	0	0	0	6	15	3
Girls Primary Schools	13	2	0	0	1	10	0
Co-Primary Schools	211	41	64	15	6	47	38
Total	**248**	43	64	15	13	72	41
Boys Middle Schools	17	1	1	0	0	10	5
Girls Middle Schools	13	5	0	2	0	6	0
Co-Middle Schools	140	48	43	10	0	18	21
Total	**170**	54	44	12	0	34	26
Boys High Schools	8	3	0	0	0	4	1
Girls High Schools	52	26	5	5	0	6	10
Co-High Schools	74	28	34	2	1	5	4
Total	**134**	57	39	7	1	15	15
Boys Higher Secondary Schools	0	0	0	0	0	0	0
Girls Higher Secondary Schools	4	3	1	0	0	0	0
Co-Higher Secondary Schools	4	3	1	0	0	0	0
Total	**8**	6	2	0	0	0	0
Boys Schools	49	4	1	0	6	29	9
Girls Schools	82	36	6	7	1	22	10
Co-Edu. Schools	429	120	142	27	7	70	63
Total	**560**	160	149	34	14	121	82

Table 6: Health Facilities in Gilgit-Baltistan-2009

Type Health Facilities	Gilgit-Baltistan	Gilgit	Ghizer	Astore	Diamer	Skardu	Ghanche
Combined Military Hospitals	02	1	-	-	-	1	-
District Headquarters Hospitals	05	1	1	--	1	1	1
Civil Hospitals	21	5	4	2	2	4	4
Rural Health Centers	02	1	--	--	--	1	--
Basic Health Units	17	4	1	2	3	4	3
Dispensaries	118	24	15	10	12	34	23
First Aid Posts	133	35	19	09	23	19	28
Mother and Child Health Centers	91	21	16	4	8	30	12
TB Leprosy Centers	20	4	3	1	3	6	3
EPI Centers	63	28	06	08	03	11	07

Annex :IV Horticulture production and processing

District-wise Production and Utilization of Fruits

Table 4.1: District-wise Production of Apricot (MT)

District	Production	wastage	% Loses	Consumption		Marketed	
				Fresh	Dry	Fresh	Dry
GB							
Gilgit	27,821	10,951	39	831	1,346	1142	1,919
Hunza/Nagar							
Ghizer	14,257	5,605	39	526	326	827	532
Astore	3,430	1,452	42	96	107	0	16
Diamer	2,296	984	43	354	134	277	302
Skardu	38,061	14,686	39	411	1,249	431	1,428
Ghanche	22,723	8,596	38	227	352	264	952

* Source : Northern Areas Agriculture Statistics 2007 , Department of Agriculture Northern Areas Gilgit

Table 4.2: District-wise Production of Apple (MT)

District	Production	wastage	% Loses	Consumption		Marketed	
				Fresh	Dry	Fresh	Dry
GB	**19,054**	**1,362**	**21**	**3,059**	**0**	**2,203**	**0**
Gilgit	6,618	403	23	1,235	0	453	0
Hunza/Nagar							0
Ghizer	1,794	298	21	405	0	599	0
Astore	1,166	18	10	189	0	0	0
Diamer	2,657	278	15	868	0	703	0
Skardu	5,200	351	32	285	0	445	0
Ghanche	1,619	14	15	77	0	3	0

* Source : Northern Areas Agriculture Statistics 2007 , Department of Agriculture Northern Areas Gilgit

Table 4.3: District-wise Production of Grape (MT)

District	Production	wastage	% Loses	Consumption		Marketed	
				Fresh	Dry	Fresh	Dry
GB	**7244**	**1733**		**3562**	**0**	**1964**	**0**
Gilgit	2896	674	23	1561	0	684	0
Hunza/Nagar					0		0
Ghizer	1890	282	15	880	0	728	0
Astore	119	51	43	68	0	0	0
Diamer	1619	582	36	647	0	382	0
Skardu	639	110	17	359	0	170	0
Ghanche	81	34	42	47		0	

* Source : Northern Areas Agriculture Statistics 2007 , Department of Agriculture Northern Areas Gilgit

Table 4.4: District-wise Production of Cherry (MT)

District	Production	wastage	% Loses	Consumption		Marketed	
				Fresh	Dry	Fresh	Dry
GB	**2,256**	**362**	**16**	**1,110**	**0**	**757**	**0**
Gilgit	1,251	155	12	496	0	574	0
Hunza/Nagar					0		
Ghizer	245	33	14	163	0	48	0
Astore	122	23	19	89	0	11	0
Diamer	218	72	33	114	0	32	0
Skardu	348	69	20	201	0	78	0
Ghanche	51	10	14	48		14	

* Source : Northern Areas Agriculture Statistics 2007 , Department of Agriculture Northern Areas Gilgit

Table 4.5: District-wise Production of Pear (MT)

District	Production	wastage	% Loses	Consumption		Marketed	
				Fresh	Dry	Fresh	Dry
GB	**2,579**	**594**	**23**	**1,285**	**0**	**696**	**0**
Gilgit	1,705	321	19	784	0	600	0
Hunza/Nagar					0		0
Ghizer	227	95	42	81	0	52	0
Astore	119	9	8	110	0	0	0
Diamer	207	68	33	118	0	21	0
Skardu	243	91	38	143	0	22	0
Ghanche	78	9	12	50	0	2	0

* Source : Northern Areas Agriculture Statistics 2007 , Department of Agriculture Northern Areas Gilgit

Table 4.6: District-wise Production of Almond (MT)

District	Production	wastage	% Loses	Consumption		Marketed	
				Fresh	Dry	Fresh	Dry
GB	**1,700**	**6**			**849**	**0**	**806**
Gilgit	585	1	0	0	330	0	255
Hunza/Nagar			0	0		0	
Ghizer	542	2	0	0	217	0	323
Astore	45	0	0	0	28	0	17
Diamer	320	2	0	0	133	0	185
Skardu	148	2	2	0	121	0	24
Ghanche	60	0	0	0	19	0	2

* Source : Northern Areas Agriculture Statistics 2007 , Department of Agriculture Northern Areas Gilgit

Table 4.7: District-wise Production of Pomegranates (MT)

District	Production	wastage	% Loses	Consumption		Marketed	
				Fresh	Dry	Fresh	Dry
GB	**4,355**	**914**	**21**	**1,623**	**0**	**1,725**	**0**
Gilgit	2,012	483	24	697	0	832	0
Hunza/Nagar							
Ghizer	296	58	20	136	0	102	0
Astore	122	29	24	0	0	0	0
Diamer	1,909	340	18	779	0	791	0
Skardu	16	4	25	12	0	0	0
Ghanche	0	0	0	0	0	0	0

* Source : Northern Areas Agriculture Statistics 2007 , Department of Agriculture Northern Areas Gilgit

Table 4. 8: District-wise Production of Mulberry (MT)

District	Production	wastage	% Loses	Consumption		Marketed	
				Fresh	Dry	Fresh	Dry
GB	**9,092**	**5,144**	**57**	**1,155**	**226**	**0**	**174**
Gilgit	2,429	1,616	67	456	83	0	31
Hunza/Nagar							
Ghizer	738	431	58	180	41	0	133
Astore	576	335	58	28	17	0	0
Diamer	1,207	588	49	99	12	0	0
Skardu	3,019	1,465	49	283	68	0	10
Ghanche	1,124	709	63	108	5	0	0

* Source : Northern Areas Agriculture Statistics 2007 , Department of Agriculture Northern Areas Gilgit

District-Wise Production and Utilization of Cereal Crops

Table 4.9: District wise Area, Production and utilization of Wheat

District	Area	Seed Required	Production	Consumption	Marketed	Wastage
Gilgit	4,122	801	9,096	9,096	0	0
Ghizer	2,250	459	4,482	4,482	0	0
Skardu	4,247	1,000	7,174	7,174	0	0
Ghanche	1,179	248	2,542	2,542	0	0
Astore	652	133	1,219	1,219	0	0
Diamer	5,726	1,095	14,242	14,242	0	0
Total	**18,176**	**3,736**	**38,755**	**38,755**	**0**	**0**

Table 4.10: District wise Area, Production and utilization of Maize

District	Area	Seed Required	Production	Consumption	Marketed	Wastage
Gilgit	4,334	740	10,893	9,456	1,438	0
Ghizer	3,333	482	9,532	6,807	2,725	0
Skardu	1,417	224	3,235	2,082	1,152	0
Ghanche	0	0	0	0	0	0
Astore	589	100	1,744	1,659	85	0
Diamer	8,046	1,184	21,682	20,802	880	0
Total	**17,718**	**2,730**	**47,086**	**40,805**	**6,281**	**0**

Table 4.11: District wise Area, Production and utilization of Barley

District	Area	Seed Required	Production	Consumption	Marketed	Wastage
Gilgit	218	46	371	361	10	0
Ghizer	409	90	874	855	19	0
Skardu	2,259	557	4,064	3,460	604	0
Ghanche	1,758	380	3,736	3,466	270	0
Astore	158	524	306	306	0	0
Diamer	73	42	164	164	0	0
Total	**4,874**	**1,638**	**9,516**	**8,613**	**903**	**0**

Table 4.12: District wise Area, Production and utilization of Buckwheat

District	Area	Seed Required	Production	Consumption	Marketed	Wastage
Gilgit	24	4	40	40	0	0
Ghizer	72	9	152	152	0	0
Skardu	245	45	453	407	46	0
Ghanche	521	76	934	902	33	0
Astore	85	17	219	194	25	0
Diamer	0	0	0	0	0	0
Total	**948**	**150**	**1798**	**1,694**	**103**	**0**

Table 4.13: District wise Area, Production and utilization of Cultivated Fodder

District	Area	Seed Required	Production	Consumption	Marketed	Wastage
Gilgit	2,703	0	13,478	10,903	2,575	0
Ghizer	1,140	0	5,070	4,554	516	0
Skardu	1,216	0	6,714	4,550	2,164	0
Ghanche	605	0	2,895	1,814	1,081	0
Astore	1,935	0	10,408	9,770	638	0
Diamer	693	0	3,913	3,580	333	0
Total	**8,293**	**0**	**42,478**	**35,170**	**7,308**	**0**

Table 4.14: District wise Area, Production and utilization of Potato

District	Area	Seed Required	Production	Consumption	Marketed	Wastage
Gilgit	4,256	7,944	64,168	5,637	54,156	4,376
Ghizer	679	1,278	10,308	1,453	7,931	924
Skardu	1,510	2,932	24,872	2,267	20,846	1,759
Ghanche	968	1,894	14,051	2,789	9,571	1,691
Astore	882	1,680	15,738	4,061	10,479	1,197
Diamer	126	237	2,138	1,284	537	318
Total	**8,422**	**15,965**	**131,275**	**17,491**	**103,519**	**10,265**

Table 4.15: District wise Area, Production and utilization of Tomato

District	Area	Seed Required	Production	Consumption	Marketed	Wastage
Gilgit	132	0	4,141	2,354	1,089	699
Ghizer	46	0	385	243	101	41
Skardu	34	0	667	49	594	24
Ghanche	1	0	5	5	0	0
Astore	24	0	326	37	279	9
Diamer	77	0	643	528	31	84
Total	**314**	**0**	**6,168**	**3,217**	**2,093**	**858**

Table 4.16: District wise Area, Production and utilization of Peas

District	Area	Seed Required (MT)	Production	Consumption)	Marketed	Wastage
Gilgit	83	12	68	147	21	2
Ghizer	12	30	89	18	62	9
Skardu	37	5	123	59	55	9
Ghanche	9	64	141	3	138	0
Astore	6	1	35	6	26	3
Diamer	667	96	1,735	170	1,515	50
Total	**814**	**207**	**2,190**	**402**	**5,024**	**72**

Table 4.17: District wise Area, Production and utilization of Chinese Cabbage

District	Area	Seed Required	Production	Consumption	Marketed	Wastage
Gilgit	90	0	1,543	469	912	162
Ghizer	8	0	41	23	17	1
Skardu	0	0	0	0	0	0
Ghanche	0	0	0	0	0	0
Astore	0	0	35	35	0	0
Diamer	3	0	170	123	9	38
Total	**102**	**0**	**1,790**	**651**	**937**	**202**

Table 4.18: District wise Area, Production and utilization of cabbage

District	Area	Seed Required	Production	Consumption	Marketed	Wastage
Gilgit	35	0	1605	1122	263	220
Ghizer	12	0	60	53	3	3
Skardu	32	0	147	105	35	8
Ghanche	24	0	145	131	10	4
Astore	20	0	122	110	9	3
Diamer	13	0	308	244	4	61
Total	**135**	**0**	**2,388**	**1,765**	**324**	**300**

Table 4.19: District wise Area, Production and utilization of Onion

District	Area	Seed Required (MT)	Production	Consumption	Marketed	Wastage
Gilgit	62	0	1,408	1,157	251	0
Ghizer	22	0	602	548	55	0
Skardu	37	0	1,249	1,118	130	0
Ghanche	9	0	831	757	74	0
Astore	5	0	537	492	45	0
Diamer	51	0	884	792	92	0
Total	**187**	**0**	**5,511**	**4,864**	**647**	**0**

Table 4.20: District wise Area, Production and utilization of Capsicum

District	Area	Seed Required	Production	Consumption	Marketed	Wastage
Gilgit	14	0	126	10	114	0
Ghizer	1	0	3	1	1	0
Skardu	1	0	7	2	5	0
Ghanche	0	0	0	0	0	0
Astore	0	0	0	0	0	0
Diamer	85	0	792	68	720	2
Total	**101**	**0**	**927**	**81**	**840**	**2**

Table 4.21 Gender Roles in Agriculture

Type of Activity	Gilgit			Ghizer			Hunza-Nagar			Astore			Diamer			Skardu			Ghanche		
	Men	Women	Both	Men	Women	Both	Men	Women	Both	Men	Women	Both	Men	Women	Both	Men	Women	Both	Men	Women	Both
Decision making			x			x			x			x	x					x			x
Purchase of inputs	x			x			x			x			x					x			x
Land preparation			x			x			x			x	x					x			x
sowing			x		x				x			x	x					x			x
irrigation	x			x			x			x			x				x			x	
weeding		x			x			x			x			x			x			x	
Pest Management	x					x			x			x		x				x			x
Harvest			x			x			x			x			x			x			x
Post harvest jobs		x				x			x			x	x					x			x
Decision on sales			x	x			x					x	x					x			x
Marketing	x			x			x					x	x					x			x
Income possession/utilization	x			x			x					x	x					x x			x

Table 4.22 : Average Fruit Tree Holdings Per Household In 2008

Fruit Tress	Skardu	Ghanche	Gilgit	Ghizer	Astore	Gilgit Baltistan
Apricot	28.43	36.25	1.57	1.77	1.10	15.10
Apples	4.47	4.24	9.00	4.66	3.68	5.36
Mulberry	8.59	2.20	2.77	1.70	0.80	3.45
Almond	1.45	0.43	1.63	9.48	0.57	2.93
Walnut	1.01	0.62	2.65	1.99	1.06	1.51
Pears	0.39	0.19	1.22	0.64	0.10	0.55
Grapes	0.64	0.16	2.11	1.65	0.13	1.02
Cherry	0.53	0.52	7.55	1.09	0.86	2.23
Peach	0.33	0.34	1.48	1.33	0.12	0.78
Pomegranate	0.05	0.02	1.85	1.17	0.00	0.68
Plums	0.24	0.11	0.30	0.27	0.18	0.22
Fig	0.01	0.00	0.42	0.15	0.00	0.13
Others	0.02	0.00	0.25	0.02	0.01	0.06

ANNEXES V: HORTICULTURE MARKETING

Table-1 Summery of Supply of Horticulture Products in GB market (Rs. Millions)

Supply of Horticulture	Gilgit-Baltistan	Gilgit	Hunza	Ghizer	Astore	Diamer	Skardu	Ghanche
Vegetable supply from Down Country	197.84	78.05	3.93	13.24	11.37	15.19	49.58	26.47
Vegetable Supply from Local producers	118.03	79.04	4.02	2.78	1.71	6.95	15.99	7.54
Dry Fruit Supply from local producers	905.32	346.48	102.24	158.33	78.19	40.56	130.20	49.32
Fresh Fruit supplied from Local Producer	92.87	62.70	1.51	2.19	0.96	15.69	7.20	2.62
Fresh Fruit supply from Down Country	222.30	127.86	1.07	10.35	2.57	23.70	43.00	13.77
Total:	1536.36	694.14	112.78	186.88	94.80	102.09	245.97	99.73

Table-2 Whole-sale Supply of Dry Fruit (Rs. Millions)

Fruits	GB	Gilgit	Hunza/ Nagar	Ghizer	Astore	Diamer	Skardu	Ghanche
Almond Kaghazi	304.47	142.94	17.28	26.59	59.60	8.93	40.64	8.50
Almond Katha	132.48	57.86	18.56	28.89	3.28	6.13	13.47	4.29
Apricot-A	136.45	50.97	12.29	25.33	2.30	6.88	24.12	14.56
Apricot-B	78.78	14.75	7.92	26.60	9.94	4.51	9.12	5.93
Apricot-Normal	25.59	5.90	0.25	9.11	1.13	0.00	6.02	3.19
Kernel Bitter	19.43	8.51	1.97	2.67	0.00	0.00	3.62	2.65
Kernel Sweet	37.93	8.53	3.61	9.37	0.00	6.98	5.89	3.56
Mulberry A	49.48	16.56	19.04	8.44	0.00	1.33	3.97	0.14
Mulberry B	14.32	2.62	10.22	1.49	0.00	0.00	0.00	0.00
Walnut	106.39	37.84	11.10	19.85	1.94	5.81	23.34	6.50
Total	**905.32**	**346.48**	**102.24**	**158.33**	**78.19**	**40.56**	**130.20**	**49.32**

Table-3 Wholesale Supply of Dry Fruit (Value in Percent)

Fruits	GB	Gilgit	Hunza/ Nagar	Ghizer	Astore	Diamer	Skardu	Ghanche
Almond Kaghazi	34%	41%	17%	17%	76%	22%	31%	17%
Almond Katha	15%	17%	18%	18%	4%	15%	10%	9%
Apricot-A	15%	15%	12%	16%	3%	17%	19%	30%
Apricot-B	9%	4%	8%	17%	13%	11%	7%	12%
Apricot-Normal	3%	2%	0%	6%	1%	0%	5%	6%
Kernel Bitter	2%	2%	2%	2%	0%	0%	3%	5%
Kernel Sweet	4%	2%	4%	6%	0%	17%	5%	7%
Mulberry A	5%	5%	19%	5%	0%	3%	3%	0%
Mulberry B	2%	1%	10%	1%	0%	0%	0%	0%
Walnut	12%	11%	11%	13%	2%	14%	18%	13%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

ANNEXES VI: LIST OF FGD PARTICIPANTS

Location: Gilgit
Venue : Gilgit Continental Hotel

Group: Socio-Economic Conditions

S/N	Name	Occupation/Designation	Address
1	Mehmood Asgar	Dept. secretary F&A	Gullapoor
2	Abdullah Khan	Training coordinator	Astore
3	Zakir Hussain	Faramar	Astore
4	Shazad Alam	Farmar	Haramosh
5	Mohd Ayoub	Farmar	Haramosh
6	S.M.Ali Shah	Agri-officer	Danyor
7	Malik Maskin	Farmar	Pari Bangla
8	Gari Khan	Faramar	Oshkandas
9	Engr. Mohd Afzal	Manager IPD	Amphary
10	Kosar Bano	FFS facilitator	Danyor

Group: Horticulture Marketing

S/N	Name	Occupation/Designation	Address
1	Aziz ullah	Trader	Charbagh Commision Shop Gilgit
2	Akbar Shah	Trader	Hashowans Traders Gilgit
3	Kifayat Hussain	Trader	Baghrot chara Gilgit
4	Mehmood Alam	Trader	Oshikhandass Jagir
5	Khan Bahadur	Trader	North Pole Traders Road Gilgit
6	Imtiaz Ali	Field Assistant	DoA
7	Inayat ullah	Trader	Amir Ahmed Rakaposhi Mandi
8	Abdul Khabir	Director	Prov.Coordinator AgriBusiness
9	Javed Akhtar	Depty Director	Statistics unit, DOA

Group: Horticulture production and processing

S/N	Name	Occupation/Designation	Address
1	Zulfiqar Ali	Assistant Professor	KIU, Gilgit
2	Iqbal Hussain	Deputy Director	DoA
3	Ghulam Mustafa	Project Co-ordinator	DoA
4	Dr.Fazal Rehman	Director Research	DoA
5	Riaz Ali	Project Director SDA	DoA GB
6	Jan Alam	Progressive Farmer	Danyore
7	Mansoor Ali	Farmer	Gilgit
8	Sher Ghazi	CEO	Mountain Fruit Company Gilgit
9	Zahid Ali Khan	Dy.Director	DoA Skardu
10	Melad ul Karim	PM NRM	AKRSP Gilgit
11	Hassan Alam Shah	IDO	AKRSP Gilgit

Location: Skardu
Venue: AKRSP Conference hall

Group: Scio-Economic Conditions

S/N	Name	Occupation/Designation	Address
1	Sher Mohd Payalo	Manager	KSAN LSO shangrala, Satpara
2	Akhtar Hussain	Manger	MLSO Shiger
3	Zahid Hussain	Manger	LSO Shagri Calan
4	Ghulam Mohd	SO	LSO Mehdi Abad
5	M.Ali	Scientific Officer	DoA
6	Wazir Mohd Ali	Manager	LSAO Mandi
7	Zahid Ali Khan	Deputy Director	Agri.Deptt. Skardu
8	M.Ali	Manager	LSO Hussainabad
9	M.Yousuf Yasir	Manager	LSO serman Gold Sermik
10	Sheraz-u-Allah Baig	NPM	CESVI Pakistan
11	Syed	Capacity Building Coordinator	AKRSP

Group: Horticulture Marketing

S/N	Name	Occupation/Designation	Address
1	Ghulam Nabi	Manager	Baltistan fruit company, Skardu
2	Fida Hussain	Consultant	Agri-business
3	Muhammad Abbas	Trader	Skardu
4	Mohd Sanbool	Vegetable shop	Skardu town
5	Ahmad Din	Farmer	Shigir
6	Mohd Abass	Farmer	Mehdiabad, Skardu
7	Nazakat Ali	Farmer	Sermik Skardu
8	Akbar Hussain	Trader	Stapara, Skardu
9	Abid Hussain	Officer BCDF Skardu	Skardu
10	Mohd Hassan	Vegetable shop	Skardu
11	Jafar Ali	Vegetable Shop	Skardu

Group: Production and Processing

S/N	Name	Occupation/Designation	Address
1	Shujaat Hussain	Research Officer	Agri Dept Skardu
2	Muhammad Iqbal Khan	Scientific Officer	PCSIR Skardu
3	Haji Muhammad Askari	BoD member	Shigar Kalan
4	Haji Ghulam Raza	Manager VO	Chorka Shigar
5	Muhammad Ibraheem	President VO	Gabol Bargai
6	Muhammad Ayub	SO, MARS/PARC	PARC MARS Skardu
7	Haji Ali	Valley Specialist	Daskhor, shigar
8	Muhammad Askari	Manager VO	Chorka Shigar
9	Haji Hassan	President VO	Skardu
10	Haji Mubarak Ali	Member VO	Shigar
11	Muhammad Abuzer	Member LSO	Hussain abad
12	Muhammad Bashir	Member VO	Sundus Skardu
13	Muhammad Baqir	President VO	Chorka Shigar

14	Niaz Ali	President Al maraj	Kot Pana Skardu
15	Haji Ali	Member VO	Astana Skardu
16	Musa Ali Hashmi	Agri. Officer	Agri Dept Skardu
17	Syeed Zahid Hussain	Agronomist	AKRSP
18	Ghulam Hassan	Member Organic Forming Committee	Nongsoq Skardu

Location: Chilas Diamir
Venue: Panorama Hotel Chilas

Group: Soci-Economic

S/N	Name	Occupation/Designation	Address
1	Saif-u-Allah	Driver/Farmer	Chilas
2	Badsha	Employee	Batoga Chilas
3	Abdul Hadi	Farmer	Babosar
4	Akbar Hussain	Businessmen	Babosar
5	Mohd Maroof	Farmer/ employee	Babosar
6	Amal Shah	Employee	Thangir
7	Abdul Satar	Teacher/ farmer	Thangir Jaglote
8	Abdul Rafique	Farmer	Darayl

Group: Horticulture Marketing

S/N	Name	Occupation/Designation	Address
01	Munir	PCSIR	Chillas
02	Abdul sidiq	DoA	Chillas
03	Majeed ullah	Farmer	Darrel
04	Abdul hadi	Farmer	Goner farm
05	Ghulam ullah	Shopkeeper	Chilas
06	Wali muham,mad	Farmer	Darrel
07	Basher ahmed	Farmer	Gonar farm
08	Umar khan	Shop keeper	Goner farm
09	Muhammad sadiq	Farmer	Tangir
10	Abdulllah khan	Farmer	Boner
11	Hazrat nabi	DoA	Darrel
12	Muhammad Usman	Farmer	Batogha
13	Fazal	Famer	Tangir

Location: Eidga, District Astore
Venue : AKRSP Office

Group: Socio-Economic Conditions

S/N	Name	Occupation/Designation	Organization
1	Yousof Ali	Farmar	Chongra
2	Samad Khan	Politician/Farmer	
3	Afridi	Journalist	Eidga
4	Amina	Social Mobilizer	Eidga
5	Nasim	Social Mobilizer	Fina
6	Kifayat	BOD member	Doyian
7	Rozi Khan	Farmer	Gorikot
8	Shabir Husain	Farmer	Eidaga

Group: Horticulture Marketing

S/N	Name	Occupation/Designation	Address
01	Raja Muzaffar	DoA	Astore
02	Khukuro bilal	DoA	Astore
03	Arshad	Shopkeeper	Astore
04	Kalim ullah	Shopkeeper	Gorikot
05	Ghulam nabi	Farmer	Fina
06	Abdullah jan	Farmer	Harchoo
07	Abdul wadod	Farmer	Tarashing
08	Musa	Shopkeeper	Godai
09	Asghar hussain	Shop keeper	Gorikot
10	Abdul Hussain	Farmer	Astore
11	Hassan ali	Farmer	Rama
12	Arshad khan	Shopkeeper	Astore chowk

Group: Horticulture production and Processing

S/N	Name	Occupation/Designation	Address
1	Khokuro	Dy. Director Agri	Agri. Dept. Gilgit
2	Jamsheed Ali	Chairman LSO	Nowgam
3	Mumtaz Ali	Member LSO	Gudai
4	Muhammad Abrar	Member LSO	Gudai
5	Muhibullah	Member LSO	Astore
6	Shahjahan	Member VO	Eid gah
7	Sagir Muhammad	Farmer	Gorikot
8	Mehbob Ali	Farmer	Fina
9	Ghulam Haider	Farmer	Eid gah

Location: Karimabad, District Hunza
Venue: Hunza Embassy Hotel

Group: Socio-Economic Condition

S/N	Name	Occupation/Designation	Address
1	Ghulam Ali	Genral Manager	Kudaabad Gojal
2	Sehat Ali	Teacher	Hyderabad
3	Amin Shaha	Businessmen	Hyderabad
4	Iftikar Ali	BOD member	Hyderabad
5	Islam Shaha	BOD member	Hyderabad
6	Yasmin	BOD member	Hyderabad
7	Shamila Bano	GB member	
8	Zohra Amin		Karimabad
9	Zulikha	Teacher	Karimabad
10	Nizamudin	G.Secratary	Hyderabad
11	Meher Ali	Member	Hyderabad
12	Ejaz Ali	Employee	Hunza
13	Ahmad Din	Employee	Dorka

Group: Horticulture Marketing

S/N	Name	Occupation/Designation	Address
1	Amir Hayat	Farmer	Haiderabad
2	Nadir Aman	Business	Garelt
3	Abdul Majid	Fruit Business	Murtazabad
4	Akram Khan	MDF Private Limited	Nasirabad
5	Irfan Ali Shah	Fresh Fruit	Nasirabad
6	Shah Turei	Fruit Business	Altit
7	Manzoor Karim	Hunza Fruits	Murtazabad
8	Karim ud Din	Vegetables	Haiderabad
9	Abdul Hakim		
10	Rehmat Karim	Farmer	Haiderabad
11	Muhammad Jan	Dry Fruit	Haiderabad
12	salman Ali	Potato Seed Business	Shishkat
13	Hidayat Shah	Dry Fruit / veg	Rihimabd
14	Parveen	Agriculture	Aliabad
15	Karim	Agriculture	Aliabad
16	Atiqa	Agri-Marketing	Haiderabad
17	Salma	Agruculture	Haiderabad
18	Rashida	Agriculture	Haiderabad

Group: Horticulture Production and Processing

S/N	Name	Occupation/Designation	Address
1	Ghulam Murtaza	farmer	Hyder Abad
2	Mumtaz Ali	Do	Ali Abad
3	Ashiq Ali	Do	Hyder Abad
4	Imdad Ali	Do	Hyder Abad
5	Muhammad Anwar	Do	Hyder Abad
6	Ulfat	Do	Gulmit
7	Gul Zadi	Do	Karimabad
8	Malika	Do	Ali Abad
9	Shamim Bano	Do	Ali Abad
10	Mehar Angaz	Do	Ali Abad
11	Hasina	Do	Ali Abad
12	Hussain Bano	Do	Ali Abad
13	Zubaida	Do	Hyder Abad
14	Bibi Soni	Do	Hyder Abad
15	Lala Bagum	Do	Hyder Abad
16	Zaib Unnisa	Do	Hyder Abad
17	Khair Un Nisa	Do	Sheraz
18	Shamim Bano	Do	Hyder Abad
19	Mehrab	Do	Ali Abad
20	Rashida	Do	Ali Abad
21	Ahmad Din	Do	Murtaza Abad

Location: Gakuch, District
Venue: Al-Karim Guest House Meeting Hall

Group: Socio-Economic situation

S/N	Name	Occupation/Designation	Address
1	Zafar Ali Kan	Manager	Yasin
2	Rajuli	Memeber	Dain
3	Chusht	Do	Do
4	Didar Shah	Manager	Immit
5	Mirza Murad	Businessmen	Do
6	Mohzam Khan	Manager	Goldas
8	Bulbul Haji	Member	Singal
9	Tai Guli	Do	Do
10	Shakila	Do	Do
11	Shakila	Do	Do
12	Shukan Khan	GB member	Yasin, Taus

Group: Horticulture Marketing

S/N	Name	Occupation/Designation	Address
01	Khush Begum	Thindas WO	Thindas
02	Nafas Bibi	Aysha LSO	Ayshi
03	Kamaal	VO Goharabad	Goharabad
04	Ameer Ali Shah	VO Singal	Singal
05	Delawar Shah	LSO Hasis	Hasis
06	Shazia	LSO	Gitch
07	Aftaab Wali	LSO	Yaseen
08	Maqsad Ali Shah	LSO	Gahkuch
09	Syed Amjad	LSO Chatorkhan	Chatorkhan
10	Baber Khan	LSO Immit	Ishkoman
11	Hamidullah	LSO Hamuchal	Ponial
12	Nayab Khan	LSO Goharabad	Ponial
13	Mehboob Alam		Gitch
14	Hassan		Goharabad
15	Walayat		Hasis
16	Bulbul Jan	LSO	Gupis

Group: Horticulture Production and processing

S/N	Name	Occupation/Designation	Address
1	Ali Madad	LSO member	Village Bar Jungle
2	Himat Murad	Chairman LSO Hatoon	Village Hasis
3	Habib u rahman	DD Agriculture	Singal Punial
4	Goher kamal	Business man	Gahkuch
5	Amjad Ali	MDG WRCA	Gahkuch
6	Aziz Ahmed	Teacher	Village Ayeshi
7	Narges Begum	Ayshe	Singal Punial
8	Bibi Aman	WO member	Singal Punial
9	Khosh Begum	WO member	Singal Punial
10	Wasila Begum	WO member	Singal Punial
11	Mashroof	WO member	Singal Punial
12	Pari Tawas	WO member	Village Gitch Punial

Location: Khapulo, District Ghanche
Venue : AKRSP Office Meeting Hall

Group: Socio-Economic Conditions

S/N	Name	Occupation/Designation	Address
1	Mushatq Ahmad	Farmer+ Fruit Processor	Khapolu
2	Mohd Aslam	Farmer/Vegetable producer	
3	Mohd Ayoub	Farmer	
4	Noor Ali	Social Organizer	Daghadai
5	Mohd Taqi	Fruit producer	Khapolu Paeen
6	Ali Muhammad	Vegetable Producer	Khapolu Bala
7	Sakhawat Hussain	Social Mobilizer	Daghoni

Group: Horticulture Marketing

S/N	Name	Occupation/Designation	Address
01	Ghulam ali	Farmers	Barra village
02	Muhammad ali	Farmer	Baghoni
03	Muhammad hussain	Shopkeeper	Daghoni
04	Afzal khan	Shopkeeper	Thalay
05	Ghulam abbas	Farmer	machulu
06	Ghulam hussain	Farmer	Barra village
07	Hassan abbas	Farmer	Daghoni
08	Kacho Ibrahim	Shopkeeper	Ghawari
09	Asghar hussain	Shop keeper	Khaplu
10	Mehdi	Farmer	Khapku
11	Jaffar hussain	Farmer	Tara

Group: Horticulture Production and Processing

S/N	Name	Occupation/Designation	Address
1	Muhammad Suliman	President VO	Khaplu
2	Sher Ali	Member LSO	Sagori
3	Ibraheem	President VO	Malasung
4	Abdul Raheem	Field Assistant	Gongmastakji
5	Muhammad Hussain	BoD member LSO	Balgar
6	Faizullah	Agriculturist	Thaskong
7	Akber Hussain	Water Management Officer	Garbong

ANNEXES VII: FOCUSED GROUP DISCUSSION NOTES:

FGD Notes: Economic Conditions and Natural Resources

Historical Background

Astore : Astore is a settlement of different casts, having different origins. The main tribes/Casts are Loan, ***Pirzada, Khawaja, Butt, DardamKhail,***Bottay and ***Hachok***. These are migrants from ***Kashmir, Asfan, Kohistan*** and *Diamar*. Some people migrated between 1848 to 1890 and a large population migrated during Dogra Raj. Hachok tribe is the oldest resident of Astore district, entered in Astore before 600 years.

District Skardu: The inhabitants of this district consist of different casts and tribes like, ***Mangols, Broopa, Kachay, Yashkoon&Sheen, Maqpoon*** and ***Amacha.*** The inhabitants migrated in from Central ***Asia, Magnolia, India, and Tibet; and domestically from Gilgit, Hunza/Nager, and Kashmir***. The flow of migrants remained in the area between 1200 century to 1400 and people shifted from Hunza/Nager, about 800 years ago during kingdom in Hunza. The people, who are called Balti, are migrants from Tibet.

Diamar: The participants had not well enough knowledge about the origin and background of the district. Very little knowledge they shared was that people of Chilas were living in the upper valleys, like Darail, Baboosar and Tangir. After formation of Pakistan, the area was declared as sub-division and people moved from the valley to the proper Chilas. It was by the guessed by the participants that people came from Kohistan***Thangir and Darail in the central Chilas***. Peer Mazoob was the person (the grant father), who preached Islam in the area and the largest part of inhabitants living in the district are his generation.

Ganchay: People came in Ganchay district from China during the rule of Changaze Khan known. Some people came from Iran and some people came from India to preach Islam during Dogra Raj.
There is no concept of tribes in the area but cast system exists as people relate them to the families of different Rajas. For example, Hajan, Kacho and Bacho. In genral, they use to call themselves Balthi, Rather then connecting to different tribes. In a book by Yousof has written that word Balthi is driven from Bloristan.

Hunza/Nager: Hunza and Nager valley has been remained two different states under kingdom of Mir of Hunza and Nager. The inhabitants of upper Hunza are migrants from Wakhan, Tajikistan, China, and other parts of northern areas. The main tribes in central Hunza are Brong, Daramthig, Khur-kuchHkalKuch, Brathaling. The residents of Hunza and Nager are said to be generation of two brother Kirgis. Kirgis and Maglot were two brothers who came in the valley; Maglot went to Nager valley and Kirgis settled in Hunza. Later on Kirigs was killed by his brother in a war but his wife was pregnant and she gave birth to a boy, who became king of Hunza.

Natural Disaster
Major disasters have happened in Gilgit Baltistan due to heavy snowfall, land sliding, mud-flow, flood in the river, epidemic diseases, and flesh flood and earthquake.

Heavy Snowfall/ Avalanche/ Heavy rain fall

- In 1957 heavy snow fall in Astore damaged crops standing in the fields and many livestock. That caused food insecurity of more then 25000 people for one year. In 1981 avalanche completely ruined village Phoopan, out of 500 people from 150 household only 35 people survived
- The upper valleys of Ghizer district are vulnerable for snow fall. Major damages made have been done by this disaster as, In 2008 avalanche killed 4 people in Yasin valley and ruined the agricultural land.
- In 1987 avalanche in district skardu completely destroyed 22 house hold, agricultural resources, and forest and killed 48 people. Only four people survived in the village and 1000 livestock were killed. The same happened in 1988 and killed 27 people village Doro
- In 1988 due to heavy rainfall, flood kill about 200 people and damaged the properties of the inhabitants in Darayl valley of district Diamer.
- In District Ganchay rain fall in the mid of March remains harmful for the fruit production. During the blossom rain, causes to damage the fruit production.
- District Hunza/Nager is vulnerable for Snow fall and avalanche. As a result of snowfall and avalanche, the infrastructure communication and agriculture infrastructure are damaged and several time it caused for lose of human lives.

Earthquake/ Land sliding

- **I**n 2002, earthquake hit the lower area of district Astore, The disaster killed 9 people, destroyed communication infrastructure, completely destroyed village Riakote and 1491 households suffered directly and indirectly. The same disaster was also faced by the people of district diamar near Tathu village.
- In 1975 and 1982, Baltistan road was blocked by land sliding in Shungus village and in many other areas. Many residential and agriculture properties were damaged by the disaster. In Village Dasu/Torbing, land sliding caused to damage agricultural land. This disaster caused economic lose for Skardu and Ganchay district simultaneously.
- In 1857 and 2010, land sliding caused to block the KKH in Hunza district and formed artificial lakes that killed 19 people in 2010 and affected socio-economic situations.

Story by Kifayat by Doyian Village
It was the night of 21 November, 2002 at 2: am in the night, when earthquake hit our village. We came out of our houses in the safe place and saved our lives. We passed wrest of the night in the open air because of rapid aftershocks. In the morning when we saw at the village, it was totally ruined by the disaster. Road, irrigation channel, houses, cattle shed and 2 schools were destroyed. Nine people were killed and two villages (Tatu and Raikote) were completely destroyed. We were shifted in other village, where we spent many nights in the tents and suffered from sewer cold weather. The aftershocks continued for a couple of weeks and land sliding remained continued. The main road to Astore valley was under the heap of rocks throughout the affected area that caused to stop supply of commodities to the district.

Remedies to escape from natural disaster

- To reduce the chances of avalanche, thick plantation on the mountains would be helpful and deforestation should be discouraged. Deforestation is due to fuel shortage in the area, which could be minimized through providing alternative resources. According to a survey, forest worth Rs. 140 million is used for fueling in the area, annually. The deforestation also causes global warming and melting of the glaciers.
- Proper steps should be taken to prevent the plants from various diseases
- Protective walls must be constructed in the danger areas.

Mud and Flesh-floods

- In 1966, 1974 and 2104, mud-flow and flesh flood disasters happened in the district Astore that caused to damaged crops, infrastructure and also more then 10 people injured.
- Before 1972, flood disaster happened in district Ganchay two times. People of Village Daghoni, Balgar, Sali, Aghooni and Harko lost their agriculture land, trees and constructions as a result of that.
- In 1979, flesh flood blocked the Ghizer River in Ghalti village. As result of the disaster the village came under water and the disaster lake still exists. And in 2008 same happened in Yasin valley.

Story by Abdul Rafique
Abdul Rafique from Darayl valley said: "1n 1982, I was child when a flood entered in our village. It destroyed our infrastructure, forest and fruit trees, and fields and caused to kill 200 people. In that destructive disaster, my younger brother became injured; he was admitted in the hospital in Gilgit and he could hardly survive after a couple of months."

Other then the above given disasters, glacial flood, animal diseases, plant diseases and epidemic human diseases also remained as disaster for human life.

Developmental programmes

Agriculture

Irrigation channels

- Construction of irrigation channels by AKRSP and government agriculture department have helped the community to increase agricultural production through bring large barren land into cultivable. For further improvement in this regard, construction on new channels should be done and widening of old irrigation channel required. This would be efficiently made through joint venture project of government and agriculture department

Potato and vegetable development

Potato is currently the major cash crop in Gilgit Baltistan. This source was enhanced by AKRSP and government agriculture department through providing improved verities of seeds and technical support. Still there are capacities to improve this source by providing storage facilities

and better marketing. The area has potential for vegetable production but there is lack of market and technical support still prevailing that has lessen the income earning opportunities from this source.

Forest development

Forest development is the prime need of the area. In this regard, AKRSP has already taken a marvelous initiative evident by the block plantations, nurseries varieties of fruit plants existing in different district of northern areas. Government forest department is also working in this regard. However, still there is need to expend this sector. A major problem is supply of plant, which is damaged during transporting from down country to the area.
The area is potential in fruit production and proper utilization of the produced fruit is not being made due to lack of proper packing, poor marketing and other technical loops. In addition, fruit processing plants are very rarely available in the area, which cause loses of large amount of produced fruit. Nurseries should be encouraged to increase fruit forest and fruit industry should be promoted through quality service.

Story by Haji Mushataq
I have 400 apricot trees and I have purchased a machine to dry the apricot. In the peak season of apricot production I spare one month fully for drying the apricots along with children and wife but in spite of that 2/4 of my apricot is wasted. The wasted part of apricot is used as fuel in the stove. This apricot becomes rotten due to shortage of time and unavailability of such facilities, which could be used to store the apricot for a long time of period. My suggestion is that juice machines and other processing plants should be made available in the area to save the apricot from being destroying.
I have got training regarding fruit management and I can train other people as well but due to lack of shift toward industrialization we can not fully utilize our resources. The average tree holding per household in Khapolo village is 200 but the community undergoing lack of facilities and technical expertise. To increase the quality of local apricots, crafting of improved verities of root-stocking should be made.

Communication development

Communication infrastructure, such as link roads, pony trek, bridges and Foot Bridge etc has played a vital role to improve human life in the area**.** AKRSP has taken a lead role in this regard by using participative approach and government is the major contributor to improve the communication infrastructure

Culture development

Culture development of the area hasincreased flow of tourist that has increased economic opportunities. This sector could be further improved through Celebration and publicity of festivals in the perspective of tourism discourages adoption of media culture, enhance importance of culture through awareness programme and, discourage terrorism.

Education development

AKES, private sectors and other NGOs have played a vital role to develop education in GB. Currently private sector is leading the education sector in the area but to it is expensive. Government education system is lacking quality, no proper monitoring system is prevailed, and induction of staff is made by ignoring merit. In nutshell, the participants in all districts are not satisfied with the government education system in the area and expect to improve it through form a proper monitoring system.

Livestock

The communities were provided with improved bread by AKRSP and government livestock projects that increased milk and its by-product in the area. The products are stilconfind to the household use but exploration of market and value addition is needed to work on.

Women development

AKRSP has launched several projects to uplift women's socio-economically. Currently the programmes like, gender development, self-employment projects and participation of women in political process has led women toward contributing in the development of the area.

Mineral development

Local people have started to work on gems mining, cutting and polishing. This could be the largest industry in the area but technical and financial support for the local people is to required to do it on large scale efficiently. In Ghizer, Baltistan and Hunza/Nager districts work on this sector has been initiated and programmes like Rupani Foundation and KADO has played a vital role in this regard.

Health development

Health facilities have been promoted through different programs like, AKHS has done remarkable work for improvement of health almost in all areas of Gilgit Baltistan. In the same way, government has initiated some programmes regarding health improvement, such as PPHI, women health and child health care etc. Another programme by AKHS is Micro Health Insurance that has lessened the problems of poor community to access health facilities.

Festivals

Local festivals were used to celebrate with show and pump in the past but it is now on decline and almost confined to some remote area, where very few festivals are celebrated and the rest of festivals have been abolished. From the FGD, it was found that in Upper Hunza, Yasin and other upper areas of Ghizer District and Ganchay district, some festivals related to agriculture are celebrated but in the town/semi-urban areas the festivals have no more existence.

Common festivals celebrated in GB

Name of Festivals	Celebrated in districts	Reasons of Celebrations	Procedure of celebration
Goni	Astore	To stop attack of insects on the crops	Small peaces of juniper tree was used to mix with fire, a man was taking it in hand a walk around the field.
BaniKjahono	Astore	Hope for being better production from the newly cultivating crops.	Before cultivation of crops, sweet in local butter was used to make from all households and people used to get gather to share the food. At last, the oldest person was asked to open the cultivation
Khoichupkra	Astore	Being whish for good yield from agriculture and protract it from bad creations (Giant -booth etc)	Families used to come together on that day, cut an animal and share its meet. Eating the meet, nobody was allowed to talk and if any surplus of the meet was used to kept in the cattle shad

Name of Festivals	Celebrated in districts	Reasons of Celebrations	Procedure of celebration
Miphang	Skardu/Ganchay	Celebrated on the arrival of spring. The reason of celebration is to joy, as winter goes off and spring comes on.	Celebrated by getting together in a place and organizes dance party. In the ancient time people celebrated it because, on starting of spring they had to start cultivation/agricultural activities
Norfung	Skardu	Before shifting the cattle in the high pastures in the spring	people used to get together in the Imambarga(religious place), they share food and plan the journey toward the pasture.
Strufla/ sown thab	Skardu	Whish for better production from crops	Before taking fertilizer in the fields, the religious leader is called at homes by each household. He gives the correct date for fertilizer shift in the fields, which could be the better date in the religious perspective
CholimanoqSathsnmo	Ganchay	To keep the culture alive and show equal right of the villagers on the resources	Women bring wild vegetable from the mountains, cook it in one house and distribute it to all the villagers.

Home based industries

The finding of FGDs conducted across the regions in GB reveals that though the area is potential for home based industries but the trend of this industry is on decline. The major home based industries found in the area, are given as bellow**:**

- Vocational center
- Garment factory
- Handicraft
- Fruit processing
- Green houses
- Embroidery
- Wood carving

Problems for the promotion of home based industries

- Lack of awareness
- Lack of technical capacities
- Poor marketing/lake of market opportunities for the products
- Lack of quality In the products
- Terrorism
- Lake of financial resources
- Un affordability of Equipment to initiate home based industries
- Market linkages is not given priority

- Infrastructure/ road etc.
- Chinese products have replaced the vocational product, because Chinese products are easily available on less cost, while the local products make more cost.
- Availability of raw material

b. General socio-economic situation of local communities; landholding, income sources food supply etc

Source of household income and its distributions

Title	Astore	Gilgit	Ghizer	Skardu	Ghancha	Chilas	Hunnza / Nager
Percentage of household income from farm source	50%	Participants could not guess	50%	-	75%	Approximately 40%	Question not asked from the participants
Percentage of household income from the market	50%	Large part of the income	50%	-	25%	Approximately 60%	-
Major contributing income sources	Potato	employement	agriculture	-	Agriculture	Agriculture	-

c. General Situation of Poverty Level

Definition of poverty

People, who have less landholding, having less number of livestock, having lack of skills, unemployed, mentally or physically disable, and having lack of access to basic facilities like, education health and basic necessities of life are poor in GB.

Definition of poverty in different districts

Ghizer: People, who can not feed their children, afford the educational expenses of their children, are disable people, unskilled, can not access health facilities, drug addicted and having large number of children

Astore: those people are poor who have less piece of land, they are uneducated, they don't have skills or they don't have cattle.

Hunza/Nager: We consider people as poor who have less pieces of land available for cultivation or they have land available but due lack of awareness and skill, they underutilize their land

Chilas: In our views, those people are poor who can not access their two times meal, basic health facilities and education.

Skardu: In our views, those people are poor who are unskilled, mentally or physically disabled, who can't feed their children or access to education and health facility.

Ganchay: people having less land, unemployed people and disable people are poor
Gilgit: Not given**Percentage of poor people in different districts**

Districts	Percentage of poverty according the views of the participants
Astore	25%
Gilgit	Not give
Ghizer	21%
Skardu	80%
Ganchay	70%
Chilas	80%
Hunza/Nager	50%

d. General Situation of social services; education, health and sanitation Education

From the FGDs conducted with the key informants in all district, it was found that people in GB are not satisfied with the education system prevailing in the area due to following reasons;

Reasons/Problems

- There is less number of schools in the area, specifically high schools. While, access to the available schools is difficult due to large distances.
- Quality of education is not up to the mark
- Lack of girls high schools in the area
- Teachers get appointment on the posts given to a district and transfer to other area by using unfair means.
- Teachers in the government schools are mostly not well qualified and they are not well trained.
- lack of proper control/ monitoring system in the government school
- unfair induction of teachers
- colleges in some areas are constructed without PC4
- Lack of discipline and interest of the teachers lead the students toward lack of competency.
- Lack of educational awareness/interest of Parents
- Teachers' salaries are very less
- Weak students, who are expelled from the private school, are given admission in the government schools.
- Strength of students remains large in the classes at government schools.
- Unfair induction of teachers discourages quality of education.

How to solve the problems?

- Proper monitoring, check and balance in the schools and in this regard a monitoring committee should be formed.
- Give awareness to the teachers regarding their roles and responsibilities
- Establishment of new schools required

- fair appointment of teachers should undertaken
- HR department should be separated from the education department (independent HR system(
- Hiring/selection of competent teachers is required
- Public private partnership should promoted
- Establishment of school/college project with PC4 and Proper selection of project through proper identification process
- Strengthen SAP schools system
- A monitoring committee should be formed by the community to monitor the education system at their places. Such example exists in Karimabad Hunza.

Health Facilities

According to the FGD results hospitals and dispensaries are available in all districts of GB. Some hospitals and dispensaries are lacking staff and in some hospital staff member remain absent. Overall result of the FGDs shows that medicines are not easily available in the hospitals and at some places poor quality of medicines are being given to the people. For example, *the participants of FGD in Diamar district complaint that the medicines given to them in the hospitals do not work effectively for recovery of the patients and they purchase it from the market.*

Problems/issues

- Lack of facilities (equipment, medicine and doctors)
- Dispensers do not perform their duties properly,
- Medicines are not available, which is mostly purchase from the market
- Shortages of staff / staff remain absent from the hospitals. Doctors give less time to the hospital and promote their clinics.
- Lady Doctors are not available at some hospitals, eg. Chilas
- In Supervision of PPHI, the hospitals have become worsen.
- There are no standard schools available for the children of doctors/ professionals in
- District Diamer that is also a reason for the doctors to transfer themselves in other districts.

How health facilities can be improved?

- Proper monitoring, check and balance system should be introduced to improve the system and strict monitoring of the staff should be done.
- Awareness programme should be conducted for the community regarding importance of health.
- Availability of doctor should remain 24 hours in the hospitals including lady doctors
- Quality of services and 24 hours availability of lady doctor should be ensured
- Availability of medicines in the hospitals must be ensured and Quality of the medicine should also be checked
- Women from the remote districts should encourage getting medical education in order to fulfill the need of lady doctors in locally.

e. General Situation of Socially Vulnerable People; Elderly Disable, Religious

Disable people

From the FGD it was found that, in number of disabled people in Astore Skardu and Chilas districts out of the total populations are 3%, 5% and 25% respectively. While in district Ghizer, number of disabled people is reported as 985 and the participants of other district did not respond the questions regarding disabled people.

What should be done for the betterment of disabled people?

Consolidated result of the FGD shows following suggestions for the betterment of disabled

- Special education for disables people should be introduced
- Establishment of school specifically for disables (technical schools).
- Scholarship programmes should be introduced to educate them
- Social welfare department should concentrate on disables through innovative programmmes
- Mostly people become disabled due to road accidents; therefore, mitigation plan should be developed to avoid road accidents.
- Skill enhancement through various programmes
- Technical/ financial support for involvement of disable people in income generating activities
- Contaminated water is a major cause for increase in number of Disable people that should be reduced through providing clean/purified water system in the area.
- In district Ganchay, the participants reported that disability rate by birth is on decline in the area. Reason for the decline has been reported as increased food security and access to health facilities.

f. Basic Information on Major Industries

Major industries in GB

Major industries in GB are flour mills, tourism, hotel industries, transport industry and wood industry that exist in all districts of GB. Other industries that exist in some of the districts, are very rarely; such as, mining industry, fruit processing and marble industries.

Problems for promotion of industries in GB

Major problems that are commonly faced by the industrial sector in the area are:

- Lack of awareness about industrialization in the area
- Lack of energy
- Lack of technical human resource
- Lack of financial capacity/ capital
- Less trend of private sector investment in the area
- Terrorism in Pakistan (specific to tourism, hotels and foreign investments)
- Poor communication and infrastructure
- Natural Disasters

Suggested solution for promotion of major industries in the area

A struggle for converting all above given problems into opportunities would galvanize the pace of development in industrial sector in the area. However, improvement of energy efficiency will be the prime factor in this regard.

g. Basic information on rural/domestic/home-based industries

Home based industries

The finding of FGDs conducted across the region in GB reveals that though there is potential for the home based industries in the area but very on limited base these industries exist in the area. The major home based industries found in the area, are given as bellow**:**

- Vocational center
- Garment factory
- Handicraft
- Fruit processing
- Green houses
- Embroidery
- Wood carving

Problems for the promotion of home based industries

- Lack of awareness
- Lack of technical capacities
- Poor marketing/lake of market opportunities for the products
- Lack of quality In the products
- Terrorism
- Lake of financial resources
- Un affordability of Equipment to initiate home based industries
- Market linkages is not given priority
- Infrastructure/ road etc.
- Chinese products have replaced the vocational product, because Chinese products are easily available on less cost, while the local products make more cost.
- Availability of raw material

FGD Notes: (Production and Processing)

Deliverable	Points of Investigation	Questions

Crop productivity (yield/unit area)	Production levels and causes for low productivity (Comparison with National/international benchmarks)	**What are the reasons of low productivity as per national/ international standards?**
		
		• Low priority for Agriculture due to low comparative economic output.
		• Old system of farming.
		• Lack of new varities and technologies.
		• High cost of inputs and erratic supplies.
		• Lack of Subsidy on
		  o Fertilizer
		  o Seed
		• Lack of favorable government policies.
		• Soil quality is low on newly developed lands.
		• Livestock-wheat cycle which doesn't generate outwards economic impact.
		• Poor extension services.
		• Lack of Availability of Agri Loans and payment capacity.
		• Labor shortage during sowing and harvest season.
		
		What strategies do you recommend to overcome them?
		
		• Identification of area specific technologies for small holders through adaptive research.
		• Provision of efficient implements, irrigation systems and leveling techniques.
		• Training to extension workers and farmers on the use of inputs and harvesting.
		• Training on crop management.
		• Development of polices which are conducive to agriculture sectors for the creation of enabling environment.
		• Development of Cost effective techniques and niches to get benefits from small holdings in GB.
		• Provision of Loans through Pass Books.
		• Minimize water losses through development of Pucca Nallah`s.
		• Development of check dams, retaining walls and mini dams for water retaintion.

Deliverable	Points of Investigation	Questions
Access to inputs	Seed, fertilizer, pesticides, irrigation water and credit availability parameters (quality, price and services). New ideas	**Are you satisfied with present access to services?** • Poor seed quality and availability. • Absence of local seed system. • Farmers use home saved seed which is of poor quality. • Seed rate is 120 Kg per acre! • High cost of fertilizer and pesticides. • Black marketing in fertilizers. • Difficult procedures for acquiring agriculture credit • Miss use of agriculture credit by the farmers. • Poor acess of farmers to training & demonstration facilities. **In your opinion, how the quality and cost can be rationalized.** • Identification of role of department in quality assurance. • Development of linkages with bigger seed and fertilizer companies. • Guarantee of business to suppliers in each district. • Development of community based umbrella services for provision of quality inputs in the big villages and UCs . • Training and advisiory services for the farmers regarding use of inputs at UC level. • Govt should subsidize the transportation costs on fertilizers for farflung valleys.
Infrastructure facilities for agriculture production and processing.	Water channels, Cold storages, processing and packing facilities, mode and means of transportation, value addition.	**Infrastructure** • Existing roads need improvement. • Water channels are old and fragile. • Absence of rural assembly markets. • There is not a single cold store in the region. • Need modern technology for vertical expension as there is little room for horizontal expension. • Currently available technology is poor. • There is lack of training opportunities in modern agriculture. • Lack of proper processing facilities at village and UC level to create an exportable product. • Monoply of few people on purchase of agriculture production especially in potato

		and apricot. **What is needed** • Development of rural assembly market at UC level. • Development of wholesale market at district level. • Training in value addition. • Processing facilities at village level with modern technology. • Development of information system to benefit from peak and lea period. • Diversification of export markets.
Produce losses and identify their causes?	Farm, market, storage, transportation and other levels along the distribution chain.	**Reasons:** • The main reason of lossess is at the farm level is due to poor post harvest knowledge • Harvest of many crops coincides and there is shortage of human resource in the families. • The loss at processing and transportation level is due to poor packaging and lack of sauitable storage facilities along the supply chain. • Poor roads and road blockadge is one of the important factor for fruit losses **Result:** • Poor profits at farm and market level. • Huge wastage at farm level, fruit is feed to the animals. **What is needed?** • Post harvest fruit handling training. • Less perishable fruits and vegetable varieties. • Value addition at household and village level. • Improvement in road infrastructure. • Use of poor quality fruits and vegetables for making concentrated food for animals.
Current role of Public and Private Sector.	Gaps between demand and supply (R&D institutions, extension services, private sector service providers, lending institutions)	**Issues:** • Lack of linkages between Agriculture extension and farmers. • Absence of potent research system in GB. • Lack of coordination between DoA and ZTBL. • No valley specific adaptive research. • No local mountain specific agriculture institute. • Lack of consistencey in NGO driven projects. (AKRSP remained out for over a

		decade). • Lack of appropriate technologies. **What is needed:** • Government policy for the promotion of agriculture/horticulture. • Mountain specific research. • Longer NGO role-long term funding – not small projects. • Public private partnership in processing. • Linkage with premium markets.
Production and processing strengths and market niches	Organic horticulture products Fresh and value added Seed production, non timber forest products products etc.	• Organic farming • Production of Apple, Cherry, grapes and pomegranate • Commercial production of Potato seed, pea and bell pepper • Organised farmers. • Growing Chinese market. • Tourist market • Big volumes in case of apricot and apple for processing.
Need identification	Trained/skilled human resource Trainings and TA (national & international)	• High Quality planting material of improved fruits and vegetables. • Training of farmers in modern fruit and vegetable production technologies. • Linkage with export markets and with South East Asian markets through China for fresh and dried fruits.

FGD Notes: Horticulture Marketing

Group:Horticulture marketing

Section 1- Fresh Fruit

List and ranking of major fresh fruits of traded in local, Gilgit and down country markets in terms of volume suggested by participants of Focus Group.

Order number	Local Fruit	Imported
1	Apple	Mango
2	Grapes	Banana
3	Cherry	Oranges
4	Pomegranates	Kinno (Mandarins)
5	Pear	Guava
6	Persimmon	Melons
7	Peach	Grapes
8	Apricot	Apple
9	Plum	Pear
10		Pomegranates

Major Issues identified by Focus Group Participants in Fruit marketing in local, Gilgit and down country markets?

Order number	Issues Local Fruit	Issues Imported Fruit
1	Distant Markets	Fruits are inferior quality
2	Transportation from villages to local and national market is not available at time of need	Very costly compared to other areas at similar destination from production areas
3	Link road to most of villages are in poor conditions and there are number of village which are not even have a link road	Not Fresh
4	Packaging is not available	
5	There no storage facility for fresh fruits in whole district	Transportation losses are high
6	Quality of majority of fresh fruits are not good enough to sell in the market. Moreover, no post harvest handling and grading, sorting and cleaning is known to the farmers.	Quality issue
7	Work load is high, as harvesting season is same for food crops (wheat and maize) and fruits.	
8	Weak supply chains and marketing system. Lack of timely buyers specially for fruits.	

Suggestions of Focus Group to overcome the issues in Fruit Marketing

Order number	Local Fruit	Imported
1	Introduction of collective marketing system and handholding during initial years	None
2	Training and linkage development of groups and individual interested in marketing	
3	Incentive to local entrepreneur to run Packaging units	
4	Improvement in link roads	
5	Construction of storages	
6	Construction of truck able roads	
7	Formation and support to establishment of associations and unions	
8	There should be Information system through which up dated prices information of bigger markets disseminated to the farmers and marketing groups	

Section 2- Processed/ Dry Fruit

List and ranking of major dry fruits of GB traded in local, Gilgit and down country markets in terms of volume suggested by participants of Focus Group

Order number	Local Dry Fruit	Imported Dry Fruit
1	Walnuts	Kishmish (Dry grapes)
2	Dried Apricots	Apricot kernel (china)
3	Almonds	Pistachio
4	Pine nuts	Almond
5	Dried Grapes	Walnuts
6	Dried Mulberry	Dried Figs
		Peanuts

Major Issues identified by Focus Group Participants in Dry Fruit marketing in local, Gilgit and down country markets?

Order number	Issues Local Dry Fruit	Issues Imported Dry Fruit
1	Lack of information and linkages with main down country markets.	
2	Lack of packaging technology .	
3	Lack of finance and credit	
4	Lack of skills and trainings opportunities for value addition, i.e grading, packaging, nut cracking etc	
5	Low volumes and productivity of marketable varieties	

Suggestions of Focus Group to overcome the issues in Dry Fruit Marketing

Order number	Actions	Issues Imported Dry Fruit
1	Linkage Development with main dry fruit supply chains	
2	Creation of market information system.	
3	Provision of finance for value addition.	
4	Provision of quality plants of marketable varieties.	
5	Standardization and branding	
6.	Developing blended health product.	

Section-3 Processing

Existing processed products of fruits and vegetable traded in local, Gilgit and down country markets in terms of volume suggested by participants of Focus Group

Order number	Processed Fruit and vegetable Products	
1	Jam and Pickle	
2	Juices	

Major Issues identified by Focus Group Participants in Fruit and Vegetable processing and marketing in local, Gilgit and down country markets

Order number	Issues Local Fruit Products
1	Volume of processed fruits and vegetable production is very small
2.	Marketing beyond village is diffcult

Suggestions of Focus Group to overcome the issues in Processed Products

Order number	Issues Local Fruit Products
1	Training and capacity building in value addition
2	Testing and certification facilities
3	Market linkages with pulp buyers
4	Investment from major food companies in fruit processing
5	Finances and credit for value addition.

Section-4 Vegetables

List and ranking of major fresh vegetable traded in local, Gilgit and down country markets in terms of volumes suggested by participants of Focus Group

Order number	Local Vegetable	Imported Vegetable
1	Potato	Onion
2	Tomato	Tomato
3	Pea	coriander
4	Onion	Cabbage
5	Bell pepper	Okra
6	Spinach	Carrot
7	Okra	Radish
8	Beans	Turnip
9	carrot	Tomato
10	Turnip	Potato
11	Radish	

Major Issues identified by Focus Group Participants in fresh vegetable marketing in local, Gilgit and down country markets

Order number	Issues Local Vegetable	Issues Imported Vegetable
1	No Storage	Costly
2	Lack of quality inputs.	Poor quality
3	Lack of market information.	Not healthy/grown under heavy use of pesticide
4	No packaging material is available	
5	Lack of proper transportation.	
6	Lack and poor condition of Roads.	

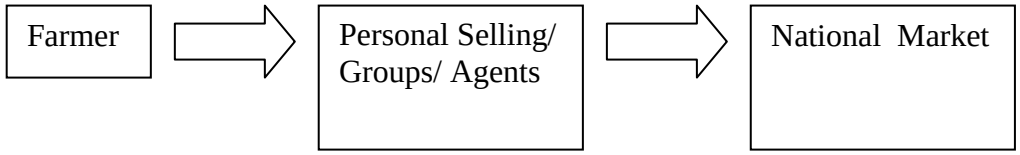
Suggestions of Focus Group to overcome the issues in fresh vegetable Marketing

Order number	Activities	Issues Imported Vegetable
1	Provision of quality inputs and advisory services through DoA.	Price monitoring
2	Training and demonstration of the proven technologies.	
3	Support and handholding for collective marketing	
4	Provision of packaging material through promoting local enterprises.	
5	Credit availability	
6	Improve roads and transport system	
7	Establishment of local vegetable markets.	

Section - 5 Marketing System

Existing Marketing system-Fresh Fruit

Existing Marketing system-Fresh fuits



Existing Marketing system-Dry Fruit

Existing Marketing system- Fresh Vegetable

Existing Marketing system- Potato

Section - 6 Solutions

Proposed solutions suggest by focus group participants

Short Term 1 year	Medium Term 5 years	Long term 10 years
Capacity building of farmers/Training of agents/ groups in marketing skills and linkage development	Transformation of production system to marketable varieties	Promotion of commercial orchards on big community lands.
Ensure a mechanism of quality Input supply	Introduction of fruit and vegetable certification system	Establishment of Processing Industry
Demonstration plots	Improvement in road network and transportation system.	Marketing under an established brand name.
Local and down country fruit exhibitions	Local Packaging enterprises	Promotion of blended health products.
Strengthening of one fresh fruit sector (Apple or cherry) and one processed fruit sector (Apricot).	Construction of Storage facility for fresh fruits, vegetable and specially for potato	
Promotion of pea and bell paper as alternate crops for potato.	Capacity building and technical support to develop commercial orchards and vegetable farms	