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ISLAMABAD**

**PROMOTION OF AGRICULTURE
IN GILGIT BALTISTAN
RESEARCH STUDY**

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1. INTRODUCTION

Gilgit-Baltistan region has a total area of 72,496 sq. km with around 1.8 million population (estimated) and lies at extreme north of Pakistan with borders connected to Xinjiang province of China (North), Chitral District, KP province (West), Kohistan, Swat and Mansehra Districts of KP province (South) and Indian Administered Ladakh and Kashmir (East). It comprises of ten districts, which are located in the most remote and isolated parts of the country. Most of the area i.e. 90 per cent is mountainous, 04 percent is under forest and 4.2 per cent is cultivable waste. The current cropped area is only about 1.2% of the total area (IFAD, 2015). Population density is at very low i.e. 24 persons per sq. kms connected through Karakoram Highway (KKH) with rest of the country with a distance of 630 kms from provincial capital Gilgit to Islamabad, which takes around 12 hours. The other end of KKH connects the region with China, with nearest sizeable city, Kashgar. GB is primarily a rural society dotted with small urban centers and agriculture is the primary occupation of rural people (IFAD, 2015).

The main strength of the economy of Gilgit-Baltistan (GB) depends largely on dry fruits and agriculture. This area is famous for its almond, apricot, cherry and other dry fruits production in the world, but the most popular fruit is almond; a huge variety of almond is found in all districts of GB. Each type has its own specific characteristics. Gilgit-Baltistan produces about 120,650 tons of almonds per year¹. Farmers of GB could earn billions of rupees through almonds export. The fresh and dried almonds in Gilgit-Baltistan are famous for its rich taste and organic nature. Pollution free environment and abundant water resources make it ideally suitable for natural growth of fruits and vegetables.

Gilgit-Baltistan faces problems with advantages in respect of fruit sector like long and difficult road journey, lack of storage facilities, non-availability of export quality packing material, quality control for grading and facilities for disinfection decrease the worth of fruits and cannot be dispatched to various markets of the country. Gilgit-Baltistan could be a business hub between Pakistan and China in the wake of China Pakistan Economic Corridor (CPEC) and can be used as a gateway between both the countries. In this scenario people of GB could get huge benefits by exporting its finest quality of almonds and other dry fruits to china. The irony is the lack of infrastructural facilities and efficient road network to reach timely to market network.

People of GB have more opportunities in the agriculture sector and organic farming. Climate and abundant water resources make it ideally suitable for marvelous growth of this sector in Gilgit-Baltistan, where immense potential is yet to be exploited. The nearest large city from GB is Rawalpindi/Islamabad. Under these conditions one of the options available is to process the fruits at location to increase its shelf life and to add to its value, so that it may be transported economically.

¹ <https://par.com.pk/news/gilgit-baltistan-can-earn-billions-with-almond-exports-through-cpec>



1.1. Topography, Climate and Ecological Zones

Gilgit-Baltistan has unique geographic features and is dominated by one of the most mountainous landscapes on earth with an arm of the Hindu Kush to the west, the lesser Himalaya to the south, the Karakoram to the east, and the Pamir to the north. More than half of GB is located above 4,500 meters from sea level. World’s second highest peak K-2 and over 40 famous glaciers are located in this region as well. Climate conditions vary widely across GB, ranging from the monsoon-influenced, moist temperate zone in the western Himalayas to the arid and semi-arid cold desert in the northern Karakoram and Hindu Kush. Below 3,000 meters, precipitation is minimal, rarely exceeding 200 millimeters annually. However, there is a strong altitude-based gradient, and at 6,000 meters 2,000 millimeters of precipitation fall per year in the form as snow (AKRSP, 2017). Temperatures in the valley bottoms vary from extremes of 40°C in summer to less than -10 °C in winter.

The diverse climatic conditions in Gilgit-Baltistan, coupled with extreme variations in altitude and aspect has led to an equally wide array of vegetation and ecological zones. Five distinct zones can be identified as:

1. Dry alpine areas and permanent snowfields
2. Alpine meadows and alpine scrub
3. Sub-alpine scrub
4. Dry temperate coniferous forest

5. Dry temperate evergreen oak scrub

1.2. Objective of the Study

Gilgit-Baltistan is a remote mountainous region of smallholders with comparatively higher incidence of poverty. Agriculture productivity is generally low due to poor access to quality inputs, huge post-harvest losses (45% for apricot and 10% for potato), lack of local processing and value addition and poor access to markets. Production is scattered and fragmented over large areas and of variable quality with difficult access and there are no aggregation platforms. Varietal selection is inappropriate and most farmers produce fruits and vegetables of multiple varieties; many of which are not in demand in the market or have poor shelf life. There is a poor connectivity among the actors and stake holders along the value chains of key products. Supportive policies and incentives are often weak or entirely missing. In view of these challenges, this study is designed with the following objectives:

1. To determine the potential of agriculture in areas of Gilgit-Baltistan
2. To identify investment opportunities in Gilgit-Baltistan
3. To determine challenges of farming community in this area and to provide recommendations/suggestions

2. POTENTIAL OF AGRICULTURE IN GILGIT-BALTISTAN

Agriculture sector in Gilgit Baltistan has a very huge potential for the investment because of the availability of a very hardworking human resource. The main strength of economy of Gilgit-Baltistan mainly depends on fruits and horticulture (vegetable production). Horticulture and dry fruit sector can earn millions of rupees as revenue, which are being neglected due to lack of interest of public sector administration as well as improper transportation system and storage system.

This area is not only gateway to China and Central Asian State but also has an ideal climatic conditions and abundant water resources, which are calling huge investment opportunities in the value added sector and medicinal herbs. Both the sectors have marvelous chances for vertical and horizontal expansion but unfortunately the sectors could not be developed to the desire levels for want of due participation of the private sector.

A distinct feature of GB is that over 90% of the households own some agricultural land as compared to 52% in rest of the country. The ownership of cattle, goats and sheep is also almost 30% higher than rest of country. This fact has significant bearing on overall equality in the society and individual empowerment IFAD (2015).

GB is being produced 169,000 tons of fresh and dry fruits out of which only 10,119 are being marketed in mostly low end markets and a huge volume equal to 57,178 tons is wasted due to issues along the value chain. Similarly, in vegetables, against the production of 152,000 tons, around 12,000 tons goes waste due to connectivity problems and lack of infrastructure and storage facilities.

Business opportunities:

1. Availability of trained contract farmers, well established tissue culture laboratories, storage and certification facilities make it convenient for the business community to put their money in these sectors.
2. Gilgit-Baltistan Horticulture Policy also ensures a number of incentives to the private sector by reducing regulatory barriers.
3. Soft loans are also available to the businessmen for the development of modern horticulture business enterprises while expansion of Karakorum Highway and opening up of Babusar-Naraan Road are the added advantages.

2.1 Agro-biodiversity in Gilgit-Baltistan

Biodiversity provides information on species, varieties, food, income and raw materials; use for clothing, shelter, & medicines. It also maintains of soil fertility, ecology through soil and water conservation that is very essential for human survival.

2.1.1. Crop Diversity

Gilgit-Baltistan is particularly well-suited for the production of deciduous fruits and nut crops. It also lies close to the two major centers of fruit diversity, namely Central Asia and China. Wheat, barley, triticale, maize, millet, potato, pulses, buckwheat and several fodder crops are grown here.

Total area under cereal crops and fodder was 49,317 hectares with a production volume of 137,944 Metric Tons (MT). Wheat is the major crop grown across GB for household consumption followed by maize barley and buckwheat. Most of these crops are consumed 87,903 MT at household level while very little quantity of maize, barley and buckwheat 7,598 MT² is marketed².

Fodder crops include Lucerne, shaftal, vetch, berseem (introduced), rye, white clover and sweet clover (which also occurs in the wild). Approximately 500 wild relatives of cultivated crops and fruits have been discovered in Pakistan, many of which are found in Gilgit-Baltistan. Commonly grown pulses include lentils, black gram, peas, chickpeas, broad beans, moth bean (a wild type of soya bean) and beans.

2.1.2. Fruit Crops

Gilgit-Baltistan has a very favorable climate for producing diverse fruits, particularly apricots. For centuries, the farmers of the region have been practicing horticulture as part of their livelihoods management strategy. Horticulture contributes about 83 percent of the entire income generated from agriculture. Similarly, within the horticulture, fruits contribute 60 percent. There are about 5.749 million fruit trees (3.653 million fruit bearing and 2.096 million non-fruit bearing) with a total

² Book on Women Agriculture in Pakistan, Food And Agriculture Organization of The United Nations Islamabad, 2015

production volume of 169,373 tons produced over an area of 25,012 hectares³. Major fruits produced in the area include apricot, apple, grapes, pears, peaches, pomegranate, cherry, mulberry, walnut and almond. Details of some important fruits along with their value addition are given below:

a. **Apricot**

In Gilgit-Baltistan, the most of growing fruit is apricot but due to low shelf life and lack storage systems, these fruit can't be transported to distant areas where its demand is high. In GB fresh apricots are rarely transported but dried apricots are sometime transported to local and distant markets through their own effort and risk. Apricots are of different types and have many varieties like 'margholam' 'halman' 'sharrakarfo' 'doso' and many more⁴.

Value addition

Dried apricots are exported after treated with sulfur to enhance its value, appearance and price. Oil can be extracted from seeds of apricot, which is used for cooking purpose due to free from cholesterol.

b. **Apple**

Second most important fruit is apple which is grown mostly in the east of Skardu. These apples are very famous in all over Gilgit-Baltistan due to its taste and appearance. 'Saspolo' a variety of apple (is very soft, delicious, and tasty and blood red in color) is very famous and its demand is also high as compared to other varieties of apple. In the south west of Skardu the Shangarilla, farmers grown different varieties and sold their produce to tourists and in local market.

c. **Grapes**

Grapes were cultivated in high quantity at a time but now people are not grown them as much as they should, due to lack of their interest and problems. However, it is being grown highly in Sakardu and Hunza-Nagar.

Value addition

In Hunza, people mostly grow Grapes for making wines and drinks because there is no any restriction for taking and drinking wine and alcohol. In Skardu, people grow them for home requirements not for sale and making wine. There are also different types of grapes; some remain green after ripe and some change into full black. It can also be eaten as dried known as 'shoglo'.

d. **Mulberry**

Mulberry is the most common fruit in GB and the most delicious one. There are two prominent type 'shahtoot' and 'bidana'. Shahtoot is of two colors, black and red while bidana is white in color. The other variety is 'karfoosay' which is not eaten as fresh but dried and stored for winter. The main

³ Horticulture Crop Research Station, Agriculture Department, Government of Gilgit Baltistan

⁴ Common and popular varieties of Gilgit and other areas

problem for mulberry is wind because its fruits stalks are very delicate and a slow wind can break them and the fruits fall on the ground and don't remain eatable.

e. Cherries

Cherries are also grown in this area for sale in local market. Red cherries and Black cherries are the two prominent types and grown almost in all parts of Gilgit-Baltistan (Sajjad et al, 2018). The most common problem for cherries is lack of harvesting tools. People harvest them by hand, so most of the fruits are damaged. There is also the chance of attack of birds and they can destroy the whole fruits of a tree. Cherries are also eaten as fresh and dried.

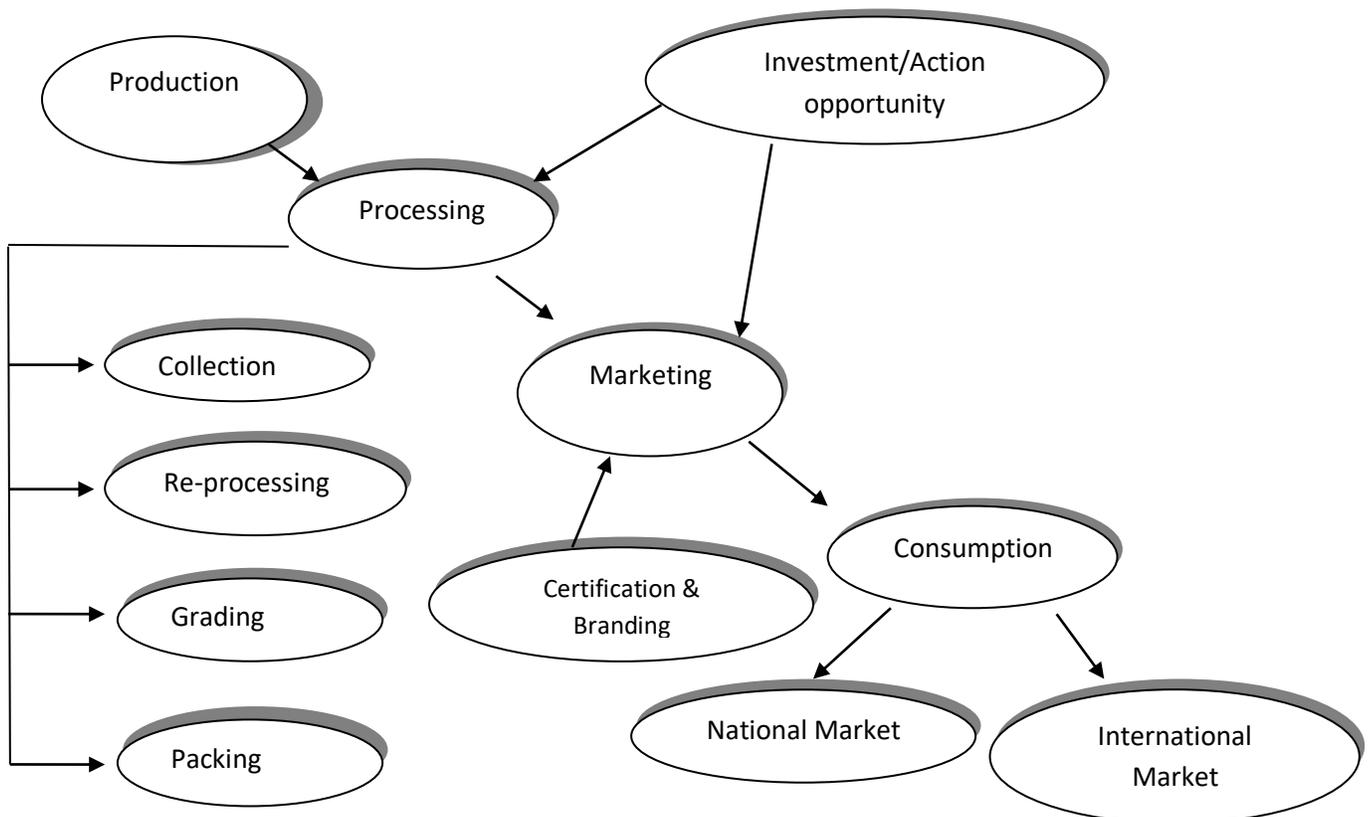
f. Walnuts and almonds

Walnuts and almond are the most popular dry fruits of this region. People mostly sell them to the local markets and from there they are transported to other regions.

Value addition

Walnuts can be eaten as a healthy snack or can be chopped to add in favorite salads, vegetable dishes, desserts or ice-cream. Oils from walnuts and almonds can be extracted, which are free from cholesterol/fat and has a huge market price and shelf life.

Fruit Sector Value Chain in Gilgit Baltistan

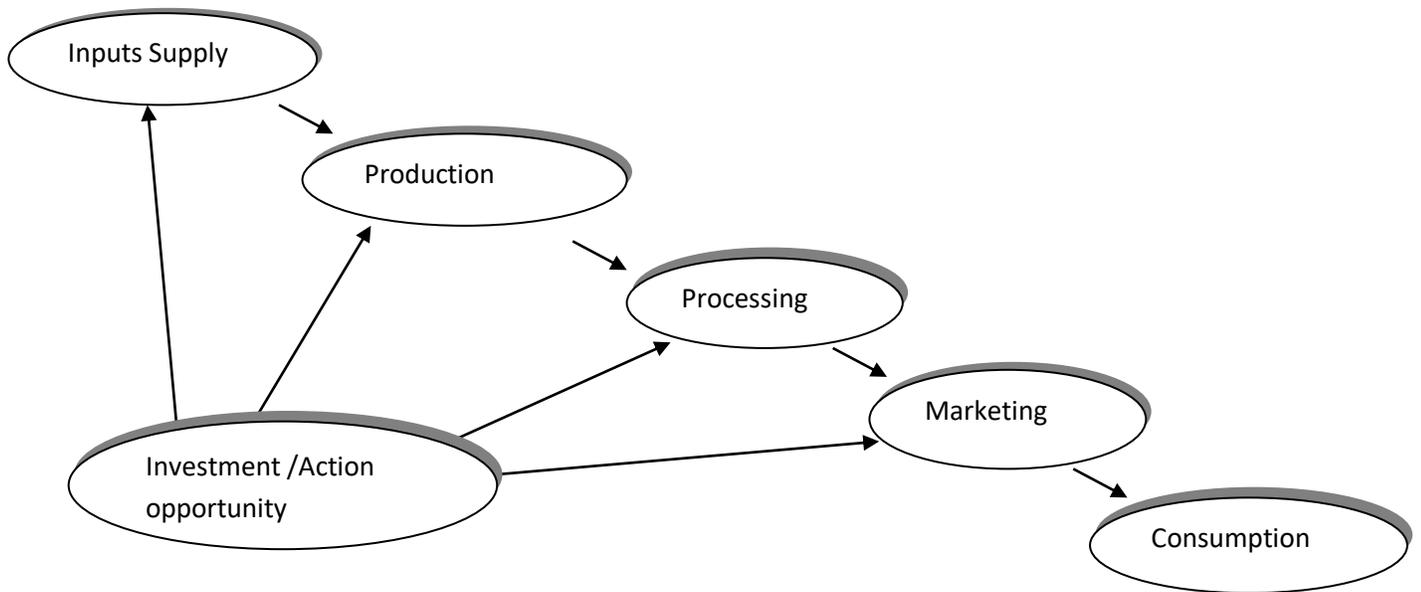


2.1.3. Vegetables and seeds

Major vegetable crops are produced in GB include potato, tomato, peas, cabbage, Chinese cabbage, onion and capsicum. According to agriculture census 2009, the total area under vegetable crops was 10,109 hectares with a production volume of 153,017 MT. Out of this, 28,135 MT is consumed at household level while 112,987 MT is marketed and within this about 94 percent are potatoes. Vegetables other than potatoes are traditionally grown on a limited scale. Usually, the area reserved for vegetable cultivation is not more than 0.5 to 2 kanals. Vegetable sowing is done by using different methods such as line sowing, sowing in small beds, intercropping with other crops, etc.

Some prominent vegetables are cabbage, carrot, spinach, cauliflower and many more grown in this area. In winter, vegetables are grown in tunnels and in summer they are grown in fields. The people of this region store these vegetables in winter for the use in summer.

Value Chain in Vegetables Seed Sector



2.2. Livestock Rearing

Livestock in GB plays a central role in the rural economy as rural farmers use livestock for both dairy and meat production. They also use the manure, skins, and hides for income generation. Livestock contributes 35-40 percent to the overall agriculture income⁵. The production potential of livestock is too low to meet the demand of meat and dairy products. This Gap is filled from importing meat from other parts of the country. As a part of subsistence farming, every household rears some kind of livestock.

Many different breeds of sheep, goats and cattle are found in Gilgit-Baltistan. Sheep breeds include the Baltistani, Gojali and Kohai Ghizar varieties. Goat breeds include Baltistani, Pamiri, Gojali,

⁵ High-Altitude Rangelands and their Interfaces in the Hindu Kush Himalayas, 2013, ICIMOD

Kohai-Ghizar, Jarakheil, Gaddi and Kaghani. Farmers also keep cattle, yaks and various cross breeds of the two known as zo/zomo. Yaks are typically kept in the high regions such as Gojal, Baltistan and parts of Ghizar District. Preferred animals are yaks (*Bos grunniens*), Zo (cross infertile breeds of yaks and domestic cow), and Zomo (female fertile breed). Zo are used as source of meat or sold to meet domestic requirements. In addition, each household maintains local breeds of cows for subsistence milk production.

These are highly valued animals and very important to the local economy as they provide milk, wool, draught power and manure. Yaks are physically well-adapted to high altitudes. Their heavy wool and other thermo regulatory mechanisms enable them to tolerate extreme weather conditions.

2.3. Poultry Husbandry

In Gilgit Baltistan poultry farming is being practiced at subsistence level to over-come the household requirements. It has been practicing since centuries as part of food security strategy. The government has been found as unable to meet the growing poultry egg and chicken meat requirement in the region and is now fulfilling from importing other parts of the country.

2.4. Wool Management

Traditional wool products such as *Patti* is woven by both men and women to prepare woollen clothes including men's caps, soaks, men and women coats and *chogas*, produced by almost every household. This activity is more prevalent in single cropping zone. These products are produced both for household consumption and for income generation. Women are more involved in this activity in the winter season. Wool management includes sheering of sheep, cleaning, separating, dyeing, spinning and weaving.

2.5. Forestry

Forests in GB cover an area of 281,600 hectares. Majority of these are found in the districts of Diamer, Baltistan, Gilgit and Ghizer. The forests provide timber, firewood, torchwood, grazing land and medicinal plants.eg. kuth (*sassuria, lappa*) black cumin, and other non-timber forest products (NTFP) including pine nuts (chilghoza), mushrooms, honey, berries of sea buckthorn, and animal products. The forests are important watersheds for the downstream population. Many species of wild animals and plants depend on these forests for survival.

Fuel wood is the main resource harvested from the forests, followed by timber. The young branches of trees provide an important fodder source from March to May, when other fodder sources are scarce. Fuel wood is collected from low and high pastures, private land, fruit trees, and purchased from local markets. Generally, fuel wood is collected in spring and autumn and is stored for use during winters. Wood is also harvested to make agricultural and household tools and utensils while some types of bark, leaves, and berries are widely used for medicinal purposes.

2.6. Fish Sector in Gilgit-Baltistan

Gilgit-Baltistan (GB) has immense natural endowment of freshwater resources; which have a wide range of native and exotic fish species. The cold and fresh water of GB are known to have 20 different species of freshwater fish, including 17 natives and three exotics. Prominent among exotic species is Brown trout, which was introduced into GB in early 1900s. Ghizer River and its tributaries, streams and lakes upstream Gilgit in particular, are considered to be the most potential areas of Brown Trout. Trout fish is found abundantly in almost all the streams and rivers of Ghizer district. However, distribution of different species, their key habitats, abundance and total allowable stock is yet to be known.

A project economics for fish farming is given as under, where all figures in the financial model have been calculated for 12,000 units of fish on 1 kanal of land. The following table shows internal rates of return and payback period.

Description	Details
Net Present Value (NPV)	Rs. 9,348,988
Benefits Cost Ratio (BCR)	1.82
Internal Rate of Return (IRR)	54%
Payback Period (years)	2.31

Factors that influence the profitability of Inland Fish Farm are farm management, quality of inputs and environmental factors.

3. CHINA PAKISTAN ECONOMIC CORRIDOR (CPEC) AND GILGIT-BALTISTAN

China-Pakistan Economic Corridor (CPEC) is a massive bilateral project to improve infrastructure within Pakistan for better trade with China and to further integrate the countries of the region. The project was formally launched on April 20, 2015 when Chinese President Xi Jinping and Pakistani Prime Minister Nawaz Sharif signed 51 agreements and Memorandums of Understanding valued at \$46 billion. The goal of CPEC is both to transform Pakistan's economy, by modernizing its road, railway, air, and energy transportation systems and to connect the deep-sea Pakistani ports of Gwadar and Karachi to China's Xinjiang province.

CPEC is offering new avenues for the nascent economy of Gilgit-Baltistan. It offers huge opportunities for the human resource development, cash crops and fruit exports, chains of intra city roads in the area, removal of trade and tariff barriers, addressing policy impediments and building support for other trade related sectors. Albeit, CPEC is not bringing in any significant direct investment in this area, but the indirect investment effects in the country is expected to morph Gilgit-Baltistan into a regional hub of connectivity impacting multiple sectors of its economy. With the lowest density of roads around 0.06km/sq. in Gilgit-Baltistan, the transportation and logistics

sector is expected to grow the most as an inter-district road network is expected to be built connecting CPEC route, bringing in economic and social integration.

3.1. Opportunities for Businesses and Investments

According to a study conducted by Aaga Khan Rural Support Program (AKRSP), that there is huge potential for investment in different sectors. Therefore building synergies with investors can help promote trade in the region. With the growing tourism in Gilgit-Baltistan, there is a great opportunity for investments in the hotel industry. Besides investments in hotelling and food, the mineral, the cottage industry, and hydroelectric power sectors have much potential for foreign investment. Further, the state-of-the-art infrastructure in GB under the CPEC would result in attracting huge investments in addition to providing a shorter route for traders in China to access the sea for shipping their goods. In a similar vein, giving the region the status of free trade zone would attract local and foreign investment in the area.

3.2. Reinforce Export of Fruits

The region of Gilgit-Baltistan is known for its fresh fruit exports, like cherries, apricot and apples. CPEC will be a game changer by opening business opportunities for the region's traders. With an estimated production of 4,000 tons of cherries and up to 20,000 tons of apples every year, the region has potential to tap into the Chinese market. This will provide local traders with an advantage and help them to increase their sales by tremendous saving in cost of transportation. Presently, fruits are being exported through air-cargo via Dubai to China, which deteriorates fruit quality and add cost of transportation. Therefore, it would be faster and cheaper if the same could be sent by road to China via Xinjiang. For example, selling of cherries to China would be more profitable as cherries are more popular there.

4. ROLE OF WOMEN IN GILGIT-BALTISTAN

Roles of women in GB are involved in a full range of agricultural activities, particularly in preparing manure, weeding, harvesting, herding, fruit processing, collecting fodder, growing vegetables, and raising poultry. They also carry out daily activities required to keep the household running throughout the year including processing and managing grain crops, vegetables, milk, and meat products, fetching water, rearing livestock, cleaning the house, repairing and washing clothes, and child care. Whilst men have season based work however, women work on continuous basis specially their work increase in summer season due to harvesting of crops.

Men and women play diverse roles in resource management, food and livelihood security. Knowledge of these roles however, mainly is static and descriptive. The activity matrix shows that women have more responsibilities (47 percent) than men (35 percent).

Table: Share of activities of Men and Women

Tasks	Percentage Share				
	M	F	F/M	M/F	Total
Household Chores	78	20		2	100
Irrigation	31	56	10	2	100
Vegetable Production	52	36	6	6	100
Cereal Crop Production	26	25	6	43	100
Fruit Production	44	35	3	18	100
Forestry	13	38	30	18	100
Livestock	67	22	11	0	100
Poultry Farming	78	22	0	0	100
Wool Management	33	56	0	11	100
Average	47	35	7	11	100

5. ROLE OF ZTBL IN GILGIT-BALTISTAN

The Bank is catering the credit needs of farming community in the Gilgit Baltistan Zone through its zonal office and the 11 branches. The Bank has been disbursed an amount of 371 million to 1,573 borrowers in 2018.

5.1. Lending Products

1. Launching of Special Products/Schemes for Gilgit Baltistan

An amount of Rs. 128 million was disbursed under this scheme to 434 numbers of borrowers during the year 2017 for special products of Trout Fish Farming, Yak Farming, Sea buckthorn cultivation, and Hybrid Poplar launched for Gilgit-Baltistan area.

During the year 2012, following four special products under said scheme were introduced by the Bank for uplifting farmers' level in Gilgit Baltistan Area:

- **Trout Fish Farming:** Keeping in view of scarcity of productive land in GB and to increase business opportunities in the area, financing for trout fish farming was started by the Bank under special package for GB.
- **Yak Farming:** In order to overcome the dairy or meat requirements in GB, the Bank had started financing of Yak farming in the northern hilly areas. Yak is reared for both milk and meat purpose, which has an ample demand in local market.
- **Cultivation of Sea Buck-thorn plant:** Various precious items like oil, jams and jelly are produced from the seed of sea Buck-throne plant. In order to utilise its potential in the area, loan facility was extended for its cultivation and processing of seed to earn maximum income and foreign exchange through exports of its product.

- **Hybrid Popular:** In order to raise the cultivation of popular in areas of Gilgit Baltistan, the Bank has been offering credit to farmers for its cultivation.

2. Tahafuz-e-Samar Scheme (Scheme for De-hydration of Fruits & Vegetables)

The distant location of GB from main cities of Pakistan as well as adverse roads/air routes/weather conditions restrict timely transportation of perishable goods like fresh fruits & vegetables to big markets. Under prevailing conditions the available option is to process these fruits through solar de-hydration at their location to increase their shelf life and to add their value so that they may be transported for longer period over a great distance economically.

With an objective to facilitate the farmers of Gilgit-Baltistan to get suitable price of their produce by de-hydration of fruits and vegetables through solar energy systems. Financing limit is up to Rs. 0.500 million per borrower/party. During the year 2017, the Bank advanced an amount of Rs. 0.200 million under this scheme.

5.2. Technology Dissemination

Zarai Taraqati Bank Limited (ZTBL) has established a chain of ZTBL Model villages renamed as “Farmers Training Centers” in all the four provinces including Gilgit-Baltistan and Azad Kashmir. These Farmers Training Centers conducts field days, workshops and seminars to disseminate the latest agriculture information, success of modern techniques applied in agriculture through Mobile Credit Officers (MCOs).

“These Training Center are serving as center of excellence for all the agriculture activities, information, and training, needs of the farmers to serve the problems encounter by them and increase their productivity thereby contributing to the national economy”.

5.3. Initiatives Need to be Taken

5.3.1. “Kissan Sahoulat Scheme (KSS)”

Due to small land holdings, most of the farmers of Gilgit Baltistan are serving various Government Departments to supplement their Agriculture income. The operational area of Gilgit-Baltistan is scattered in far-flung hilly areas, which discourages process of mortgaging process of borrowers due to lengthy and time consuming process. Therefore, most of farmers are reluctant to avail credit facility from ZTBL by indulging in this lengthy, costly and time consuming process.

In order to facilitate all such farmers who are also in government service, a special product with title of “Kissan Sahoulat Scheme (KSS)” may be included in the Bank’s financial Inclusion Program.⁶ Under this scheme, farmers can avail Agri. credit against their salaries as collateral/security in loan

⁶ A proposal was sent by Branch Manager of Gilgit Branch, ZTBL.

able items like cherry marketing, bee keeping, and vegetable cultivation. This will save time and will increase repaying capacity of borrower, rate of recovery of disbursed loan and deposit for the Bank.

5.3.2. Promotion of Medicinal Plants

a. Sea Buckthorn cultivation

Sea buckthorn plant is famous for its multipurpose qualities. It is nutritious and has medicinal, efficacy, ornamental beauty and environment friendly. It is also used around the world for water and soil conservation, land rehabilitation and reclamation, reforestation, wildlife, conservation, fuel wood production, soil improvement and farm land protection.

Value addition

A variety of products can be prepared from this plant which are given below:

1. Jams, jellies, syrup, squash, and shampoo can be prepared from the plant.
2. It is used for curing pain, support digestion and strengthen blood circulation and to get rid of cough.
3. The pulp or seed is used for oil extraction, which is recommended for external usage in case of skin complications.
4. The waste material of sea buckthorn, such as leaves, fruits and seed residues from juice and oil extraction, could be used to develop value added nutraceutical products for animals.

Potential

It has a great potential to become cash crop and to create off-farm employment and support cottage industry in the region. Farming communities of GB are unwilling to adopt this natural resources due to its difficult and time consuming manual harvesting techniques because of the dense arrangement of fruits among the thorns on each branch.

The Bank can launch awareness campaigns with the Agri. Extension Department to adopt sea buck thorn as a cash crop among local farming community. Farmers who are already growing plants should be encouraged by giving incentives in terms of credit at subsidized rates. There is needed to run projects involving the local communities. Seed, softwood or hard wood cuttings, suckers and meristems culture should be used to stimulate further propagation on large scale to export raw material and semi-finished products to down cities and abroad.

Local young people know very little about the importance of sea buckthorn. Therefore, workshops should be organized to train local women in collection, processing and value addition of sea buckthorn seed or fruits. Sea buckthorn plant should be planted on the road sides of highways of mountainous regions because its extensive rooting system can help to “grab onto” soil and keep it clumped together to combat land sliding.

b. Cumin

Cumin is very famous in Gilgit Baltistan and even in the whole country and has a considerable potential in the economy of the country. Gilgit Baltistan's weather encourages its production due to high snow fall and rain throughout the year. Unfortunately, it is not being cultivated at commercial level due to minimum resources. This crop can be cultivated at commercial level, if the Bank provide credit to small farmers for the period of 3 years with the support of Gilgit Baltistan's Government. This would also help to decrease the rate of unemployment.

c. Mint

Mint is also being cultivated at subsistence level in the Gilgit Baltistan. This herb is also being used for cooking and medicinal purpose. The Bank may include this crop in its lending program and provide credit to small farmers at subsidized rates.

d. Fileel

It is also very common and easily available in market of Gilgit Baltistan. It is mostly grown at moist places i.e. near of streams and rivers. It is used for medicines for the treatment of fever, cough, and abdominal disorders.

e. Buckwheat

It is a crop with high medicinal value. It is highly effective for the patients of sugar and it can be used in replacement of wheat for diabetic patients. Any agricultural loan scheme for buck wheat production can help in increasing awareness as well as production of buckwheat.

5.4. Potential of Trout Fish Farming

A study was carried out by Hassan *et. al* (2007) regarding potential of trout fish farming in the northern areas of the country at the Trout Fish Research and Multiplication Centre (TRMC), Jaglote and the private farmers ponds to estimate cost of and return from trout fish farms. They concluded that Northern Areas of the Pakistan are technically sound for trout fish farming. Trout fish farming provides a great opportunity for exploiting the abundant source of cold water in Northern Areas. However, a market should be established before promoting trout production. The demand for trout fish exists in Northern Area and also in the other parts of Pakistan. In this regard, the Bank can promote trout fish farming through following suggestions with the collaboration of Government:

- i. Training in trout fish farming be imparted through its training Centers to the interested farmers/entrepreneurs.
- ii. Make availability of credit for fingerlings in the area to the farmers.
- iii. Availability loans for quality feed in the market be assured.

5.5. Development of Value Added Products

Large amount of fruit and vegetable are gone wasted and does not reach in market due lack of processing, preservation, testing, transportation, communication gaps. In this regard, Khan et al, (2016) conducted a study to develop methods for processing; preservation and development of value added products and provision of trainings to farmers to control these fruit losses which will help to control food security in Gilgit-Baltistan. In this regard, they had identified following value added products in fruit sector which may be included in Financial Inclusion Program of the Bank:

- **Apple Apricot mixed fruit squash:** Apricot apple fruits are used to develop mixed fruit squash (50:50 ratios).
- **Apple Apricot mixed fruit jam Fruits:** (Apricot, apple, sea buckthorn and mulberry) are preserved as jam, jelly, on high solid high acid principal.
- **Apple Apricot mixed fruit candy/leather:** Fruit leather/candy is a concentrated nutritious fruit product has a chewy texture similar to semi dried fruits and is a good source of dietary fiber, vitamins and sugars.

6. CHALLENGES AND RECOMMANDATIONS

1. **Limited farm resource base:** Integrated farming systems prevail due to small land holding. Households mostly rely on subsistence farming to ensure food security. Government due to its limited capacity is reluctant to invest in long-term development projects e.g. development of barren lands through irrigation.
2. **Institutional support:** Farmers do not have exposure to modern farming practices due to weak extension services. Hence, strengthening existing institutional support can also help to improve local production systems, for example action research, extension services, supply of subsidized credit and inputs, and crops and livestock insurance schemes for mountain farmers.
3. **Constraints of marketing system:** Farmers do not receive a fair price for these products due to poor transportation and marketing systems, which discourages increased production. Low volumes of production, scattered and disorganized marketing system are major challenges in marketing products. It is important to improve the transportation, marketing systems and to organize farmers into groups to strengthen their bargaining power, increase the efficiency of marketing and enhance farmer's income.
4. **Storage problems:** Fruit and nut growers suffer from storage problems due to lack of storage, processing, packaging, and standardization facilities, which again leads to farmers receiving lower prices for their products, as well as increased post-harvest losses. Policy support is needed to encourage private sector investment in storage, grading, processing, and packaging industries. The government may offer financial and other incentives for private sector investment in mountain areas.
5. **Exports constraints:** To utilize the full potential of fruit and nuts, ongoing efforts to improve market access are needed to be further strengthened. Measures should be taken to enhance the export competitiveness of fruit and nuts, especially in dried form. Special incentives and support might be given to the transport of high value and perishable products with a high demand in export markets.
6. **Week market information system.** Information from the existing marketing information system does not reach mountain communities in a timely or useful way. The system needs to be strengthened through the use of ICTs such as mobile phones, local FM radio, e-information systems, and other mechanisms to improve farmers' access to market information.

7. **Fewer amounts of remittances:** Many mountain communities receive considerable amounts of remittances from overseas workers. However, these are rarely properly invested in this area. Adequate incentives and awareness-raising are needed to encourage mountain communities to invest in their local area to generate income opportunities and to contribute in food security.
8. **Lack of income opportunities:** Young people are migrating from mountain areas due to the lack of income opportunities. There is a need to generate non-farm income opportunities to reduce out-migration and improve local livelihoods and food security. Capacity building of youth on small and medium enterprises will be required to ensure the use of loans is effective and productive.
9. **Limited Access to Financial Assistance:** Peoples of the area are also facing shortage of agri. Credit facilities from both private and public sector's financial institutions. Zarai Taraqati Bank Limited (Successor of ADBP) has branches in the area to provide credit to farmers for crop loans but due to complicated terms and conditions and collateral requirements, poor men and women farmers can not avail credit. The Bank should launched subsidized schemes with no or little markup rates along soft terms and condition to enhance agri. Credit portfolio.
10. **Limited exposure to extension services:** Men and women farmers do not have exposure to modern farming practices due to weak extension services. Availability and access to technology are missing. As mentioned earlier, lack of women personnel in all concerned departments further restricts women farmers' access to improved and mechanized farming systems.

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