AKRSP

AGA KHAN FOUNDATION

Aga Khan Rural Support Programme (AKRSP)

IMPACT ASSESSMENT STUDY

Agriculture and Food Security Component
Central Asia Poverty Programme (CAPP)
July 2023

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General Manager's Message

At AKRSP, we are dedicated to building sustainable, resilient communities in Gilgit-Baltistan and Chitral by addressing key challenges in Agriculture, Climate Change, Enterprise, Civil Society, Education, and Health. Our initiatives focus on climate resilience, economic opportunities, and food security through data-driven interventions that lay the foundation for long-term progress.

This Impact Assessment Report highlights the success of our programmes, particularly in agriculture, where climate-smart agriculture practices, efficient irrigation systems, and certified seeds have increased crop yields, boosted food security, and improved household incomes. Additionally, passive greenhouse technology has enabled year-round vegetable production, further enhancing resilience. Our green enterprise efforts help farmers diversify their incomes, access markets, and adopt sustainable practices.

The report also emphasises the vital role of our MERL team in conducting rigorous assessments aligned with global indicators. Their insights guide our strategy, ensuring that our programmes remain effective and transformative. We are proud of the progress made and are committed to continuing our work toward a prosperous, climate-resilient future for the region.

Jamil Uddin
General Manager
Aga Khan Rural Support Programme (AKRSP)

Executive Summary

The Aga Khan Rural Support Programme (AKRSP) is a non-profit organisation focused on reducing poverty and improving quality of life in Gilgit-Baltistan and Chitral over the past 40 years. Under the Central Asia Poverty Programme (CAPP), its Agriculture and Food Security (AFS) component has worked to improve food security, increase incomes, and create on-farm jobs through activities like land development, solar greenhouses, seed and livestock provision, and building irrigation and storage facilities in resource-poor valleys.

From 2016 to 2020, AKRSP's interventions in seven valleys (Chipursan, Immit, Silgan, Broghil, Khot, Rech, and Garam Chashma) were evaluated for impact on income, agriculture, and climate-smart practices. Data was gathered from 276 households using mixed methods, including face-to-face, phone, and online interviews. The study found that households averaged 7.8 members, with farming largely a secondary occupation, especially for women who face cultural and educational limitations. Ethical standards ensured informed consent, confidentiality, and gender-responsive approaches throughout the study. Project impact was assessed across key indicators, with results summarised below.

1. Productive Household Assets:
Over 88% of households acquired new assets, particularly mobile phones, TVs, and kitchen appliances. The Garam Chashma and Silgan valleys showed the highest asset growth, with over 97% of households benefiting. Access to electricity through micro-hydel power units further improved asset use and promoted green energy.

2. Food Security:
CAPP support reduced lean months from 5 to 3 on average, with greenhouses and farming inputs bringing further reductions. About 91% of beneficiaries reported no basic food shortages, compared to 79% of non-beneficiaries. Overall, 24% of households are fully food secure, while 49% face moderate to severe food insecurity.

3. Climate-Smart Agriculture:
Climate-smart practices, including water management, solar irrigation, and greenhouses, were adopted across seven valleys, improving over 2,350 hectares of farmland and involving 8,511 farmers. This enhanced both subsistence farming and yields, with improved land management on 56% of cultivated areas.

4. Household Income Growth:
CAPP beneficiaries' average income was PKR 729,994, 29% higher than non-beneficiaries. Farm income rose significantly, while off-farm income became the main source for many due to CAPP's skills training and job creation efforts, reflecting a shift toward diversified income sources.

5. Farm Production and Land Use:
CAPP infrastructure projects supported 2,789 households with irrigation, terracing, and storage, increasing average landholding by 24% for beneficiaries. Crop yields rose 26% for staples, with notable gains in vegetables due to CAPP-provided inputs, boosting food security and income.

6. Value of Production and Solar Greenhouses:
Solar greenhouses have greatly enhanced food security and income, especially during winter. These greenhouses have a 44.9% return rate, with a three-year payback period, and have supported crop diversification, particularly for winter vegetables, positively impacting local nutrition and income.

Acknowledgment

This report, Impact Assessment Study: Agriculture and Food Security Component under the Central Asia Poverty Programme (CAPP), was developed by the Aga Khan Rural Support Programme (AKRSP). This assessment would not have been possible without the dedication and expertise of AKRSP's Monitoring, Evaluation, Research, and Learning (MERL) team, who worked tirelessly to bring this study to life.

Special thanks go to the lead team members Ijaz Hussain and Rubina Bano, M&E Specialists, along with Muhammad Younis Khan and Waseem Abbas, Regional M&E Managers who oversaw every detail with great care. We are equally grateful for the invaluable efforts of our field team, including Shahzad Ali and Abrar Ahmed, M&E Officers, whose work on the ground was essential to gathering data and insights. We were also fortunate to have the technical guidance of Maqsood Khan, an external consultant, whose expertise brought rigour and depth to the study. AKRSP's Senior Management and General Manager AKRSP, Jamil-Uddin, provided invaluable leadership and support throughout this process.

This report reflects a truly collective effort. AKRSP's MERL team worked alongside Programme Manager, Agriculture and Food Security Muhammad Zaman, Agriculture Officers, farmers, private sector and government representatives to share the real challenges and opportunities in agriculture and food security. We're grateful for the collaboration of our development partners, including LSOs, AKDN Imamat Fund, provincial and regional governments, and civil society leaders, all of whom supported this programme with enthusiasm and commitment.

Special thanks to AKRSP's Communications Office, Zulfiqar Ali Khan, Manager Communications, Ponum Humza, Communications Officer, and Nadeem Haider, Communications Fellow, for handling the editing, design and printing, ensuring the report is accessible and insightful.

Thank you to everyone involved for your commitment to strengthening agriculture and food security in our communities. This study stands as a testament to the impact we can achieve together.

A woman milks a cow provided by AKRSP through the CAP Programme in Arkari, Chitral.

Acronyms

AFS	Agriculture and Food Security
AKF	Aga Khan Foundation
AKRSP	Aga Khan Rural Support Programme
CAPP	Central Asia Poverty Programme
CBA	Cost Benefit Analysis
CPI	Community Physical Infrastructure
CR	Climate Resilience
CSA	Climate Smart Agriculture
EOP	End of Project
FGD	Focus Group Discussion
GBC	Gilgit-Baltistan and Chitral
IRE	Infrastructure and Renewable Energy
IRR	Internal Rate of Return
KIIs	Key informant interviews
M&E	Monitoring and Evaluation
MERL	Monitoring, Evaluation, Research, and Learning
PKR	Pakistani Rupee
PMF	Performance Measurement Framework
PSGH	Passive Solar Greenhouse

A shepherd and his grandson in Shitmerg, Chipursan, graze sheep provided by AKRSP through the CAP Programme.

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A crop harvesting machine provided under AKRSP's CAP Programme enables a family in Chipursan to efficiently harvest their wheat.

CHAPTER 1

1. Introduction

The Aga Khan Rural Support Programme (AKRSP) has commissioned this study to assess the impact of its interventions under the Agriculture and Food Security Component of the Central Asia Poverty Programme (CAPP) Phase 1. For this purpose, AKRSP engaged the services of the consultant through a comprehensive competitive process, to conduct this impact assessment study. As a first step after hiring the services of the consultant, a kick-off meeting was held on 22nd December 2022 to develop a common understanding on the objectives, approach, scope, limitations, methodology, and research tools and instruments to be developed and used for data collection of this study.

This survey report is essentially based on the initial concept note and the subsequent inception report that was produced by the consultant and approved by the Head of M&E, AKRSP. The objectives, scope, methodology, approach, data analysis and findings presented in this report are consistent with the plans and methodology outlined in the approved inception report of this assignment.

The methodology given in this report covers the tools and processes of data collection, sample size and sampling process, data collection team, and work plan. The data collection tools proposed for this study included a questionnaire for the household survey and opinion polls for data collection under different modules of this study to cover the requirements of the objectives and scope of this study.

1.1 AKRSP and the CAP Programme

The Aga Khan Rural Support Programme (AKRSP) is a non-profit, organisation working to improve quality of life and poverty alleviation of the rural communities in Gilgit-Baltistan and Chitral since the last four decades. AKRSP's functional areas include a diverse range of themes related to rural development including Infrastructure and Renewable Energy (IRE), Agriculture and Food Security (AFS), Civil Society, Youth Development, Works and Enterprise, Climate Resilience, Health, and Education. Currently, AFS is one of the major components of Central Asia Poverty Programme (CAPP) – funded by the Aga Khan Foundation, Geneva. Under the AFS component of this Programme, several targeted interventions have been made in resource-poor remote valleys of Gilgit-Baltistan and Chitral.

The overall objective of interventions under AFS component was to generate significant impact in terms of food security, on-farm employment creation and increase in farmer's incomes. For attaining this overall objective, AKRSP undertook an array of activities under three subcomponents including: (i) land development, (ii) storage, production and processing assets, and (iii) production support. Key activities included installment of passive solar greenhouses, provision of livestock to poor farmers, land levelling and terracing, fencing fruit orchards, construction and rehabilitation of agriculture infrastructure include channels and pipe irrigation schemes.

The end of project report of the first phase of CAP Programme has noted impressive outcomes from the interventions and investments made under the agriculture and food security component during the period 2016 – 2020, which are summarised as follows:

- The EOP Report of CAPP-Phase-1 has reported a 30% increase[1] in the agricultural production in that target households who benefited from additional land brought under cultivation by new irrigation channels, land development (levelling and terracing), training and input supply (new varieties of seeds, improved breeds of livestock, new varieties of plants) enabled farmers to increase their products. Storage capacity for potatoes seeds available locally reduced the cost of inputs for farmers significantly. With internal finding, 22 new irrigation channels help farmers brought 46,896 (5,862 Acre) Kanals of new land under cultivation which benefited 2,781 households (17 Kanals per households on average). Following general cropping pattern, net farm income from one Kanal is around PKR 11,000 (US$ 65) per year, therefore the additional income from the new land for one household is estimated to be PKR 187,000 (US$ 110).

- Through passive greenhouse technology the farmers are now able to produce vegetables at very low temperatures in winter months and use these greenhouses for the production of vegetable seedlings in March for onward transplanting to the field in April and May. AKRSP constructed 66 such facilities[2] in different parts of priority valleys. Through the introduction of this technology the health of the farmers has also improved because they are now getting fresh vegetables in the extreme winter months[3].

It increased farmers' income manyfold and created employment for females in the area. The seedling production in the greenhouses helped in the commercial production of vegetables in the area. On average, the income of the owner of a green house is around PKR 3,000 per months.

Through this study, AKRSP intended to assess and confirm the impact of the key interventions on the household incomes and well-being of the target communities in priority valleys of the CAP Programme area.

1.2 Objectives of the Study

The objectives of this impact evaluation study are as bellow:
i. Assess the impact of agricultural inputs/interventions on the income of households.
ii. Assess the intermediate and immediate outcomes of the interventions carried out under AFS component. These include:

(a) Hectares of land under improved management and improved yield / returns
AKRSP supports communities and individual farmers for land development by the construction of irrigation channels and land levelling and terracing schemes.

[1] Source: End of Project Report Phase-1; GBC-CAP Programme; AKRSP.

[2] AKRSP, M&E Section; CAP Programme Beneficiary Database, 2020.

[3] Ibid, 1 above.

By "land under improved management", AKRSP means farming land area (expressed in hectares, one hectare being 10,000 sqm or 2.471 acres) where soil, water and biodiversity are preserved and nurtured using one or several techniques/practices in line with regenerative agriculture, conservation agriculture, agroforestry, agro-sylvo-pastoralism and/or organic agriculture. This study assesses the enhanced yield/ returns from said practices and its sustainability analysis.

(b) % of smallholder farming households who adopt climate-smart agricultural practices

This outcome indicator seeks to capture whether farmers have tried the targeted practice and whether they continue to do so over a period of time.

Along with the assessment for above indicators, this study covers the impact of passive solar greenhouses through cost-benefit analysis of PSGHs on selected locations in Gilgit-Baltistan and Chitral.

1.3 Scope of the Study

The study has assessed the medium-term impact (impacts seen after at least 5 years) of past AKRSP interventions under CAP Programme where AFS-related activities were carried out aiming at improving livelihoods from agriculture and livestock, increasing the sustainable management of water and soil, and enhancing food security.

- This study aimed to assess the impact of interventions at micro (household) and macro (sectoral) levels on the beneficiary individuals disaggregated by gender, age groups, households, communities, and institutions levels where applicable.
- The study has covered major interventions covered under the agriculture and food security component for impact assessment. These include:
    - o Irrigation infrastructure projects
    - o Land development and agricultural inputs provided to poor households
    - o Passive Solar Greenhouses given to poor households as a means of livelihoods and food security
    - o Storage facilities, Bio-climate cellars
- The study takes into account the above-mentioned projects completed and made functional during the first phase of CAP Programme, i.e. 2016 to 2020.
- The study has included participants of all types of agriculture-related trainings because these trainees are already included in the population frame of this study as beneficiaries of the listed projects, packages and inputs. Moreover, the beneficiaries of food packages were not included being beneficiaries of non-productive inputs.
- The geographic area coverage of this study is comprised of the seven priority valleys where the first phase of CAP Programme has been implemented from 2016 to 2020 (five years). These valleys include; (i) Chipursan, Hunza, (ii) Immit, (iii) Silgan, (iv) Broghil, (v) Khot, (vi) Rech, and (vii) Garam Chashma.
- The study has obtained responses from male and female adult beneficiaries of all the selected interventions, packages and projects given under CAP Programme Phase-1 in 7 priority valleys.

The study has collected data on indicators listed in Table 1 below.

Table 1: The list of impact indicators covered by this study

Indicators	Results Section (Reference to Report)
1. % of smallholder farming households with positive variation in PRODUCTIVE ASSETS (disaggregated by valley and types of inputs/Land/ trees/ animals & other productive assets)	Household Assets; Page-19
2. % change in QUANTITY OF FARM PRODUCTION (disaggregated by valleys and types of crops/ animals/ plants)	Farm Sector Review; Page-30
3. % change in VALUE OF PRODUCTION using benefit cost ratios and rate of return (disaggregated by valleys and types of agri. Inputs) taking care of values of production and assets forgone and production costs including labour	Cost-benefit Analysis; Page-36
4. Change in average length of LEAN SEASON indicating improvements in food security of the supported households	Food Security; Page-22
5. Perception of supported farmers on change in LEVELS OF FOOD SECURITY	Food Security; Page-22
6. % share of CAPP inputs in overall FARM INCOME of the household	Household Income & components; Page-26
7. Hectares of land under improved management and improved yield / returns	Climate Smart Agriculture; Page-23
8. % of smallholder farming households who adopt climate smart agricultural practices translating into improved and sustainable management of soil and water.	Climate Smart Agriculture; Page-23

1.4 Limitations of the Study

The following were the limitations of this study that were discussed and agreed upon during the kick-off meeting between the consultant and the M&E team of AKRSP Core Office, along with PM AFS/CR.

- Due to budget limitations, the survey took a statistically viable sample of 272 households across all the CAPP priority valleys covering all the inputs/projects implemented during the first phase of CAPP (i.e. from 2016 to 2020).
- As agreed, the consultant was responsible for the following tasks under this assignment:
- Design the survey methodology and data collection plan/schedule;
- Design appropriate qualitative and quantitative tools/instruments for data collection;
- Devise the sampling scheme and draw sample on the population frame data provided by ARKSP covering the selected agricultural interventions of CAPP phase-1;
- Provide training to enumerators, facilitators, field supervisors, and designated staff of AKRSP on the methodology, tools and instruments, population frame and sampling scheme and on how to collect data maintaining high levels of accuracy;
- To analyse the clean soft data provided by AKRSP and then prepare and submit the draft report to AKRSP for review and feedback. Based on the feedback, the consultant to revise and submit the final version of the research report.
- Validate data collected by the AKRSP team for cross-verification and authentication.

In Siyah Arkari, Chitral, AKRSP has constructed a water irrigation channel through its CAP Programme to support local agriculture.

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CHAPTER 2

2. Approach and Methodology

The study adopted a mixed-methods approach, integrating a quantitative survey at household level and multiple qualitative research tools in order to provide triangulated results and to ensure a clear picture of the current status of the intended impact for each indicator assessed. For data collection, face-to-face interviews has been carried out to ensure precision and minimising errors in collected data. However, due to the extreme weather conditions of winters in the target valleys, all possible means of reaching out to the target respondents were utilised, such as telephone calls, 'Kobo Toolbox' via internet & emails as appropriate.

The consultant trained the enumerators for conducting field interviews with respondent to collect quantitative and qualitative data in target geographies.

2.1 Literature review

Secondary data was extracted from available project documents including the Performance Measurement Framework (PMF), Logical Framework, relevant global indicator definition sheets, narrative reports, end of project report for CAPP Phase-1, and any other documents provided by AKRSP. Additionally, other literature relevant to the project (such as studies relevant to agriculture and food security) will also be reviewed to understand and deliver on the requirements and objectives of this impact study.

2.2 Data Collection Tools

Four types of data collection tools were used:

- Household Survey: a structured questionnaire
- Qualitative data collection tool - FGD guide
- Opinion Poll checklist – using Likert scale
- Key informant interviews (KIIs) guide

The Consultant reviewed the available conventional "Farm Household Income and Expenditure (FHIES) survey questionnaires and tailored these to cater to the needs of the objectives and indicators of this survey which are listed in Table 1 above. The last column of Table 1 indicates different modules of the questionnaire relevant to different indicators.

2.3. Sampling Strategy

2.3.1. Universe and Population Frame

The population frame for this study includes 60,760 individual beneficiaries (22,392 women and 23,674 men) covering 8,680 beneficiary households from seven priority valleys of the districts of Lower and Upper Chitral, Ghizer, and Hunza. See the details in Table 2 below:

Table 2: Population Frame of the Impact Study

Agricultural Inputs provided	Beneficiary Households	Beneficiary Population		
		Female	Male	Total
Greenhouses, Land Development, Cellars	493	348	1,218	3,451
Agri Production Inputs	3,544	5,468	6,531	24,808
Irrigation Projects	4,643	16,576	15,925	32,501
Grand Total Beneficiaries	8,680	22,392	23,674	60,760

Source: AKRSP's CAPP beneficiary database

The universe of this study comprised of all the beneficiaries (listed in Table 2 above) of the CAPP agricultural interventions that were implemented during 2016-2020 across seven priority and five other valleys in the two districts of Chitral and two districts of Gilgit-Baltistan, i.e. Upper and Lower Chitral, Ghizer, and Hunza. The target population comprises rural women and men in all adult age groups of the workforce, (i.e. 18 to 60 years).

2.3.2. Sampling Frame

A multi-purpose sampling frame for the CAPP priority valleys in GBC has been developed on the basis of beneficiary population universe data provided by AKRSP. According to this frame, a "Beneficiary Household" – apparently for being the farm production and consumption unit – has been taken as a Population Unit for this study. It may be noted that the CAP Programme has provided farming assets, such as greenhouses, cold storage cellars, fruit and forest plants, seeds, fertilisers, livestock, farming tools, to "Individual" beneficiaries. Even though these inputs have been given to 'individual' beneficiaries but these have benefitted the households/ families of these beneficiaries as a whole. Therefore, this study has treated these 'individual' beneficiaries as "households", maintaining consistency with the beneficiary households population of irrigation and land development projects.

Table 3: Overall Sampling Frame of the Beneficiary Households across all CAPP Priority Valleys

Agricultural Inputs Provided	Beneficiary Households
Greenhouses, Land dev, Cellars	493
Agri/ Farming inputs (seeds, fertiliser, livestock, plants, orchards, etc)	3,544
Irrigation projects	4,643
Grand Total Beneficiaries	8,680

The valley-wise breakdown of the beneficiary households by types of inputs provided by CAP Programme during the period 2016–2020, has been provided in Table 4 below:

Table 4 (a): Valley-wise Sampling Frame (Beneficiary Households of Farming Inputs)

Priority Valleys	Fruit Orchards	Kitchen/ Vertical Gardens	Fruit Trees	Vegetable & Potato seed with Fertiliser	Cows	Sheep	Grand Total
Chipursan	-	-	-	209	-	-	209
Immit	15	-	43	430	-	52	540
Silgan	14	-	52	538	-	17	621
Teru	3	-	10	94	-	-	107
Garamchashma	14	55	100	369	27	5	570
Khot	11	49	70	268	21	44	463
Rech	8	28	70	308	15	50	479
Yarkhun/ Broghil	11	56	70	374	24	20	555
Sub-Total Agri Inputs (A):	76	188	415	2,590	87	188	3,544

Table 4 (b): Valley-wise Sampling Frame (Beneficiary Households of Productive Infrastructure)

Priority Valleys	Irrigation Channel	Land Terracing & Levelling	Passive Solar Green House (CAPP)	Storage Facility (Bio Climate Cellar)	Grand Total
Silgan	118	47	10	2	177
Gulaghmuli	-	10	5	-	15
Ishkoman	70	50	9	-	129
Immit	-	-	-	2	2
Chipursan	1,079	34	11	-	1,124
Shimshal	25	-	3	-	28
Garamchashma	507	77	6	4	594
Arkary	-	-	2	-	2
Khot	1,907	46	5	2	1,960
Rech	376	56	5	2	439
Yarkhun/ Broghil	441	93	8	2	544
Madaklasht	120	-	-	-	120

Laspur	-	-	2	-	2
Sub-total CPIs (B):	4,643	413	66	14	5,136
Grand Total (a+b):					**8,680**

2.3.3. Stratification Plan

The purpose of stratification was to control the variation in the survey characteristics which improves the precision of the survey findings on measured indicators. Keeping in view the objectives of the survey, the whole universe of the study has been treated as a 'one' stratum and the 276 sampled households units have been allocated according to the proportion of the valley-wise, year-wise, types of intervention-wise number of beneficiary households across all the CAPP priority valleys. Table 5(a) and Table 5(b) below provide number of year-wise, package-wise, valley-wise quota of sampled households allocated according to the population ratio of beneficiary households.

2.3.4. Sample Size and its Allocation

Keeping in view the objectives of the study and level of variability in the variables of interest of this study, the statistically viable sample size of 272 households (adjusted to 276 households) was computed.

The level of confidence is expected as 95% with 10% margin of error in consultation with the M&E team of AKRSP. The quota allocation of sampled households were used to systematically select the sampled households by applying the given 'Nth-number' against each valley and package to the sorted list of the beneficiary database provided by AKRSP.

The complete beneficiary database of AKRSP has been used as the population universe and sampling frame for this study. As the size of rural areas/villages are heterogeneous within each district, hence Probability proportional to size (PPS) helped control any variations thereof. For each valley and types of interventions, a proportionate number of sampled households has been allocated of this report considering the nature of interventions and the attributes of the beneficiary database, a systematic random probability sampling scheme has been adopted to allocate quota proportionate to the size of beneficiary population in each valley against each type of packages/ projects given under CAP Programme.

It was very important that sampled households in each of the valley given above are properly identified in the field. The enumerators were given a list of sampled households identified/ selected using the Nth number and sample quota allocated to each valley. The list with names of the sampled households in each valley were made available with the exception of the beneficiaries of irrigation project for which the list of households is not provided. For the beneficiaries of the irrigation projects in targeted villages, the enumerators used the technique of random selection of households using the Nth numbers given in table above. The consultant provided training to enumerators on how to select households using systematic random selection methods in the field.

Once the enumerators identified and reached out to the selected sampled households, they interviewed the direct beneficiary men or women in sampled household. The enumerators and field supervisors deployed by AKRSP, ensured that the relevant adult beneficiary men and women have been interviewed to maintain accuracy of the data thus obtained. Replacement/substitution of households in case of refusal cases/closed/non-contacted households, substitution of sample households undertaken. The reasons of substitution wil recorded properly.

2.3.5 Sampling for Key Informant Interviews and Opinion Polls

The sampling scheme was used to conduct quick perception survey-based checklists included as module 4&5 of the household survey questionnaire.

This helped obtain the much-needed qualitative aspect of the survey particularly on food security, changes in lean season, status of farm management practices, etc.

2.4. Data Collection and Analysis Processes

2.4.1 Survey Teams

AKRSP constituted four data collection teams. One team in each of the 4 CAPP districts of Hunza, Ghizer, Upper and Lower Chitral. Each team was consisted of three members i.e. one woman and one man for interviewing male and female respondents at household level while the third member (either male or female – as appropriate) to supervise the enumeration teams, data checking on filled questionnaires and validation besides arranging logistics.

Table 6: Consolidated summary of Valley-wise sample distribution (# households)

Districts	Valleys/CPIs	2016	2017	2018	2019	2020	Total Sample Households	Enum Teams
Ghizer	Immit/Ishkoman	4	2	10	5	6	27	1 team
	Silgan	1	6	14	8	1	30	
Hunza	Chipursan	7	14	4	3	20	48	1 team
Lower Chitral	Garamchashma	2	1	12	18	15	48	1 team
Upper Chitral	Khot	8	1	8	5	13	35	1 team
	Rech	6	2	9	14	5	36	
	Yarkhun/Broghil	2	1	15	24	10	52	1 team
	Grand Total	**30**	**27**	**72**	**77**	**70**	**276**	**5 teams**

For each district, local teams of enumerators were engaged to avoid language, cultural, social and communication barriers. Khowar, Wakhi and Burushaski are the languages spoken in the target valleys of Chitral, Ghizer and Hunza district and enumerators were those who spoke these languages fluently.

2.4.2. Orientation Training for the Data Collection Team

Orientation training was delivered to enumerators on the guidelines for step-by-step data collection process and to enhance understanding of the enumerators on the questions of the survey tools. The training covered the following areas:

- A brief introduction to the programme
- The purpose, methodology and scope of the impact assessment study
- Safeguarding in data collection
- Sampling process
- The data collection tools (modular questionnaire and KII checklists)
- The process and protocols of conducting household survey interviews
- Probing methods
- The process of review of the data by supervisors
- Data collection pilot exercise in the field

The consultant worked out the data cleaning, quality checks and subsequent data analysis. This report was produced by the consultant based on the end-Tables of the findings of the survey data that he generated for this report.

2.4.3. Data Analysis and Reporting

All quantitative data was processed and analysed using MS-Excel and the report has been produced using MS-Word. The quantitative data has been analysed per the data analysis plan presented in Table 7 below. Results of the data are reported with appropriate disaggregation by valleys, gender, and type of packages/ interventions in this report.

Through the CAP Programme, AKRSP supported a local farmer in Parabeg Garamchasma, Chitral, to establish a fruit orchard.

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CHAPTER 3

3. Ethical and Safeguarding Considerations

The consultant and all field researchers and data collection teams adhered to safeguarding standards of AKRSP and AKF. This includes demonstrating ethical behaviour, ensuring ethical and gender responsive approaches throughout the research and data collection processes, obtaining informed consent, ensuring privacy and confidentiality during data collection sessions, protecting beneficiary information, and, reporting concerns or incidents to AKRSP.

The survey protocol ensured complete adherence to research ethics. The principles of voluntary participation, confidentiality, do no harm, and respect were upheld. At each selected household, the data collection teams explained the nature of the study to the respondents and described the advantages and risks for participating to the household members.

Youth in Immit, Ghizer, receiving entrepreneurship training through AKRSP's CAP Programme.

CHAPTER 4

4. Challenges, Risks, and Mitigation Measures

It was expected that the enumeration would start in field latest by 3rd week of January 2023 but the snowfall had already started by end of December 2022, and hence the higher altitude villages in all the priority valleys became inaccessible for field enumeration during winters. This caused a delay in data collection by AKRSP team which held back the further processes of data analysis and then producing the survey report. The processes of data collection, data entry, and then data cleaning took longer than usual due to weather-dependent delay in field enumeration. Consequently, the first-cut unclean set of data was made available to the consultant on 16th of May 2023. It took more than two weeks for the consultant to clean the rough dataset provided by enumerators. The analysis and report writing processes took another three weeks and hence this study report was produced and submitted to the AKRSP in the 3rd week of June 2023.

A couple plants seeds and waters flowers in a greenhouse provided by AKRSP under its CAP Programme in Kandujal, Garamchasma, Chitral.

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CHAPTER
5

5. Findings of the Study

5.1. Demographic Features of the Seven Priority Valleys

The following sections provide valley-wise analysis of the survey data collected at household level. To start with, Table 5.1.1 below illustrates population data from the valley profile reports of CAP Programme, Year 2021-2022.

Table 5.1.1: Population Profile of the seven selected CAPP

Priority Valleys	Population			Total Households	Average Household Size
	Total	Male	Female		
Garamchashma	22,545	11,557	10,988	2,928	8
Immit	6,397	2,879	3,518	956	6.7
Silgan	10,954	5,071	5,883	1,421	10
Chipursan	3,334	1,796	1,908	438	6.7
Yarkhun-Broghil	5,578	3,002	2,576	746	8
Rech	3,678	1,883	1,795	492	7.4
Khot	6,821	3,416	3,405	885	7.7
TOTAL	**59,307**	**29,604**	**30,073**	**7,866**	**7.8**

Source: AKRSP, CAPP Valley Profiles;

The overall household size as depicted in Table 5.1.1. above, is 7.8 members per household. However, the highest number of 10 members per household has been noted in Silgan valley Yasin. All other valleys have average household sizes within normal range of 6 to 8 members, which is consistent with all other areas of Gilgit-Baltistan and Chitral.

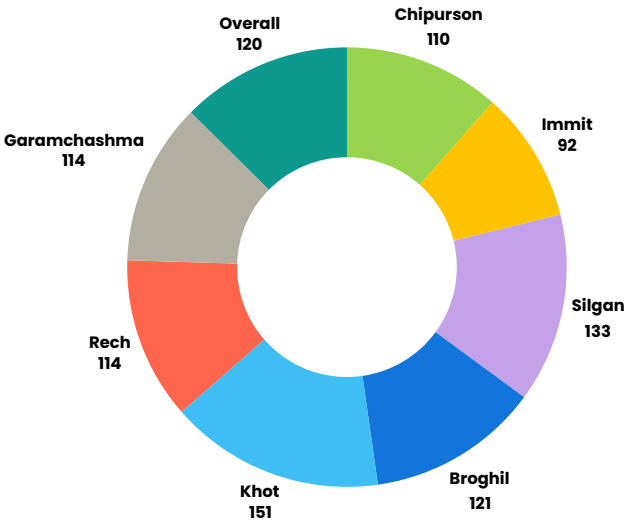
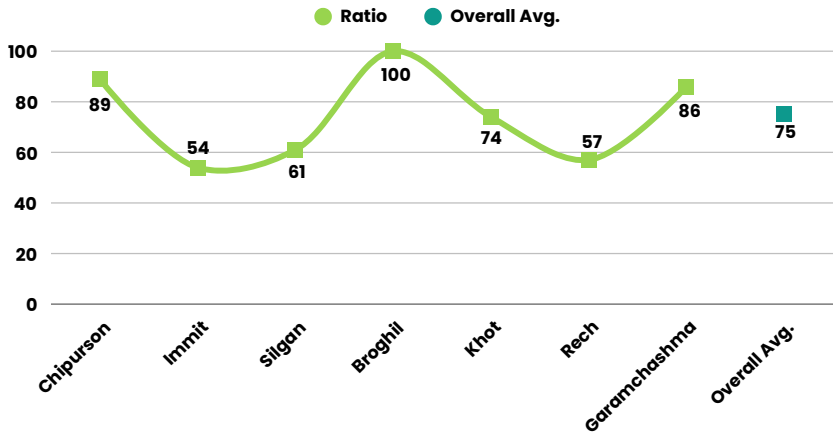


Figure 5.1.2:
Male-Female Ratio[4](Age 10+)

[4]The Male to Female Ratio is a population census tool to show sex-parity status of a population. It is calculated by dividing the number of males by the number of females, and then multiplying by 100. Ratios above 100 signify a higher male population, while ratios below 100 signify a higher female population.

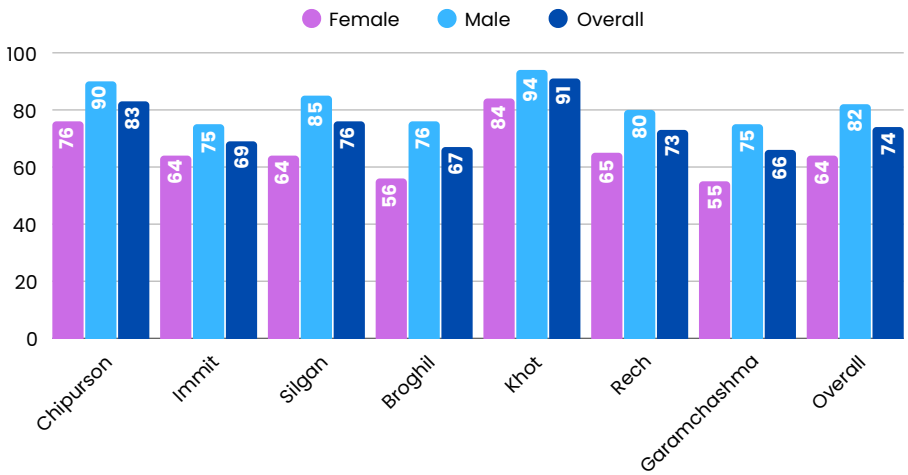
Figure 5.1.2 above shows that the male population is considerably higher than that of the females in productive age of 10+ among the people in selected priority valleys registering the higher ratio of male population while Immit valley appears to have a higher ratio of female population. This imbalance in sex-parity can be attributed to the high rate of mortality among mothers and female children due to non-availability of basic mother and child health care facilities and the cultural tendency of women's deprivation from the due care and comfort.

Figure 5.1.3 Dependency Ratio on Workforce



Evidence from survey data presented in the Figure 5.1.3, above shows dependency ratios within a reasonably ideal range of well below 100 for all valleys, except for Broghil valley where the workforce in age range of 18-60 years matches to that of the dependents in age ranges of below 18 and above 60 years of age. It is worth noting that people in all the 7 priority valleys traditionally maintain a larger household size that ranges between 6 – 10 persons per household with majority of family members in unproductive age groups but with the ever-escalating inflation rates, the people are sending more children to larger towns and cities for education and off-farm employment which contributes to increase number of earners and decrease number of dependents thereby bringing an ideal balance to the household income and expenditures.

Figure 5.1.4 Adult Literacy Rates in 7 Priority Valleys (Average Percent)



People with age 10+ having at least primary education

It appears from the Figure 5.1.4 above that priority valleys Khot in Chitral and Chipursan in Hunza Gojal, have the highest literacy rates for males, females and combined for both. Interestingly, the valleys of Silgan and Rech appear to be catching up with the Chipursan and Khot valleys. The literacy rates for Garamchashma and Broghil seem to be relatively lower but are pretty consistent with overall district and regional level literacy rates. The male literacy rates across these valleys are nearing 90% while the female literacy rates have risen above the 50% mark which clearly indicates improve access to education and increasing tendency of population to diversify livelihoods from agriculture to off-farm source by improving capacity of their workforce through education and skills.

5.2. Occupational Trends

The following sub-components under this section provide survey results on occupational trends of the workforce in the seven priority valleys:

5.2.1. Male Labour Force – Primary & Secondary Occupations

The Table 5.2.1.1 below shows interesting trends whereby the primary occupations of male workforce has increasingly shifted from farming to off-farm sectors, such as daily wage skilled and unskilled labour, pursuing jobs in public and private sectors and a decreasing ratio of people still primarily working as farmers.

Table 5.2.1.1: Male Labour Force with PRIMARY Occupations

Occupations	Garamchasma	Broghil	Khot	Rech	Immit	Silgan	Chipursan	Overall (N=1679)
1. Farmer	23%	8%	13%	13%	6%	16%	0%	12%
2. Govt. Service	9%	2%	8%	9%	3%	11%	6%	7%
3. Private Service	8%	6%	1%	3%	7%	13%	11%	6%
4. Trading Shop	2%	3%	2%	1%	2%	2%	6%	2%
5. Skilled Labour	5%	9%	4%	9%	20%	13%	6%	9%
6. Unskilled Labour	16%	24%	18%	26%	11%	4%	22%	17%
7. Student	34%	34%	48%	33%	47%	34%	42%	38%
8. Unemployed	1%	3%	5%	6%	4%	4%	8%	4%
9. Unable to work	3%	8%	2%	1%	1%	4%	0%	3%
10.Retired	0%	3%	0%	0%	0%	0%	0%	1%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

The highest percentage (38%) of males in younger age cohort of the workforce are students, which indicates that a large proportion of these young people will pursue off-farm employment after completing their education.

Table 5.2.1.2: Male Labour Force with SECONDARY Occupations

Occupations	Garam -chasma	Broghil	Khot	Rech	Immit	Silgan	Chipursan	Grand Total
1. Farmer	60%	97%	100%	91%	51%	94%	48%	74%
2. Private Service	0%	0%	0%	0%	0%	0%	5%	1%
3. Trading Shop	0%	2%	0%	0%	0%	0%	0%	0%
4. Unskilled Labour	23%	2%	0%	2%	0%	0%	0%	3%
5. Student	11%	0%	0%	7%	45%	0%	38%	18%
6. Unemployed	6%	0%	0%	0%	3%	6%	10%	3%
7. Unable to work	0%	0%	0%	0%	1%	0%	0%	0%
Grand Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Survey results presented in Table 5.2.1.2 above shows that 74% of male workforce is pursing farming as their secondary source of employment, while 12% of them are practicing farming as their primary occupation. This indicates that over 60% of the farmers have switched over to non-farm income sources as their primary occupation but they still engaged in farming as a secondary job, which is apparently a clever strategy to cope with the problems of sky-rocketing livelihood costs, shrinking farm-size due to population outgrowth and out-migration of labour force because of visible comparative advantage of off-farm employment over the traditional farming.

5.2.2. Female Labour Force – Primary & Secondary Occupations

The evidence generated from the survey as illustrated in Table 5.2.2.1 below shows that almost half of the female workforce is still engaged in reproductive roles as housewives and larger proportion of the other half of younger population is pursing education.

Table 5.2.2.1: Female Labour Force with PRIMARY Occupations

Occupations	Garam -chasma	Broghil	Khot	Rech	immit	Silgan	Chipursan	Grand Total
1. Farmer	0%	7%	1%	4%	4%	1%	2%	3%
2. Govt. Service	2%	0%	3%	0%	1%	2%	0%	1%
3. Private Service	1%	2%	0%	2%	3%	1%	6%	2%
4. Trading Shop	1%	0%	1%	0%	1%	0%	0%	0%
5. Skilled Labour	2%	1%	0%	0%	1%	2%	0%	1%
6. Unskilled Labour	1%	1%	0%	1%	3%	1%	0%	1%

Occupations	Garam -chasma	Broghil	Khot	Rech	immit	Silgan	Chipursan	Grand Total
7. Student	39%	29%	31%	31%	51%	46%	41%	38%
8. Unemployed	0%	5%	2%	2%	3%	5%	11%	3%
9. Unable to work	3%	6%	3%	1%	1%	4%	3%	3%
10. Housewife	52%	48%	60%	60%	32%	38%	37%	48%
11. Retired	0%	1%	0%	0%	0%	0%	0%	0%
Grand Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

As mentioned earlier, approximately half of the female adult population consists of housewives in all the priority valleys who also practice farming as their secondary occupation. The results presented in Table 5.2.2.1 above indicate that largest proportions of the female population are either in reproductive roles or are students who denote girls in schooling ages.

It may be noted from the above Table that disabilities are alarmingly high among women particularly in valleys of Broghil and Silgan while moderate numbers are noted in Garamchashma, Khot and Chipursan as well. The evidence presented in this Table gives the impression that women are seldom involved in non-traditional productive roles given the conservative local culture that prevents women taking on productive roles. Female students claim the larger proportion of the population after housewives in all priority valleys. But there is a tendency of female students to drop out beyond primary and middle levels due to non-availability of higher education facilities in villages within mobility range and also due to traditional mobility restrictions.

Table 5.2.2.2: Female Labour Force with SECONDARY Occupations

Occupations	Garam -chasma	Broghil	Khot	Rech	Immit	Silgan	Chipursan	Grand Total
1. Farmer	97%	93%	94%	85%	53%	93%	33%	80%
2. Trading Shop	0%	1%	0%	0%	0%	0%	0%	0%
3. Skilled Labour	3%	1%	3%	5%	1%	2%	23%	5%
4. Unskilled Labour	0%	0%	0%	0%	0%	0%	2%	0%
5. Student	0%	0%	0%	5%	40%	2%	42%	12%
6. Housewife	0%	4%	3%	4%	6%	2%	0%	3%
	100%	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

The Table 5.2.2.2 above shows that 80% of female workforce is engaged in farming besides primarily working as housewives and students. Their farm work involves vegetable production, crop production and harvesting, tilling and weeding, livestock and poultry rearing, fruit and vegetable processing, etc. The Table above shows that 12% women pursue education as a secondary activity and also a few of them appear to pursue secondary off-farm jobs for cash income earning but ratio of such women is very small.

5.3. Household Assets

This survey has attempted to gather data on inventory of household assets and variations thereof during the production year 2022. The Table 5.3.1 below shows that number of households who reported a positive variation in their household assets in comparison to the total number of households enumerated in this survey.

> **Over 88% of households gained new assets during the 6-year CAP programme**

It appears that an overall 72% of households have purchased/acquired new household assets with varied proportions across different valleys. The highest rate was noted in Silgan and Chipursan where 65% and 92% of households reported to have acquired assets during the year 2021-22.

Table 5.3.1: % of smallholder farming households with positive variation in Household Assets during the Year-2022

Priority Valleys	Total household surveyed	Households with +ive variation in assets	Percent of household with +ive asset variation
Broghil	52	42	81%
Chipursan	26	24	92%
Garamchasma	48	31	65%
Immit	34	27	79%
Khot	34	17	50%
Rech	38	17	45%
Silgan	38	36	95%
Grand Total	**268**	**194**	**72%**

Table 5.3.2 below shows the positive variations reported by surveyed households over the last 6 years of the CAP Programme period. Thereby over 88% of the surveyed households reported to have acquired at least one or more household assets. The highest percentage of households in Garamchashma and Silgan valleys have reported positive variations in their assets over the 6 years period.

Table 5.3.2: % of smallholder farming households with positive variation in Household Assets during 2016-2022 (GBC-CAP Programme period)

Valleys	Number of households surveyed	Household reporting +ive variation in Assets	% Variation in Assets
Broghil	52	45	87%
Chipursan	26	22	85%
Garamchashma	48	47	98%
Immit	34	22	65%
Khot	34	30	88%
Rech	38	34	89%
Silgan	36	35	97%
Grand Total	**268**	**235**	**88%**

Table 5.3.3 shows an interesting picture whereby a visibly large majority of households in all valleys have purchased highest numbers of electronic communication and entertainment equipment, such as mobile phone, TV, satellite dishes, radios. Third highest assets were noted to be electrical appliances used for cooking, heating, cooling, lighting, washing, and other kitchen-ware. This indicates significantly increased levels of purchase power and well-being of the communities in the priority valleys.

Table 5.3.3: % of smallholder farming households with positive variation by type of Household Assets during last 5 years (2018-22)

Household Assets	Broghil	Chipursan	Garam -chasma	Immit	Khot	Rech	Silgan	Overall
House/ Residence	0%	0%	5%	0%	0%	0%	0%	1%
Refrigerator/ Freezer/Air conditioner	2%	0%	5%	0%	13%	9%	12%	6%
Washing machine	2%	18%	14%	0%	0%	9%	12%	8%
Vacuum cleaners	0%	0%	0%	0%	0%	0%	3%	0%
Electric, oil stove	14%	27%	2%	0%	0%	0%	15%	8%
Ovens (electric)	0%	14%	21%	10%	30%	29%	27%	19%
Lantern, gas light, Electric lamps	39%	14%	0%	5%	0%	0%	3%	10%

Other kitchen electric appliances (blenders, juicer, etc.)	0%	0%	17%	5%	0%	0%	0%	4%
Sewing machine/s	0%	14%	31%	5%	23%	6%	15%	14%
Gas connections (Stoves/Cylinders)	0%	0%	0%	15%	0%	3%	12%	4%
Bukhari/ Heater	0%	27%	12%	10%	0%	0%	30%	10%
Shops/ commercial spaces	0%	0%	0%	5%	3%	6%	6%	3%
Coal iron	0%	0%	0%	0%	3%	9%	3%	2%
Jeep, Suzuki, tractor, transport vehicles, motorbike, etc.	7%	18%	12%	10%	7%	15%	15%	12%
Agricultural tools/implements	7%	5%	12%	45%	10%	12%	6%	12%
Other houses owned by the household	0%	0%	5%	15%	7%	0%	3%	4%
Furniture (beds, chairs, desks, tables, carpets, decorations etc.)	5%	9%	5%	30%	23%	15%	15%	13%
Computers/ Laptops	5%	18%	2%	30%	7%	3%	18%	10%
Utensils (cooking, inclusive of water coolers)	0%	5%	0%	40%	3%	12%	3%	7%
Fans, Air coolers, Electric heater	5%	23%	26%	25%	0%	3%	24%	14%
Radio, TV, DVD, Satellite dish	55%	9%	14%	30%	37%	24%	33%	30%
Mobile Phones/ tablets/other electronic gadgets	73%	73%	45%	60%	67%	68%	70%	64%
Grand Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

The highly significant percentages of electrical home appliances, especially those used for cooking, heating, lighting and communication seem to be a spontaneous impact of the micro-hydropower units constructed in larger villages of all the priority valleys to provide the communities with alternate renewable green sources of energy thereby reducing pressure on the forest resources.

5.4 Household Food Security

Table 5.4.1: Average length of smallholder farming households' Lean Season (disaggregated by valleys and type of support provided by CAPP)

S.No.	# Type of support provided by CAPP	# of lean months (with inputs from AKRSP)	# lean months reported (without AKRSP support)	% Households reporting reduced lean months
1.	Greenhouses	1	5	12%
2.	Farming Inputs (potato, vegetable seed, fertiliser, forest/ fruit plants, orchards)	2	5	40%
3.	Land Development/terracing	3	5	11%
4.	New land irrigated from CAPP irrigation project	3	5	37%
	Total	**3**	**5**	**100%**

The majority of direct beneficiary households of CAPP-AFS reported NO food shortages in basic foods and milk in the preceding 12 months (Figure 5.4.2). A high percentage of households reported having sufficient fruits and vegetables, with about 52% of families in the seven valleys reporting having sufficient vegetables compared to only 29% of non-beneficiary households in the same valleys. Similarly, 36% of beneficiary households in seven valleys, compared to only 21% of non-beneficiary households in same valleys reported having sufficient fruits.

> **"Lean months were reduced from 5 to 3 with CAPP support"**

The survey found out that both the direct beneficiary and non-beneficiary households in all valleys have roughly the same ratios of livestock and dairy production which indicates sufficient level of food security in terms of availability of protein and fats especially during winters.

This may be because the communities living in higher elevations in all priority valleys depend largely on livestock production for their livelihoods and maintain roughly equal numbers of animal herds regardless to any support extended or not from the CAPP or any other projects.

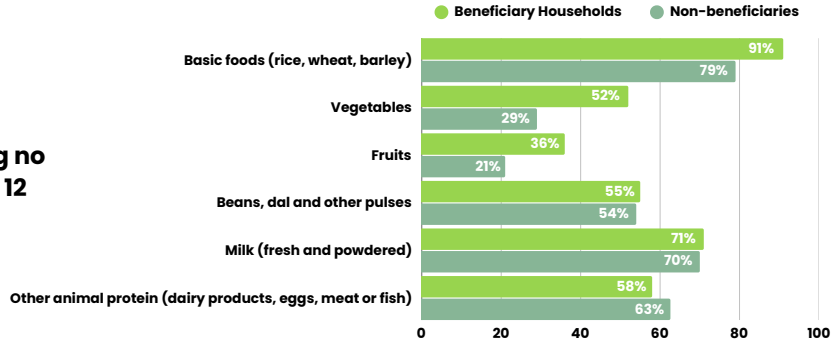


Figure 5.4.2: Households reporting no food shortages in the preceding 12 months (Year 2022)

> **"91% of CAPP beneficiaries have stable access to staple foods (e.g, rice, wheat) in the programme area"**

Fewer numbers of households who faced food shortages mainly remained dependent on relatives during any food crisis especially during winters, with twice as few of the direct beneficiary households in the seven valleys, compared to non-beneficiary households in same valleys, reporting relying on food from friends or relatives (Figure 5.4.3).

Only 5% households relied on aid or charity. Twenty-eight percent of households ate fewer meals during this period.

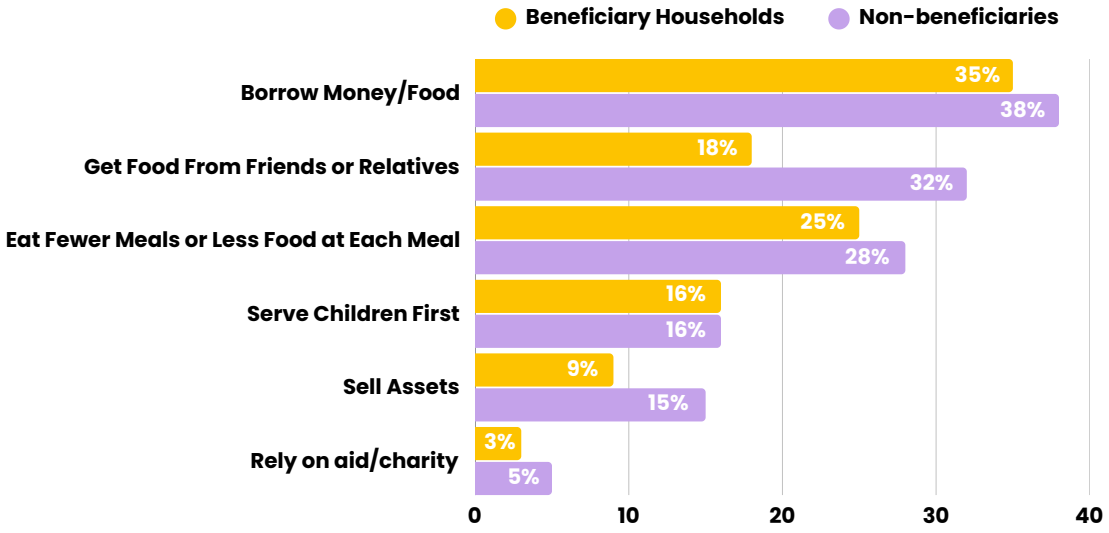


Figure 5.4.3: Household strategies to cope with food shortages

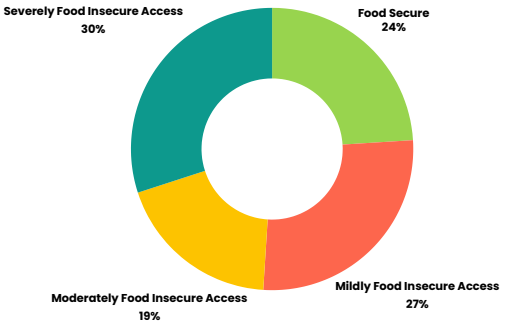


Figure 5.4.4: Household Food Insecurity (based on perceptions of respondents)

The survey findings presented in Figure 5.4.4 show that 24% of the households were food-secure, and another 27% reported to be mildly food insecure, while overall 49% of surveyed households may have suffered from moderate to severe food insecurity in all the 7 valleys.

**The number of Household serveys is 268. The percentage responses may feel somewhat biased due to respondents' interests during enumeration.*

5.5. Climate-Smart Agriculture

Typically, a mix of traditional and modern 'climate-smart' farming methods are practiced in Gilgit-Baltisan and Chitral as well as the across all the seven priority valleys of CAP programme. The priority valleys are situated in the middle of the mighty Karakoram and Hindukush Mountain ranges. These mountain ranges are a huge natural water collection and delivery machine. The mountain peak collects and deposits water in the form of ice and snow above the permanent snow line.

With the rising summer temperatures, the snow gradually starts melting to feed the streams and brooks that run down the steep mountain gorges to merge into the rivers flowing down the valleys to feed the plains with fertile soil and water. The mountain communities in these deep valleys have dug out irrigation canals across the rocky mountains to develop the vast barren lands which provide for the subsistence livelihoods of these communities. The traditional farming practices were largely organic until recent past. However, over the last four decades the farmers increasingly started applying chemical fertilisers, modern farming techniques to maximise their farm production. AKRSP, under its CAP Programme, has introduced so many climate-smart farming techniques, which include improved management of water canals, minimum tillage to maintain soil cover by establishing orchards, fruit and forest nurseries all over these priority valleys.

Moreover, AKRSP has introduced farm-forestry practices, solar lift irrigation systems to feed water to plantations, provision of passive solar greenhouses for off-season vegetable production, etc. The Tables below in this section of the report provide the survey findings on key indicators of climate-smart farming practices adopted by the supported farmers in the priority valleys.

> **"AKRSP introduced climate-smart practices, enhancing water use, reducing tillage, and enabling off-season crop production through solar irrigation and greenhouses"**

Table 5.5.1: Hectares of land under improved management and improved yield / returns

S.No.	Valleys	Total # of hectares under cultivation – all surveyed households (N=268)	# hectares under improved management (N=214 beneficiary household)	% of total cultivated land under improved management
1.	Garamchasma	20	12	60%
2.	Broghil	45	34	76%
3.	Khot	18	9	50%
4.	Rech	11	7	64%
5.	Immit	22	9	41%
6.	Silgan	18	7	39%
7.	Chipursan	28	14	50%
	Total	**163**	**91**	**56%**

> **"Improved management practices were adopted on 56% of cultivated land in priority valleys, with Broghil at 76%, Rech at 64%, and Garamchasma at 60%"**

Table 5.5.1 above shows that more than half of the total cultivated lands in all the seven priority valleys have come under improved management practices. AKRSP engages farmers through community organisations in every village of these mountain valleys to train them on Climate-Smart Agriculture (CSA) practices & then provide them with farming inputs, such as funding for construction of irrigation channels, water distribution and management practices, greenhouses, crop and vegetable seeds, fruit and forest plants, agriculture tools, productive improve breed livestock, etc.

Table 5.5.2: % of smallholder farming households who adopt climate smart agricultural practices translating into improved and sustainable management of soil and water

S. No.	Type of CSA practice	No of farmers (as % of total 8,511 beneficiaries of CAPP) using CSA practices (N=8,500)	Land (hectares) under improved management/ Yield
1.	Zero/minimal tillage/ permanent soil cover	1,447 (17% of total)	400
2.	Direct seeding	3,404 (40%)	941
3.	Crop rotation/association	2,638 (31%)	729
4.	Reforestation and agroforestry	1,021 (12%)	259
5.	Cut-and-carry feed/fodder production	766 (9%)	212
6.	Solar Irrigation	170 (2%)	47
7.	Collective construction & maintenance of Water channels	4,498 (53%)	2,330
8.	Land terracing, levelling	413 (5%)	432
9.	Nurseries/Orchards	264 (3%)	71
	N=8,500	14,621*	2,350

**Includes multiple counting of farmers who received multiple benefits.*

The Table 5.2.2 above illustrates the distribution of AKRSP's CAPP beneficiary data across various CSA practices implemented over the last 5 years (2016-2020) of CAP programme. AKRSP has supported over 8,500 farmers covering over 2,350 hectares of cultivated lands with climate-smart agricultural intervention across all the seven valleys.

The hectares of land and the number of benefiting farmers given in Table 5.5.2 above includes multiple count of farmers and land benefiting from multiple CSA interventions as listed in the Table.

5.6. Household Income & Income Components

Apart from the highly unfavourable geographic and harsh climatic conditions, all the Priority valleys are rich in natural resources, particularly the land, water, farm-forestry, pastures and related resources. To reap maximum benefits from the available natural resources, the communities are equipped with a healthy work force of skilled and unskilled labourers.

> **"AKRSP's enhanced 2,350 hectares of land, benefiting 8,511 farmers through CAPP"**

The active and highly concentrated support to promote agriculture and food security under the CAP programme has translated into visible increase in per household farm and off-farm incomes among all the priority valleys which is mostly derived out of a blend of off-farm and on-farm resources. The total income has been divided into two major components; farm incomes and off-farm incomes. The main contributors in farm incomes are crops and vegetables, livestock, and farm-forestry resources; whereas, off-farm contributors are; businesses, skilled and unskilled labourers, employment in public and private sector organisations etc.

Table 5.6.1: Overall Average Per Household Incomes (Pak Rupees) Year 2022 (N=268 surveyed Households)

Priority Valleys	Overall Average Annual Income	Average Annual Farm Income	Farm Income as % of Total Income	Average Annual Off-Farm Income	Off-Farm Income as % of Total Income
Broghil	627,398	351,343	56%	276,055	44%
Khot	615,361	221,530	36%	393,831	64%
Rech	606,861	230,607	38%	376,254	62%
Garam -chashma	504,854	237,281	47%	267,573	53%
Chipursan	449,855	197,936	44%	251,919	56%
Immit	673,641	350,293	52%	323,348	48%
Silgan	717,147	329,888	46%	387,259	54%
Overall Average	**599,302**	**274,126**	**46%**	**325,177**	**54%**

Table 5.6.1 above shows aggregate overall averages of farm and off-farm incomes with overall household incomes across all the seven priority valleys. The overall size of the incomes, including the farm and off-farm annual incomes, has increased to above half a million rupees per household which is mainly due to high rates of inflation over the last 5 years. The farming communities have accessed off-farm income sources more to cope with the ever-escalating consumption needs.

Therefore, where the farm income size has increased, there the off-farm incomes have also gone up significantly which indicates the households' strategies to cope with high prices of household and farm consumption commodities.

> **"CAPP beneficiaries earn an average annual income of PKR 729,994, significantly more than non-beneficiaries at PKR 468,611"**

It appears that the off-farm incomes in Khot valley have risen to the highest levels of 64% as the share of farm income is only 36% in this valley. Rech valley shows the second highest ratio of 62% share of off-farm sources in overall income of the households.

The survey data shows that this is mainly because of many people have migrated to foreign countries, especially to the middle east for employment who send in significant amount of remittances which have outrun the farm-incomes in Khot, followed by Rech valley. The remaining valleys have shown a roughly equal balanced share of farm and off-farm incomes.

Table 5.6.2: Valley-wise per household Income (PKR) – CAPP Beneficiaries

S.No.	Valleys	Overall Average Annual Income	Annual Farm Income	Annual Off-Farm Income	Farm-Income as % of Total Income
1.	Broghil	778,284	463,773	314,511	60%
2.	Khot	748,293	285,774	462,519	38%
3.	Rech	689,904	283,647	406,257	41%
4.	Garamchashma	620,993	301,347	319,645	49%
5.	Chipursan	612,069	275,131	336,938	45%
6.	Immit	772,551	423,855	348,696	55%
7.	Silgan	887,867	445,348	442,519	50%
	Overall Average	**729,994**	**354,125**	**375,869**	**49%**

The survey evidence presented in Table 5.6.2 above shows income composition of the CAP Programme Beneficiaries. The average size of overall incomes of the direct beneficiaries of the CAP Programme appears to be far larger than those of the non-beneficiary households (see figures for non-beneficiary households in Table 5.6.3 below):

Table 5.6.3: Valley-wise per household Income (PKR) – NON-BENEFICIARIES

S.No.	Valleys	Overall average annual income per household	Annual farm Income per household	Annual Off-farm Income per household	Farm-income as % of total income
1.	Broghil	476,513	238,913	237,600	50%
2.	Khot	482,429	157,286	325,143	33%
3.	Rech	523,817	177,567	346,250	34%
4.	Garamchashma	388,715	173,215	215,500	45%
5.	Chipursan	287,641	120,741	166,900	42%
6.	Immit	574,732	276,732	298,000	48%
7.	Silgan	546,427	214,427	332,000	39%
Overall Average		**468,611**	**194,126**	**274,485**	**41%**

It may be noted from the overall average amounts presented in both the Tables above that the overall incomes of non-beneficiary households are roughly 32% of the incomes of the CAPP-beneficiary households, which implies that the investments made in agriculture and food-security interventions under the CAP programme have yielded a highly significant impact translated into such high levels of farm and off-farm incomes.

Table 5.6.4: Per Household Overall Incomes (Pak Rupees)

Income Components	CAPP Beneficiaries	Non-Beneficiaries	Overall Avg.
Per household overall income	729,994	468,611	599,302
Per Household farm income	354,125	194,126	274,126
Per household off-farm income	375,869	274,485	325,177
% Share of farm income in overall income	49%	41%	46%
% Share of off-farm Income in overall income	51%	59%	54%
Difference farm vs off-farm ratios	2%	18%	8%

The summary Table 5.6.1 above show that, by end of year 2022, the off-farm sector has overtaken the farm sector by 8% as a major source of incomes for the rural communities of the 7 priority valleys. The main reasons behind this shift from farm to off-farm sector is increasing population, land-fragmentation, out-migration of work-

force, and increased employability of workforce due to improved level of literacy and marketable skills. Though the share of farm incomes seems slightly lower than off-farm incomes, but the aggregate revenue size has visibly increased in both types of incomes which may include the effect of present-day high inflation rates.

Table 5.6.5: % Share of CAPP inputs in overall Farm Income of the household

Priority Valleys	CAPP Beneficiary Households	Non-Beneficiary Households	Overall Average Per Household	% Difference of Benef. Households Incomes vs Non-benef Households
Broghil	463,773	238,913	351,343	32%
Khot	285,774	157,286	221,530	29%
Rech	283,647	177,567	230,607	23%
Garamchasma	301,347	173,215	237,281	27%
Chipursan	275,131	120,741	197,936	39%
Immit	423,855	276,732	350,293	21%
Silgan	445,348	214,427	329,888	35%
Overall average	**354,125**	**194,126**	**274,126**	**29%**

From the data presented in Table 5.6.5 above, it is evident that the average per household incomes of CAPP beneficiaries are 29% higher than the incomes of farmer who did not receive any benefit from CAPP over the last 5 years.

Table 5.6.6: Per Household Average Annual Off-farm Incomes (Pak Rupees)

Priority Valleys	CAPP Beneficiary Households	CAPP Non-Beneficiary Households	Overall Average Per Household	CAPP Beneficiary Household Income as % of Non-Beneficiary Household
Broghil	314,511	237,600	276,055	24%
Khot	462,519	325,143	393,831	30%
Rech	406,257	346,250	376,254	15%
Garamchasma	319,645	215,500	267,573	33%
Chipursan	336,938	166,900	251,919	50%
Immit	348,696	298,000	323,348	15%
Silgan	442,519	332,000	387,259	25%
Overall Average	**368,603**	**278,352**	**323,478**	**24%**

5.7. Farm Sector Review

This section of the report includes survey findings on valley-wise and type-wise facts and figures of agricultural development interventions implemented during the first phase of CAP Programme with outreach ratios of the target population of households in all the seven priority valleys. These key interventions, such as irrigation and land development projects, passive solar greenhouses, cold storage facilities, provision of farming inputs, etc. have translated into significant improvements in per household landholdings, farm incomes of the households, production of major cereal and vegetable crops, etc. The data analysis presented in sub-sections below provide a snapshot of findings of the survey.

5.7.1. Review of CAPP Agricultural Inputs provided during 2016 - 2020

Evidence presented in Table 5.7.1 below shows a type-wise and valley-wise breakdown of the beneficiary households of agricultural productive infrastructure projects implemented by AKRSP under its CAP programme. A total of 2,789 households (32%) out of total population of 8,815 households have benefited from these projects.

Table 5.7.1: Beneficiary Households of CAPP Agri. Infrastructure Projects

Row Labels	Irrigation Channels	Land Terracing & Levelling	Passive Solar Greenhouses	Storage Facility (Bio Climate Cellar)	Total Beneficiary Households	Total No. of Households in Valleys	Benef Household as % of Total Households
Chipursan	393	34	11	-	438	438	100%
Immit	70	50	9	-	129	956	13%
Silgan	118	47	10	2	177	1,421	12%
Garam -chashma	507	77	6	4	594	3,234	18%
Khot	415	46	5	2	468	1,226	38%
Rech	376	56	5	2	439	739	59%
Yarkhun	441	93	8	2	544	801	68%
Grand Total	**2,320**	**403**	**54**	**12**	**2,789**	**8,815**	**32%**

Source: CAPP Beneficiary Database, AKRSP Core M&E

In addition to the agricultural productive infrastructure project given above, another 3,437 households (39% of total 8,815 households) have benefited from farming inputs provided to them by AKRSP under the CAP programme, which include trainings in agriculture, livestock and farm-forestry, establishing fruit -

> **"AKRSP supported 2,789 households with agricultural infrastructure, benefiting all in Chipursan Valley and 68% in Yarkhun"**

orchards, kitchen gardens, PSGHs and provision of fruit trees, vegetable & potato seed with fertiliser, cows, sheep, and farming tools. Table 5.7.2 below shows valley-wise details of the inputs provided under the CAPP.

Table 5.7.2: Beneficiary Households of CAPP Agri. Inputs Provision

Priority Valleys	Fruit orchards/ kitchen gardens	Fruit trees	Vegetable & potato seed with fertiliser	Cows/ sheep	Total CAPP beneficiary households	Total no. of households in valleys	Beneficiary household as % of total households
Chipursan	-	-	209	-	209	438	48%
Immit	15	43	430	52	540	956	56%
Silgan	14	52	538	17	621	1,421	44%
Garam-chashma	69	100	369	32	570	3,234	18%
Khot	60	70	268	65	463	1,226	38%
Rech	36	70	308	65	479	739	65%
Yarkhun	67	70	374	44	555	801	69%
Grand Total	**261**	**405**	**2,496**	**275**	**3,437**	**8,815**	**39%**

> **"AKRSP provided farming inputs to 3,437 households including orchards, gardens, seeds, livestock, and tools"**

The productive physical infrastructure projects and the farming inputs listed in above Tables have, over the last 5 years, translated into the spontaneous results showing substantial improvement in household assets, farm production, household incomes, food security and overall well-being of the target populations in all the priority valleys. The following sections provide detailed analysis of the findings of this study.

5.7.2 Improvements in Landholdings per household

The most important impact of agricultural productive physical infrastructure projects, such as irrigation and land development schemes, has been the substantial improvements in landholdings across all valleys. The increase in farm size is the key to increase the production of all natural resources at the disposal of the rural communities. Table 5.7.3 shows the average per household landholdings reported by this study whereby the per household farm size of CAPP-beneficiary households has increased from one and a half acre to more than 2 acres across all valleys as compared to the non-beneficiary households.

Table 5.7.3:Comparison of Landholdings Between CAPP Beneficiary and Non-Beneficiary Households (Average per household – kanals)

Priority Valleys	Overall Average	CAPP Beneficiary per Household	Non-Beneficiary per Household	% Difference CAPP Benef. Households
Garamchasma	9.2	9.4	7.9	17%
Broghil	23.4	24.3	15.6	36%
Khot	11.7	13.4	7.2	46%
Rech	8.4	8.9	6.8	24%
Immit	14.8	15.8	12.7	20%
Silgan	11.2	13.1	7.9	39%
Chipursan	28.1	29.8	25.3	15%
Overall Average Landholdings	**15.0**	**15.9**	**12.1**	**24%**

Table 5.7.3 above shows that the CAP Programme has directly contributed to a significant increase in per household landholding across all valleys. This has been made possible through construction of irrigation channels and by bringing vast barren lands under irrigation.

The overall farm size has now increased from average under one acre to more than four acres in Chipursan, three acres in Broghil, 2 acres in Immit, while the landholdings in Garamchashma and Rech valleys have remained consistent around the overall average of one acre as is elsewhere in GBC.

> **"CAPP irrigation and land development supported 4,967 households, irrigating 46,348 kanals (9 kanals per household)"**

The Table above also shows an overall average 24% increase in landholdings among the CAPP-beneficiary households as compared to the non-beneficiaries. The survey has reported highest increase in average per household landholdings in Khot valley followed by Silgan and Broghil.

Table 5.7.4:CAPP Beneficiary Households with Land Irrigated/ Developed by CAPP Irrigation & Land Development Project in Priority Valleys

Priority Valleys	Beneficiary Households	Land Developed/ Irrigated by CAPP Programme (Kanals)	Average per Household Land Benefitted (Kanals)
Ishkoman	129	10,051	78
Silgan	177	3,556	20

Chipursan	1,124	14,245	13
Garamchashma	594	4,882	8
Khot	1,960	6,503	3
Rech	439	1,363	3
Yarkhun	544	5,748	11
Grand Total	**4,967**	**46,348**	**9**

Source: CAPP Beneficiary Database

The Table 5.7.4 above has exclusively documented the valley-wise actual overall number of 4,967 households who have benefited from the irrigation and land development projects implemented by CAPP during the 5 years of its first phase. A total of 46,348 kanals of agricultural land benefitted, which include new lands brought under irrigation and also existing cultivated lands that benefitted from more supply of irrigation water resulting from these projects. In addition to their existing landholdings reported in Table 5.7.3 above, the 4,967 direct beneficiary households have benefited from an overall average of 9 kanals per household land brought under irrigation by the CAP Programme.

5.7.3 Farm Production of Major Crops

> **"Crop yields for beneficiary households increased by 26%, with potatoes rising 45% in Immit, 33% in Khot, and 30% in Rech"**

The investments made in Agriculture sector development during phase-1 of CAPP have translated into significant improvements in farm production of various major crops.

The Table 5.7.8 below shows a comparison of major crops produced by both the Beneficiary households and non-beneficiary households across the seven priority valleys.

Table 5.7.8: Valley-wise comparison of major crops produced (Average per household - quantity in mounds)

Crops Produced (Mounds)	Broghil	Chipursan	Garam-chasma	Immit	Khot	Rech	Silgan	Overall
CAPP Beneficiary Households	**9.9**	**14.1**	**26.0**	**24.6**	**11.6**	**13.4**	**14.8**	**15.5**
Local Wheat	12.7	10.3	5.3	9.4	9.4	8.7	11.0	9.9
Local Maize	4.0	-	8.3	7.7	5.0		4.0	6.4

Crops Produced (Mounds)	Broghil	Chipursan	Garam-chasma	Immit	Khot	Rech	Silgan	Overall
Local Potato	12.5	26.0	44.0	54.7	13.2	30.8	26.9	29.6
Barley	5.2	6.9	-	4.0	13.0	3.4	12.0	7.2
Millets	5.2	4.8	-	-	-	-	3.5	5.1
Non-Beneficiary Households	**7.6**	**13.2**	**19.3**	**13.5**	**7.8**	**9.4**	**12.6**	**11.5**
Local Wheat	7.7	12.3	4.0	8.3	4.6	3.1	9.8	8.3
Local Maize	5.0	-	-	7.6	-	-	2.8	5.2
Local Potato	11.8	25.4	27.0	25.1	17.0	22.5	28.8	22.8
Barley	5.0	8.4	-	-	2.5	2.8	-	5.4
Millets	5.3	6.0	-	-	-	-	-	5.6
Grand Total	**9.7**	**13.8**	**25.7**	**21.1**	**10.9**	**12.7**	**14.2**	**14.7**
% difference - CAPP beneficiary production over non-beneficiaries	**23%**	**6%**	**26%**	**45%**	**33%**	**30%**	**15%**	**26%**

As illustrated in Table 5.7.8 above, this study has found out an overall average 26% increase in per household production of major crops as listed in this Table, among the CAPP-beneficiary households as compared to the non-beneficiary households. Among all the crops, potato production per household has shown the highest quantities which is apparent given the suitability of cold climatic conditions of the high-altitude areas across all the priority valleys, particularly Immit, Rech and Chipursan have shown higher quantities of potato production.

As depicted by an overall 29% increase of vegetable production by CAPP-beneficiary household has been noted by this study as comparison with non-beneficiaries, the highest ratio of 66% increase in per household vegetable production is noted in Silgan, followed by 56% in Rech and 54% in Chipursan valley. This is noted because of huge quantities of Tomato and Chilli produced in Silgan valley, higher quantities of carrot and onion produced in Rech, and huge quantities of leafy vegetables produced by beneficiary households in Chipursan valley.

Table 5.7.9:Average Quantity of Fresh Vegetables Produced per Household (KGs)

Type of Vegetables	Broghil	Chipursan	Garamchasma	Immit	Khot	Rech	Silgan	Overall
CAPP Beneficiary Households	**26**	**172**	**23**	**42**	**13**	**17**	**63**	**37**
Beans	-	-	15	27	14	10	93	36

Type of Vegetables	Broghil	Chipursan	Garamchasma	Immit	Khot	Rech	Silgan	Overall
Cabbage	21	15	18	31	7	16	81	33
Carrot local	25	30	19	41	14	40	24	27
Cauliflower	-	-	-	-	-	-	20	20
Chilli	-	-	1	6	-	-	258	117
Cucumber local/ Improved	12	-	18	57	-	-	62	49
Lettuce	3	-	-	49	15	14	19	16
Onion Improved	-	-	200	20	-	12	20	31
Onion local	9	18	21	44	9	23	30	23
Palek	45	1584	16	48		20		122
Peas local	-	130	-	28	-	-	28	46
Pulses	-	6	15	18	11	11	-	12
Pumpkin	30	-	-	35	-	-	40	37
Radish	24	-	15	103	12		18	28
Spinach	37	-	33	55	15	8	93	47
Swanchal Vegetable	-	130	-	95	-	-	32	53
Tomato improved	-	-	48	58	-	-	1320	266
Tomato local	-	10	23	40	26	17	54	33
Turnip	35	20	32	32	11	14	56	31
Non-Beneficiary Households	**17**	**80**	**20**	**35**	**12**	**8**	**21**	**26**
Beans	-	-	40	49	-	7	35	40
Cabbage	19	80	-	21	5	-	11	26
Carrot local	15	25	40	32	5	7	24	24
Cauliflower	-	-	-	8	-	-	-	8
Chilli	-	-	-	17	-	-	5	13
Cucumber local/ Improved	20	-	-	38	-	-	14	26
Lettuce	3	-	-	40	30	8	17	18
Onion Improved	-	-	-	30	-	-	-	30

Type of Vegetables	Broghil	Chipursan	Garamchasma	Immit	Khot	Rech	Silgan	Overall
Onion local	20	-	18	26	12	9	25	22
Palek	6	-	-	10	-	-	-	8
Peas local	-	100	-	24	-	-	-	39
Pulses	-	-	-	18	7	7	12	12
Pumpkin	14	-	-	-	-	-	35	24
Radish	15	-	-	30	15	-	-	19
Spinach	6	16	12	24	-	-	18	17
Swanchal Shaa	-	161	-	70	-	-	27	59
Tomato improved	-	-	12	30	-	-	-	21
Tomato local	-	-	16	75	10	7	27	44
Turnip	40	16	-	12	30	9	15	21
Grand Total	**24**	**137**	**22**	**40**	**13**	**16**	**53**	**35**
% Production Difference: Beneficiary Households	**34%**	**54%**	**10%**	**18%**	**13%**	**56%**	**66%**	**29%**

The Table 5.7.9 above shows average per household production (in kilograms) of fresh vegetables with a comparison of the productions of CAPP-beneficiary and non-beneficiary households across all the seven valleys. The quantities of vegetables listed in Table above show a concentrated and significant increase in per household production of Tomato and leafy vegetables among the CAPP-beneficiary households compared to non-beneficiaries. This is apparently because of the agriculture inputs provided by CAPP for raising kitchen gardens and the passive solar greenhouses established across all valleys.

5.8 Cost-Benefit Analysis of Passive Solar Greenhouses

The primary objective of PSGHs is "to provide affordable and locally produced vegetable round the year specially during the winter season" when there is heavy snow fall in the valleys. Besides catering for the dietary needs, food security it also contributes to reducing poverty by providing income generating opportunities for the beneficiary households as well as income and time saving opportunities for local consumers within the village and surrounding areas.

> **"Vegetable production in beneficiary households rose by 29% due to CAPP inputs, with Silgan at 66%, Rech at 56%, and Chipursan at 54%"**

Passive solar greenhouses offer a real prospect for improved food security, diversification, dietary needs, nutrition support and income generation, for people living in remote high-altitude valleys where there is very short span of time (hardly three to four month) available for open growing.

AKRSP has introduced passive greenhouse technology to minimise the lean winter season and maximise the agricultural cropping season in sub-zero climatic conditions of villages at high altitude terrains in priority valleys. Through this technology, the farmers are now able to produce vegetables at very low temperature in lean winter months and use this greenhouse to produce vegetable seedlings in March for onward transplanting to the field in April and May. By the introduction of this technology the nutrition needs in terms of food availability and diversity, has also improved because they are now getting fresh vegetable in the extreme winter months. It increased farmers' income manyfold and created employment for females in the area. The seedling productions in the greenhouses helped in the commercial production of vegetables in the area.

Following are the spontaneous short-term and long-term impacts reported by various case studies and regular monitoring:

- The field evidence suggests that the greenhouses are viable means for sustainable graduation of the supported households out of the absolute poverty trap.
- Greenhouses have a significant impact on improving food security and nutrition by ensuring round-the year supply of fresh vegetables and cash income thereby improving the overall living standards of the supported households.
- Provide a highly level of inspiring model for replication by general communities in surrounding areas thereby generating an impact on improvement of food security and nutrition at a larger scale.
- Provides a sustainable and viable means of self-employment and cash income for the household.
- Table below shows the inventory of the vegetable crops grown in greenhouse with yearly calendar of production cycle:

Production activity	Months	Inventory of crops cultivated
Off-season vegetable production	October	Leafy vegetables (cabbage, spinach, lettuce, Pak Choi, etc.)
	November	
	December	
	January	

Production activity	Months	Inventory of crops cultivated
Nursery for seedlings	February	Tomato seedlings
	March	
	April	

Production activity	Months	Inventory of crops cultivated
Summer Production	May	Tomato, Cucumber, Cabbage, Chinese Cabbage, Chilli and leafy vegetable, Coriander, spices
	June	
	July	
	August	
	September	

Based on this calendar and inventory of production, the typical Social CBA of a greenhouse in high altitude valleys in GBC shows a highly encouraging trends of profitability over a lifetime period of 20 years. The Table below shows a summary of the cost benefit analysis of the greenhouse whereby it shows a highly encouraging 44.9% rate of return with a benefit to cost ratio of 1.52 which is achieved from highly careful assumptions used for both cost and benefit side flow of values for the project.

Summary of Cost-Benefit Analysis of Passive Solar Greenhouse *(Base year 2022)*:

Appraisal period (years)	20
Capital Cost (Initial)	739,780
Whole of Life Costs (PKR)	1,846,371
Whole of Life Benefits (PKR)	2,809,314
Cost-benefit analysis of monetary costs and benefits	
Present Value of Benefits (PKR)	2,809,314
Present Value of Costs (PKR)	1,846,371
Cost Benefit Ratio	1.52
Net Present Value (PKR)	962,944
Payback period	3 years
IRR	44.95%

This Study had found out the following impact of the passive solar greenhouses provided with other agricultural inputs to the poor farmers across the priority valleys:

- The increased variety of crops/vegetables and increased variety/quality of food being grown is attributed to AKRSP's passive solar greenhouses and vegetable seed provision/training. This activity has led to increase crop yields, a shift to commercial production, and increased income.

- The increased availability of food has led to increase food security because of the passive solar greenhouses as depicted by the data presented under food-security section of this report.

Under the CAP Programme, a woman in Umalsat, Yasin, Ghizer, maintains a register of vegetables sold from a greenhouse provided by AKRSP.

Aga Khan Rural Support Programme (AKRSP)

The Aga Khan Rural Support Programme (AKRSP) is a pioneering rural development non-profit organisation, established in 1982 to help improve the quality of life of the local communities of Gilgit-Baltistan and Chitral. Registered under the Companies Act, 2017 with the Securities and Exchange Commission of Pakistan (SECP), AKRSP's approach is community-led and encourage equitable social and economic development in the region. AKRSP's success has led to the replication of the programme and its development models in Pakistan and many other parts of the world.

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