Effects of Microfinance on Mountain Poverty and Living Standards: An Empirical Investigation from Central Karakorum National Park Region of Gilgit Baltistan, Pakistan

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Abstract

This research investigates the impact of microfinance in alleviating the mountain-specific poverty and improving the living standards of the mountain inhabitants in the Central Karakorum National Park region of Gilgit-Baltistan, Pakistan. For the empirical investigation, this study collected quantitative and qualitative household-level data from a total of 424 households through structured questionnaires from two districts of CKNP region in Gilgit-Baltistan using a multi-stage sampling technique in the year 2019. The paper finds that microfinance is playing a key role in enhancing mountain people's living standards and reducing mountain poverty in the study area. The findings of the study suggest for the policymakers and other stakeholders to enhance productive capacities of the poor mountain inhabitants through technical and vocational education and ensure financial services delivery by increasing outreach of the microfinance program in order to achieve the objective of sustainable mountain areas development in future.

Keywords: Microfinance, Impact evaluation, Living standards, Mountain poverty, CKNP region

JEL Classification: C21, G21, I32

Introduction

Almost 25% of the total population in Pakistan is living below the poverty line while the population living in rural mountains of Pakistan had the largest proportion of poverty headcount i.e. 34% (Kiran, Jean-Yves, & Brigitte, 2011). Compared to other geographic areas of Pakistan, poverty in these mountainous areas has different roots. Challenges like limited access to factors and product markets make cultivation and agriculture very tough which in return lead to chronic poverty in these areas. Other sources of poverty in these areas are deterioration of the natural resource base, higher dependency rates, illiteracy, non or limited availability of health care and educational services, gender discrimination, and vulnerability to environmental degradation (Ullah, Khan, & Ahmad, 2014).

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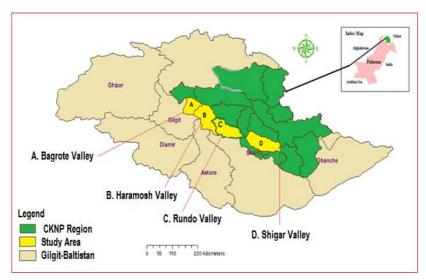[3] Karakoram International University, Gilgit

Fig. 1**:** *Map of the CKNP Region and Study Area*

Development policies and interventions designed mostly for mountainous areas development tend to be unproductive because these interventions do not acknowledge, and often miscalculate the implications for mountain specificities. Such miscalculations often lead to misunderstandings about socio-economic conditions and misdiagnosis of the poverty sources in these areas. Therefore, it is necessary to examine and understand mountain-specific poverty so that effective mountain development policies can be devised in order to fight against mountain poverty and to improve mountainous inhabitant's standards of living.

Microfinance is the provision of formalizing financial services to the people living in poverty which are usually excluded by the conventional banking sector to fight against chronic poverty (Janjua, Muhammad, & Ullah, 2013; Nawaz, 2010). Microcredit is a sub-component of microfinance through which a small amount of loan is distributed among the poor and marginalized segment of the society so that they set up small-scale businesses and improve their income levels (Chemin, 2008; Nawaz, 2010). There is disagreement among practitioners and academics regarding the role of microfinance in improving the standard of living and poverty reduction. For example, some studies revealed that participation in microcredit programs affected people positively on income and expenditures at the enterprise, household, and individual levels (Chemin, 2008; Janjua *et al.*, 2013; Saboor, Hussain, & Munir, 2009). This approach allowed poor people to improve their quality of life by increasing spending in education, illness, housing and nutrition, etc. (Ali, Islam, & Hatta, 2015; Maitrot & Zarazua, 2017). Whereas other studies concluded that microfinance has no impact on income, expenditures, health, education, and poverty status of the borrowers (Banerjee *et al.*, 2015).

The microfinance sector in Pakistan has been working for three to four decades. There is a dearth of reliable studies that have attempted to measure impact using rigorous methods and reliable data because the availability of primary and secondary level data about microfinance in Pakistan is limited (Galib, Malki, & Imai, 2011). Keeping in view the poor to population ratio, the microfinance industry in Pakistan has a vast scope. The industry reached out to 5.8 million active borrowers with a gross loan portfolio of PKR 202 billion, as savings increased to PKR 186.9 billion with 30.9 million active savers (Pakistan Microfinance Network's Annual Report, 2017).

In the Gilgit-Baltistan region of Pakistan, the microfinance sector has evolved in 1993, when the Agha Khan Rural Support Program (AKRSP) started this initiative. The poor mountain people who never had any access to the formal banking sector, joined AKRSP's microfinance program via village and women organizations (Janjua *et al.*, 2013; Muhammad, Janjua, & Ullah, 2011). There are few empirical studies like Muhamad *et al.*'s (2011) and Janjua *et al.*'s (2013) that have confirmed the positive side of microfinance in Gilgit-Baltistan but these studies were carried out in urban areas (mostly in Gilgit city & surroundings) while completely ignoring the rural mountainous areas, particularly the CKNP region.

Despite the usage of microfinance as a tool for poverty alleviation, the questions of whether access to credit leads to poverty reduction and improve standards of living in mountainous areas and whether microfinance is reaching to the poor mountainous population remain open and unanswered. This study is aimed at exploring the answers to these questions in the mountainous CKNP region of Pakistan. The major objectives of the study are given as under:

1. To identify the target group of micro-financial services targeted by Microfinance Institutions (MFIs) working in the mountainous CKNP region of Pakistan.
2. To assess the impact of micro-financial services on the mountainous inhabitants' living standards in the study area.
3. To estimate the incidence, depth, and severity of mountain poverty among treatment and control groups.

Literature Review

Economic poverty can be described in relative and absolute terms. Relative poverty is simply possessing lesser goods than others in a given society while, absolute poverty is the inability to afford basic human needs like food, clothes, and shelter (Gerlitz, Hunzai, & Hoermann, 2012).

Inclusive finance is the most critical element that increases the income of poor families inclusively. To investigate this hypothesis, Yang and Fu (2019) undertook a study in twelve provinces of rural China by collecting survey-based data from 2010 to

2016. The study found differences in poverty alleviation effects of microfinance programs between poor families with distinct labor capacities. The study also found that if the target of the microfinance institution is to provide particular services to the working population, then it will increase both the income of the household and the sustainability of microfinance institutions.

Mustapa *et al.* (2018) investigated the impact of working capital and training programs on the socio-economic conditions of low-income households in Kelantan, Malaysia. They used a cross-sectional design and data were collected from 450 micro-entrepreneurs living in seven districts of Kelantan. The findings revealed that the total amount of economic loan received, length of the program's participation, and number of hours spent on training programs had a positive effect on the household income to decrease the level of economic vulnerability.

To address the question of whether access to credit lead to poverty reduction, Maitrot and Nino-Zarazua (2017) conducted a systematic review of the quantitative literature of microfinance's impacts in the developing world. The authors found that, at best, microfinance induces short-term dynamism in the financial life of the poor. The authors do not find compelling evidence that this dynamism leads to an increase in income, consumption, human capital, assets creation and ultimately a reduction in poverty.

Banerjee and Jackson (2017) critically analyzed microfinance and its role in poverty alleviation by conducting an ethnographic study in Bangladesh. The study findings explored that microfinance had provided different business opportunities to poor people, which ultimately reduced poverty in poor and economically marginalized communities.

Janiua *et al.* (2013) investigated the impact of Village Group Financial Services on Living Standards of Households in Gilgit. For the empirical investigation, the study employed Quasi-Experimental Design. Primary data from 200 respondents were collected through the survey method. The study findings concluded that participation in microfinance programs had successfully improved households' living standards in the study area. On similar lines, Malik *et al.* (2011) analyzed the impact of Village Group Financial Services (VGFS) on poverty reduction and women empowerment in rural areas of district Gilgit. Data were collected from 200 female respondents using a multi-stage sampling technique. The study results found a significant positive impact of VGFS on women empowerment by improving their decision-making power. Results also confirmed a significant reduction in the poverty status of women due to their participation in microfinance programs.

Research Methodology

Impact Evaluation

In economics and other related disciplines, impact evaluation techniques are generally used to analyze the positive and negative contributions of a particular program or policy. It measures both the positive and the negative effects of a given program on society (Baker, 2000). For a comprehensive counterfactual analysis, this technique proposes control and treatment groups (Khan, 2004). Through counterfactual analysis, researchers establish cause and effect relationships between interventions and outcomes. Counterfactual effects are investigated by making a reference or a comparison group that cannot be directly observed. The selection of appropriate impact evaluation design depends upon the nature of the study and availability of the data (Ravallion, 2005).

Mean Difference Model

For the empirical investigation of the microfinance on the mountain peoples' living standards, the present study adopted the Mean Difference Model. This method is also used by Muhammad *et al.* (2011), Ravallion (2005), and Khan (2004) in similar types of impact evaluation studies. This method measures the mean differences in a particular variable of interest among treatment and control groups due to participation in a specific program i.e. microfinance. The mathematical equation to show such kind of relationship is given as under:

$$\Delta \overline{X} = (\overline{X_T} - \overline{X_c}) \qquad\qquad (I)$$

Where:

$\Delta \overline{X} =$ Mean variation in the outcome variable

$\overline{X_T} =$ Mean variation in treatment outcome indicator

$\overline{X_c} =$ Mean variation in Control outcome indicator

T = Treatment households

C = Control households

To avoid selection biases, various statistical and econometric techniques are available in the impact evaluation literature. The study adopted the Poverty Score Card (PSC) introduced by the World Bank for matching different groups to avoid such selection biases. This method has been previously adopted by Muhammad *et al.* (2011) and Janjua *et al.* (2013) in similar types of microfinance impact evaluation studies in Pakistan. PSC is considered the most reliable method because it controls observable selection biases. In comparison to other methods, the PSC can be implanted quickly and cheaply (Khan, 2004).

Assessment of Absolute Poverty

The idea of absolute poverty is relatively simple to identify poor among a given population. The absolute poverty line differentiates poor and non-poor populations by applying minimum socially acceptable income and consumption standards (Cheema, 2010; Kakwani *et al.*, 2003). The official poverty line income of Pakistan for the year 2015-16 is PKR 3250.28 per adult, equivalent per month. This poverty line income is available in the National Poverty Report 2015-16, published by the Ministry of Planning, Development, and Reforms. In order to analyze the incidence of absolute poverty in the study area, the present study, the adjusted inflationary changes over time, on the basis of Consumer Price Index (CPI) values are 4.2 for the year 2016-17 and 3.9 for the year 2017-18. The CPI values are available in the Pakistan Economic Survey 2018-19. On the basis of the CPI for the adjusted values of income, we calculated the poverty line income as PKR 3518.87 per adult, equivalent per month, for the year 2017-18, to do further analysis of mountain poverty in the study area.

Calculation of Incidence of Mountain Poverty

The incidence of mountain poverty, also known as the headcount of the mountain poor is the proportion of those living below the poverty line in the total population. The headcount of the mountain poor can be calculated as (Cheema, Khalid, & Patnam, 2008).

$$\gamma = \frac{c}{d} \qquad (a)$$

γ = Headcount of the mountain poor

c = Number of the mountain poor (with income below the poverty line)

d = Total mountain population (poor + non poor)

Intensity of Mountain Poverty

The Intensity of Poverty is an index of the income transfer required to get every poor person out of poverty and can be calculated as under (Cheema *et al.*, 2008).

$$\theta = \frac{1}{n}\Sigma \left[\frac{(z - y_{i)}}{z} \right] \qquad (b)$$

θ = Intensity of mountain poverty

z = Poverty line income

y_i = Income of each mountain poor

n = Population of the mountain poor

Severity of mountain poverty

The Severity of Poverty undertakes income distribution among mountain poor which can be measured by the squared proportionate poverty gap ratio as under (Cheema *et al.*, 2008).

$$\delta = \frac{1}{n}\Sigma\left[\left(\frac{z-y_1}{z}\right)^2 + \left(\frac{z-y_2}{z}\right)^2 + \left(\frac{z-y_3}{z}\right)^2 + \cdots + \left(\frac{z-y_q}{z}\right)^2\right] \tag{c}$$

δ = Severity of mountain poverty

z = Poverty line income

y_1 to y_q = Income of the mountain poor

n = Total population of the mountain poor

Determinants of Mountain Poverty (Logit Model)

The present study employed Binary Logistic Model (Asteriou & Hall, 2011) to investigate the effect of socio-economic variables including microfinance on mountain poverty. The binary logistic regression equation for the estimation of microfinance program, along with other socioeconomic variables on the poverty status of the households in the CKNP region of Gilgit-Baltistan, Pakistan is given as under:

$$Logit(P_i) = ln\frac{P_i}{1-P_i} = \beta_0 + \sum_{j=1}^{k}\beta_i X_{ij} + \mu_i \tag{1}$$

The construction and interpretation of logit model is given as under:

$$\text{Logit}(P_i): \text{Log} - \text{Odd Ratio}$$

$$\frac{P_i}{1-P_i} : \text{Odd ratio that favor,s poor, where}$$

$$(P_i) = \text{prob}(Y_i = 1) = \frac{1}{1+e^{-(\beta_0+\Sigma_{j=1}^{k}\beta_i X_{ij}+\mu_i)}} = P_i = (P_i) = \text{prob}(Y_i = 1)$$

$$= \frac{e^{(\beta_0+\Sigma_{j=1}^{k}\beta_i X_i+\mu_i)}}{1+e^{(\beta_0+\Sigma_{j=1}^{k}\beta_i X_{ij}+\mu_i)}} \tag{2}$$

Equation (2) denotes response probability model of being poor

$$1 - P_i = Prob(Y_i = 0) = \frac{1}{1+e^{(\beta_0+\Sigma_{j=1}^{k}(\beta_i X_{ij}+\mu_i)}} \tag{3}$$

Equation (3) simply represents response probability model of being non-poor

$$\frac{P_i}{1-P_i} = e^{(\beta_0+\Sigma_{j=1}^{k}(\beta_i X_{ij}+\mu_i)} \tag{4}$$

If we apply log on odd-ratio, then we get:

$$ln\frac{P_i}{1-P_i} = \beta_0 + \sum_{j=1}^{k}\beta_i X_{ij} + \mu_i \tag{5}$$

Equation (5) is the final logistic regression equation and $(\frac{P_i}{1-P_i})$ denotes odd-ratio

β_0 = Intercept Parameter
β_i = Vector of regression coeficents
X_{ij} = Vector of predictors
μ_i = Error/residual term

The major characteristic of a logistic distribution is that when logit (P) tends to the negative infinity then (p) tends to zero and when logit (P) tends to infinity then (P) tends to one (Asteriou & Hall, 2011). There exists a non-liner relationship between regressor and regressed in logistic regression model, therefore this model assumes nothing regarding the distribution of independent variables.

Population and Sample size

The target population for this study consisted of the microfinance banks (MFBs) operating in the CKNP region of Gilgit and Baltistan, as well as the microfinance beneficiaries of the banks.

Sampling Technique

To avoid sampling variation, the study followed a multi-stage sampling technique. At the first stage, two districts from the CKNP region were chosen randomly. At the second stage, two valleys from each district were chosen randomly. The sampling frame of the target population for the year 2014[4] was collected from the microfinance banks in the third stage. Two microfinance banks in the CKNP region provide micro-financial services i.e. The First Microfinance Bank (FMFB) and The Karakoram Co-operative Bank (KCBL). The sampling frame which included district and valley-wise list of the beneficiary households (treatment group) is given in the following table.

Table 1: *Sampling Frame of Treatment Group for the Year 2014*

Districts	Banks	Bagrote	Haramosh	Roundo	Shigar	Total
Gilgit	KCBL	29	25	-	-	-
	FMFB	27	31	-	-	-
	Total (G)	56	56	-	-	112
Skardu	KCBL	-	-	20	26	-
	FMFB	-	-	32	41	-
	Total (S)	-	-	52	67	119
Grand Total (G + S)						231

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[4] For the impact assessment of any development program or intervention, a minimum three to five-years period is required after its execution (Baker, 2000; Janjua *et al.*, 2013; Khan, 2004). Therefore, only those microfinance beneficiaries were chosen for treatment group who had joined the microfinance/microcredit program in 2014 (five years before study conduction year 2019).

The sample should be a true representative of a population from which it is drawn, therefore in the fourth stage, we selected the beneficiary population (treatment group) from the two districts in each valley, following Yamen's formula on a random basis. Finally, following the PSC of the treatment group, a similar number of samples from the control group were chosen.

Sample Size

To determine representative samples from the population, the study adopted Yamane's (1967) sample determination formula (an alternative to Cochran's 1977 formula). According to him, assuming the maximum variability (which is equal to 50 %) i.e. p=.5, and taking 95% confidence level with 5% precision level (e=.05), the sample size should be:

$$n = \frac{N}{1 + N(e)^2} \qquad (I)$$

Population size and precision level are denoted by (N) and (e) respectively.

Table 2: *Calculation of Sample Size through Yamane's Formula*

Districts	Banks	Bagrote	Haramosh	Roundo	Shigar	Total (Treatment)	Total (Control)	Grand Total
	KCBL	27	23	-	-	50	50	
Gilgit	FMFB	25	28	-	-	53	53	
	Total	52	51	-	-	103	103	206
	KCBL	-	-	19	24	43	43	-
Skardu	FMFB	-	-	29	37	66	66	-
	Total	-	-	48	61	109	109	218
Total Sample size (n)						212	212	424

Using Yamane's sample determination formula, a total of 212 samples of treatment group for the four valleys in the two districts of CKNP region who have joined the microfinance program in the year 2014 have been chosen. The respondents were enjoying different socio-economic characteristics, therefore we have chosen samples in the control group keeping in view the socio-economic characteristic of the treatment group in order to minimize the sample selection bias. Keeping in view the PSC of the treatment group, an equal number of samples for the control group from the same four valleys in both districts have been selected. In this way, a total of 424 samples have been chosen from the four valleys in two districts of the CKNP region for final analysis.

Data Collection and Sources of Data

Both primary and secondary data are used in this study. Primary data is collected through a structured questionnaire, administered by the researchers themselves in the study area in the months of March and April 2019. The questionnaire contains a

combination of close- and open-ended questions designed to seek information about the personal, socio-economic, and demographic variables of the respondents. The questionnaire employed for the collection of primary data was pilot-tested before the conduction of the main study and was found reliable. Secondary data sources included records of microfinance banks as well as the records of micro-businesses studied in the study area, government, and private publications, particularly publications from State Bank of Pakistan and Pakistan Microfinance Network (PMN), etc.

Results

Descriptive Analysis

The demographic characteristics of the treatment and control groups respondents', including gender, age group, literacy level, marital status, and relationship with the household head are presented in Table 3.

Table 3: *Respondents Profile*

| | Respondents | | |
	Treatment Group	Control Group	All respondents
Gender (%)			
Male	100.0[5]	100.0	100.0
Female	-	-	-
Age			
Average Age	34.43	33.60	34.02
Total Number of Respondents	212	212	424
Age Group (%)			
18-30	33.0	34.9	34.0
31-55	67.0	65.1	66.0
Above 55	-	-	-
Literacy Level (%)			
Not Literate	3.8	5.7	4.7
Primary	18.9	20.3	19.6
Middle	12.7	12.7	12.7
Secondary	29.7	34.9	32.3
Higher Secondary	23.6	10.8	17.2
Graduation	8	11.3	9.7
Masters	3.3	4.2	3.8
Others	-	-	-
Material Status (%)			
Never Married	10.4	7.5	9.0
Married	89.6	92.5	91.0
Divorced/Separated	-	-	-
Widowed	-	-	-
Relationship with HH Head (%)			
Self	74.5	77.8	76.2
Son	22.2	19.8	21.0
Brothers	3.3	2.4	2.8
Others	-	-	-

Source: Authors' calculations based on survey data

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[5] Due to strict tribal traditions in the study area, female participation in microfinance program is limited, therefore the study relied on male respondents only.

Target Group of Microfinance Program in the Study Area

Does microfinance[6] reach to the poor? To explore the answer, we examined PSE of treatment group in the study area. Table 4 given below highlights the results of mountain poverty headcount on the basis of PSE in the study area.

Table: 4 *Mountain Poverty Headcounts on the Basis of Poverty Score Card (PSE)*

	Treatment Group	Control Group	All Households
Poor	136	136	272
Percent to poor-population	64.15	64.15	64.15
Non-Poor	76	76	152
Percent to non-poor population	35.84	35.84	35.84
Grand Total	212	212	424

Source: Authors' calculations based on survey data

The threshold level to declare any household as poor under the PSC is that any household who scores less than 24 score points is considered poor (Janjua *et al.*, 2013). From the PSC, we established that out of a total of 212 households of the treatment group, 136 households (64.18 %) were poor at the time of availing the microfinance facility. Thus, on the basis of the PSC, we conclude that most of the microcredit beneficiaries in the study area were poor at the time of availing the microfinance facility and MFIs are well targeting the mountain poor.

Impact of Microfinance on Household Living Standards

Income, expenditures, and net-worth (asset minus liabilities) are considered as core indicators of living standards (Janjua *et al.*, 2013). The sole objective of a microfinance program is to improve the living standards of the participants. Table 5, given below, presents the mean distribution and mean differences of annual household and per capita income, expenditures, and the net-worth among the control and treatment groups in the study area. The local currency unit i.e. Pakistani Rupee (PKR) is used to assess the impact of microfinance programs in the study area.

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[6] For this study the term microfinance includes microcredit facility only.

Table 5: *Mean Distribution and Mean Differences of Income, Expenditures and Net-Worth among Treatment and Control Groups*

	Treatment Group		Control Group		Mean Difference
	Mean	Std. Dev.	Mean	Std. Dev.	
Income (PKR)					
Annual Household Income	331331.56	70438.88	312916.33	79906.20	18415.22
Per-Capita Income	52687.35	15026.96	47457.27	16258.35	5230.08
Monthly Per-Capita Income	4390.64	1252.23	3954.76	1354.89	435.89
Expenditures (PKR)					
Annual Household Expenditures	258541.46	58748.88	244163.33	58130.69	14378.12
Per-Capita Expenditures	41339.16	13289.48	37010.08	12316.85	4329.07
Monthly Per-Capita Expenditures	3444.92	1107.47	3084.13	1026.40	360.71
Net-Worth (PKR)					
Household Net worth	1415380.00	328602.35	1408073.27	307675.53	7306.68
Per-Capita Net worth	117948.33	27383.53	117339.43	25639.61	608.89

N=424 (Treatment Group: 212, Control Group: 212)
Source: Authors' calculations based on survey data

According to the results reported in Table 5, the average annual household income, per-capita income, and monthly per-capita income for the treatment group in the study area are PKR 331331.56, PKR 52687.35, and PKR 4390.64, respectively. Similarly, for the control group, these values are PKR 312916.33, PKR 47457.27, and PKR 3954.76. The results also show positive mean differences in all three categories of income. These positive mean differences are also evident for the different categories of expenditures. Similarly, positive mean differences are also found for the net-worth at the household and per-capita levels. However, these positive mean differences are insignificant. These positive mean differences between the treatment and control groups among different categories of living standards clearly indicate that treatment households are economically better off than the control group households in the study area.

In order to check whether the mean differences among the different categories of living standards for the control and treatment groups are statically significant or not, the

study employed the independent sample t-test. Table 6 reports the results of F-test and t-test as under:

Table 6: *Results of Independent Sample t-Test*

	P-Value (F-Test)	P-Value (t-Test)
Income		
Annual Household Income	1.534	2.517
	(0.216)	(0.012)**
Per-Capita Income	0.336	3.440
	(0.563)	(0.001)*
Monthly Per-Capita Income	0.337	3.440
	(0.562)	(0.001)*
Expenditures		
Annual Household Expenditures	0.288	2.533
	(0.592)	(0.012)**
Per-Capita Expenditures	0.953	3.479
	(0.330)	(0.001)*
Monthly Per-Capita Expenditures	0.953	3.479
	(0.329)	(0.001)*
Net-Worth		
Household Net-Worth	2.496	0.236
	(0.115)	(0.813)
Per-Capita Net-Worth	2.496	0.236
	(0.115)	(0.813)

*Note: *p<.01, **p<.05, ***p<.1*
Source: Authors' calculations based on survey data

The independent sample t-test results showed that the difference between the two means for both the groups in the two categories of living standards (income and expenditures) is significant, indicating the satisfactory impact of the microfinance program in the study area. However, the net worth category of the living standards showed an insignificant mean difference for the treatment and control groups.

Impact of Microfinance on Mountain Poverty

Table 7 reports the results of different measures of mountain poverty in the study area.

Table 7: *Impact of Microfinance on Mountain poverty*

	Respondents		
	Treatment Group	**Control Group**	**All Households**
Mountain Poverty Headcounts			
Total Households	212	212	424
Non poor	158	133	291
Poor	54	79	133
Mountain poverty Headcount Ratio	25.47	37.26	31.36
Intensity of Mountain Poverty			
Poor Population (Headcount)	54	79	133
Intensity	9.88	19.77	29.65
Severity of Mountain Poverty			
Poor Population (Headcount)	54	79	133
Severity	2.44	6.94	9.39

Source: Authors' calculations based on survey data

The incidence of poverty, also called the poverty headcount ratio is the proportion of the population living below the poverty threshold determined by the minimum income needed to satisfy basic needs. It is based on the national poverty line income. According to the survey results, the poverty headcount ratio in treatment households is less than the control group households (25.47 < 37.26), showing a positive effect of the microfinance program in the study area. Along with the poverty headcount ratio, the ratios of intensity and severity of mountain poverty in the treatment group were also lower than the control group, which further acknowledges the positive effect of the microfinance program on mountain poverty.

Determinants of Mountain Poverty (Logistic Regression Analysis)

The logistic regression technique has the ability to deal with categorical as well as continuous predictors simultaneously in the model. In our study, the categorical dependent variable (poverty status) has two categories i.e. poor and non-poor, therefore, we used binary logistic regression technique for poverty analysis.

Table 8, given below, shows the maximum likelihood estimates for mountain poverty in the CKNP region of Gilgit-Baltistan, Pakistan.

Table 8: *Determinants of Mountain Poverty (ML Estimation of Binary Logit Model)*

Variables	Coefficient	Std. Error	Wald Stat	P-Value	Odd Ratio
Farm Land Ownership	-.107	.081	1.744	.187	.899
Dependency Ratio	.622**	.286	4.73	.030	1.863
Female/Male Ratio	-.707***	.391	3.262	.071	.493
Household Size	.715*	.118	36.58	.000	2.045
Participation	-.874**	.385	5.159	.023	.417
OP Assets Index	-.27**	.133	4.108	.043	.763
Living Conditions Index	-.29*	.076	14.481	.000	.748
Household Head Age	-.054*	.02	7.542	.006	.947
Household Head Education	-.128**	.052	6.101	.014	.880
Post-Natal Care	-1.179**	.573	4.234	.040	.307
Constant	-.122	1.435	.007	.932	.885

Note: $*p<.01$, $**p<.05$, $***p<.1$

Source: Authors' calculations based on survey data

The regression results show that out of ten variables included in the model, nine variables are significant at different significance levels. Although farmland ownership has a negative effect on the household poverty status in the study area, it is insignificant even at a 10% level of significance. The results of the binary logistic regression in the mountain poverty model indicate that the higher dependency ratio and higher household size significantly contribute to the probability of mountain poverty. On the other hand, the higher levels of household head's education, age, participation in a microfinance program, female to male ratio, other productive assets index (other than farmland i.e. livestock, fruit and forest trees, machinery), living condition index (i.e. pukka house, piped water, access to electricity and liquid purified gas (LPG) as a cooking fuel instead of solid cooking fuel like firewood) and post-natal care significantly contribute to the probability of being non-poor in the study area.

Discussion

One of the major problem people living in poverty face is the asymmetries of information which produce credit constraints and binds their access to bank credit because they do not have the collateral that banks require. Therefore, the promotion and provision of the responsible productive finance to the poor and marginalized people is the need of the day to fight against chronic poverty. Microfinance Institutions (MFIs) significantly contributed towards poverty reduction (Xu, Fu, & Liu, 2019). A big criticism on MFIs that came in the recent past was that they had mistargeted their clients to gain higher profits, thereby violating their vision and mission (Banerjee *et al.*, 2015). Analysts on this side argued that the majority of the poor people were excluded from the

microfinance programs. From the PSC (Table 4), we established that most of the microfinance beneficiaries in the study area were poor at the time of availing this facility and the MFIs were targeting mountain poor well in the CKNP region of Pakistan.

The microfinance sector has played a significant role in sustainable development by providing access to financial resources and by creating productive opportunities for the people living in poverty (García-Pérez, Muñoz-Torres, & Fernández-Izquierdo, 2018). Through our research, we tried to explore the relationship between microfinance living standards, poverty reduction, and sustainable development. The results reported in Table 7 showed reduced mountain poverty headcount, intensity, and severity in the treatment group as compared to the control group, indicating the positive role of microfinance towards poverty reduction in the CKNP region of Pakistan. Not only the headcount ratio but also the intensity (poverty gap ratio) and severity (squired poverty gap ratio) of mountain poverty are also reduced drastically among the treatment group in the study area. These findings further endorsed the success story of the microfinance program in the study area. The results are also comparable with various national and international studies that supported the positive connection between microfinance and poverty reduction (Chemin *et al.*, 2008; Ghalib *et al.*, 2011; Janjua *et al.*, 2013;).

The binary logistic regression results in Table 8 highlight major determinants of mountain poverty in the CKNP region of Pakistan. In the logistic regression technique, odd ratios are commonly used to measure the magnitude of any particular program or intervention effect (Davies, Crombie, & Tavakoli, 1998). Each variable in the logistic regression is individually evaluated by using the p-value of the Wald-test statistic. The empirical results showed that farmland ownership has a negative impact on mountain poverty (the odd ratio is less than one) but is insignificant even at the 10% level of significance. Variables like the dependency ratio, and household size have odd ratios, greater than one, which implies that both variables have positive relationships with the probability of being mountain poor. These results were also in line with other studies (Hashmi *et al.*, 2008; Ullah *et al.*, 2014). On the other hand, variables like farmland ownership, female-male ratio, participation in the microfinance program, other productive assets, living conditions index, household head age and education, and post-natal care have odd ratios less than one, meaning that all these variables have an inverse relationship with the probability of being mountain poor.

Conclusion and Recommendations

Based on survey results, the study concluded that the microfinance program has a positive and statically significant impact on mountain poverty in the CKNP region of Gilgit-Baltistan, Pakistan. Treatment households in the study area were less deprived of the incidence, intensity, and severity of mountain poverty. The participation coefficient of

the microfinance program in the logit-model showed a positive and significant result indicating a sizeable program impact on mountain poverty. Microfinance programs had successfully improved household income, expenditures, and reduced economic vulnerability in the study area. The impact of microfinance on the third indicator of living standards i.e. net worth is although positive but insignificant. It confirmed Keynesian Absolute Income Hypotheses that income and consumption have a positive relationship and second marginal propensity to consume (MPC) for poor's is high i.e. poor prefer more consumption than saving from the additional increment in income that's why net worth of treatment group is statically insignificant both at household and per capita level analysis.

Based on survey results, the study suggests the following recommendations to policymakers and other stakeholders for the improvement of mountain communities' living standards and to fight against mountain poverty in the mountainous regions of Pakistan.

- Development of Agroforestry Based Enterprises (ADEs) in mountainous regions can be helpful not only in the improvement of mountain living standards by widening economic opportunities available to the poor mountainous communities and enhancing their income levels, but at the same time can improve microclimate by reducing pressure on natural forest and upland ecosystems. Along with traditional enterprise development (cottage, processing, and other small-scale enterprises), microfinance institutions and other development agencies should focus, encourage and invest in agroforestry-based enterprises particularly in Non-Timber Based Forest Products (NTFPs) and agroforestry livestock-based production.

- In the CKNP region, women's entrepreneurial potential is largely untapped due to socio-economic and cultural constraints. Policymakers and other stakeholders should ensure gender equality and women empowerment through entrepreneurship development, advocacy, and research so that they become bread makers for their families. Federal and provincial governments should follow the principles of economic and social justice in the distribution of public goods and the allocation of scarce resources among poor women and marginalized groups in society.

- Physical capacity building and skill enhancement of the treatment group are also mandatory for productive use of the credit. Before credit disbursement, MFIs and line agencies first develop necessary technical and business skills among treatment groups through capacity building and skill enhancement training

programs and sessions, then provide the credit facility to achieve better and more sustainable results of the microfinance program.

References

Ali, I., Islam, M. S., & Hatta, Z. A. (2015). Microfinance Helps to Rural Women for Poverty Reduction in the District of Bogra, Bangladesh. *Sociology and Anthropology*, *3*(4), 218-225.

Asteriou, D., & Hall, S. G. (2011). *Applied Econometrics* (2nd ed.). China: palgrave macmillan, 245-261.

Baker, J. L. (2000). Evaluating the impact of development projects on poverty. *A handbook for practitioners*, 1, 1-15.

Banerjee, A., Duflo, E., Glennerster, R., & Kinnan, C. (2015). The miracle of microfinance? Evidence from a randomized evaluation. *Applied Economics*, *7*(1), 22-53.

Banerjee, S. B., & Jackson, L. (2017). Microfinance and the business of poverty reduction: Critical perspectives from rural Bangladesh. *Human relations*, *70*(1), 63-91.

Cheema, A., & Sial, M. H. (2010). Estimating the contributions of growth and redistribution to changes in poverty in Pakistan. *Pakistan Economic and Social Review*, *48*(2), 279-306.

Cheema, A., Khalid, L., & Patnam, M. (2008). The geography of poverty: Evidence from the Punjab. *The Lahore Journal of Economics*, *13*, 163-188.

Chemin, M. (2008). The benefits and costs of microfinance: evidence from Bangladesh. *The journal of development studies*, *44*(4), 463-484.

Davies, H. T. O., Crombie, I. K., & Tavakoli, M. (1998). When can odds ratios mislead? *Bmj*, *316*(7136), 989-991.

García-Pérez, I., Muñoz-Torres, M. J., & Fernández-Izquierdo, M. Á. (2018). Microfinance institutions fostering sustainable development. *Sustainable Development*, *26*(6), 606-619.

Gerlitz, J. Y., Hunzai, K., & Hoermann, B. (2012). Mountain Poverty in the Hindu-Kush Himalayas. *Canadian Journal of Development Studies*, *33*(2), 250-265.

Ghalib, A. K., Malki, I., & Imai, K. S. (2011). *The impact of microfinance and its role in easing poverty of rural households: Estimations from Pakistan*. Retrieved from https://www.semanticscholar.org/paper/The-Impact-of-Microfinance-and-its-Role-in-Easing-Ghalib Malki/916d30ab6d6198843b26588c6ac0f7963b66175f.

Haider, A. (2015-16). *National Poverty Report.* Retrieved from https://www.pc.gov.pk/uploads/report/National_Poverty_Report_2015-16_12-07-18(Formatted_by_JACC)1.pdf.

Hashmi, A. A., Sial, M. H., Hashmi, M. H., & Anwar, T. (2008). Trends and Determinants of Rural Poverty: A Logistic Regression Analysis of Selected Districts of Punjab. *The Pakistan Development Review*, *47*(4), 909-923.

Janjua, P. Z., Muhammad, M., & Ullah, K. (2013). Impact of Village Group Financial Services on Living Standards of Households in Gilgit: A Case Study of the First Microfinance Bank Gilgit. *Pakistan Business Review*, *15*(1), 27-49.

Kakwani, N., Son, H. H., Qureshi, S. K., & Arif, G. M. (2003). Pro-poor growth: Concepts and measurement with country case studies. *The Pakistan Development Review*, *42*(4), 417-444.

Khan, M. H. (2004). Methods of Assessment of Rural Poverty Projects and Programme Impact. *A Handbook for Practitioners in Rural Support Programmes,* 1, 69-83.

Kiran, H., Jean-Yves, G., & Brigitte, H. (2011). Understanding mountain poverty in the Hindu Kush-Himalayas: Regional report for Afghanistan, Bangladesh, Bhutan, China, India, Myanmar, Nepal, and Pakistan. *ICIMOD Regional Report* No. 2011-312011.

Maîtrot, M., & Niño-Zarazúa, M. (2017). *Poverty and wellbeing impacts of microfinance: What do we know?* Retrieved from https://ssrn.com/abstract=3076781.

Muhammad, M., Janjua, P. Z., & Ullah, K. (2011). Impact of Village Group Financial Services on Women Empowerment and Poverty: A Case Study of the First Micro Finance Bank Gilgit. *The Dialogue*, *6*(4), 383-397.

Mustapa, W. N. W., Mamun, A. A., & Ibrahim, M. D. (2018). Economic Impact of Development Initiatives on Low-Income Households in Kelantan, Malaysia. *Social Sciences*, *7*(118), 1-17.

Nawaz, S. (2010). Microfinance and poverty reduction: evidence from a village study in Bangladesh. *Journal of Asian and African studies*, *45*(6), 670-683.

Pakistan Microfinance Network,s Annual Report. (2017). Retrieved from http://www.microfinanceconnect.info/assets/articles/6b51d70c468bf7a7f984a194d0a6ee26.pdf.

Ravallion, M. (2005). *Evaluating Anti-Poverty Programs* (World Bank Policy Research Working Paper No. WPS3625).

Saboor, A., Hussain, M., & Munir, M. (2009). Impact of microcredit in alleviating poverty: An Insight from rural Rawalpindi, Pakistan. *Pakistan journal of life and social sciences*, *7*(1), 90-97.

Ullah, K., Khan, F. A., & Ahmed, E. (2014). Determinants of poverty in mountain region of Gilgit-Baltistan, Pakistan. *Developing Country Studies*, *4*(7), 10-19.

Wasti, S. E. (2018-19). *Pakistan Economic Survey*. Retried from http://finance.gov.pk/survey/chapters_19/Economic_Survey_2018_19.pdf.

Xu, W., Fu, H., & Liu, H. (2019). Evaluating the Sustainability of Microfinance Institutions Considering Macro-Environmental Factors: A Cross-Country Study. *Sustainability*, *11*(21), 5947.

Yamane, T. (1967). *Elementary Sampling Theory*. Englewood Cliffs, N.J., Prentice-Hall.

Yang, Y., & Fu, C. (2019). Inclusive Financial Development and Multidimensional Poverty Reduction: An Empirical Assessment from Rural China. *Sustainability*, *11*(7), 1900.