Factors Affecting Rural Households Livelihood Diversification in Southern Parts of Khyber Pakhtunkhwa

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Abstract

The present study investigated the factors affecting rural households' livelihood diversification in southern parts of Khyber Pakhtunkhwa. Data was collected from 389 sampled respondents through a stratified random sampling technique from four Tehsils of District Bannu and Lakki Marwat. For data collection, a semi-structured questionnaire and face-to-face interview schedule method were used; descriptive statistics and a binary logistic regression model were used for analysis purposes. The study finding indicates that the majority, 72 percent of the respondents, had diversified their livelihood income sources due to climatic conditions, limited income, and large family size in the study area. The binary logistic regression result also shows the co-efficient of sampled respondents' age (.048), education (.088), family size (.168), earning members (.364), land irrigation status (2.915), and climate change (4.009) had a positive relationship with livelihood income source diversification. Finally, it is recommended that the farm size in the study area could have been bigger, resulting in more diversification due to limited resources. Therefore, it is suggested that the government should chalk out formal entrepreneurship programs for the local community to work more productively. It also needs to emphasize community-level irrigation development to increase livelihood diversification in the study area.

Keywords: Binary Logit Model, Factors Affecting Livelihood Diversification, Southern KP.

Introduction

Livelihood that fits this kind of situation, as the study states, as the sum/total of all the means of living acquired by individuals for their survival in one way or another, the requirement for survival and the satisfaction of needs as defined by the people themselves in all aspects of their lives (Loubster, 1995). “Livelihood diversification is a process by which household members construct a diverse portfolio of activities and social support capabilities in their struggle for survival and to improve their living standards” (Ellis, 1998). Livelihood has become a popular concept in the development discourse. Pakistan is a developing country, and most people depend on agriculture. The economy of developing countries, especially Pakistan, is typically agriculture. More than 46 % of the country is estimated to reside in rural areas (World Bank, 2021). Agriculture has been the primary source of livelihood in these areas for decades. But lately, the livelihood of rural people is transforming from farm activities (Agriculture) to non-farm activities, which include business, services, remittances, etc. These non-farm activities have lessened the significance of agriculture in rural areas (Hossain & Bayes, 2010). Agriculture is a

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kind of investment that includes risk because of the volatility in weather and prices. The diversification process in rural professions income is triggered by the "Risk" and "Seasonality". On the other side, non-farm activities in combination with accomplishments that have diverse risk profiles reduce the risk, while they can also improve consumption and labor problems in connection with climate conditions (Ellis, 2005).

Diversification may be classified into two categories: farm and non-farm diversifications. The on-farm diversification refers to the "maintenance of a diverse spread of crop and livestock production activities that interlock with each other in various ways" (Ellis, 2000). On the contrary, some individuals, instead of getting engaged in farm activities, seek and look forward to finding jobs or business opportunities and livestock rearing, which may be referred to as non-farm diversification. However, these non-farm practices are linked with agriculture as they produce processing and trading of agriculture production. Besides, non-farm activities include trade, business, service provision, and manufacturing. Rural livelihood is a global phenomenon that happens worldwide at every location and across the ranges of wealth and income. Barrett et al. (2001) affirmed that the patterns of diversification show the voluntary exchange of assets by the individual across various activities to achieve an optimal balance between the risk exposure and the expected returns based on the restrictions they face. Diversity within a household also indicates the existence at one point at a time of an income source of a different household. A household or an individual is said to have having diversified livelihood when it relies on various economic activities in a year that include both farm and nonfarm work. One works for oneself or an employer, and the other works at other rural or urban locations during temporary migration. At the household level, the diversification may lead to adding or embarking on new activities. People in developing countries are poor, and presently, the concept of livelihood is emerging as a survival strategy for rural households (Ellis, 2000; Bryceson, 2000). It is observed that rural people are looking forward to the diverse opportunities to increase and stabilize their income as determined by their portfolio of assets - social, human, financial, natural, and physical capital (Ellis, 1999; Sudan, 2007). The people dwelling in rural areas still tend to find means to ensure their survival despite the conditions that may limit economic and social opportunities available to most of the rural population in developing countries. Among these ways, one common in developing countries is that people at different locations have the same circumstances to fulfill their needs by combining different activities to ensure their life within the location where they find themselves (Barrett & Reardon, 2001).

Most poor people live in rural areas of Pakistan and mainly depend on agriculture. This sector contributes to the country's productivity and economy (Dixon et al., 2001). According to the Labor Force Survey of Pakistan (2014-15), in Pakistan, 61% of the rural labor force and 35% of the total labor force is reliant on agriculture. During the last decade, a decline in growth and productivity has been noticed due to improvement in the services sector, which now accounts for more than 50% of the GDP in Pakistan. The reasons that cause volatility in agriculture are the increasing cost of agricultural inputs, climate variability, scarcity of water, low support prices, high frequency of natural disasters, and irregular rainfalls. Rural households are stressed by the increase in living costs and population, so they tend to produce more income. It is undeniable that agriculture has been the primary source of livelihood for years, but recently, rural livelihoods have been transforming rapidly.

As a consequence of the increase in population, agricultural land is falling short or decreasing. Land fragmentation is also one cause of land scarcity because the land is divided among the offspring, making small units per head. Together, these motives play a noticeable role in adopting the diversified livelihood strategy in rural populations (Shafi & Shah, 2012).

Pakistan is a developing country comprising four provinces, namely, Punjab, Sindh, Baluchistan, and Khyber Pakhtunkhwa. Since this study was conducted in Khyber Pakhtunkhwa, it is the

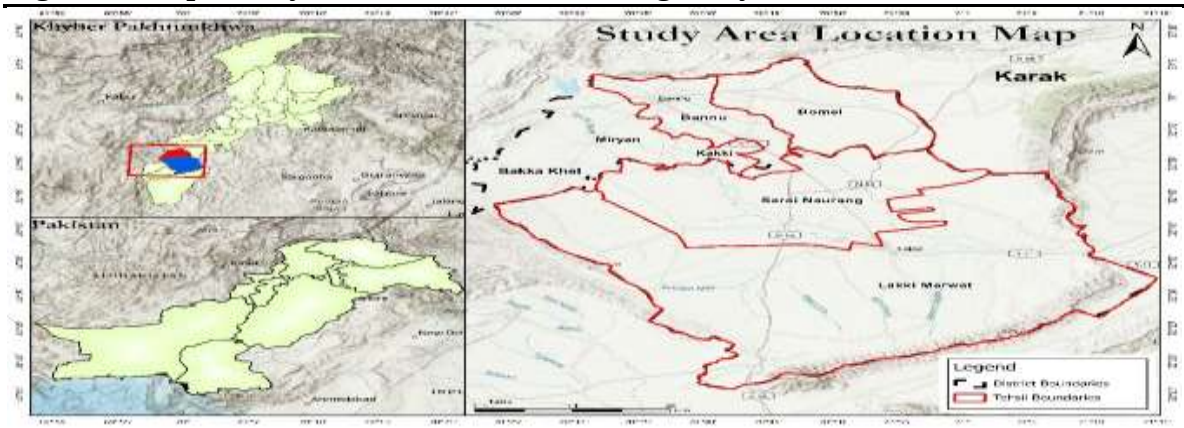
smallest and most improvised province of Pakistan. Most of the population of this province resides in rural areas where the dependency is mostly on agriculture, and agriculture contributes a lot to the province's economy. In Khyber Pakhtunkhwa, only 30% of the land is cultivable, while the remaining land could be more convenient for cultivation (Israr et al., 2014). District Bannu and Lakki Marwat are the southern parts of Khyber Pakhtunkhwa Province. District Bannu is situated at a location bounded by the long ranges of high mountains like Koh-e-Safed and Koh-e-Suleiman, while Lakki Marwat district combines hills and sandy plains. Different kinds of fruits and crops are grown in these districts, but the dates, figs, bananas, and rice are unique in their shape, smell, and taste. This area is primarily unirrigated, but some are irrigated, and the people depend on agriculture. Still, the production from agriculture is less, so the people also take an interest in other non-farming activities to enhance their economy in both districts. Generally, in Pakistan, specifically in Khyber Pakhtunkhwa, more research needs to be done on livelihood diversification issues. However, a study still needed to be conducted on this issue in the selected location of the southern part of Khyber Pakhtunkhwa. So, the current study is designed to determine the factors affecting rural household livelihood diversification in the selected location. It will be an exciting and unique research, hoping to contribute positively to the literature. It will be more attractive due to the location and topography of the research area as it is different from the other researcher's districts of the provinces of Pakistan.

The study's primary objective was "to investigate factors affecting rural livelihood diversification in the study area."

Methodology

The study was conducted in district Bannu and Lakki Marwat. From these two districts, each two tehsils namely Bannu and Domel were selected from district Bannu while Lakki and Sarai Naurang tehsils were selected purposively from Lakki Marwat district for the study.

Figure 1: Map of Khyber Pakhtunkhwa showing study area location



A total 389 sampled households were selected through Yamane, (1967) $(N/1+N(e)^2$ formula from the above mentioned tehsils and then through proportional allocation sampling technique the sample size were distributed in four tehsils of district Bannu and Lakki Marwat. i.e. Bannu-118, domel-104, lakki-110 and Sarai naurang-57. Primary data was collected through pre-tested questionnaire and face-to-face interview schedule method and for analysis purpose descriptive statistics and binary logit model were used. The binary logit model functional farm is given below;

$$\text{Logit}[p] = \ln\left[\frac{P}{1-P}\right] = \beta_0 + \beta_1 X_1 + \ldots\ldots + \beta_8 X_8 + \beta_9 D_1 + \beta_{10} D_2 + \varepsilon_i \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

Whereas:

Logit (p) = Livelihood diversification (1 = Diversified, 0 = Non-Diversified)

ln = Natural logarithm, β_0 = constant term, $\beta_1 \ldots \beta_{12}$ = Regression Co-efficient
X_1 = Sample respondents age (Years),
X_2 = Sample respondents education (Years)
X_3 = Household size (Numbers),
X_4 = Farm size (Acre),
X_5 = Income from agriculture (Rs)
X_6 = Distance from market (Km),
X_7 = Farming experience (Years),
X_8 = Earning family members (Numbers),
D1 = Climate change effect (1= Yes, 0 = No)
D_2 = Land irrigation status (1= Irrigated, 0 = Unirrigated),
ε = Error Term

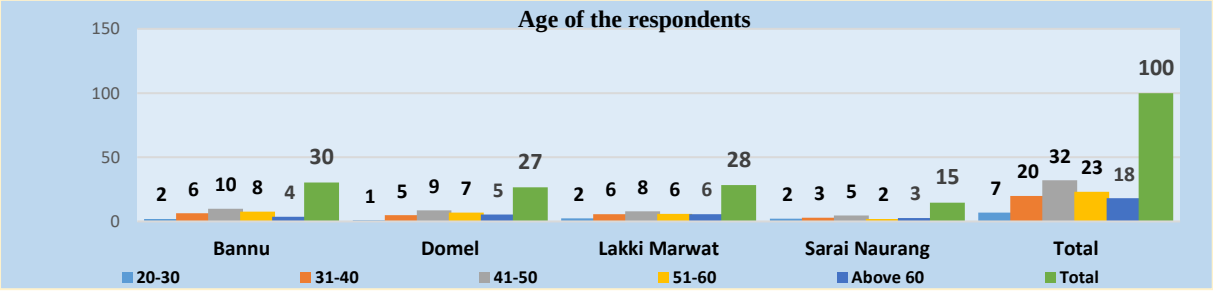
Results and Discussion

This section presents the descriptive statistics and empirical part of the study. The descriptive statistics consist of the socio-economic characteristics of the respondents, while in the empirical part, livelihood diversification and estimation are included. To understand the research findings, we start discussing the respondent's socio-economic characteristics.

Age of the Respondents

Figure 2 below indicates that the majority, 32 percent of sampled respondents belong to the middle, 41-50 years age group, followed by 23 percent from the age groups of 51-60 years, 20 percent from 31-40 years, and 18 percent respondents were belong from above 60 years age groups, while 7 percent of the sampled respondents were from the age groups of 20-30 years. From the above results, it can be concluded that the majority of sampled respondents were from the age group 40-50 years, which may be actually that they were the heads of their families and were capable of knowing their household situations about their development as well as their livelihoods.

Figure 2: Age wise distributions of sampled respondents in the study area

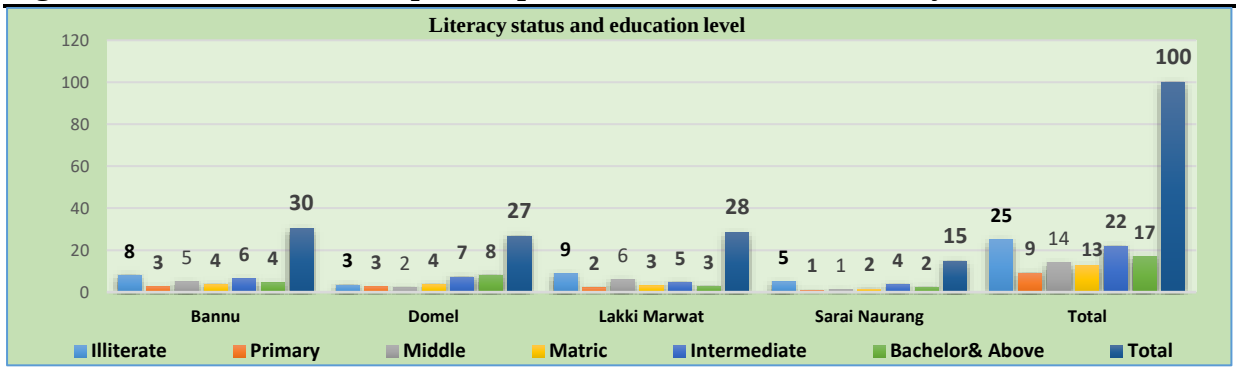


Literacy Status and Education

Figure 3 below shows the distribution of the sample respondents on the basis their literacy status and education level. The result shows that majority 75 percent of the sampled respondents were literate and 25 percent were illiterate. Out of the literate respondents 22 percent had education up to intermediate level, followed by 17 and 14 percent had bachelors & above and middle level of education respectively, while the remaining 13 percent and 9 percent sampled households had matric and primary level of education respectively. Moreover, there are several educational institutions up to the graduate level available to sample households in these areas. Those respondents who can afford to study avail themselves of this facility while those who cannot

afford to pursue further education continue drop out of school without completing their education.

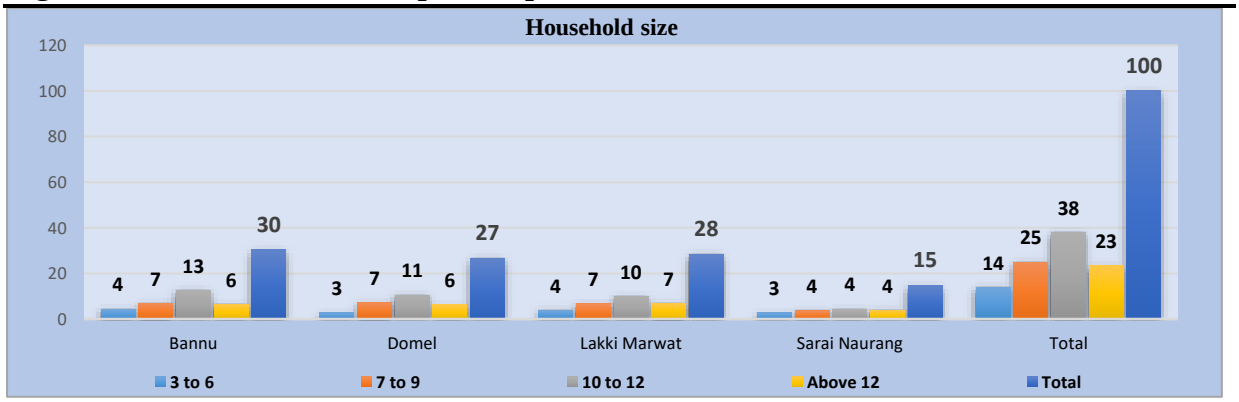
Figure 3: Distributions of sampled respondents based on their literacy status and education



Household Size

Figure 4 results shows that majority 38 percent of sampled respondents household had 10-12 members in their family, followed by 25 percent had 7-9 members and 23 percent had greater than 12 members, while the remaining 14 percent of sample respondents household had 3-6 in their family. The result suggest that majority of household had 10-12 members in their family in the study area. Overall result highlight that family size has direct effect on livelihood diversification as it creates pressure on food security as well as non-food expenses.

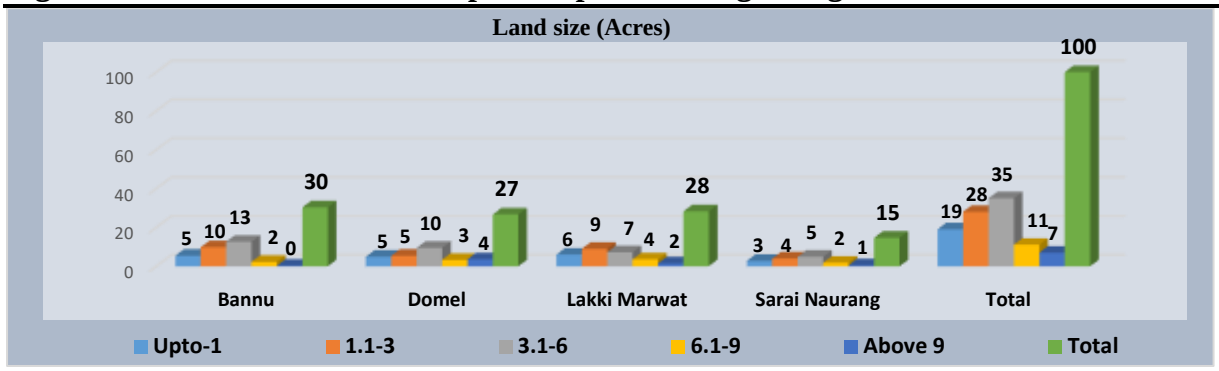
Figure 4: Distributions of sampled respondents on the basis their household size



Respondents Land Holdings

Figure 5 finding revealed that 35 percent of the sampled respondents possess (3.1-6) acres of land and 28 percent had (1.1-3) acres of cultivated land. The reaming 19 percent and 11 percent sampled respondents have (upto-1) and (6.1-9) acres land respectively which is used for cultivation of agriculture crops. While the rest 7 percent respondents have above 9 acres of agriculture land. The result suggest that majority of the sampled respondents had 3-6 acres of cultivated land in the study area. The finding is similar with Bojnec and Dries, (2005) studies they suggest that most of the respondents in the study area are working on small size of agriculture land.

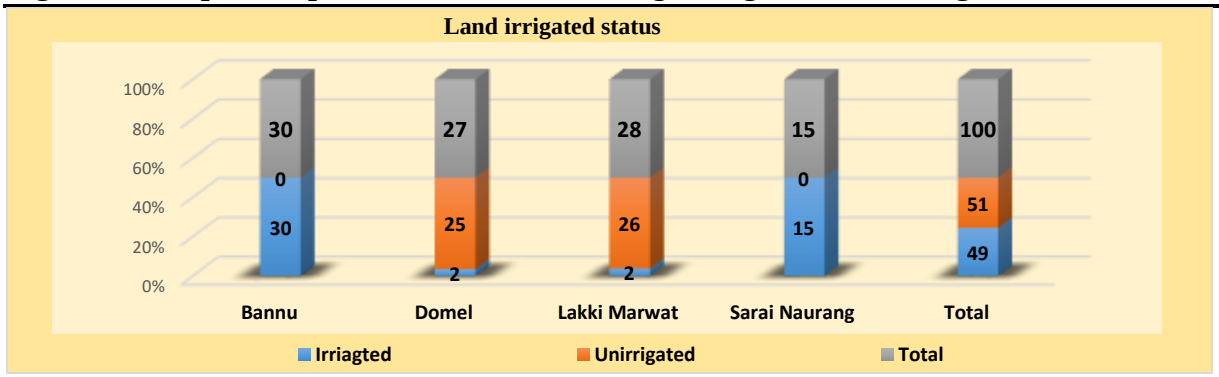
Figure 5: Distributions of the sampled respondents regarding their land size



Land Irrigation Status

Figure 6 result shows that greater part 51 percent of the sampled respondents land were unirrigated, while the rest 49 percent land were irrigated, because they were close to the small dams and constructed irrigation canal in this area and some respondents having their own tube wells to irrigated their land. The result reveals that irrigation can help in generation of more income producing surplus output and can strengthen the economic capacity and thus improves household livelihood and food security.

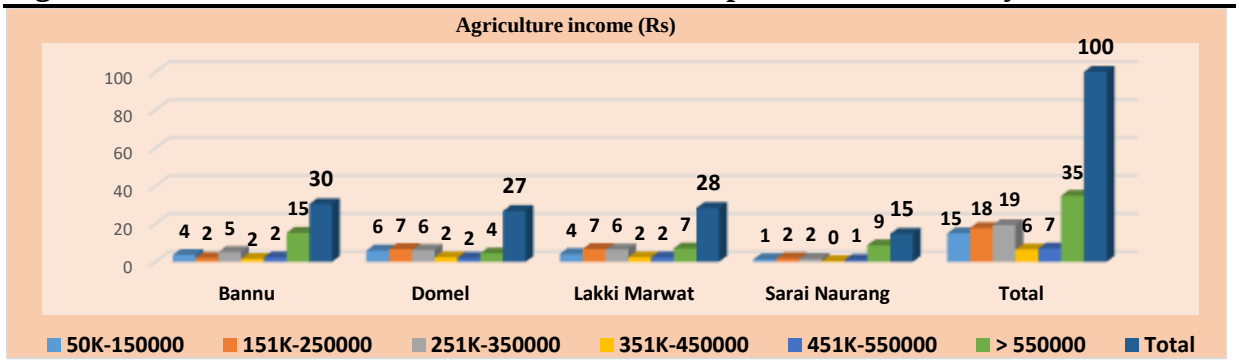
Figure 6: Sampled respondents distributions regarding their land irrigation status



Income from Agriculture

Figure 7 result shows that 35 percent of the sampled respondent's income had greater than Rs. 550000, followed by 19 percent income had equal/between to Rs. 251000-350000, while 18 and 15 percent income had equal/between Rs. 151000-250000 and 50000-150000 respectively. The rest 7 and 6 percent of the respondents' agriculture income was Rs. 451000-550000 and 351000-450000 respectively. The findings suggest that majority of the sampled respondents agriculture income had greater than Rs.550000 because most of the respondents had large size of cultivable land and most of them were irrigated, so they were involved in growing different type of crops and vegetables, while the minimum income respondents land were mostly unirrigated.

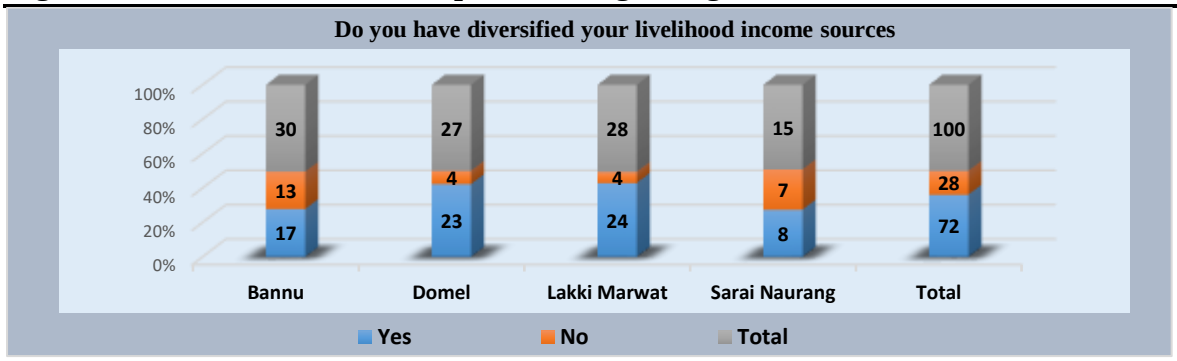
Figure 7: Annual farm income distribution of the respondents in the study area



Livelihood Diversification

Figure 8 finding shows that, majority 72 percent of the sampled respondents were diversified their livelihood source while the rest 28 percent had not diversified their livelihood. The result revealed that majority of the respondents were diversified their livelihood due to small size of land, limited agriculture income and large family size. These factors impact the livelihood strategies and compels for diversification livelihood income sources.

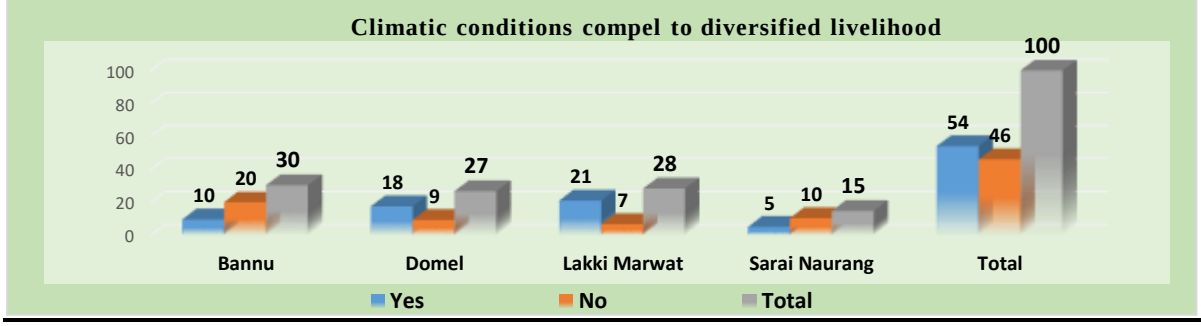
Figure 8: Distributions of the respondents regarding their livelihood diversification



Climate/Weather Conditions

Figure 9 results indicates that 54 percent of the respondent were diversified their livelihood source of income due to climatic condition while 46 percent of the sampled respondents had not diversified their livelihood income source due to climatic conditions. The study finding indicates that climate change have adversely affected the agriculture, due to this reason, people of rural areas had diversified their livelihood income sources from on-farm to off-farm income generating activities.

Figure 9: Climate conditions diversified livelihood income sources



Binary Logit Regression Model

Table 1 shows Logit regression association and effect of independent variables on livelihood diversification odds ratios. The explanatory variables in the table includes age, education, household size, farm size, farm income, distance to market, farming experience, household income, climate change and land irrigation status.

Table 1: Binary logit model estimation for livelihood diversification with explanatory variables

Explanatory Variables	(β)	SE	Odds Ratio	P. Value
X_1. Age of the respondents	.048	.031	1.049	.118
X_2. Education of the respondents	.088	.034	1.092	.010
X_3. Family size	.168	.065	1.183	.009
X_4. Farm size	-.331	.112	.718	.003
X_5. Agriculture income	-.012	.007	.989	.078
X_6. Distance to market	-.211	.096	.810	.028
X_7. Farming experience	-.111	.055	.895	.044
X_8. Earning members	.364	.180	1.440	.043
D_1. Climate change	4.009	.729	55.072	.000
D_2. Land irrigation status	2.915	.509	18.451	.000
Constant	-8.164	1.583	.000	.000

Number of observation = 389, LR Chi^2 value = 252.072, Chi^2 P-value = .000,
Negelkerke R^2 = 68.8%

X_1 in Table 1 indicates that the age of the respondents were positively relationship with livelihood diversification and p-value were (0.118), which is statistically insignificant for age at 5 percent level of significant. The co-efficient value is (0.048) which indicates that a one unit increase in age of the household head decrease logit in favor of livelihood income source diversification by (0.048) as compared to non-diversified income source. Similarly the estimated odd ratio for age is 1.049 which is greater than 1, indicates positive association with livelihood income source diversification and reveals that one unit increase in household head in case odd ratio in favor of diversified income source. The present study result in line with the Khatun and Roy, (2012) study result, who confirmed that, age is one of the significant factor determining the level of diversity. People at a young age generally have a high willingness and ability to learn and pursue diversified livelihood and are comparatively agile in moving from one profession to another in the off-farm sectors. **X_2**. According to the table result, level of education regression co-efficient sign is positive and direct relationship with livelihood diversification. The p-value were (0.010) which is statistically significance for level of education at 5 percent level of significant. The co-efficient value is (0.088) which indicates that a one unit increase in education level of the household head increases logit in favor of livelihood income source diversification by (1.092) times as compared to non-diversified livelihood income source. The study finding as matching to the result of Memon et al. (2010); Dilruba and Roy (2012); Iqbal et al. (2021), who indicates that, enhancement in level of education creates more chances for the sampled respondents to engage in off-farm economic generating activities. **X_3**. Family size had positively associated with probability of having diversified livelihood income source and statistically significant at 5 percent level of significant. The co-efficient value is (0.168) which indicates that a one unit increase in family size, increases logit in favor of livelihood diversification by (1.83) times as compared to non-diversified income source. The finding of the study is similar to the Onunka and Olumba (2017) and Adepoju and Obayelu (2013) study they indicated that,

increases family size, has increase diversification of livelihood source of income and reduced the poverty status. This is because when there is more labour force power, the members of the household are encouraged to participate in off-farm activities. **X_4**. Farm size had negative relationship with livelihood diversification and p-value for farm size was (0.003), which is statistically significant at 5 percent level of significant. The co-efficient value is (-0.331) which indicates that a one unit increase in farm size, decreases logit in favor of livelihood income source diversification by (-0.331) as compared to non-diversified income source. Similarly the estimated odd ratio for farm size is (0.718) which is less than 1 indicates negative association with livelihood income source diversification and reveals that one unit increase in farm size will decrease of livelihood income source diversification. However, small size of farming land had significant effect on livelihood income source. The study findings are supported by Anshio and Shiferaw (2016); Awotide et al. (2010) finding that in rural areas of Pakistan, there was a negative relationship between farm size and livelihood diversification. Small farm size respondents had more diversified their livelihood source of income as compared to large farm size. **X_5**. According to the above table result, the estimated regression co-efficient is negative and statistically significant, which shows that agriculture income is negatively associated with probability of having diversified livelihood income source. The co-efficient value is (-0.012) which indicates that a one unit increase in agriculture income, decreases logit in favor of livelihood income source diversification by (0.989) times as compared to non-diversified income source. The present study result were in line with Edet and Etim (2018); Babatunda et al. (2010) study who, revealed that, livelihood income diversification or off-farm service increases when agriculture income of the households' from farm output decreases and vice versa. **X_6**. The result of the table.1, estimated co-efficient is negatively associated with livelihood income source diversification and p-value were (.028), which is statistically significant for Distance to market at 5 percent level of significant. Which shows that distance to market were negatively associated with probability of livelihood income source diversification or diversified livelihood income source. The co-efficient value is (-0.211) which indicates that a one unit increase in distance to market, decreases logit in favor of livelihood income source diversification by (-0.211) as compared to non-diversified livelihood income sources. Similarly, the estimated odd ratio for distance to market is (0.810) which is less than 1' indicates negative association with livelihood income source diversification and reveals that one unit increase in distance to market will decrease livelihood income source diversification. The present study result same like to Daniel (2014), Jilito et al. (2018) study indicates that distance from market, and credit facilities, were the major factors which affects the farming household to diversify their livelihood from on-farm to off-farm livelihood activities. **X_7**. Farming experience estimated co-efficient is negative relationship with livelihood diversification and statistically significant. The co-efficient value for farming experience is (-.111) which indicates that a one unit increase in farming experience, the add ratio (.895) times decreases in favor of livelihood income source diversification. The study results is same like to the study of David (2016); Iqbal et al. (2021) who, stated that, respondents in the study area have enough farming experience had diversification in cropping and the other side small experience farmers was diversified to off-farm income generating activities. **X_8**. The result indicates, the earning members estimated co-efficient is positively and statistically significant, which shows that earning member is positively associated with probability of livelihood income source diversification. The co-efficient value is (0.364) which indicates that a one unit increase in earning member, increase logit in favor of livelihood income source diversification by (1.440) times as compared to non-diversified livelihood. The result is consistent with Croppenstedt, (2006); Ayana et al. (2021), studies, that, a higher number of earning members in the household helps in the livelihood source of income diversification. The numbers of earning members in household is more, much higher level of per capita household's

income. **D_1**. The estimated co-efficient of climate change is positively relationship with livelihood diversification and p-value is (.000), which is statistically significant at 5 percent level of significant. The co-efficient value is (4.009) which indicates that a one unit increase in climate change impact, increases logit in favor of livelihood income source diversification by (55.072) times as compared to non-diversified income source. The study finding is reliable with Asfaw et al. (2015), Luqman et al. (2018) studies, whose suggests that, changing in climate or in weather condition have adversely affected the agriculture, due to which people of rural areas diversified their livelihood income sources from on-farm to off-farm income generating activities. **D_2**. The result illustrates that the estimated co-efficient of land irrigation status is positive and statistically significant with diversified livelihood. The co-efficient value of irrigation status is (2.915), which indicates that a one-unit increase in land irrigation status increases logit in favor of livelihood income source diversification by (18.415) times compared to livelihood non-diversified households. The result shows that irrigated land had a highly significant impact on livelihood income source diversification. The current study, like Jilito et al. (2018), illustrates that households with large irrigated land have better opportunities to diversify their livelihoods and sources of income. The reason behind this from such irrigation opportunities, they can produce crops two or three times a year instead of once, which will produce agricultural surpluses for households that have irrigated land. This surplus can be used for non-agricultural activities, especially self-employment activities. The value of R square shows, (68.8 %) variation in the overall model, and the LR chi-square test is performed for testing the statistical significance of all the independent variables, with a chi-square value is (252.072) and p-value is (.000), which shows the overall model is statistically highly significant.

Conclusion and Recommendations

The present study concluded that the sampled respondents of the selected location of the southern part of Khyber Pakhtunkhwa directly or indirectly depend on agriculture. The result shows that most of the sampled respondents were literate and at intermediate levels of education. In the study area, more significant part of the sampled respondents had small agricultural land, and most were unirrigated. However, the study's finding also indicates that most of the sampled respondents had diversified their livelihood from farm to non-farm activities due to limited farm income, large family size, conservation & environmental reasons, and unavailability of irrigation water facilities in most of the study area. The binary logit model result shows that some factors, namely age, education, household size, earning family members, climate change, and land irrigation status, were positively associated with livelihood diversification.

In contrast, farm size, income from agriculture, distance to market, and farming experience are negatively associated with livelihood diversification. The p-value of all explanatory variables accepts the age of the respondents is less than 5% level of significance, which is a highly significant effect on livelihood income sources diversification. It reveals that increases in the positive regression co-efficient variables had increases in livelihood diversification.

In contrast, increased negative regression co-efficient variables had adversely affected and decreased livelihood diversification. Finally, the study recommended that the farm size in the study area was small, resulting in more diversification due to limited resources. Therefore, it is suggested that government should chalk out formal entrepreneurship programs for the local community to work more productively. However, irrigation status shows a positive relationship with livelihood diversification. Community-level irrigation development needs to be emphasized based on the significant effect of increasing livelihood diversification. Therefore, based on a study finding, local small-scale irrigation systems may be introduced in the study area. Likewise, earning family members positively and significantly affects livelihood diversification. It is

suggested that employment opportunities during the agricultural off-season may be created to combat unemployment and poverty in the study area.

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