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Determinants Of Livelihood Diversification In Punjab, Pakistan

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Abstract

This study was conducted in three randomly selected districts viz. Vehari, Faisalabad, and Narowal of the Punjab province to examine the determinants of livelihood diversification. Using multistage sampling 480 respondents were interviewed face to face using a structured questionnaire and were analyzed by SPSS (version 21). The major findings reveal that most of the smallholders, i.e., 126 (26.3%), relied on cropping and off-farm livelihood diversification strategies to sustain their household income. The structural determinant factors were identified as "push factors" while household/domestic determinant factors were identified as "pull factors" of livelihood diversification. Moreover, the results of the multiple linear regression model unveiled that household's choice and adoption of livelihood diversification strategies were positively affected by age, level of education, livestock holding status, access to credit, extension contacts, and income while gender, landholding size, access to irrigation, access to mass media, and crop risk were negatively affected. The study concludes that both structural and household determinants of livelihood diversification contribute positively to improving the smallholders' household well-being and keeping them away from vulnerabilities. The study findings have implications for policymakers and development practitioners who are working to improve the livelihoods of smallholders in the Punjab province, Pakistan.

Keywords: *Determinants, Livelihood, Diversification, Smallholders, Punjab, Pakistan.*

Introduction:

The economy of Pakistan mainly depends on the agriculture sector which is often termed as the backbone of Pakistan's economy. The agriculture sector directly or indirectly absorbs 47.0% of the labor force of 62.0% of the rural population (Rehman et al., 2015, 2017; Zahid et al., 2016). The livelihood of the smallholders of the Punjab province is mainly dependent on the agriculture sector. The agriculture sector's performance is under great stress due to the continued fragmentation of land and climate change (Ahmad and Ma, 2020). This phenomenon is adversely impacting th[1]e livelihoods of farmers whose survival is based on agricultural practices. Small farmers are more susceptible to vulnerabilities because of limited resources. The ratio of small farmers is increasing day by day and presently they hold a percentage of more than 90% in the farming community. The increased percentage is attributed to population growth and limited employment opportunities in the non-farm sector. The consequences of land division have directly affected the production potential and living means of the

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smallholders. In this context, livelihood diversification strategies may be a possible opportunity to improve livelihood standards and fight poverty (Davis et al., 2010; Urrehman & Rana, 2008). Household livelihood diversification strategies have been classified either on the asset ownership of the household (Ansoms & McKay, 2010), income quartiles (Barrett et al., 2001),major livelihood activities (Iiyama et al., 2008), or income composition (Babulo et al., 2008; Soltani et al., 2012; Xu et al., 2015). The arable land potential is decreasing despite improved technologies because of land fragmentation (Gudeta Alemu, 2012). The individuals adopting diversified livelihood strategies are more resilient against different vulnerabilities. Many researchers have witnessed that increased diversification strategies have led to decreased vulnerabilities. The households' livelihood diversification strategy options primarily rely on differential access to and control over five types of livelihood capital/assets.

Additionally, a significant influence of the location factor including geographical location and distance to key facilities (such as road, market) in the choice of livelihood diversification strategies has been further emphasized in some of the studies (Jansen et al., 2006; Soltani et al., 2012; Tesfaye et al., 2011). The smallholders are forced to diversify their income sources from cropping to off/non-farm activities due to low yield per acre, inferior quality of field inputs, crop failure, market failure, price fluctuations of the agricultural commodities, and lack of access to credit, irrigation, extension services, and farm organizations, etc.(Gebru et al., 2018a).

Moreover, the literature has revealed that demand-pull and distress-push factors further attract the attention of small landholders to diversify their livelihood strategies (Davis et al., 2010). Among the factors considered, demand-pull holds a prominent position through higher returns from non-farm activities, the appeal of urban life, and extra income to meet household needs (Barrett et al., 2001a). Distress-push diversification is triggered by factors such as inadequate farm output, failure of farm input markets, population growth, disasters and shocks, risk reduction, absence of financial services, and inadequate resources (Barrett et al., 2001a).

The determinants of the livelihood diversification strategies among the smallholders are influenced by either positive or negative factors. The positive factors encourage them to opt for livelihood diversification to sustain their household income while the negative factors discourage them from adopting multiple means of livelihood diversification.

The determinants of the livelihood diversification strategies shape the outlook of the households to weigh the pros and cons of each diversification strategy the households are going to adopt. The households are to consider the human, physical, financial, natural, and social capitals before going for diversification. The above-mentioned capitals are not equally available to the smallholders even though they are living in the same geographical region, belonging to the same ethnicity, and followers of the same religion.

The presence of interest groups, large landholders, and bureaucratic elements in the context of Pakistan's civil and political administration often restricts the equitable access of the smallholders to natural, financial, and social capital. The governments of developing countries like Pakistan often intervene to ensure proportional access to natural, financial, and social capital through administrative control and wherever possible adopt comprehensive legislation. The smallholders often accuse the government of Pakistan of a discriminatory attitude towards the farming communities located in all four provinces and the federally administrated areas. The government-led subsidies often ignore the smallholders because of the land ownership constraints. Keeping in view the above facts, the present study was planned to identify the determinant factors of livelihood diversification strategies among the smallholders in Punjab-Pakistan.

The present research paper has been divided into the following sections. The introduction is the topic of discussion in the first section. The second section elaborately discusses the methodology of this research study. Results and discussion are the points of discussion of the

third section, and the fourth section has been devoted to the conclusion, suggestions, and recommendations of this study.

Theoretical Framework of the Study

The most widely used theoretical concept in the livelihood diversification research, which is embedded in the household economic models, is the push-pull model that is used to explain the underlying causes of household diversification behavior of the smallholders. Push-pull models are indicated by the neoclassical economics paradigm, which is based on the underlying principles of utility maximization, rational choice, factor-price differentials between regions and countries, as well as labor mobility.

Neoclassical theory, at the micro-level, perceives farm households as individual and rational actors, who choose to diversify into off/non-farm endeavors according to the principle of cost-benefit calculation, and are anticipated to be able to make options available to earn the highest returns. Farm households are like production units, which maximize utility by integrating time and other inputs to produce output, subject to price and resource limitations. Diversification is viewed as a function of returns to labor from farm activities compared to off/non-farm activities (Singh et al., 1986). Given an asset base, the farm households make choices by comparing the returns from farm labor time and time spent on the off/non-farm income activities(Yaro, 2006). In compliance with this theory, the combination of push and pull factors determine the kind of diversification strategy followed by a given household. Diversification might happen as an intentional household strategy to improve standards of living or as an involuntary response to a crisis (Ellis, 1998). In addition to the capacity of the household, which is mainly determined by its assets, the rural households may be encouraged to diversify their activities by the push and pull factors (Reardon et al., 2006).

The push factors are negative factors that may force farm households to seek additional livelihood activities within or outside the farm. They tend to dominate in high-risk and low potential agricultural environments, subject to flooding, drought, and environmental degradation (Haggblade et al., 2010). In the Punjab province, Pakistan, they are viewed to be the underlying cause of the push-driven or survival-led type of diversification, according to which the poorer rural farm households participate in the low-return off/non-farm activities to ensure survival, to reduce vulnerability, or to avoid falling deeper down into poverty (Lay et al., 2008). Risk and seasonality, for the Punjab province, Pakistan, happened to be the two most widespread push factors for the farm households to diversify their income strategies from agricultural to off/non-farm activities (Barrett et al., 2001b; Ellis, 2000a). The other push factors which may include fragmented landholdings and land constraints driven by the population pressure, problems due to poor infrastructure, missing or incomplete factor markets and market access, and high transaction costs (Barrett et al., 2001a), including asset strategies and the coping behavior (Ellis, 2000b).

On the other hand, pull factors are the positive factors, which provide incentives for people to broaden their range of income-generating activities within and/or outside the farming sector. Such factors tend to dominate in less risky and more dynamic agricultural environments for the smallholders (Haggblade et al., 2010b). The examples of major pull factors include improved infrastructure, commercialization of agriculture, improvements in market access, proximity to an urban area, development of labor markets, growth of rural towns, etc.(Barrett et al., 2001a; Losch et al., 2012). Such type of pull factors is associated with the pull-driven or opportunity-led type of diversification, which occurs when wealthier rural households with accumulation objectives engage in high-return non/off-farm activities to increase the household income by maximizing returns from their assets (Lay et al., 2008).

Some rural households during the dry season, especially in the semi-arid regions, depend on incomes from selling farm products and from non-farm activities, including migration and remittances (Ellis, 1998; Reardon et al., 2006). The case of Sahelian agricultural systems can

be taken as an instance, where the smallholders turn to non/off-farm activities to augment their respective farm incomes when the harvests generally fail (Bryceson, 1999). Social positions, associations, networks, cultures, and religion are also some of the important social push factors which drive the smallholders towards income diversification from cropping to off/non-farm activities (Ellis, 1998). Other social push factors such as gender, social inequalities, and class may also restrict the smallholders to acquire the facilities of labor market opportunities (Oya, 2007; Start et al., 2004).

Rural women are often constrained in accessing land and other productive assets (Gladwin et al., 2001).

Consequently, they often adopt multiple livelihoods off/non-farm diversification strategies to shoulder the household responsibilities (Andersson Djurfeldt et al., 2013). Non-farm income, however, may contribute more to inequality among the female-headed households, where self-employment is important and non-farm opportunities are more constrained (Canagarajah et al., 2001).

Moreover, a significant role is also played by the institutional push factors in creating opportunities or constraints to the improvement of rural livelihoods. Institutional push factors such as the regressive tax system at the local level tend to discourage rather than foster the process of livelihood diversification among the smallholders (Ellis & Freeman, 2004).

Distress-push diversification, according to Barrett et al., (2001a), develops naturally due to weakening or time-varying returns to a household's productive assets which may be from market failures, from land or labor, from ex-post coping with adverse shocks, and from ex-ante risk management. It was further highlighted by Ellis, (2000a) and Obi Ajuruchukwu, (2011) that diversification might be derived from the existence of incomplete markets for credit, land, labor, and insurance. Where markets frequently do not operate competitively or efficiently. Personal and institutional constraints can play an important role in determining the participation of the smallholders in the off/non-farm activities to augment the household income. Parkin (2012) has suggested that the individual factors of production such as diminishing returns to scale and limited market access generally force the individuals and the households to come up with local coping livelihood diversification strategies that encourage self-reliance. On the other hand, Nel & Binns (2000) have found out that rural households diversify livelihood strategies as a way of achieving self-sufficiency. He further argued that lack of credit markets, crop failures, and market failures also push the smallholders to opt for off/non-farm diversification strategies. It was outlined by Obi Ajuruchukwu (2011) that well-off households are generally able to adopt livelihood diversification strategies because they can meet the investment requirements as they possess surplus credit which is necessary for entry into the remunerative non-farm activities. Obi Ajuruchukwu (2011) further went on to state that those who own sufficiently high levels of assets, can access credit, or possess the required skills and will be able to make full use of opportunities for increased returns to labor provided by rural non-farm income sources.

Materials and Methods

Description of the study area

The present study was conducted in the Punjab province of Pakistan. It is bordered by the Indian-occupied Jammu and Kashmir to the northeast, the Indian states of Punjab and Rajasthan to the east, Sindh province to the south, Baluchistan and Khyber Pakhtunkhwa provinces to the west, and Islamabad federal capital area and Azad Kashmir to the north. The provincial capital, Lahore is in the east-central region, near the border with India.

The name Punjab means "five waters," or "five rivers," and signifies the land drained by the Jhelum, Chenab, Ravi, Beas, and Sutlej rivers, which are tributaries of the Indus River. According to the sixth population census of 2017 of the Punjab province, the total area of this province is 110,012,442 square kilometers. In the overall Punjab total population of men is 55,958,974, and a total population of women is 54,046,759, and shemale/transgender are 6709. There are about 69,625,144 people who lived in rural areas including 34,425,030 women and 35,197,990 men. The number of total rural households is 10,714,102 and the total farms in the Punjab province were 5249800 (Govt. of Pakistan, 2019-20). Geographically, the Punjab province is divided into three parts i.e., Upper Punjab, Central Punjab, and Lower Punjab. The northern areas of the above-mentioned province are hilly and green. Central Punjab has plains having agricultural lands irrigated through canals. Southern Punjab is warmer with agricultural and irrigated lands but some of its parts are desert. There are 10 divisions, 36 districts, 146 tehsils, and 7602 union councils in the Punjab province, Pakistan. The major crops which are cultivated in the above-mentioned province include wheat, sugarcane, rice, cotton, maize, sorghum, potatoes, vegetables, fodder crops, lintels & gardening (mostly in the southern part), etc. That is why most of the rural population mostly depend on the agriculture sector to sustain their livelihoods.

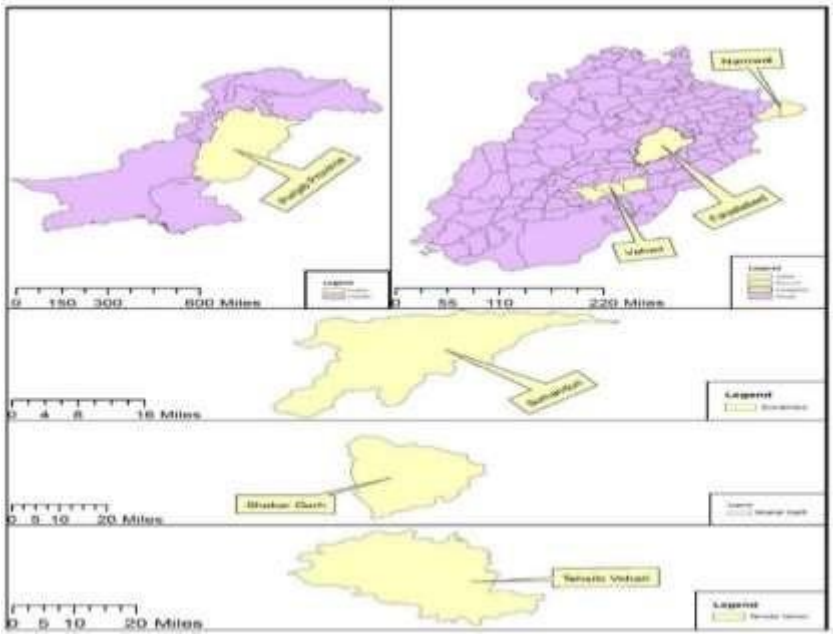

Figure 1: Geographical location of the study area

Sampling Process:

A household survey was conducted from March-September 2020 to collect the data for this study. For the selection of the respondents, a multistage sampling technique[2] (Probability Sampling) was utilized throughout the entire research study. The Punjab province is divided into three geographical regions such as upper, central, and lower Punjab. At the first stage, one district was selected from each geographical region by the Simple Random Sampling

[2] Multistage sampling divides large populations into stages to make the sampling process more practical. Furthermore, a sophisticated form of cluster sampling is also known as multistage sampling.

technique). At the second stage, from each district, one tehsil[3] was selected randomly. At the third stage, from each selected tehsil, four union councils[4] were selected randomly. At the fourth stage, two villages were selected from each union council randomly. At the fifth stage, twenty respondents (males and females) were selected from each village through systematic random sampling comprising a total of 480 respondents.

Table 1: Sampling layout of the study

Geographical Region	Upper Punjab	Central Punjab	Southern Punjab	
Districts	1	1	1	1×3= 3
Tehsils	1	1	1	1×3= 3
Union Councils	1×4= 4	1×4= 4	1×4= 4	3×4= 12
Villages	4×2= 8	4×2= 8	4×2= 8	8 ×3= 24
Respondents (Males and Females)	8 × 20 = 160	8 × 20 = 160	8 × 20 = 160	160 ×3= 480
Total				480

Research Instrument:

There are various techniques for the collection of data from the respondents. Face to face interview is the most appropriate data collection method for getting information. The interview schedule was developed by considering the objectives of the research study. The objectives were developed from the synthesis of the literature, consultation of previous research studies, peer reviews, and discussion with experts. Face and content validity was measured through a panel of experts while the reliability of the questionnaire items was assessed by Cronbach alpha.

Statistical Analysis:

For the statistical analysis Chi-square, Gamma statistics, and Multinomial logistic regression model were utilized. Chi-square was used to check the association between the dependent and independent variables while Gamma statistics were used to estimate the direction of the relationship between the dependent and independent variables. Multinomial logistic regression was used to predict categorical placement in or the probability of category membership on a dependent variable based on multiple independent variables. The independent variables can be dichotomous (i.e., binary), dummy, and continuous (i.e., interval or ratio in scale).

The Multinomial Logistic Regression model was fitted to identify determinants of livelihood diversification.

The logistic model used is specified as:

$Y = \beta o + \beta 1\ x1 + \beta 2\ x2 + \beta 3\ x3 + \ldots\ldots\ldots + \beta 8\ x14 + U$

Where:

Y = Livelihood diversification strategies

X1 = Age of Household Head (Years)

X2 = Gender of Household Head (1=Male, 2= Female)

X3 = Education Level of Household Head (years)

X4 = Land Holding Size (Acres)

[3] A tehsil (also known as a taluka, taluq) is an administrative division in some countries of the Indian subcontinent. It is an area of land within a city or town that serves as its administrative center, with possible additional towns, and usually several villages.

[4] A *Union Council* or Village *Council* in Pakistan is an elected local government body. It is headed by a chairman, a vice chairman and a body of councilors.

X5 = Family Size (number in Adult Equivalent)
X6 = Distance to Market (distance in kilometers)
X7 = Livestock holding status
X8 = Credit use by the household (0= No, 1= Yes)
X9 = Extension Contacts (0= No, 1= Yes)
X10 = Access to irrigation (0= No, 1= Yes)
X11 = Access to mass media (0= No, 1= Yes)
X12 = Crop Risk (1 if there was crop prdn risk and 0 if no)
X13 = Total Income (The total income of a household (Pkr.)
X14 = Dependency ratio (The ratio of dependents to independents)
βo = Constant term
X1 – x13 = Regression coefficients
U = Error term

Results and Discussion

The results and discussion section has been combined and the findings of each table have been discussed separately and comprehensively (to construct the debate concerning determinant factors of livelihood diversification among the smallholders) from one table to the other. Before starting the discussion, we would like to clarify that the structural and household/domestic determinant factors of livelihood diversification were identified during the household survey while administering the household questionnaire on the 480 household units. The bivariate analysis has been applied by taking the structural and household/domestic factors as dependent variables and the variables concerning socio-economic characteristics and assets/capitals as independent variables. While in the multivariate analysis, the determinant factors which have been identified are those that shape the decision-making of the smallholders regarding opting for the combinations of livelihood diversification strategies (discussed under table 4).

Table 2: Socioeconomic characteristics of the smallholders

Statement	Response	Frequency N = 480	Percentage N = 480
Gender	Male	288	60.0
	Female	192	40.0
Age (years)	Up to 40	149	31.0
	41-50	145	30.2
	51-60	115	24.0
	> 60	71	14.8
Education	Illiterate	49	10.2
	Primary	72	15.0
	Middle	69	14.4
	Matriculation	158	32.9
	> Matriculation	132	27.5
Occupation	Farmer	270	56.3
	Farmer + Govt. sector	63	13.1
	Farmer + Private sector	76	15.8
	Farmer + Self-employed	61	12.7
Marital Status	Married	414	86.3
	Divorced	9	1.9
	Widow	57	11.9
Family size	1-5	178	37.1

	6-10	221	46.0
	>10	81	16.9
Family Type	Nuclear	310	64.6
	Joint	170	35.4
House Type	Katcha	22	4.6
	Semi-Pakka	157	32.7
	Pakka	301	62.7
Land Holding Size (Acres)	Up to 1.50	110	22.9
	>1.50-3.00	210	43.8
	>3.00	160	33.3
Income (from all resources)	10001-20000	21	4.4
	20,001-30,000	42	8.8
	30,001-40,000	73	15.2
	40,001-50,000	61	12.7
	50,001-60,000	129	26.9
	Above 60,000	154	32.1

The socio-economic characteristics of the respondents impart useful information about their position in a society where he/she is living. His position in society reveals what type of authority he/she is commanding. The authority he/she commands are very important to understand what type of resources he/she occupies to sustain his living.

Table 2 discusses the socio-economic characteristics of the smallholders. According to the contents of table 2, the gender-wise distribution of the respondents showed that 60.0% of the household heads were males while 40.0% were females. Most of the smallholders i.e., 31.0% were above 40 years old. The majority of the respondents i.e., 32.9% were matriculated. The majority of the smallholders, i.e., 56.3%, belonged to the farming community. The majority of the smallholders, i.e., 86.3%, were married. The 46.0% of the smallholders had 6-10 family members. The majority of the smallholders i.e., 64.6% were living in the nuclear family system. The 62.7% of the smallholders were living in the Pakka houses (concrete). The 43.8% of the respondents were having >1.50-3.00 (acres) land holding size. As far as the income of the household heads were concerned, the majority of the smallholders, i.e., 32.1%, were earning above 60,000 Pkrs per month.

Table 4: Livelihood Diversification Strategies adopted by the smallholders.

Livelihood Diversification Strategy	**Yes**		**No**		**Rank**
	F	**P**	**F**	**P**	
Cropping only (C)	12	2.5	468	97.5	5
Cropping and off-farm only (CO)	126	26.3	354	73.8	2
Cropping, poultry, and livestock production only (CPL)	85	17.7	395	82.3	3
Cropping, fishing, livestock production, and off-farm only (CFLO)	10	2.1	470	97.9	4
Cropping, poultry, livestock production, and off-farm only (CPLO)	253	52.7	227	47.2	1

The smallholders were asked to tick on the livelihood diversification strategy which they had adopted among the five above-mentioned livelihood diversification strategies. The response of the smallholders was ranked according to their response. The contents of table 4 illustrate that

52.7% of the smallholders had adopted the "Cropping, poultry, livestock production, and off-farm only (CPLO)" livelihood diversification strategy, and only 2.5% were involved in cropping. The response of the smallholders was ranked from 1-5. The data show that the majority of the respondents opted for "Cropping, poultry, livestock production, and off-farm only (CPLO)" and it was ranked 1st while a few of the smallholders opted for "cropping" and it was ranked 5th. Moreover, 26.3%, 17.7%, and 2.1% of the smallholders had opted for Cropping and off-farm only (CO), Cropping, poultry, and livestock production only (CPL), and Cropping, fishing, livestock production, and off-farm only (CFLO) livelihood diversification strategies to sustain their respective household income to combat poverty.

Table 3: Farm labor, access to credit, farm organization, livestock, credit, extension contacts, access to irrigation, access to media, and crop risk status of the smallholder

Statement	Yes		No	
	F	P	F	P
Do you hire farm labor regularly?	280	58.3	200	41.7
Do you have agricultural input credit?	144	30.0	336	70.0
Do you have any type of membership in a farm organization?	160	33.3	320	66.6
Livestock holding status of the respondent.	341	71.0	139	28.9
Credit owned by the household to cope with risk strategies.	136	28.3	344	71.6
Extension contacts.	226	47.1	254	52.9
Access to irrigation.	462	96.3	18	3.75
Access to mass media.	453	94.4	27	5.6
Crop risk.	466	97.1	14	2.9

In the light of the sustainable livelihood framework (SLF), we can assess from the contents that a significant majority of the smallholders were denied access to capital/assets. Institutional failure is working in the background because the institutions have failed to ensure equitable access of resources to the smallholders. The monopoly of the upper castes, hegemony, and political influence of the large landholders was identified (during the field survey) as the major factors working in the background of the rural politics to deny the equitable access of resources to the small farmers. The study area mostly contains plain terrain devoid of pastures, forests, and mountain ranges. So, in the range of natural resources, the smallholders have only small patches of land (which becomes smaller after division among the second generation) to cultivate. They have few alternatives to opt for livelihood diversification like keeping livestock items, poultry, and non/off-farm livelihood activities. If we look into the entire situation using the lens of sustainable livelihood framework (SLF) we will conclude that in the range of natural resources, the smallholders only possess the land (which can be converted into financial capital if required), the surplus labor force in the range of physical capital, regarding social capital it was explored that due to the division of society into different subgroups based on caste, ethnicity, sectarianism, regionalization, level of education, kinship relations, etc., different people possess different types social relations depending on their position in the village setup. As far as the financial capital is to be considered, the smallholders mostly depend on the earnings from agricultural activities, livestock & poultry rearing, and other miscellaneous off/non-farm activities. Human capital most of the time overlaps with physical capital and both can be used interchangeably.

The farm labor, access to credit, farm organization, livestock, credit, extension contacts, access to irrigation, access to media, and crop risk status play a vital role in the decision-making of the smallholders either to diversify their livelihood activities or not. The above-mentioned variables either have a significant or non-significant influence on the livelihood diversification strategies. The contents of table 3 reveal that 58.3% of the smallholders were hiring farm labor regularly and 41.7% of them were not utilizing the services of fam labor, a significantly large

majority of the smallholders i.e., 70.0% did not have access to credit to buy farm inputs. The 66.6% of the smallholders were not members of a farm organization. A significant majority of the smallholders i.e., 71.0% possessed items of livestock. A large majority of the smallholders were of the view that they did not possess credit in their respective households to cope with the risk strategies. The 52.9% of the smallholders did not have extensive contacts. An overwhelming majority of the smallholders i.e., 96.3%, 94.4%, and 97.1% responded that they had access to irrigation, access mass media, and crop risk.

Table 5: Major determinants factors which force respondents to adopt household livelihood diversification strategies.

Factors	District			Total
	Vehari	Faisalabad	Narowal	
Structural Determinant Factors				
Seasonality (Related to labor)	70	92	97	259
	43.8%	57.5%	60.6%	54.0%
Market failure	67	73	89	229
	41.9%	45.6%	55.6%	47.7%
Crop risk	160	148	158	466
	100.0%	92.5%	98.8%	97.1%
Crop failure	69	130	101	300
	43.1%	81.3%	63.1%	62.5%
To cope with risk strategies	116	139	136	391
	72.5%	86.9%	85.0%	81.5%
Household Determinant Factors				
Household size	157	127	148	432
	98.1%	79.4%	92.5%	90.0%
To supplement the family income	157	138	157	452
	98.1%	86.3%	98.1%	94.2%
Education of the family members	152	102	140	394
	95.0%	63.8%	87.5%	82.1%
Health provision to the family members	156	127	153	436
	97.5%	79.4%	95.6%	90.8%
To maintain the social status of the family	160	117	150	427
	100.0%	73.1%	93.8%	89.0%
Lack of contribution by the other family members in the household expenditures	115	89	87	291
	71.9%	55.6%	54.4%	60.6%

Structural Determinants Factors of Livelihood Diversification Strategies

The structural determinant factors have been recognized as push factors that compel the smallholders to opt for livelihood diversification strategies. A detailed discussion in the light of the push-pull theory of livelihood diversification has been given below.

Seasonality (related to labor): Seasonality (related to labor opportunities) can be regarded as a push factor that forces the smallholders to opt for off/non-farm diversification strategies. The labor opportunities other than in the agriculture sector are scarce in rural areas of the Punjab province, Pakistan. During the sowing and harvesting seasons, the rural people find labor opportunities, and, in the off-season, only the skilled and semi-skilled laborers get employment opportunities in the urban areas. The unskilled labor force and women usually suffer the most. The data unfolded that more than half of the respondents 259 (54.0%) were diversifying their

livelihood strategies due to seasonality related to labor opportunities. The frequency analysis of the data across the regions reveals that the majority of the smallholders i.e., 97 (60.6%) from Narowal were adopting the livelihood diversification strategies followed by the smallholders of Faisalabad and Vehari due to seasonality related to labor. The data show that the factor of seasonality was affecting the decision-making of the majority of the smallholders regarding the adoption of livelihood strategies of the study area.

Market failure: Market failure is another contributing factor or perhaps we may call it a push factor that compels the smallholders to opt for livelihood diversification strategies. Market failure is a recurring phenomenon that often deprives the smallholders of their due profit. The market failure is usually caused by the market agents who force the smallholders to sell their agricultural produce at a low price because they know that the smallholders cannot store their yield because they (smallholders) have no storage facilities. The supply and demand factor also plays a major role in market failure because during the harvesting season the supply of the agricultural yield increases as compared to the demand. Resultantly, the prices of the agricultural commodities go down and the smallholders are forced to sell them at low prices. The data reveal that less than half of the smallholders 229 (47.7%) were diversifying their livelihood strategies due to market failure. The government has formulated a market committee to control the prices of certain agricultural commodities such as wheat but due to lack of control, the commission agents usually hoodwink the smallholders. The frequency analysis of the data across the regions reveals that the majority of the smallholders i.e., 89 (55.6%) from Narowal were affected by the market failure followed by the smallholders of Faisalabad and Vehari.

Crop risk: The crop risk is a contributing push factor that forces the smallholders to adopt multiple means of livelihood diversification to sustain their household income (Brons, 2005; Ellis, 1998; Manlosa et al., 2019; Melketo et al., 2019; Sekumade AB & Osundare FO, 2014; Wan et al., 2016).. Excessive or insufficient rains, unexpected rains, hailing, storms, insufficient quantity of canal water, salinity and waterlogging, inferior quality of field inputs, etc. are some of the contributing factors which pose a severe risk to crops. The smallholders of Vehari were facing problems related to pest attacks on cotton crops even though they apply pesticides to combat pests but to no avail.

Due to the inferior quality of field inputs or the non-judicious use of fertilizers, pesticides, herbicides, and insecticides the yield per acre is decreasing. The low yield per acre is leaving no room for the smallholders except to adopt other means for their livelihood degeneration. Climate change has affected the cropping pattern not only in Pakistan but around the globe also. It is a universal phenomenon to reckon with (Akbar & Gheewala, 2020; Ali et al., 2017; Karki & Gurung, 2012; Kayani et al., 2018; Usman Shakoor, 2011).

Data unfolded that a significant majority 466 (97.1%) of the smallholders were having crop risk. They said that the crop risk has posed severe dangers to the sustainability of the cropping system in Pakistan. The frequency analysis of the data across the regions reveals that the majority 160 (100.0%) of the smallholders from Vehari were having 100.0% crop risk followed by Narowal and Faisalabad. Vehari is known as the land of silver fiber.

During the past decades due to uncontrollable pest attacks the yield per acre has been decreasing continuously. The smallholders were complaining about the inferior quality of field inputs which was the major reason for the destruction of the cotton crop. Furthermore, the pattern of rains and global warming has affected the cropping pattern in Pakistan to a great extent.

The results are in line with that of Asravor (2018)who investigated that the smallholders of Northern Ghana have diversified their income sources because the decrease in average rainfall has forced them to diversify their income sources from cropping to off/non-farm activities.

Saqib et al., (2019) were of the view that the smallholders of Pakistan have shifted their livelihood strategies from cropping to off/non-farm activities due to the adverse effects of climate change on the cropping particularly cotton crop in the cotton belt region of Pakistan. Abeje et al., (2019) have reported from the Upper Blue Nile Basin, Ethiopia that the vulnerability of the crops due to climate change has significantly affected the pattern of livelihood diversification strategies among the smallholders. Aniah et al., (2019) reported from Kenya that various cropping, on-farm, and off-farm adaptation strategies were used by the smallholders to ameliorate the negative impacts of climate and ecological changes on their livelihood. McCord et al., (2015) have reported from Kenya that the smallholders have changed their cropping pattern under the stress of climate change.

Crop failure: Among the structural determinant factors, crop failure can also be regarded as a distress push factor. The crop failure adversely affects the household income, and the smallholders are to seek off/non-farm activities to provide basic amenities to their respective family members. The data unfolds that a large majority of the smallholders i.e., 300 (62.5%) were affected by the crop failure. The frequency analysis of the data across the regions reveals that the majority of the smallholders i.e., 130 (81.3%) from Faisalabad were adopting the off/non-farm livelihood diversification strategies due to crop failure followed by the smallholders of Narowal and Vehari.

To cope with risk strategies: To cope with the risk strategies, households need savings, which can be utilized at the time of emergency. The data reveal that a significant majority of the smallholders i.e., 391 (81.5%) believed that they were diversifying their livelihood resources to cope with the risk strategies. “to cope with the risk strategies” can also be regarded as a push factor. The frequency analysis of the data across the regions reveals that the majority of the smallholders i.e., 136 (86.9%) were diversifying their livelihood sources to cope with the risk strategies followed by the smallholders of Narowal and Vehari.

The above-mentioned structural determinant factors can also be regarded as push factors that force the smallholders towards livelihood diversification. It has already been explored in the literature by Ellis (1998), Ellis (2000a), Barrett et al., (2001a), Dercon & Krishnan (1996), Start et al., (2004), and Malmberg & Tegenu (2007) that deterioration of assets, seasonality, climatic uncertainty, land fragmentation, lack of access to market facilities, high transportation cost, and poor infrastructure are some of the major push factors which force the smallholders to adopt off/non-farm livelihood diversification strategies. Asokhan & Eswaran (2019) has fragmentized the push factors into the following categories i.e.; production push factors (scarcity of labor, poor irrigation facility, lack of storage facility, lack of training facility, variation in seasonal rainfall, inadequate processing and value addition units, small farm sizes, high cost of farm labor, fragmented landholdings, inadequate resource availability, agro-climate, and lack of insurance facilities); marketing push factors (poor transport facility, poor consumer preferences, less market price for the product/commodity, lack of marketing infrastructure, market distance, excessive product availability, middle men involvement, and inadequate processing facility); economic push factors (increased cost of cultivation, asset deterioration, poor asset base, inadequate farm output, and substantial income fluctuations): and social push factors (fear of risk taking, lack of rural infrastructure, ex post risk coping strategy, working age of family members, guilty feel about the business, lack of awareness on new inventions, family members decision, elevation in choosing non-farm wage strategy, societal factors, less support from family members, population growth, health status, family type, disasters, and poverty). Mostly, the above-mentioned push factors play an essential role in the decision-making of the smallholders regarding the adoption of livelihood diversification strategies.

Household Determinants Factors of Livelihood Diversification Strategies

In the range of the household/domestic determinants factors, a combination of push and pull factors had been identified during the research study.

Push Factors of Household/Domestic Determinant Factors

The household size/family size of the smallholders and their urge to augment household income has been identified as push factors of livelihood diversification.

Household size/Family size of the smallholder: Among the range of household/domestic determinant factors the household/family size of the smallholder is a significant factor that shapes the outlook of the small farmers regarding the adoption of livelihood diversification strategies. The common hypothetical condition is that "higher the family size of the smallholder, the more he would like to adopt the off/non-farm livelihood diversification strategies". It was found that there was a significant association between the family size of the smallholder and his adoption of the livelihood diversification strategies.

The data reveal that a significant majority of the smallholders i.e., 432 (90.0%) were adopting livelihood diversification strategies due to their large family sizes. The frequency analysis of the data across the regions reveals that around 90.0% of the smallholders of Narowal and Vehari were adopting livelihood diversification strategies due to their large family sizes followed by the smallholders of Faisalabad. The household/family size of the smallholders may be regarded as the push factor because it forces the smallholders (if he/she has a large family size) to diversify their income sources to satisfy the needs of the family members.

Lack of contribution by the other family members in the household expenditures: Lack of contribution of the family members in the household income usually pressurized the household heads to seek more options to satisfy the fundamental needs of the family members. The other contributing factors along with the lack of contribution of family members include low yield per acre, market failure, large family sizes, small farm size, lack of labor opportunities, etc. also pushes the household head to multiply the family income by diversifying the livelihood sources.

The data reveal that a significant majority of the smallholders i.e., 291 (60.6%) responded that they were diversifying their livelihood resources because of the lack of contribution of the other family members. The frequency analysis of the data across the regions reveals that the majority of the smallholders i.e., 115 (71.9%) from Vehari responded that lack of contribution by the family members in the total household income managed them to diversify their income sources followed by the smallholders of Narowal and Faisalabad.

Pull Factors of Livelihood Diversification

The provision of education and health facilities can be recognized as opportunity-led diversification factors because they will provide the family members better labor opportunities not only in the government or semi-government sectors but also in the private sectors as compared to their illiterate and physically weak counterparts.

Education of the family members: The data reveal that a significant majority of the smallholders i.e., 394 (82.1%) responded that they were adopting off/non-farm activities to earn more income so that they could be able to provide quality education. The frequency analysis of the data across the regions reveals that the majority of the smallholders i.e., 152 (95.0%) from Vehari responded that to provide the facilities of standard education they were diversifying their livelihood strategies followed by the smallholders of Narowal and Faisalabad. It was observed during the field visit that in Vehari and Narowal due to the lack of industrialization there were very scarce job opportunities. It was the major reason that the

smallholders were investing more in education as compared to the smallholders of Faisalabad who were living adjacent to the urban settlements.

Health provision to the family members: The data reveal that a significant majority of the smallholders i.e., 436 (90.8%) responded that they were adopting off/non-farm livelihood diversification strategies to provide health facilities to their family members.
Usually, the government-sponsored health institutes provide health facilities at a minor cost but due to population pressure, most people are forced to seek medical help from the privately-owned health institutes.
The privately-owned health institutes are comparatively far costlier than government-sponsored health institutions. Health is the concern of every individual and to cope with the health-related risk strategies one should have enough savings so that at the time of emergency the saved income could be utilized to provide health facilities not only to the family members but to the livestock items also.

To supplement the family income: The data reveal that a significant majority of the smallholders i.e., 452 (94.2%) responded that income was the major determinant factor of livelihood diversification. It is the innate desire of human beings to want to increase their respective wealth. So, it was found that 94.2% of the smallholders responded that they were diversifying their livelihood strategies to supplement their family income. The frequency analysis of the data across the regions reveals that around 90.0% of the smallholders were diversifying their livelihood strategies to increase their family income. It has already been established in the literature by Adepoju & Oyewole (2014), Mackenzie (2017), O. et al., (2019), Majbauddin et al., (2020), and Dai et al., (2020) that income was the major determinant factor that plays an important role in the adoption of off/non-farm livelihood strategies.

To maintain the social status of the family: The data reveal that a significant majority of the smallholders i.e., 427 (89.0%) responded that they were diversifying their livelihood strategies to maintain the social status of the family.
The smallholders who belong to the upper castes usually are more concerned about their social status even though they now have small patches of the land but still they are concerned about their family status. The smallholders who belong to the scheduled caste have no problems with the maintenance of their social status because they have always been overpowered by the upper castes.
It is the factor of social status which has fragmentized society into different classes. The factor of class consciousness is the pervasive one in the rural settlements in comparison to the urban areas. The smallholders of the upper castes, it was observed, usually spend more money as compared to their earnings just to have feelings of superiority over the fellow farmers of the lower castes.
The frequency analysis of the data across the regions revealed that most of the smallholders from Vehari and Narowal were more concerned about the maintenance of the social status as compared to the smallholders of Faisalabad.
Certain pull factors led the smallholders to diversify their respective income sources. It has already been established in the literature by Asfaw et al., (2017), Kassie et al., (2017), Achiba, (2018), and Kassa et al. (2019) that improved infrastructure, better market access, commercial agriculture, proximity to an urban area, higher returns from entrepreneurial activities, higher wage rates, lower risks, the power of technology, and high productivity pull the smallholders to adopt different means of livelihood diversification strategies. Asokhan & Eswaran, (2019) has fragmentized the push factors into the following categories i.e.; productive pull factors (agriculture mechanization, availability of advisory services enabled, new affordable technology emergence, dynamic agricultural environment, low level of water consumption,

low pest and disease occurrence, excess training facility, resource availability, and availability of farm inputs/implements); marketing pull factors (commodity-based approaches, demand in value-added preferences, availability of various marketing opportunities, high market competition, demand in processing industry, product perishability, consumer preference, market demand, and storage facility); economic pull factors (excess credit/subsidy facility, better relative returns, attractive income from livestock, high price for specific commodity, less cost with increased remuneration, value addition/processing unit, storage facility, income rise motivation, and group activity), and social pull factors (improved social status, high exposure, socio-cultural system, development policy, specific work knowledge, social cohesion, social recognition, work experiences, and less risk).

The push and pull factors generally motivate the smallholders to adopt off/non-farm livelihood diversification strategies to sustain their household income to keep their respective family members away from vulnerabilities. The level of intensity of the above-mentioned push and pull factors differ in affecting the decision-making of the smallholders.

Table 6: Multiple Linear Regression Model-1

Model Summary				
Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**
1	0.708[a]	0.501	0.489	0.401

ANOVA[a]						
Model		**Sum of Squares**	**D. F.**	**Mean Square**	**F**	**Sig.**
1	Regression	75.522	11	6.866	42.741	0.000[b]
	Residual	75.176	468	0.161		
	Total	150.698	479			
a. Dependent Variable: Extent of the adoption of livelihood diversification strategies by the smallholders?						
b. Predictors: (Constant), Gender (D), age of the HH (years), Education level of the smallholder, Land holding size, Livestock status of the smallholders, Access to credit by the smallholders (D), Extension contacts of the smallholder, Access to irrigation (D), Access to mass media (D), Crop risk (D), Income/month of the Household from all resources (after the adoption of livelihood diversification Strategies.						
Coefficients						
Model		**Unstandardized Coefficients**		**Standardized Coefficients**	**T**	**Sig.**
		B	**Std. Error**	**Beta**		
1	(Constant)	1.186	0.165		7.194	0.000
	Gender	0.024	0.038	0.021	0.632	0.528[NS]
	Age of the Household Head	0.062	0.020	0.115	3.037	0.003**
	Education level	0.043	0.015	0.101	2.856	0.004**
	Land holding size	-0.041	0.025	-0.054	-1.605	0.109[NS]
	Livestock holding status	0.609	0.042	0.493	14.364	0.000**
	Access to credit	0.087	0.044	0.070	1.968	0.050*
	Extension contacts	0.142	0.039	0.126	3.639	0.000**
	Access to irrigation	0.061	0.107	0.021	0.575	0.565[NS]
	Access to mass media	-0.076	0.089	-0.031	-0.854	0.393[NS]
	Crop risk	-0.124	0.114	-0.037	-1.081	0.280[NS]

	Income/month of the Household from all resources (after the adoption of livelihood diversification Strategies	0.131	0.014	0.347	9.633	0.000**
a. Dependent Variable: To what extent your household adopt livelihood diversification strategies?						

NS=Non-significant
*=Significant (at 0.5% level of significance)
**=Significant (at 1.0% level of significance)
The Multiple Linear Regression analysis was carried out to investigate the factors affecting the adoption of livelihood diversification strategies among the smallholders. To check the overall significance of the model R^2, adjusted R^2 and F-test are used. The respective values of R^2, adjusted $R^{2,}$ and F-test were calculated as 0.501, 0.489, and 42.741, respectively. The value of R^2 indicated that about 50.0% of the total variation in the adoption of livelihood diversification strategies among the smallholders is explained by the 11 explanatory variables included in the model. As the primary data is used in the analysis, the estimated value is very high, and the overall model is considered reliable.
To check the reliability of the model F-test was also used. The calculated value of 42.741is statistically significant at less than one percent level of significance, this too indicates that all the independent variables included in the model are explaining the dependent variable.

Gender of the smallholders: The coefficient for this variable has a positive sign with a value of 0.024 and it was found statistically non-significant ($p=0.528^{NS}$) at > 0.5% level of significance. It means that the gender of the smallholder has nothing to do with the adoption of livelihood diversification strategies. The smallholders of the study area were adopting livelihood diversification strategies irrespective of the fact they were males or females to multiply their total household income. Chi-square has also revealed a non-significant association between gender and different livelihood diversification strategies adopted by the smallholders i.e., cropping and off-farm (CO), cropping, poultry and, livestock production (CPL), and cropping, poultry, livestock production, and off-farm (CPLO) as revealed by the $p=0.75^{NS}$, $p=0.625^{NS}$, and $p=0.487^{NS}$, respectively. On the contrary, it was found by A. Ali & Erenstein, (2017), and Ahmed et al., (2018) that gender was among the main driving factors for the adoption of livelihood diversification strategies. It was reported by different empirical studies that gender has a mixed influence on the adoption of livelihood diversification strategies. Most of the studies, in this regard, reported that the male households were adopting income diversification strategies as compared to females because the males enjoy more social mobility as compared to females in the male-dominated society of Pakistan (Larson et al., 2015.; Mentamo & Geda, 2016; Van Den et al., 2006). Lack of social mobility, freedom of speech, non-involvement in the decision making, lack of access to credit, extension services, & market, etc. were the contributing factors observed during the field survey which generally hinder in the adoption of livelihood diversification strategies among the female smallholders.

Age of the Household Head: The coefficient for this variable has a positive sign with a value of 0.062 and it was found statistically significant (p=0.003**) at 1.0% level of significance. The data reveal that age has a significant influence on the adoption of livelihood diversification strategies. Chi-square has also revealed a highly significant association between age and different livelihood diversification strategies adopted by the smallholders i.e., cropping and off-farm (CO), cropping, poultry and, livestock production (CPL), and cropping, poultry,

livestock production, and off-farm (CPLO) as revealed by the p=0.004**, p=0.000**, and p=0.000**, respectively. The results of this study are in line with that of Gebreyesus, 2016), Dinku, (2018), Lorato, (2019), Roy & Basu, (2020), and Gebbisa & Mulatu, (2020) that the age of the smallholder positively affects the adoption of livelihood diversification strategies. On the contrary, Gebruet al., (2018b) and Dai et al., (2020) were of the view that the age of the smallholder negatively affects the adoption of livelihood diversification strategies. The contents of tables 92, 101, and 110 revealed that the younger smallholders were diversifying more than that of the old smallholders.

Education level of the smallholders: The coefficient for this variable has a positive sign with a value of 0.043 and it was found statistically significant (p=0.004**) at 1.0% level of significance. It was found that age had a significant influence on the decision-making of the smallholders regarding their adoption of livelihood diversification strategies. The data reveal that the educated people were adopting livelihood diversification strategies as compared to the illiterate and low qualified smallholders. Chi-square has also revealed a highly significant association between age and different livelihood diversification strategies adopted by the smallholders i.e., cropping and off-farm (CO), cropping, poultry, and livestock production (CPL), and cropping, poultry, livestock production, and off-farm (CPLO) as revealed by the p=0.004**, p=0.000**, and p=0.000**, respectively.
The results of this study are in line with that of Gordon et al., (2001), Camlin et al., (2014), Saguye, (2016), Kassie et al., (2017), A. Ali & Erenstein, (2017), Gebru et al., (2018b), Saqib et al., (2019), and Roy & Basu,(2020) that level of education has a significant effect on the adoption of livelihood diversification strategies. The educated household members can diversify their livelihood strategies by securing salaried jobs (in the government, semi-government, and private sector), while those with low education levels and the illiterate are involved in wage-earning occupations. Along with other knowledgeable family members, the literate household head can easily differentiate between the best alternative economic activities for the well-being of the family by integrating on-farm and off-farm activities (Mentamo & Geda, 2016). It was found by Rashid, (2020) that households with higher education and assets diversify their livelihood strategies and resultantly get secured. The research study conducted by Kassie et al., (2017) reported that education has a negative effect while Ahmed et al., (2018) reported that education has a positive effect on the adoption of livelihood diversification strategies. Furthermore, the educated smallholders possess the capability to learn and adapt to the changing circumstances under the impression of the capability approach. They can diversify their income sources by shifting from cropping to off/non-farm activities to sustain the household income as compared to the illiterate and unskilled smallholders.

Landholding size of the smallholders: The coefficient for this variable has a negative sign with a value of -0.041 and it was found statistically non-significant ($p=0.109^{NS}$) at > 0.5% level of significance. The data reveals that the landholding size of the smallholder did not have a significant influence on the adoption of livelihood diversification strategies. The negative value of coefficient (-0.041) unfolds that the smallholders with more acres of land do not opt for livelihood diversification strategies. The results of this study are in line with that of A. Ali & Erenstein, (2017) and Gebru et al., (2018b) that landholding size has a negative and non-significant influence on the adoption of livelihood diversification strategies. While Yenesew et al., (2015) and Saguye, (2016) have concluded that the landholding size has a positive and significant influence on the adoption of livelihood diversification strategies.

Livestock holding status: The coefficient for this variable has a positive sign with a value of 0.609 and it was found statistically highly significant (p=0.000**) at 1.0% level of significance. The data reveal that the livestock holding status of the smallholder has a significant influence

on the adoption of the livelihood diversification strategies. The results of this study are in line with that of Yenesew et al., (2015), Saguye, (2016), Makate et al., 2016) and Abeje et al., (2019b) that the livestock holding status positively and significantly while Gebru et al., (2018b) and Dai et al., (2020) reported that livestock holding status negatively influence the adoption of livelihood diversification strategies.
The livestock holding status of the smallholders amplifies their capability to invest in the off/non-farm activities as compared to the smallholders who have no or small size livestock holding status.

Access to the credit of the smallholders: The coefficient for this variable has a positive sign with a value of 0.061 and it was found statistically highly significant (p=0.050*) at 0.5% level of significance. The data reveal that the livestock holding status of the smallholder has a significant influence on te adoption of the livelihood diversification strategies. Chi-square has also revealed a highly significant association between access to credit and different livelihood diversification strategies adopted by the smallholders i.e., cropping and off-farm (CO), cropping, poultry and, livestock production (CPL), and cropping, poultry, livestock production, and off-farm (CPLO) as revealed by the p=0.000**, p=0.003**, and p=0.000**, respectively. The results of this study are in line with that of Yenesew et al., (2015), Saguye, (2016), Makate et al., (2016), A. Ali & Erenstein, (2017), Gebru et al., (2018b), Ahmed et al., (2018)and (Abeje et al., 2019b) that access to credit positively and significantly influences the adoption of livelihood diversification strategies. Access to credit helps the smallholders to start off/non-farm activities to supplement the household income. Unconditional access to credit also saves the smallholders from exploitation by the dealers and money lenders. The smallholder can also take better decisions regarding the sale of his agricultural produce. It can strengthen his bargaining power in the market.

Extension contacts of the smallholders: The coefficient for this variable has a positive sign with a value of 0.142 and it was found statistically highly significant (p=0. 0.000**) at 1.0% level of significance. The data reveals that extension contacts of the smallholder have a positive influence on the adoption of livelihood diversification strategies among the smallholders. Chi-square has also revealed a highly significant association between extension contacts and different livelihood diversification strategies adopted by the smallholders i.e., cropping and off-farm (CO) and cropping, poultry and, livestock production (CPL), as revealed by the p=0.000** and p=0.016*. The association between extension contacts and cropping, poultry, livestock production, and off-farm (CPLO) were found to be non-significant ($p=0.06^{NS}$). The results of this study are in line with that of of Yenesew et al., (2015), Saguye, (2016), Makate et al., (2016), A. Ali & Erenstein, (2017), Ahmed et al., (2018)and Abeje et al., (2019b) that extension contacts of the smallholders positively and significantly influence the adoption of livelihood diversification strategies. On the contrary Gebru, et al. (2018) were of the view that extension contacts negatively influence the choice of the smallholder regarding the adoption of livelihood diversification strategies.

Access to irrigation of the smallholders: The coefficient for this variable has a positive sign with a value of 0.061and it was found statistically non-significant ($p=00.565^{NS}$) at > 0.5% level of significance. The data reveal that access to irrigation has nothing to do with the adoption of livelihood diversification strategies among the smallholders. Saguye, (2016) believed that access to irrigation non-significantly influences the choice of adoption of livelihood diversification strategies.

Access to mass media of the smallholders: The coefficient for this variable has a negative sign with a value of -0.076 and it was found statistically non-significant ($p=0.393^{NS}$) at > 0.5%

level of significance. The data reveal that access to mass media has nothing to do with the adoption of livelihood diversification strategies among the smallholders. The negative value of coefficient (-0.076) unfolds that the smallholders who had access to mass media would not opt for livelihood diversification strategies. The results of this study are in line with that of Saguye, (2016) and Makate et al., (2016) that access to mass media negatively influences the choice of the adoption of livelihood diversification strategies. It was revealed by Yenesew et al., (2015) that the smallholders who keep themselves with the mass media usually participate in the off/non-farm activities more than that of the smallholders who had no access to mass media. It was reported by Achiba, (2018) that households who watch TV and listen to a radio at least once a week were found to have a greater likelihood to be engaged in off/non-farm activities.

Crop risk: The coefficient for this variable has a negative sign with a value of -0.124 and it was found statistically non-significant ($p=0.280^{NS}$) at > 0.5% level of significance. The data reveal that crop risk does not influence the choice of the smallholders regarding the adoption of livelihood diversification strategies.

Income/month of the Household from all resources (after the adoption of livelihood diversification Strategies: The coefficient for this variable has a positive sign with a value of 0.131 and it was found statistically highly significant (p=0.000**) at 1.0% level of significance. The data reveal that the income of the smallholder has a significant influence on the adoption of livelihood diversification strategies. The results of this study are in line with that of Makate et al., (2016), Gebru et al., (2018b), and Abeje et al., (2019b) who reported that the income of the smallholder has a significant influence on the adoption of livelihood diversification strategies.

The results of the Multiple Linear Regression model revealed that the determinants factors such as age, education level, livestock holding status, access to credit, extension contacts, and income/month of the household from all resources (after the adoption of livelihood diversification strategies) were found statistically significant while the determinant factors i.e., gender, landholding size, access to irrigation, access to mass media, and crop risk were found statistically non-significant on the adoption of livelihood diversification strategies by the smallholder.

Conclusion

The current research concludes that smallholders are adaptive and resilient in their livelihood choices and outcomes depending on their access to resources, opportunities, and constraints. The smallholders face various challenges and constraints in accessing capital, resources, and institutions that affect their decision-making and outcomes. The factors that influence the choice of different livelihood diversification strategies among the smallholders, such as farm labor, credit, farm organization, livestock, extension contacts, irrigation, media, and crop risk. The structural and household determinants factors affect the decision-making process of the smallholders concerning livelihood diversification. The structural determinant factor has been identified as push factors that compel the smallholders to opt for different livelihood sources to cope with the challenges and uncertainties in their agricultural sector. The structural determinants factors are beyond the control of the smallholders and require policy interventions and institutional support to mitigate their negative impacts. The results of the multiple regression model conclude that the model is a good fit for the data and provides valuable insights into the factors affecting the adoption of livelihood diversification strategies among smallholders. The overall conclusion of this research is that both structural and household determinants of livelihood diversification contribute positively to improving the household wellbeing of the smallholders and keeps them away from vulnerabilities.

Suggestions, and Recommendations

Based on the results of the current research, the following suggestions and recommendations can be made to support smallholders in their livelihood diversification strategies:

These findings suggest that policymakers should focus on developing policies that promote livelihood diversification among smallholders in Punjab province. These policies could include providing access to credit, extension services, and education, as well as reducing the risk of crop failure.

Policy interventions and institutional support should be provided to mitigate the negative impacts of structural determinants factors that are beyond the control of smallholders. These push factors compel smallholders to opt for different livelihood sources to cope with challenges and uncertainties in their agricultural sector.

Access to capital, resources, and institutions should be improved for smallholders to help them overcome challenges and constraints in their decision-making and outcomes.

Support for farm labor, credit, farm organization, livestock, extension contacts, irrigation, media, and crop risk should be provided to smallholders to help them make informed decisions about their livelihood diversification strategies.

Structural and household determinants factors should be considered when designing policies and programs to support smallholders in their livelihood diversification.

Overall, these recommendations aim to provide smallholders with the necessary support and resources to make informed decisions about their livelihood diversification strategies and achieve positive outcomes.

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Conflict of interest

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