

Farm management capacities contribute to sustainability of rural livelihoods amongst small farmers in district Layyah, Punjab, Pakistan

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Key Message This study reveals that about 98% of the respondents had farms, while 100% respondents had livestock assets for their livelihoods in district Layyah, Punjab, Pakistan. The study will help in the development of relevant sustainability policies.

ABSTRACT Punjab is one of the fertile provinces of Pakistan but poverty is prevailing especially in its rural areas. The main reasons for poverty in these areas include the lack of planning as well as implementation of policies. The present study was conducted in district Layyah, Punjab to investigate the sustainability of rural livelihoods amongst the small farmers. The results show that a majority of the respondents (68.33%) had their own land and 98 percent of the respondents had a farm. 41.66% were farming on the current farm for a period of 11-15 years. During this study, it was found that 87% respondents had electricity available for farming activities and 74.33 percent of respondents were using canal water to irrigate their land. A majority of the respondents (37.66%) were holding 1.1-2 ha of land and performing cultivation activities. As far as active membership of a community organization is concerned, about two thirds (65%) of the respondents held active membership in a community organization via different non-government organizations. After taking into account livestock and farming; 100 percent respondents told that they possessed these assets as their primary financial capital because the area was rural in nature and the targeted respondents were farmers by occupation. Agriculture loans were also found to be a source of income for a majority (61.66%) of the respondents. The findings of this study will be helpful for policy makers to develop policies that correspond to the realities of farming in the region.

Keywords: Farm, Layyah-Punjab, Management capacity, Small farmers, Sustainable livelihoods

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INTRODUCTION

Universally, more people are involved in farming than in any other industry and a vast majority of the world poor is reliant on agribusiness to earn their livelihood (Food and Agriculture Organization [FAO], 2004). The rural poor are unable to sustain themselves from agricultural earnings especially when they cannot access financial tools that would help them succeed. The utilization of accessible assets creates conflicts among farm individuals and the poor are more likely to be vulnerable to being deprived of these assets (FAO, 2000; Wisner et al., 2003). Among 1.3 billion individuals on the earth, about one third lives beneath the poverty line. It has been estimated that 678 million poor people of the world who keep domesticated animals in the developing nations account for 66 percent of the rural poor and they are considered as the most significant part of this huge population (International Livestock Research Institute [ILRI], 2000). The domesticated animals in the developing nations contribute more than 33 percent to the farming total national output and give a noteworthy food security to about 1 billion poor people in underdeveloped countries (Swanepoel & Moyo, 2010). The availability of different trainings helps the rural farmers to stop repeating failing practices,

and change their patterns of livestock husbandry over time (Elis, 2000). In the developing nations, the domesticated animals are kept in the house and plain land for sustainability (Herrero et al., 2010).

The rural household units in Pakistan are tied to farming as an occupation for livelihood and education of their children. Agriculture produces 20.9 percent of the national wage and uses 43.4 percent of total workforce of the nation. Moreover, this section of the economy provides raw material to local agro-based commercial schemes for example sugar, oil, calfskin etc. In Pakistan nearly 66 percent of the population is poor and is living in rural areas; likewise 80 percent of the world poor is spending their lives in rural areas (Ishaq & Memon, 2016). Considering the wages, it can be easily concluded that the household earnings are lower in rural areas than that of urban areas. There is 34 percent poverty ratio in rural areas whereas in urban areas it is 19.1 percent. Lack of access to the basic necessities is a serious issue for the rural people. Agriculture has long been a major contributor to Pakistan's economy and to sustain rural livelihoods (Buhtoo & Bazmi, 2007).

Punjab is one of the fertile provinces of Pakistan but poverty is prevailing especially in its rural areas. The main reasons for poverty in these areas include the lack of planning as well as implementation of policies. This is because the basic necessities of life like food, shelter, health and entertainment are not provided by the government. People have to rely on their own resources to acquire these things. The spending on these things means there will be no savings and this ultimately results in poverty because the spending is going on the nonproductive way. Layyah is one of the districts of Punjab where land is fertile and the major crops grown by the farmers are wheat, sugarcane, cotton, maize, vegetables and fruits. Due to prevailing poverty in rural areas of Layyah, the majority of the poor depend upon agriculture for earning their livelihood. Politics, economics, and social and cultural norms are the basic factors that affect livelihood. In addition to these factors, one has to determine the day-to-day activities of households. In rural areas of district Layyah, basic daily activity revolves around the farm activities as the poor farmers depend on small scale farming activities such as cultivation of crops, fodder, livestock, sugarcane, maize, cotton, rice, orchard and forests. The political instability and unequal distribution of resources has adverse effect on the income of a rural household. The main sources of political instability in the area are the persons called landlords locally they are known as "Zameen Dar" or "Malik" or "Mulla". These are those people who enjoy the powers within the local community and influence the decision of masses. Due to their own benefits, they influence others for the vote casting and choosing of their representatives. Moreover, ever-changing government creates the disturbance in the policies of the previous one. That's why; this is contributing factor towards political instability for a person who is unable to accommodate in a political elite class. The study area is ignored by this class in terms of basic necessities and infrastructure development.

The present study was conducted in district Layyah, Punjab Pakistan to investigate the sustainability of rural livelihoods among small farmers. We initially carried out this research study in the targeted area to investigate the strategies employed by small farmers to try to increase income, as well as the farm management capacities of small farmers for earning their livelihood. It is our hope that policy makers will use the findings of our study to develop community-centered rural development programs.

METHODOLOGY

Profile of research locale

For the purpose of investigation district Layyah was selected as a population center. District Layyah is located in the south of Punjab with three sub districts i.e. Layyah, Choubara and Karor Lal Esan. Small scale farms and day-labour are the standards for wage earning in the area under study. The area has been selected purposively for the study for the following reasons:

- (1) Government of Pakistan declared it the poorest district after 1998 census.
- (2) Multiple livelihood activities are being carried out by the local people of the district.
- (3) Selected area is rural in nature.
- (4) People have had the resources for the livelihood but in scattered form due to low awareness level.

Research design

The study was quantitative in nature to collect data from the respondents of three union councils of Layyah which includes Jaman Shah, Samtia and Choubara. The classifications consisted of small farms, livelihood sources and income of the participants. For the purpose of investigation, we used questionnaires as a tool for data collection. The investigator visited the targeted audience by himself and the data was collected in face to face setting for the purpose of on spot recording of the expressions of respondents for the avoidance of errors. A majority of male and female participants were relying on the small farms for their livelihood and earning.

Sampling technique

Due to the limitation of time and resources, sampling was done by the investigator. After going through different resources which were available with the investigator; the investigator decided a sample of 300 respondents. These respondents were engaged in different levels of small farm activities for their livelihood. While we recognized that including female respondents' views in the study would have been very beneficial but the realities of the local cultural and social norms dictated that we interviewed only the heads of households who were always males. We were unable to interview women to allow for meaningful separation of data according to sex.

A random sampling technique was employed for the selection of 300 respondents from three union councils of district Layyah. A list of all households was taken from the district election office and this voting list of respective union councils served as a sampling frame (Table 1). Accessing all respondents was very difficult for the investigator; the base line survey technique in the present study was used because the researcher had to focus on many small scale farmers. Discussion with service providers was also conducted. For this a total sample of N=35 was drawn and officials selected from veterinary and agricultural departments. Local representatives of banks providing loans to farmers for agriculture and non-governmental organization specialists were included for the purpose of knowing that what they think about the local farmers and their community and also what they think about the services of the organizations from the organizational perspective.

Table 1 Sampling distribution of targeted respondents

Union councils	Total population	Households	Sample
Jaman Shah	23,590	3370	100
Samtia	30,626	4375	100
Choubara	20,845	2978	100
Total	75061	10723	300

Pilot survey

For the present study a questionnaire was developed and tested to insure the workability of the questionnaire and whether it addressed the ground realities or not. Twenty small farmers were selected for the study. After considering the views of respondents and social settings, a few questions were revised to address those issues.

Data analysis

The questionnaire was used as a tool for data collection. Numbers and symbols were given to each item for the categorization of variables used in the study. Data was analyzed through SPSS by applying statistical techniques and procedures.

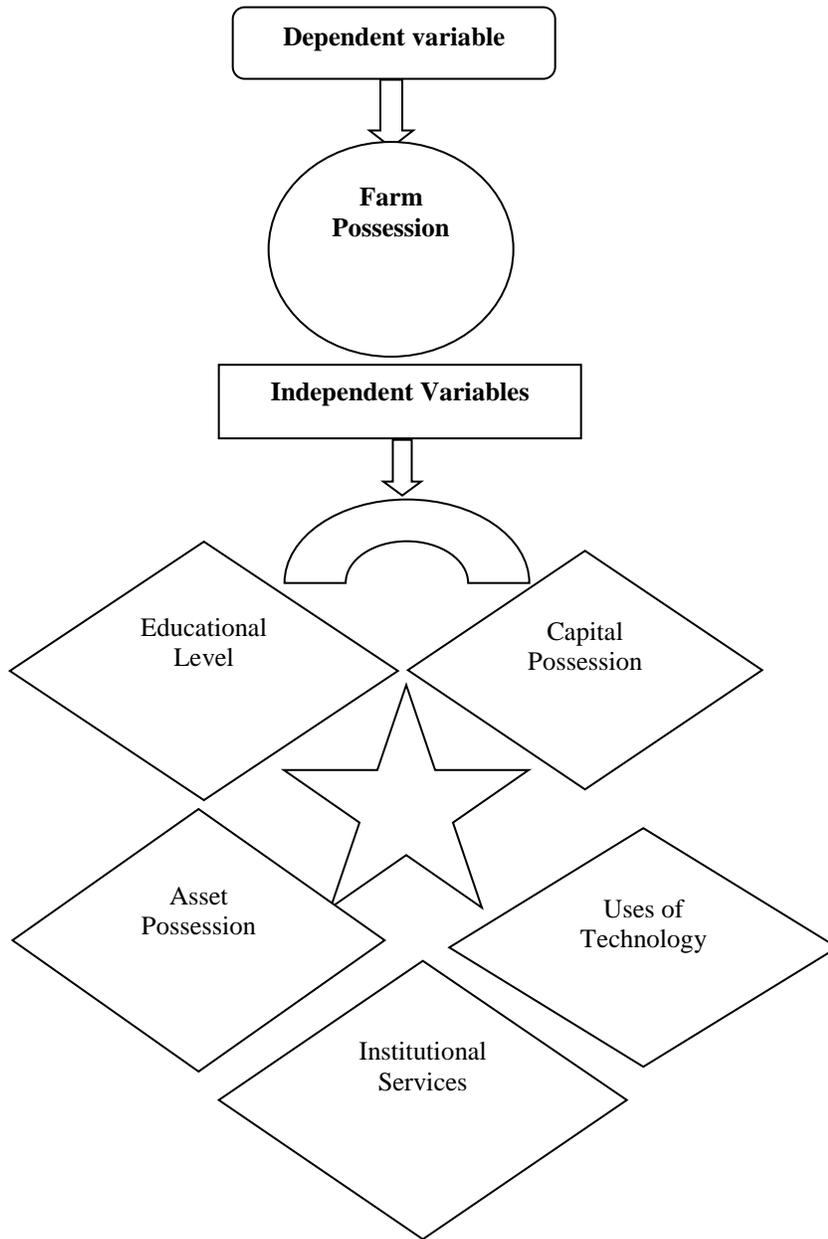


Fig. 1 Conceptual model

In conceptual model the variables used during investigation was listed categorically (Fig. 1). The investigation consisted of one dependent variable and five independent variables. The dependent variable was farm possession. The reason behind the respective dependent variable was to know the farm management capacity of the farmers. To find this the investigator targeted the respondents of the rural areas of district Layyah who had farms. Major independent variables used in this investigation having high impact on farm management were education level of household head, capital possession, asset possession, use of the latest technology and contribution of institutional services. Education level for farming was treated as the independent variable because this is the education which enables a farmer to know how to get the best out of available resources by managing them properly for the livelihood sustainability. Secondly in this study, the capital possession was further categorized into remittances, wages, pension, livestock, and farming and agriculture loans. The third variable used in this investigation was asset possession. Asset possession was

measured in section B of the questionnaire. Asset possession was further measured by categorizing it into natural and physical capital and human and social capital. Natural and physical capital was broken down further into land, tube well, forest and own house. Human and social capital was further categorized into technical and vocational skill, capacity to work, active membership of community organization and labor network for measuring the variable.

Use of the latest technology in section C of questionnaire was measured through questions like steps taken to enhance income, use of the latest technology, and use of developed breeds, money borrowing and migration. Finally, institutional services were included to know the impact of institutional services on the farm management and also to see if they contributed towards livelihood earning. This variable was measured in section D of the questionnaire through services of local agriculture extension officer and services from veterinary doctor and also the contribution of credit facilities.

RESULTS

Selected characteristics of the respondents

Data given in table 2 indicates the selected characteristics of the respondents. During this study, age of the respondents was divided into 4 parts. About 10% of the respondents were 21 to 30 years old. 25% respondents were 31 to 40 years age. A majority of the respondents (35.7%) were 41 to 50 years old. One fifth of the respondents (20%) were aged 51-60 years, while a minimum number of respondents were in the age group of above 60 years. Marital status of the respondents was also studied that shows that more than half of the respondents (about 66%) were married followed by 19% respondents who were widowed.

Table 2 provides information about the literacy level of heads of households. Results show that 54.33 percent of the respondents who were literate could write their names only, while 45.7 percent of the respondents were illiterate. This table also indicates the level of education of literate respondents. There were five categories for this question. Out of these five categories, the first category represented the primary level of education of respondents; results showed that 30.06 percent respondents were represented in this category. The second category was the eighth standard of education and 39.26 percent respondents were represented in this category. The third category was secondary level of education and 20.24 percent respondents were represented in this section, while 6.13 percent and 4.29 percent respondents were in twelve years of education and fourteen years of education categories, respectively. The size of households has also been presented in table 2. Results indicate that a majority (46 percent) had household sizes of 4 to 6 members. The family size of 25 percent of the respondents consisted of 7 to 9 members. The family size of 1.7 percent of the respondents was over 13 members. Results indicate that the main occupation of 55 percent of the respondents was agriculture followed by 25 percent respondents whose main occupation was that of tenant. This may be due to the reason that the study area is rural in nature and most of the people are related to cultivation of crops and growing of animals. Although a number of occupations are available in these areas besides farming such as dairy, animal rearing, carpenters, electricians, handicrafts, daily wage workers, selling and purchasing of crops but these are in minute quantity.

Farm activities of the respondents

Data in table 3 indicates the percentage distribution of respondents regarding their various farm activities. Results indicate that 68.33 percent of respondents had their own land, while 31.66 percent of respondents did not have their own land. The residents of this rural area prefer to have land for earning livelihood by growing crops because this is their only opportunity to earn livelihood. The people who did not own land were working on the land of others as a tenant or on lease. Results indicate that 98 percent of respondents had a farm. The purpose of investigation was to target the population who had farm to perform various farming activities. The respondents who owned land were asked what percentage of their land was actually in use. Then the highest number of respondents (294) told that they were cultivating all of their land for various agricultural operations.

Table 2 Selected characteristics of the respondents

Selected characteristics	Frequency	Percentage
Age		
21-30	30	10.00
31-40	75	25.00
41-50	107	35.66
51-60	60	20.00
60 and above	28	9.33
Marital status		
Unmarried	30	10.00
Married	198	66.00
Widowed	57	19.00
Divorced	15	5.00
Literacy status		
Literate	163	54.33
Illiterate	137	45.66
Education level of literate respondents		
Primary	49	30.06
Eighth standard	64	39.26
Matric	33	20.24
Twelve years of education	10	6.13
Fourteen years of education	7	4.29
Size of households		
1-3	52	17.33
4-6	138	46.00
7-9	75	25.00
10-12	30	10.00
Over 13	5	1.66
Occupation of household head		
Agriculture	165	55.00
Daily wages worker	45	15.00
Tenant	75	25.00
Government job	8	2.66
Private job	7	2.33

Table 3 Distribution of the respondents regarding their farms activities

Selected characteristics	Frequency	Percentage
Respondents having their own land		
Yes	205	68.33
No	95	31.66
Respondents cultivating all the land they owned		
Yes	294	98.00
No	6	2.00
Respondents regarding the duration of farming		
1-5 years	45	15.00
6-10 years	28	9.33
11-15 years	125	41.66
16-20 years	73	24.33
Above 20 years	29	9.66
Respondents' status for performing farm activities		
Performing full time farm activities	281	93.66
Performing part time farm activities	19	6.33
Respondents with respect to availing electricity		
Yes	261	87.00
No	39	13.00
Respondents with respect to availing canal water		
Yes	223	74.33
No	77	25.66
Respondents with respect to the area (cultivated)		
Up to 1 hectare	23	7.66
1.1 – 2.0 hectares	113	37.66
2.1 – 3.0 hectares	77	25.66
3.1 – 4.0 hectares	53	17.66
4.1 – 5.0 hectares	34	11.33
Respondents with respect to area (uncultivated)		
Up to 1 hectare	41	93.18
1.1 – 2.0 hectares	0	0.00
2.1 – 3.0 hectares	3	6.81
3.1 – 4.0 hectares	0	0.00
4.1 – 5.0 hectares	0	0.00

Table 4 Description of the respondents with respect to their possession of household assets

Type of capital	Frequency	Percentage
Natural and physical capital (respondents saying "Yes")		
Land	205	68.33
Tube well for irrigation	233	77.66
Forest	33	11.00
Own home	261	87.00
Natural and physical capital (respondents saying "No")		
Land	95	31.66
Tube well for irrigation	67	22.33
Forest	267	89.00
Own home	39	13.00
Human and social capital (respondents saying "Yes")		
Technical and vocational skills	161	53.66
Capacity to work	293	97.66
Active membership of community organization	195	65.00
Labor network	55	18.33
Human and social capital (respondents saying "No")		
Technical and vocational skills	139	46.33
Capacity to work	7	2.33
Active membership of community organization	105	35.00
Labor network	245	81.66
Financial capital (respondents saying "Yes")		
Remittances	5	1.66
Wages	6	2.00
Pension	3	1.00
Livestock	300	100
Farming	300	100
Agricultural loan	185	61.66
Financial capital (respondents saying "No")		
Remittances	295	98.33
Wages	294	98.00
Pension	297	99.00
Livestock	0	0.00
Farming	0	0.00
Agricultural loan	115	38.33

Table 5 Contribution of on-farm activities in the annual income generation for sustainable rural livelihoods

On-farm activities	Income generation from various assets (Pakistani Rupees)	Total income (Pakistani Rupees)
Crops	7,80,000	
Livestock	43,000	
Farm machinery	15,000	
Tube wells	13,000	12,35,000
Orchard trees	1,50,000	
Selling vegetables	78,000	
Fodder cultivation	27,000	
Poultry	1,29,000	

Data in table 3 also indicates the percentage distribution of respondents with respect to how long have they been farming. It is clear from the table that a majority of the respondents (41.66%) were farming on the current farm for a period of 11-15 years, while 9.66 percent respondents were farming for more than 20 years. Results reveal that 93.66 percent respondents were full time farmers and dedicated to farming activities, while 6.33 percent respondents were part time farmers. They are placed in the category of part time because a few of them were engaged in government or private jobs not directly involved with farming activities. Data in table 3 indicates the percentage distribution of respondents with respect to access to electricity. During this study, it was found that 87% respondents were accessing the public electricity grid for farming activities, while 13% respondents were not using the electricity facility. The reason behind not using the electricity facility was that the farmers had their own arrangement and a few responded that electricity was not available in their village. This table also indicates that 74.33 percent of respondents were using water from the canal system for irrigation, while about one fourth of the respondents (25.7%) were not using this facility because they had their own arrangement for water like tube wells, water pumps and peter engines for irrigation. As far as the cultivated area was concerned, a majority of the respondents (37.66%) were holding 1.1-2 ha land area and performing cultivation activities. About 93.18 percent respondents were holding up to 1 ha land for other purposes. On investigation respondents told the investigator that they built a house which they called "chopaal" or "dera" for the guests and some respondents told that they built stores for vegetables and crops which were rented to other farmers. Some whose land was beside the road had shops that they rented out.

Household assets of the respondents

Data regarding natural and physical capital has been shown in table 4 that demonstrates that more than two thirds of the respondents (68.33%) had their own land, while 31.66 percent respondents did not have their own land. Therefore, the people who did not own their land were working on the land of others as a tenant or on lease. During this study, it was found that 77.66 percent respondents had a tube well/ motor for irrigating their land, while 22.33 percent respondents did not have this asset. Those respondents who did not have this irrigating facility, borrowed water from a nearby tube-well on an hourly basis or take water from nearby canals through watercourses. When asked about forestry, a vast majority of respondents (89%) replied that they did not grow tree plantations but they grew trees alongside the watercourse in small quantities which they sold out when these trees grew up. A small number of respondents (11%) reported that they grew trees such as *Dalbergia sisso* (Sheesham wood) and eucalyptus locally known as sufaida, and this is a source of livelihood for their households. When asked about home-ownership, about 87 percent respondents told that they had their own homes, while 13% respondents did not own their homes. On investigation, the respondents said that they lived in the rented homes or living in houses on their owner's land in exchange for cultivating it.

Technical and vocational skill, capacity to work, active membership of community organization and labor network were categorized as part of the study. Results indicated that 53.66 percent respondents possessed sufficient technical and vocational skills to tackle the issues of keeping machinery working in the farm i.e. tube-well, tractor and electric equipment etc., while 46.33 percent of respondents did not have capacity to make repairs and maintain equipment. They were dependent on the skilled worker and laborers to do this work for them. On the question of capacity to work, 97.66 percent respondents had capacity to work, while 2.33 percent respondents did not have capacity to work because of their disability but their son or daily wage workers locally called as "Dihari daar" worked on the farm. As far as active membership of community organization is concerned, about two thirds (65%) respondents had active membership of community development through non-government organization (NGO's), while 35% respondents were not a member of any community organization. About 18.33% respondents had their labor network for working on different farms on a daily wage basis, while 81.66 percent respondents worked on their farm by themselves.

Data in table 4 also indicates the percentage distribution of respondents regarding their information on financial capital. On providing the information on financial capital, 1.66 percent respondents said that they earned through remittances, while 98.33 percent respondents had nobody outside the country and were unable to get the remittances. Only 2 percent respondents earned wages because they worked in any government or private office, while 98 percent respondents did not earn any non-agricultural wages. A small number of respondents (1%) was earning through pension, while 99 percent respondents did not earn

through pension. Agricultural loans were also found to be a source of income for the majority (61.66%) of respondents, while 38.33 percent of respondents reported that they did not access this funding source and instead arranged loans by private means i.e. from a local trader locally known as "Aarhti" or from friends or from relatives. They preferred this less formal method to meet their day-to-day expenses of farming.

Sustainable rural livelihoods from on-farm activities

Table 5 indicates the estimated contribution of different on-farm activities to the annual income generation for sustainable rural livelihoods. Results indicate that the farmers of this area were earning a total average of 12,35,000 Pakistani rupees through different farm activities (Table 5). It was evaluated that different crops (wheat, sugarcane, maize and cotton) were contributing about Rs. 7, 80,000 in income generating activities. Livestock was contributing about Rs. 43,000. Few farmers were rearing animals for domestic-purposes but the most of the farmers were using them to increase income. Farm machinery was contributing Rs. 15,000. Orchard trees including orange, mango, lemon and date palm were contributing about Rs. 1,50,000 in total earnings. Vegetables were contributing about Rs. 78,000 in the annual earning. Different vegetables were grown by the farmers for sale in the market. Farmers grew fodder for their own use as well as for sale (Table 5). Poultry was also a fruitful business for the local farmers in district Layyah. Although poultry was being raised on a small scale basis, it was contributing about Rs. 1,29,000 in the total farmer's annual income.

Raising of crops and rearing of livestock animals

During this study it was noticed that 100 percent respondents were raising crops. As the targeted respondents were farmers involved in the farming activities, the analysis of data showed that among 300 respondents, 245 were raising wheat. Further analysis showed that out of these respondents who were raising wheat; a majority of respondents (54.3%) were growing this crop on 1.1-2 ha of land. Secondly, out of 300 respondents only 139 were engaged in growing of cotton. This was determined to be due to local variations in soil fertility and difficulties associated with cultivating hard soils. More than half of the respondents (56.83%) were growing cotton on 1.1-2 ha area. Fruit orchards were grown in two union councils namely Samtia and Jaman Shah but due to lack of soil hardness in Choubara, fruit orchards could not be grown. Therefore, only 59 respondents out of 300 respondents carried out this activity. Among respondents who were growing fruit orchards; 89.83 percent were growing them on 1.1-2 ha land, while 10.16 percent respondents engaged in growing orchards on 2.1-3 ha land. Vegetables were grown by all the respondents. Among these respondents, a majority of respondents (65%) were performing this activity on up to 1 ha land area, 35 percent farmers were carried on this activity on 2.1-3 ha land area. Sugarcane is an essential crop for the farmers to grow because income from the sugarcane is very common in the area, while in Choubara, this crop cannot be cultivated due to lack of soil hardness and the remedy is to grow "Beet" in these areas. Therefore, out of 300 targeted respondents, only 161 respondents were carrying out this activity. So, 59.62 percent respondents were growing sugarcane on 2.1-3 ha land area followed by 28.57 percent respondents who were growing sugarcane on 1.1-2 ha land area. The crop gram (chick pea) was only grown by 100 respondents out of 300 respondents because this crop requires specific area and soil to grow. This crop can be cultivated on the land where land is desert in nature. About 56 percent respondents were growing gram on 3.1-4 ha land area followed by 35 percent respondents who were growing gram on 2.1-3 ha land area (Table 6).

Data about rearing of livestock animals has been presented in table 6 which reveals that 100 percent respondents were rearing animals. Farmers had animals for income generation but few of them were rearing the animals for domestic purposes. Farmers told the investigator that rearing of animals was an essential activity in rural areas. Presented data in table 6 indicates the percentage distribution of respondents regarding rearing of livestock animals, and the type of animals they had. Results indicate that 113 respondents kept buffaloes. Out of 170 respondents, 90.58 percent respondents had local breeds, while 9.41 percent respondents had improved breeds. Further investigation clarified that improved breeds of cows required special environment and cost. Small farmers were unable to afford the added expense for improved breeds. Regarding goats and sheep, it was found that all 300 respondents kept these animals. Results also showed that 100 percent respondents had local breeds of camels (Table 6). In response to the question regarding donkeys, 130 respondents said that they had donkeys and the analysis showed that 17.69 percent

respondents had local breeds, while 82.3 percent had an improved breed of donkey that is locally known as “*Khachar*” (a cross breed of donkey and horse). Further investigation showed that donkeys were used by the respondents for domestic work as well as for earning purpose providing services for the locally transportation of goods.

Enhancement of income for sustainable livelihoods of the respondents

Table 7 denotes the percentage distribution of respondents regarding steps taken to enhance their income for sustainable livelihoods. Results indicate that 100 percent of respondents told the investigator that they were taking steps to enhance their income at all levels. During this study, it was found that 80.33 percent of respondents relied on the use of the latest technology for agriculture and livestock, while 19.66 percent of respondents told that they did not use the latest technology but relied on old methods and explained the reason that they could not afford the price of developed technology. Results indicate that 94.33 percent respondents were shifting themselves from the use of conventional breeds to the latest developed breeds, while 5.66 percent respondents were not using developed breeds due to having a small number of livestock animals and they had the livestock on part time basis for domestic purposes only. Data regarding percentage distribution of respondents about the use of a bull for breeding of cattle has been shown in table 6 that shows that a majority of the respondents (45%) used any available bull for breeding the cattle followed by the respondents (30%) that used a bull from neighbours for breeding of cattle. Only 10 percent of respondents used artificial insemination for breeding of cattle. This was because of non-familiarity with the advantages of artificial insemination.

Data regarding borrowing of money for farm activity has also been presented in table 7 that indicates that 100 percent of respondents borrowed money for their farm activities. As far as the source for borrowing money is concerned, about 63.33% respondents were borrowing money for their farm activity from a wholesale dealer followed by the respondents (18.33%) who were borrowing money from agriculture banks as agriculture development loans. Data about percentage distribution of respondents regarding access to local agriculture officers for extension services indicates that 29.66 percent respondents had access to a local agriculture officer for extension services, while 70.33 percent respondents had no access to local agriculture officers. As far as using the credit facilities was concerned, 100 percent of respondents were aware of the credit facilities available in the area but only 18.33% of the respondents were using them. Data in table 7 indicates the percentage distribution of respondents regarding skills training. Results indicate that 74.33 percent respondents got trainings to improve their skills, while 25.66 percent respondents did not take any training. Respondents also said that non-governmental organizations have more opportunities regarding trainings than that of governmental institutions. The respondents who did not make use of trainings indicated that due to their day to day activities they were not able to attend any training. They also revealed that the duration of trainings was very long, and daily compensation rate was very low as compared to what they earned while working in the field.

Table 6 Description of the respondents with respect to raising of crops and rearing of livestock animals

Activities	Status of crops and livestock					
	Land occupied (hectare)					
Raising of crops	Up to 1	1.1 – 2.0	2.1 – 3.0	3.1 – 4.0	4.1 – 5.0	Total
Wheat	23 (9.4%)	133 (54.3%)	43 (17.6%)	31 (12.7%)	15 (6%)	245 (100%)
Cotton	34 (24.5%)	79 (56.83%)	26 (18.7%)	-	-	139 (100%)
Fruit orchard	-	53 (89.83%)	6 (10.16%)	-	-	59 (100%)
Vegetables	195 (65%)	105 (35%)	-	-	-	300 (100%)
Sugarcane	-	46 (28.57%)	96 (59.62%)	8 (4.96%)	11 (6.83%)	161 (100%)
Gram	-	-	35 (35%)	56 (56%)	9 (9%)	100 (100%)
Rearing of animals	Local breed		Improved breed		Total	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Buffalo	113	100	-	-	113	100
Cow	154	90.58	16	9.41	170	100
Goats and sheep					300	100
Camel	11	100	-	-	11	100
Donkey	23	17.69	107	82.3	130	100

Table 7 Description of the respondents regarding the steps taken to enhance their income for sustainable livelihoods

Characteristics	Frequency	Percentage
Steps taken to enhance their income		
Yes	300	100
Use of latest technology for crops and livestock		
Yes	241	80.33
No	59	19.66
Conventional to latest developed breeds		
Yes	283	94.33
No	17	5.66
Bull used for breeding of cattle		
Own	45	15
From neighbours	90	30
Any available	135	45
Artificial insemination	30	10
Source of borrowing money for farm activity		
Agriculture banks	55	18.33
NGO's	38	12.66
Family and friends	17	5.66
Credit form wholesale dealer	190	63.33
Access to local agriculture officer for extension services		
Yes	89	29.66
No	211	70.33
Availing credit facility		
Yes	55	18.33
No	245	81.66
Getting trainings to enhance the skills		
Yes	223	74.33
No	77	25.66

DISCUSSION

Poverty reduction, rural development and sustainable rural livelihood are interlinked with each other and have remained as major aims of various democratic and military governments in Pakistan. The rural household units in Pakistan have been related to farming as a major occupation to sustain the rural livelihoods for a long period of time (Buhtoo & Bazmi, 2007). The present study was conducted to understand how the farm management practices of small farmers contribute to their sustainable livelihoods. It also describes the focus on the components and identification of livelihood sources by the small farmers with effective ways to improve these sources in district Layyah. Similar to our findings, Chaudhry (2009) examined the factors influencing rural poverty using Asian Development Bank data as essential source information about southern Punjab, Pakistan. Findings of the study demonstrated that rural poverty could be lessened by limiting the family unit size, reliance proportion, enhancing training, more female work power cooperation, high family support rate and enhancing resources. The study recommended that administration should give careful consideration for fundamental framework and market access facilities along with other socio-economic and demographic elements to alleviate rural poverty in remote regions of Pakistan. Jamali et al. (2011) investigated livelihoods in rural Sindh and described that the public sector organization had a significant contributing role through different interventions for the alleviation of poverty but the basic necessities like food and shelter were ignored and dealt as a corner stone having negatively affected on needy and poor people. Mobilizing people socially was one of the important factors that was carried out by the Sindh agricultural and forestry workers with different interventions of development. The most important aspect of this NGO was that they addressed and reached the people at ground level i.e. poor who were targeted but lack of budget and other technical aspects provoked the problems. Hence, the new technologies must have to be introduced by the NGOs for the improvement of crop production and avoidance of the fund provided by the government. This led to the arrangement of funds from the individuals who were rich.

Our findings coincided with the earlier proposition by Bahadur (2009) who investigated a relationship between socio-economic and spatial methodology for assessing rural production resources and the strategies of development in Asia's mountain region. An approach of farming system was used to know the livelihood and practices on farm in rural regions. A household survey was used for the collection of data on socio-economic conditions by selecting household farm randomly. This study explained that expansion in agriculture was unavoidable for the development at high level. For obtaining the development at all levels, 36 percent, 18 percent and 6 percent forests were converted into agricultural activities. Livestock and maize production was dominated in the villages where there was no arrangement of irrigation. Inorganic farming was common in villages which were below the hills. Difference in farming practices was due to the quality of land, availability of resources and environmental interventions. Nesamvuni et al. (2010) argued that the poor of rural areas always strived to enhance their livelihood and also faced difficulty towards food security. The major contribution towards livelihood earning in the rural areas was livestock for domestic needs and livelihood activities. In rural areas, gender was also the matter of concern as the women always exploited and underestimated in terms of contribution towards household income. For the development of rural areas, there was a need towards the institutional development regarding the women contribution acknowledgement and empowerment.

At policy and design level, consideration needs to be taken to identify critical components in a systems context to ensure sustainability of future projects. Funding of research projects is planned for shorter time periods than funding for long-term development projects. Such challenges were explored in relation to policy development that looks into creating a balance between livestock production and the consequence of its negative impact on the environment. The measurements of the negative impacts of livestock were confounded by the lack of cross-country indicators that were comparable across a range of socio-economic situations. Studies to establish appropriate livestock production systems should be a priority in developing countries to mitigate the negative impacts of greenhouse gases on the environment. Overall, the impact of livestock on human health and nutrition has been ignored, yet it offers opportunities for adding value to livestock interventions. Similarly, Rehman et al. (2008) explained that 15.8 percent households which were poor relied on the source of income other than agriculture. This group of researchers reported this after carrying the study on livelihood strategies and the factors affecting livelihood strategies in district Abbottabad, NWFP, Pakistan. The secondary income included the dependency on private and governmental services and other sources like remittances etc. Hence the improvement in the livelihood was only possible to

diversify the off-farm activities rather on-farm. Credit on easy term played a vital role to overcome the poverty in the study area.

CONCLUSION

The present study concluded that the farmers while employing various strategies for their livelihood neglected the new and developed techniques for farming and used only inherited techniques. It was further concluded that inputs (cost) by the farmers were high in terms of their social capital, financial capital and human capital. But because of the low awareness level, livelihood improvement and management were not in accordance with the resources employed. In case of farm management capacity of small farmer for the sustainability of livelihood, low education level and non-availability of resources for acquiring the capacity should be enhanced for the maximization of output and to sustain livelihood for the family.

RECOMMENDATIONS

1. As the land area of the district Layyah, Punjab Pakistan has fertile soil and broad range of land utilization for the productivity and earning of livelihood. Therefore, it has a scope for the farmers to maximize their production by different awareness programs and to enhance their skills towards utilization of the improved machinery and methods of cultivation and rearing.
2. Dairy farm development is one of the factors that can contribute significantly for the enhancement of income. This could be done with the help of local support organizations and the government institutions to link the farmers with the retailers of the area and secondly facilitate farmers by providing the improved breed of livestock that would assist the farmers in increasing production and household income.
3. Farmer income is dependent on the factors available for the production. It implies that more the human potential development, the more it will lead to increase the production for sustainable livelihood. Therefore, education and trainings should be provided in the respective fields with a special focus to build the production capacity of farmers by adopting the latest technology.

Author Contribution Statement Faria Ibad Mirza generated the idea and supervised the research. Rizwan Abbas conducted the research and wrote the manuscript. Anila Afzal analyzed the data and edited the manuscript.

Conflict of Interest The authors declare that they have no conflict of interest.

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