Scoping Study on Private Sector Resilience to Climate Change and Disaster in Pakistan

Scoping Study on Private Sector Resilience to Disaster and Climate Change

Final Report

Commissioned by: Oxfam-Novib Pakistan

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Value Resources (Pvt.) Limited

LIST OF ABBREVIATIONS

APRACA	Asia-Pacific Rural and Agriculture Credit Association
CCA	Climate Change Awareness
CSR	Corporate Social Responsibility
DRR	Disaster Risk Reduction
DSAT	Decision Support System for Agro-technology Transfer
FAO	Food and Agriculture Organization of United Nations
FDO	Farmers Development Organization
FY	Fiscal Year
GDP	Gross Domestic Product
GHG	Green House Gases
GCISC	Global Change Impact Studies Centre
GOP	Government of Pakistan
HBL	Habib Bank Limited
IPCC	Inter-Governmental Penal for Climate Change
Mha	Million hectares
MOF	Ministry of Finance
NGO	Non-Governmental Organization
PKT	Pakistan Kissan Trust
RSP	Rural Support Program
SBP	State Bank of Pakistan
UNFCCC	United Nations Framework Convention on Climate Change
ZTBL	Zarai Taraqiati Bank Limited

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EXECUTIVE SUMMARY

Private sector's engagement in climate change adaptation and resilience building in agriculture is a relatively unexplored and under researched area in Pakistan's context. Oxfam in Asia has identified private sector's engagement in this context as an area of interest. The present study is an attempt to understand the current situation, key drivers and impediments in leveraging private sector engagement in building climate-resilience in agriculture sector and thereby securing climate-resilient development in the country. The scoping study was designed as a mix method research. The primary research was complemented by a detailed review of available literature and evidences from similar research studies.

The research findings indicate that the small scale producers at the bottom rung of the selected value chains are currently experiencing the greatest risks from natural disasters and climate change. Their vulnerability is compounded by lack of awareness, adaptability deficit, and lack of external support, both technical and financial for building resilience.

Generally, the higher end of the value chain representing small to medium size private enterprises, demonstrated a low level of awareness and concern with the implications of climate change and the climatic hazards. The level of knowledge and responsiveness to the issue of climate change was noted to be significantly different in case of large, national level private sector companies and Multi-national corporations – MNCs. The larger corporate companies have environment and sustainability integrated into their corporate strategy. Climate change concerns, therefore, find special mention and response strategies as part of their sustainability actions.

Assessing the current practices in handling the impact of climate risks and extreme events a the bottom rung of identified value chains, the current situation appears to be marked by reactive adaptation measures which growers have adopted based on experiential learning.

Risk management practices at various levels of the value chains appeared to be minimal. No institutional support for risk management in the case of extreme weather events was noted to be present at the growers end. Going up the value chain, it was noted that the local top end value chain

actors comprising of small and medium size companies did not have an institutional response mechanism to handle impact of extreme weather events and climate risks. The lack of institutional response appears to stem from limited knowledge of climate risks and the ensuing capacity to incorporate it in business planning and invest in long term coping strategies.

Examining the pattern in business strategies for handling impact of hazards and climate extreme events on agri-business, it is noted that currently no policy or plan is in place at the institutional or strategic level. In general, climate change is perceived to be either an irrelevance or at best an extension of Corporate Social Responsibility (CSR). The small and medium business entities seemed to have a philanthropic approach towards disasters and extreme events. Most reported to provide emergency aid, food and nonfood items, to the disaster affected communities in Punjab and Sindh. In contrast, most of the large national companies and MNCs approach climate risks and sustainability issues from an institutional perspective.

Examining the financial sector, the findings note that currently climate-relevant lending to the agricultural sector is very limited with few climate risks/ hazards specific products and financial services. On the policy level, several regulations by State Bank of Pakistan govern the climate risk/ hazard event specific schemes/ services for farmers. However, the net benefit to small holders is not discernable because of both demand and supply side deficits. Limited awareness of and access to financial services for the small holders depresses the demand factor. On the supply side, financial institutions, particularly banks have yet to tap the base of pyramid market with customized products especially in the context of climate risks. A lack of agricultural insurance coverage mechanisms also appears to contribute to banks' skepticism over the safety of investments made in the sector.

The findings of the scoping study clearly indicate a gap in service provision and engagement between various public sector research organizations and extension departments and the grass roots level farmer communities. The engagement and particularly the impact and use of research carried out by the national and provincial level research institutions was not discernable in the farmer communities visited during the course of the study.

1. INTRODUCTION

1.1 Background

Climate change has raised serious concerns for the developing world posing severe social, environmental and economic challenges. Climate change has threatened agricultural systems and food security in world and particularly in African and South Asian countries and may increase food insecurity due to decline in food production especially in arid environments.

According to a report of The International Food Policy Research Institute[1], South Asia will be the most severely impacted by climate change. By 2050, it could lose 50% of its wheat productivity. A recent ranking by Maplecroft places Pakistan at 28th amongst those that will be most severely affected. Since 22 of those countries are in Africa, Pakistan is ranked amongst the top ten outside Africa.

Pakistan's status as an agro-based economy makes it extremely vulnerable to the effects of climate change. The Global Climate Risk Index 1993-2012 has ranked Pakistan as the 12th most affected by extreme weather events.

Pakistan is at risk of various types of natural disasters of which cyclones, flooding, landslides, earth-quakes and drought are the most common. The floods of 1950, 1988, 1992 and 1998 resulted in a large number of deaths and severe loss of property, while the July 2010 floods have been described as the worst in the last eighty years and led to nearly 20 million people being significantly affected with an estimated over 1,800 deaths. The country's seismic risk vulnerability was proven in October 2005 when a major earthquake measuring 7.6 on the Richter scale hit nine districts in Khyber Pakhtunkhwa and Azad Jammu and Kashmir (AJK), killing over 73,000 people and damaging/destroying about 450,000 houses.[2]

The agriculture sector is the single largest sector of Pakistan's economy. It accounts for 45% of the labor force, 21% of GDP and 70% of total export earnings. Agriculture in Pakistan is greatly affected by short-term climate variability and could be significantly impacted by long-term climate change. As the

[1] International Food Policy Research Institute (IFPRI) report on Agriculture Resilience.
[2] http://siteresources.worldbank.org

duration of crop growth cycles is related to temperature, an increase in temperature will speed up crop growth and shorten the time between sowing and harvesting. This shortening could have an adverse effect on productivity of crops and fodder for livestock. The hydrological cycle is similarly likely to be influenced by global warming, necessitating the agriculture and livestock sectors, particularly in rain-fed areas, to adapt to climate change.

Climate change poses a serious risk to poverty reduction efforts and threatens to undo decades of development efforts. While climate change is a global phenomenon, its negative impact is more severely felt by poor people and underdeveloped countries. They are more vulnerable because of their high dependence on natural resources, their limited technical capacity and insufficient financial resources to cope with climatic extremes.

1.2 The Scoping Study:

Private sector's engagement in climate change adaptation and resilience building in agriculture is relatively unexplored and under researched area in Pakistan's context. Oxfam in Asia has identified it as area of interest. Through exploratory research, it aims to explore the role of private sector, especially the agri-business and financial service providers for agricultural production and services, including insurance companies, in building resilience to disaster and climate risks for their businesses, for small-scale food producers and processors.

The present study explores the current situation as well as the potential for private sector resilience in selected value chains in Punjab and Sindh provinces of the country.

1.3 Key Objectives:

The key objectives of the scoping study are to:

- Examine the nature, scope and drivers of agribusinesses dependent upon agricultural value chains in disaster prone areas in Sindh and Punjab, Pakistan, focusing on businesses that work with small-scale farmers and businesses that are most affected by disaster risks and climate change impacts;

- Determine the potential entry points that Oxfam and partners can play a role in this work, and inform decision making by Oxfam in Pakistan and Oxfam in Asia on what could be done to bring about positive impact to vulnerable communities.
- Determine the main business development services, especially financial-related ones, being offered in these disaster prone areas;
- Undertake an analysis of current practices of major agri-business and financial service providers for agricultural production and services in terms of resilience to disaster and climate risks.

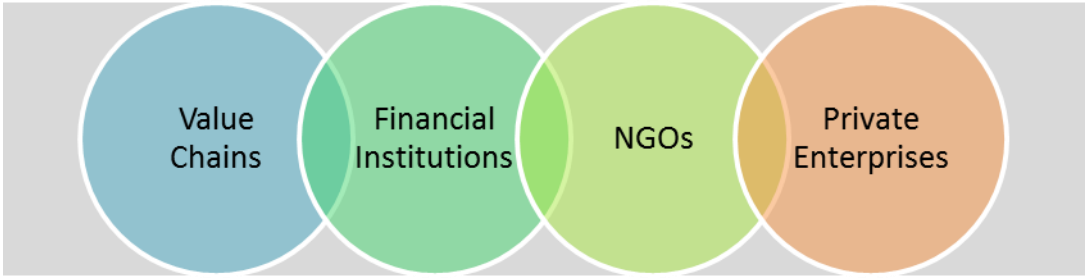
2. REARCH DESIGN AND METHODOLOGY

The scoping study has been designed as a mix method research. The primary research was complemented by a detailed review of available literature and evidences from similar research studies. The initial preparation for the study included the selection of value chains as well as geographical focus for research. Building on earlier research work on the issue and input from Oxfam- Novib team, value chains were identified in districts which had experienced recent natural disasters. Two districts in Punjab (Toba Tek Singh and Chinot) and one in Sindh (Khairpur) were identified primarily for their significance in terms of the identified value chains as major producers of the crops/ vegetables.

The following table presents the district wise break up along with identified value chains:

Districts	Value Chains
Punjab	
Chiniot	Potato
Toba Tek Singh	Wheat, Rice, Cotton
Muzzafargarh	Mango, Pomegranate, Tomato
Sindh	
Thatta	Sugarcane, Rice, Tomato
Sanghar	Cotton, Wheat
Khairpur	Cotton, Mustard

For each value chain, multiple stakeholders were identified as prime respondents. These included the small scale producers, market middle men, small scale processors etc. at the bottom end of the value chain, going on to medium and large scale business entities at the top rung of the chain. Other stakeholders including MFIs, NGOs and public sector research organizations were also interviewed during the course of the research.



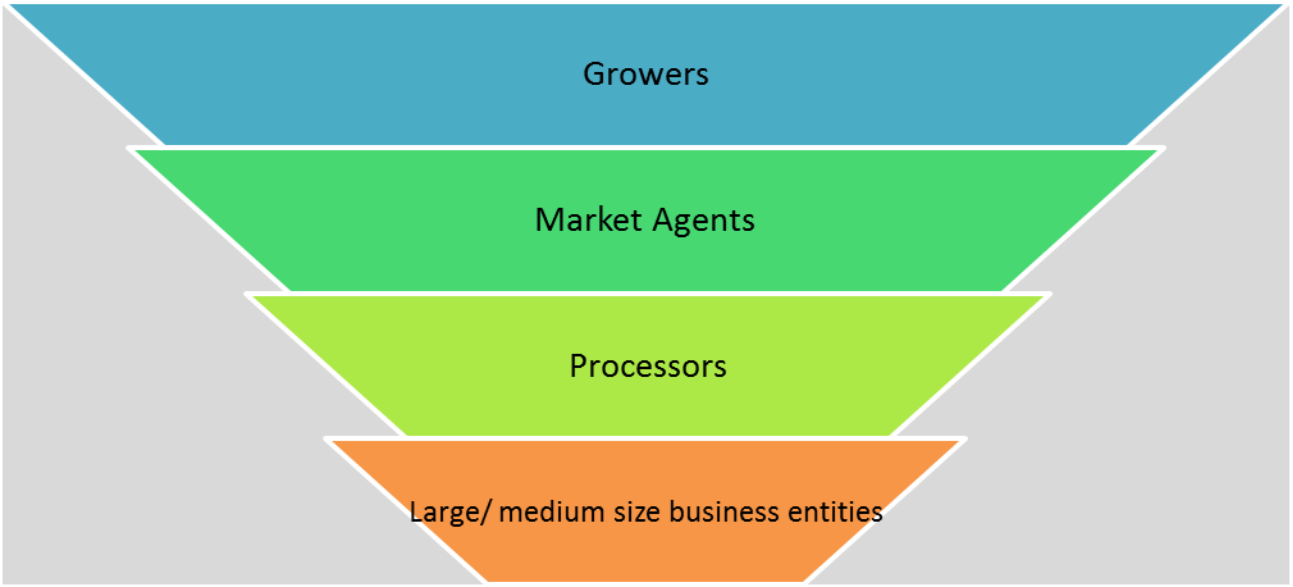


Figure: Respondents in the value chain

For the primary research, various data collection instruments were employed including closed-ended questionnaires and in-depth interviews with the various sets of stakeholders.

The multi-stage study methodology comprised of the following key steps:

Stage 1 – Secondary Research:

The first stage of the research involved a detailed desk review of available literature and research studies on the issue. The information collated through literature review was compiled and used in developing a brief scoping study tracking the broad parameters/ key dimensions of the issue of private sector resilience in the context of disaster and climate change.

Stage 2 – Research Preparation:

The second phase of the study included a detailed exercise for developing the data collection instruments. The short questionnaire was employed primarily for the growers in each value chain and IDIs for all the other stakeholders within a value chain. IDIs were carried out for all other stakeholders including the financial institutions, business enterprises, NGOs and research organizations.

The data collection plan is presented in the table at the end of this section.

Stage 3 – Field Research:

Before commencing the field activity, a training session on data collection tools for the research team was conducted. The field activity for data collection was carried out simultaneously in Punjab and Sindh. The field based interviews were supplemented by telephonic interviews in the case of business enterprises.

Stage 4 – Analysis and Report Compilation:

Following the completion of field activity, a rigourous data compilation and analysis process was initiated. For the quantitative analysis, the research team ran statistical analysis using MS Excel. For the qualitative data a triangulation of methods, combining IDIs of all different stakeholders was applied to fully understand the social and economic context of the study. The analysis techniques employed for analyzing the qualitative data included examining and tracking general trends, points of consensus and dissent.

The preliminary findings of the scoping study were presented to the Oxfam-Novib Project team in a detailed debriefing session. The present report documents the detailed findings of the scoping study.

DATA COLLECTION PLAN			
District	Value Chain	IDIs (Respondent)	Total
		Punjab	
Muzzafargarh	Mango	Contractor	2x3=6
		Commission Agent	
		Small-scale Processer	
	Pomegranate	Mandi Representative	2
	Tomato	Commission Agent	2x3=6
		Cold Storage	
		Village Artie	
Sub Total			6+2+6=14
Chiniot	Potato	Commission Agent	2x3=6
		Cold Storage	
		Village Artie	
Sub Total			6
Toba Tek Singh	Wheat	Village Artie	2x2=4
		Flour Mill	
	Rice	Village Artie	2x2=4
		Rice Mill	
	Cotton	Village Artie	2x2=4
		Ginner	
Sub Total			4+4+4=12
Total in Punjab			**14+6+12=32**
		Sindh	
Sanghar	Cotton	Village Artie	2x2=4
		Ginner	
	Wheat	Village Artie	2x2=4
		Flour Mill	
Sub Total			4+4=8
Thatta	Sugarcane	Sugar Mill	2
	Rice	Village Artie	2x2=4
		Rice Mill	
	Tomato	Commission Agent	2x3=6
		Cold Storage	
		Village Artie	
Sub Total			2+4+6=12
Khairpur	Cotton	Village Artie	2x2=4
		Ginner	

	Mustard	Mandi Processors	2x2=4
Sub Total			4+4=8
Total in Sindh			**8+12+8=28**
Total Combined for Punjab and Sindh			**32+28=60**
Financial Institutions			**6**
NGOs + research organizations			**6**
Business Enterprises			**8**

3. CONTEXTUAL ANALYSIS BASED ON LITERATURE REVIEW

Climate Change (CC) is an alteration in the composition of global atmosphere, in addition to natural climate variability, that is attributed directly or indirectly to human activity. There is growing global consensus that Climate Change is humankind's greatest threat in modern times and is likely to have profound consequences for socioeconomic sectors such as health, food production, energy consumption and natural resource management.

The harmful impacts of this global warming effect are already manifesting themselves around the world in the form of extreme weather events like storms, tornadoes, floods and droughts, all of which have been mounting in frequency and intensity.

Considering the living conditions, population density and pattern, poverty-environment nexus and vulnerability of poorer nations to changing circumstances, it is almost certain that climate change impacts will impinge on poverty reduction and development targets of the developing world. Already facing impediments to progress in the shape of poor governance, violence and resource scarcity, developing nations are poised to suffer further set-backs to progress with growing incidences of natural disasters and resource shortages that are increasing with global warming.

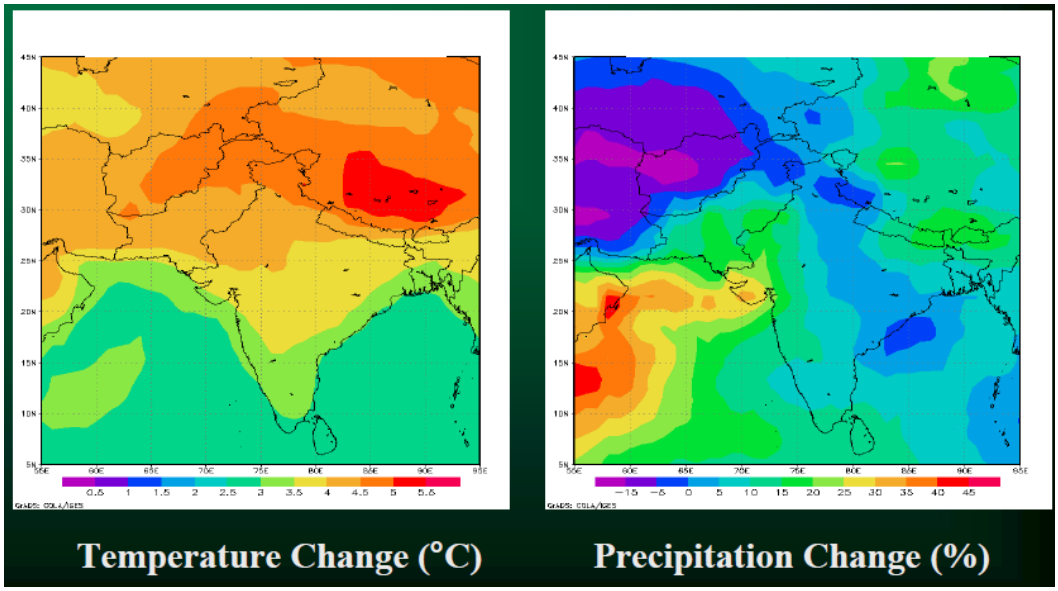


Figure: Temperature and Precipitation Change Scenarios of the World. (Source: Khan 2009)

Pakistan is ranked among the highly vulnerable countries of the world to climate change. It is among the top seven countries of the Asia which are subject to the grave situation in the face of climate change[3] . Some recent research studies to monitor and project the effects of climate change have indicated the average increase in temperature and irregular rainfall patterns (especially of the moon-soon rains) especially in the past 20 years[4]. The vulnerabilities / concerns arising in the changing climatic patterns[5] could be grouped as:

- *Increased variability of Monsoon*
- *More rapid recession of Hamaleya, Karakoram & Hindokush (HKH) glaciers threatening Indus River System flows*
- *Reduction in capacity of natural reservoirs due to rise in snowline*
- *Severe water-stressed conditions in arid and semi-arid regions the chances of occurrence of a major flood have also increased*

These climate changes resultantly have exerted adverse effects on the agricultural productivity thus endangering the food security situation and up-stream intrusion of saline sea water into the river delta endangering the mangroves and sea life.

Some other related challenges that a developing country like Pakistan has to take care of, are increased deforestation, loss biodiversity and human-health related issues like heat strokes, gastro-intestinal infections, pneumonia and other vector based diseases[6] . In the recent past, few studies[7]

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[3] Amir, P. (2009). Climate change: Vulnerabilities in agriculture in Pakistan. A booklet published by IUCN and Ministry of Environment, Govt. of Pakistan

[4] Pakistan, (2011), Economic Survey of Pakistan 2010-11, Ministry of Finance, Govt. of Paksitan, Islamabad, Pakistan.

[5] Salik, K. M. (2012). Livelihoods, agriculture and climate change: Threats, prospects and areas of cooperation. Pakistan-India Track II Dialogue on Climate Change, Islamabad, Pakistan

[6] Pontes, R.J., Freeman, J., Oliveira-Lima, J.W., Hodgson, J.C. and Spielman, A. (2000), Vector densities that potentiate dengue outbreaks in a Brazilian city. *American Journal of Tropical Medicine an Hygiene,* 62:378-383

[7] Farooqi, A.B., Khan, A.H., and Mir, H. (2005), Climate change perspective in Pakistan, *Pak. Journal of Meteorology*, 2(3)

Azmat, H. (2003), Imapct of La Nina on Pakistan Winter Precipitation, WMOESCAP TSU Quarterly Bulletin.

Hanif, U., Syed, S.H., Ahmad, R. and Kausar, A.M. (2011), Effect of climate change on agricultural sector of Punjab, 27th Annual General Meeting of PSDE, PIDE, Islamabad.

have been carried out to determine the possible changes in the climate parameters and their impacts on the socio-economic setup of the population in different regions of the Pakistan. In one such studies, Ali (2006) points out that the main growing areas of Pakistan (from the view point of crop production) would be suffering more from the climate change scenarios thus critically affecting the crop yield and increasing the threats for food security. In another study by Khan 2009, it has been predicted that long days and increased degree days would hamper the yield of wheat crop adversely thus. Mean average temperature trends in main cotton and rice growing areas of Pakistan have increased more than any other region of country thus, adversely affecting the crop production due to increased temperature and water shortage.

Effects of climate change on the agriculture sector are more prominent due to exposure of the crops / vegetable and orchards to abnormal temperatures, irregular rainfall pattern and frequent occurrence of floods and torrents (Khan 2001). Need for effective and efficient water resource management has increased many folds since the overall water shortage and unreliability of water availability (especially in context of rain-fall). It is estimated that overall water requirement of the crops have increased due to growing degree days (about 29 percent) while the availability of water has reduced since only the annual rainfall has decreased by 6 percent up to the year 2000.

Closer links with agribusinesses could ease farmers' access to climate-adaptive farm inputs – such as improved seed varieties and fertilizers – and technologies, and more secure markets for their supplies.

In the current context, however, opportunities for private sector collaboration for building resilience are largely untapped. There is a dearth of private sector led initiatives that can lead to transformative resilience along their supply chains. This is partially because resilience is often viewed as the responsibility of the public sector. Moreover, limited knowledge of climate risks and understanding of return on investment of resilience building actions further hamper proactive response from the business entities.

The present study is an attempt to understand the current situation, key drivers and impediments in leveraging private sector engagement in building climate-resilience in agriculture sector and thereby securing climate-resilient development in the country.

4. KEY FINDINGS

This section presents the detailed findings of the study. The findings and analysis are presented along the key research questions identified for the scoping study. While this section captures the common trends along the selected value chains, a detailed analysis per value chain is presented in the next section.

4.1. Private sector resilience for agri-business enterprises working on production, processing and distribution

4.1.1 Sectors experiencing the greatest risks from natural hazards and climate change:

The research findings indicate that the small scale producers[8] at the bottom rung of the selected value chains are currently experiencing the greatest risks from natural disasters and climate change. Their vulnerability is compounded by lack of awareness, adaptability deficit, and lack of external support, both technical and financial for building resilience. This observation holds true for all value chains across the various districts selected for the study. In general, the growers demonstrated experiential knowledge of climate change variations emanating from personal experience and observation and not acquired through an institutional mechanism. In Muzzafargarh, Sanghar and Thatta districts, knowledge of the disaster risk was experiential having experienced the floods of 2010 and 2011. In other districts, while most respondents especially at the grower level could identify some of the climate change elements, it was mostly observation based.

None of the respondents interviewed had been exposed to a capacity building initiative on climate risks or adaption. While most of the respondents cited change in precipitation patterns, rising temperature and surface water availability as key challenges to crop yield and production, they were not able to relate to these issues in a larger, climate change perspective. More than half of the respondents (65%) across the value chains cited electronic media as their main source of information while about a third of the respondents (35%) cited informal sources including others community members as their source of receiving information on climate change issues. None of the respondents

[8] For the purpose of research small holders were identified as farmers living off 10 – 15 acres of crop land or less. 63% of the respondents owned the land, while others were working on leased land

cited extension agents as a key source of getting information on climate change issues, indicating an underutilization of the role of public sector extension services and their vast untapped potential in knowledge development and raising awareness at the grassroots level.

On the impact of climate risks, most of the respondents in the stakeholders' group representing growers said that they affected crop productivity negatively, depressing their incomes and depleting savings. This in turn, led to their increased vulnerability to external shocks. Negative impact was also noted at the family/ community level with food insecurity and health implications.

Market intermediaries, including *arties* (middlemen), contractors and market agents, along the value chains also appeared to be least informed about climate risks. However, most of them could relate to the impacts of disasters/ climate risks, saying that it negatively affected production, bringing down their incomes as a result.

The findings note that in general the awareness around the issue of climate change centers mostly at the lowest rung of the value chain i.e the growers. There is a receding trend in terms of information and knowledge on disaster risks and climate change issues at the higher end of value chains. This was especially noted at the larger private sector enterprise level where the respondents appeared to be least informed about these issues. Generally, the higher end of the value chain demonstrated a low level of awareness and concern with the implications of climate change and the climatic hazards. Most of those interviewed from the stakeholder group representing small to medium size private enterprises reported only a marginal impact of climate hazards and/ or disasters directly on their business, mostly in the shape of a temporary disruption in supply chain especially following a disaster.

The level of knowledge and responsiveness to the issue of climate change was noted to be significantly different in case of large, national level private sector companies (for example, Engro) and Multi-national corporations – MNCs (Nestle, Unilever etc). The larger corporate companies have environment and sustainability integrated into their corporate strategy. Climate change concerns find a special mention and response strategies as part of their sustainability actions. The current engagements and interventions of MNCs with their value chains in the climate change context are discussed in detail in a subsequent section.

4.1.2 Handling impact of climate hazards and extreme events:

Assessing the current practices in handling the impact of climate risks and extreme events, the current situation appears to be marked by reactive adaptation measures which growers have adopted based on experiential learning. For example, some respondents reported a slight shift in time of sowing and harvesting due to climate variation. However, such practices remained highly localized without any institutional support from government or other stakeholders. Transfer of knowledge around adaptation measures appeared to be sporadic and mostly through conventional and informal sources which were not institutionalized. Sugarcane was the only value chains where direct link between growers and processors had resulted in adopting better adaptation measures by the growers. The farmers in this segment reported that the sugar mills often facilitated sessions with fertilizer companies where they learnt about better agriculture practices through use of fertilizers. In Muzzafargarh, some growers reported to have acquired orientation on tunnel farming through a local NGO and were using the technique for growing tomatoes. However, such coping and adaption measures appeared to be in place in few isolated examples across the value chains.

Response from the various actors of the value chain suggested that role of different institutions was not recognized in promoting adaptation at any level. Financial institutions and extension services appeared to be the least engaged institutions in the context of resilience building within the selected value chains.

Risk management practices at the various levels of the value chains appeared to be minimal. No institutional support for risk management in the case of extreme weather events was noted to be present at the growers end. None of the farmers, for example, reported to have availed any type of risk transfer or insurance scheme. In most cases, climate risks are dealt with by a mix of social networks and informal post-event credit.

Going up the value chain, it was noted that the local top end value chain actors comprising of small and medium size companies did not have an institutional response mechanism to handle impact of extreme weather events and climate risks. The lack of institutional response appears to stem from limited knowledge of climate risks and the ensuing capacity to incorporate it in business planning and invest in long term coping strategies.

4.1.3 Approach and existing practices to respond to climate risks among the top end business entities:

In order to examine the approach adopted and the ensuing practices to address the climate risks among the high end value chain actors, a two-layered analysis was carried out. The first level draws upon the primary data collected in the selected districts where top end value chain actors were identified as local business entities and exporters representing medium to large companies. The second level of analysis was carried out primarily through review of secondary literature examining national companies and multi-national corporations who are currently engaged in various sustainability initiatives engaging especially with small scale farmers at the lower end of the value chain.

As noted earlier, interviews with the high end value chain actors in selected districts reveal a limited understanding of climate risks. The risk perception in most cases seemed to be driven by direct impact in the event of a natural disaster. Most of the respondents did not perceive climate variations/ disasters as direct threats to their businesses. In general, the higher end private enterprises did not see their role in engaging directly with the lower end value chain actors for building resilience or promoting adaptation practices. It was viewed primarily as the role of the government.

Examining the pattern in business strategies for handling impact of hazards and climate extreme events on agri-business, it is noted that currently no policy or plan is in place at the institutional or strategic level. None of the business enterprises interviewed had a business plan for addressing climate hazards. The growers and market intermediaries interviewed also reported no formal linkages with the higher end value chain actors.

In general, climate change is perceived to be either an irrelevance or at best an extension of Corporate Social Responsibility (CSR). The small and medium business entities seemed to have a philanthropic approach towards disasters and extreme events. Most reported to provide emergency aid, food and nonfood items, to the disaster affected communities in Punjab and Sindh.

Some of the large national companies and MNCs approach climate risks and sustainability issues from an institutional perspective. The findings note a range of models adopted by companies working on sustainability and climate change issues. Some of the companies work on sustainability

projects as part of their business. In some cases, for example, private sector led extensions services are using their outreach services to both sell products and increase productivity and resilience working with farmers and growers across various value chains. Companies such as Syngenta, Nestle, Hala, Pioneer Pakistan (seeds), Fauji Fertilizers and Lakson Tobacco carry out such programs.

Some of the companies have specific initiatives and programs which have a combination of support and capacity building elements especially in working with value chain in dairy sector. In general, the approach is driven by a combination of corporate social responsibility (CSR) and business interest.

A few examples and cases studies of different private sector resilience interventions undertaken by MNCs and one national company working in Pakistan are presented in this section. The companies identified for the case studies were primarily chosen for their relevance to the selected value chains. As most of these initiatives are covered under the sustainability programs of these companies, the information presented below has been gathered through secondary research and literature review. The author could not find reports of third party assessments or independent reviews assessing these programs for their effectiveness.

Engro Corp:

Engro Corp was identified as a national level company with a structured sustainability program working with the farming community. Its interventions, particularly with small holder growers are covered both under its business programs as well as through Engro Foundation, the company's platform for community engagement and social investment.

As part of its sustainability interventions, Engro works with the farmer community through support, coordination and knowledge sharing particularly on the farming technology and agri-nutrients. Through Engro Foundation, it engages with farmers to encourage them in the use of fertilizers, including potash-based nutrients. This farmers' education programme targets approximately half a million farmers. The Foundation describes the intervention as '*is an investment in the long-term health and vitality of Pakistan's arable soil, one that continues to pay dividends in the form of the country's ability to sustain its own food supply and resulting in net income increase of the farmers up to the tune of Rs. 120 billion annually.'*

Inclusive Business - Engaging with Farmers in Rice Processing:

When it set up its rice processing business, Engro adopted an inclusive business model focusing on improving the competitiveness of basmati rice for farmers to ensure that there is long term raw material availability for the company through enhanced yield/acre and reduction in cost of production/ton. Recognizing that various problems inherent in the agriculture market including lower crop yields, inadequate pricing and lack of marketing structure, have a negative implication on the income and livelihood of the small holders, the company adopted various measures to work directly with farmers. Engro has implemented a quality-based pricing model whereby farmer earning is now directly linked with the quality of produce. As a natural corollary to an engaged and inclusive business model, Engro is also investing in research and development. A Research and Development team conducts trials on aspects of Basmati rice including new basmati rice seed development and water conservation. A team of agri-graduates spread across 11 procurement locations provides farmers with constant support and counseling for rice seeds, water conservation methodology, farm management and optimal use of fertilizers and pesticide for increased yields.

The key strategy is to increase farm productivity and quality through use of contract and contact farming. Rice paddy bought by Engro is grown on approximately 36,000 hectares. Engro's 2000 farmers grow paddy on 16,000 hectares under formal contract farming agreement or as contacted growers involving upfront commitment to buy paddy of the required quantity and quality at a price higher than market rates.

Through better crop seed and farm management practices the yield of basmati rice paddy increased from 3.3 tons per hectare before 2010 to an estimated 3.6 tons in 2012. This is an additional USD 2.4 million income for Engro's contracted and contacted farmers on 16,000 hectares. This translates into an additional income of USD 25/ton for farmers. 35% decrease in water usage of crop has also been reported as a result of capacity building interventions with growers[9].

Strengthening Livelihood in the livestock sector:

Dairy & livestock sector employs one in every six Pakistanis, majority of who belong to the base of the pyramid – living on less than US $ 2.5/day. Dairy farming in Pakistan follows a pre-dominant mode of backyard farming with over 80% of farmers having less than 5 animals. Milk collection and onward

[9] Engro Corp Annual and Sustainability Report 2012

delivery to city markets and household consumers is conducted by contractors in this traditional setup. The absence of milk transportation infrastructure not only results in wastage but also creates a monopoly of contractors who control pricing and payment methods.

Through Engro Foods in the dairy business, the company has focused its efforts in breaking this cycle and empowering the small-hold dairy farmers by deploying its own state-of-the art milk collection infrastructure that has helped in improving payment cycles, productivity of the animals and thereby increasing the net income in the hands of the farmers.

To further enhance their efforts, the business has focused extensively on animal health, nutrition and integration of best farming practices, hence boosting production and efficiency within the sector. Through its team of agri-services experts and regular investments in medical camps, fodder cultivation drives and modern feeding technique seminars, Engro Foods helps the farmers optimize their production. These multi-pronged attempts have helped increase the average herd size of small-hold dairy farmers by 15% whilst simultaneously increasing milk yields by 20%. The boost in the milk yield has accorded a higher standard of living to these farmers and decreased the average debt load of each family that supplies the company milk by an average of 15%. Through integrated programs such as Women Empowerment through Livestock Development (WELD), the business has developed female entrepreneurs across the country that has provided PKR 4 million per month directly in the hands of 950 families. The improvement in the lives of farmers has resulted in many of them graduating to the next stage of agricultural development with over 600 farmers reaching a scale where they have become commercial dairy farmers bringing about 20 million liters in terms of yield improvement.[10]

Nestle – Pakistan:

Nestle's work in the context of climate change includes initiatives on responsible water stewardship; striving for zero waste; using energy and resources efficiently; switching to cleaner fuels; investing in renewable energy sources; optimising distribution networks; and working with farmers to improve their resilience to climate change through adaptation in agricultural and production systems.

At the global level, Nestle continues to help farmers adapt to climate impacts and become more resilient so they can continue to grow crops in the face of changing patterns of agricultural

[10] Engro Corp Annual and Sustainability Report 2012

production. Nestle's initiative to help cocoa and coffee farmers adapt to environmental challenges has been recognised as an example of best practice by the United Nations Framework Convention on Climate Change (UNFCCC).

Through its global programme, Sustainable Agriculture Initiative at Nestlé (SAIN), Nestle supports farmers to promote sustainable development. It focuses on a range of initiatives to address key challenges in water management and irrigation, such as resilience to drought and flooding; wastewater and organic waste treatment; and farm intensification techniques. Through SAIN, it holds regional workshops for farmers, offer an intranet site where water issues and guidance are featured, and share best practice through field projects and public–private partnerships. In 2014, it implemented eight Sustainable Agriculture Initiative water projects across various markets.

Farmer Connect is another initiative through which Nestle engages directly farmers sourcing raw materials for its factories, operating at a range of scales, from smallholder to large professional farms, as well as co-operatives and a number of selected traders for dairy, coffee and cocoa.

> In February 2013, Oxfam scored ten food and beverage companies on their efforts to improve food security and sustainability. The *Behind the Brands* survey ranked companies according to their policies in seven areas: transparency, farmers, women, agricultural workers, access to land, water and climate change. Nestle was ranked at the top with the highest score.

In Pakistan, most of Nestle's sustainability and shared value initiatives have centered on the dairy sector. The following examples have been identified from their work outside the dairy sector.

Support mango farmers in southern Punjab through a joint effort with the Australia-Pakistan Agriculture Sector Linkages Program (ASLP)

Nestle Pakistan is working on a pilot initiative to support mango farmers in southern Punjab through a joint effort with the Australia-Pakistan Agriculture Sector Linkages Program (ASLP).

In the initial phase of the project – titled the 'Chaunsa Project' – farmers in Multan and Khanewal will benefit from training on best farm practices to increase yield and improve quality of chaunsa mangoes. Through the partnership, Nestle and ASLP will carry out training and capacity building in a range of areas including pre- and post-harvest horticulture, plant propagation and varietal assessment. By improving both yield and quality of chaunsa mangoes through these efforts, the project aims to improve the livelihood of small scale mango growers. The exposure will also expose

small farmers to new opportunities in the mango farming sector, including canning, pulping and exporting.

The long-term vision for the 'Chaunsa Project' is to take Nestle's principle of Creating Shared Value (CSV) and support small farmers as part of their value chain. Through responsible sourcing of mango pulp and development of linkages with Nestle's value chain, small farmers will have better access to markets where they can sell their mangoes at competitive prices, leading to improving their incomes and livelihood.

Water Stewardship Project in Pakistan:

Nestlé Pakistan has signed a Memorandum of Understanding (MoU) with WWF-Pakistan for sustainable water use and water stewardship. As part of its commitment to sustainable use of water, Nestlé Pakistan, in collaboration with WWF-Pakistan, will launch projects not just to improve the water usage within Nestlé operations and supply chain but will also implement Alliance of Water Stewardship standards.

Between 2003 and 2013, Nestlé Pakistan improved water efficiency in its operations by 22%. The company also ensures treatment of wastewater before releasing it back into the ecosystem.

Recognizing unsustainable water use and its poor management in agriculture sector as key challenges leading to water scarcity in Pakistan, Nestle Pakistan engages in capacity building initiatives with farmers. Through creating awareness on responsible water use in agriculture sector among farmers, Nestle aims to reduce the water footprint across its value chains.

Unilever Pakistan:

Unilever – Pakistan launched its Sustainable Living Plan in 2011 to contribute to its global goals for 2020 through focusing on:

- *Tackling deforestation and climate change*
- *Improving sanitation, hygiene and access to safe drinking water*

Unilever, in partnership with the Clinton Foundation and Acumen, has recently launched the Enhanced Livelihoods Investment Initiative (ELII) which is designed to create a more efficient way for Unilever to buy from small producers. It will enable farmers to generate more income as well as to improve the livelihoods of as many as 300,000 smallholder farmers and their communities in Africa, South Asia, Latin America and the Caribbean. The ELII will be a three-year, minimum $10 million investment initiative to catalyse economic growth and alleviate poverty amongst low-income communities, while creating more inclusive and sustainable value chains. One of its primary goals is to leverage market-based approaches to poverty alleviation, to create and scale up privately-held enterprises which will support smallholder farmers and link them to our global supply chains and

- *Championing sustainable agriculture and smallholder farmers*

In Pakistan, Unilever works with its partners to:

- *Improve sanitation, hygiene and access to safe drinking water*
- *Tackling the issue of climate change through our efforts to halve the environmental footprint across our value chain*
- *Enhance livelihoods of men and women in rural Pakistan*

Part of this effort focuses on working with smallholder farmers to improve farming practices and livelihoods leading to more secure supply chains. Review of the Unilever Pakistan Sustainability Report 2014 reveals that in Pakistan, the sustainability initiatives have focused diverse areas in waste reduction and energy efficiency. However, engagement with smallholder farmers is not a visible or significant component currently of its sustainability portfolio in Pakistan. On a global lever, however, Unilever has numerous initiatives engaging with its value chains and particularly focusing on small growers. For example, in India, Hindustan Unilever (HUL) entered into a public-private partnership with the Government of Maharashtra for sustainable sourcing of tomatoes locally. The objective was to mobilize farmers into producer groups, train and equip them on good agricultural practices, ultimately improving their productivity and quality of produce. As part of this initiative, HUL provides farmers with a buy-back guarantee for their produce. HUL also offers global and local knowledge and expertise in sustainable agriculture practices in tomato cultivation; this includes the latest agricultural techniques, irrigation practices and recommendation of the right type of seeds. In 2014, 2,200 farmers registered for the project to grow tomatoes on over 3,000 acres of land. HUL is also collaborating with Bayer CropScience and Syngenta, the two agribusiness companies, to develop the value chain. These specialist agronomy partners assist in areas such as setting up tomato nurseries, providing training in pest management and plant protection, and using 'demonstration fields' to showcase best practice.

Through a strategic partnership with Solidaridad, Unilever launched an initiative to improve the lives of 1 million people in its extended supply chain in 2014. The programme runs until the end of 2017 in Africa, Latin America and Asia. It explores ways to encourage smallholders to grow sustainable tea, cocoa, sugar, palm oil, fruit, vegetables, soy and dairy and provides training, new finance models and seed funding.

Levi Strauss:

Levi's is part of the global Better Cotton Initiative (BCI), a project which encourages cotton grown using more sustainable farming methods

The first BCI cotton for the 2010-11 crop year was harvested from some 68,000 small farms in India, Pakistan and Mali. The farmers engaged through BCI are using sustainable agricultural methods with fewer pesticides and less fertilizer and water to reduce the environmental impact, while increasing crop yields and profits. They are also adhering to worker labor standards.

In Pakistan, local farmers using Better Cotton farming methods reduced pesticide and water use by an average of 32 percent, and saw increases in their net profits by up to 69 percent. The majority of the farmers involved with the initiative hold less than two hectares of land.

Visa Inc.:

Visa Inc.'s work with humanitarian aid innovation was reviewed as part of the study. Visa is a global payments technology company allowing consumers, businesses, banks and governments to use digital currency, instead of cash and checks.

In the realm of humanitarian aid, Visa works with nongovernmental organizations and government agencies to provide aid quickly, securely and effectively using electronic payments for distribution. In addition to improving the humanitarian response, this approach often provides the first opportunity for the unbanked and underserved to gain access to more formalized financial services.

Technology Innovation in Payment Disbursements:

Visa and NetHope, a consortium of more than 40 humanitarian organizations, partnered to develop the Visa Innovation Grants Program, awarding five leading development organizations with grants to help modernize the distribution of payments related to microfinance, agriculture, health, and emergency relief. The Visa Innovation Grants will help the recipients transition from cash to electronic payment distribution thereby providing them with the opportunity to improve the speed, security and long-term impact of disbursements. By supporting organizations' transition to electronic payments, Visa and NetHope will help foster development and financial inclusion in the communities they serve as well as strengthen the organizations' ability to realize their missions over the long-term.

Cash Learning Partnership:

Visa has teamed up with the Cash Learning Partnership (CaLP), an inter-agency initiative whose members include Oxfam GB, Save the Children UK, the British Red Cross, the Norwegian Refugee Council, and Action Against Hunger/ACF. CaLP is focused on building capacity, sharing knowledge and promoting best practices around the use of "cash transfers"-or the delivery of assistance through money or vouchers rather than physical goods when markets are still able to function.

CaLP coverage in electronifying the distribution of money includes both in times of emergency and through non-emergency social development programs.
In the Dominican Republic, Visa has helped the government's Social Subsidies Administration electronify the distribution of money through the Solidaridad Visa card, allowing more than 800,000 people to receive critical benefits like unemployment, nutrition assistance, and help for the elderly.
In 2010, Visa and its partner financial institutions helped the government of Pakistan deliver emergency cash aid via the Watan Visa prepaid debit card, reaching more than 2 million families and ensuring that flood victims received financial help quickly and securely.

In order to support the development of best practices in the electronification of cash transfers, Visa's support of CaLP focuses on how to increase preparedness for disasters by reducing the time and resources required to distribute relief funds to people impacted by emergencies, beginning with a pilot project in the Philippines.

Visa in Pakistan - Technology to improve humanitarian aid in emergencies

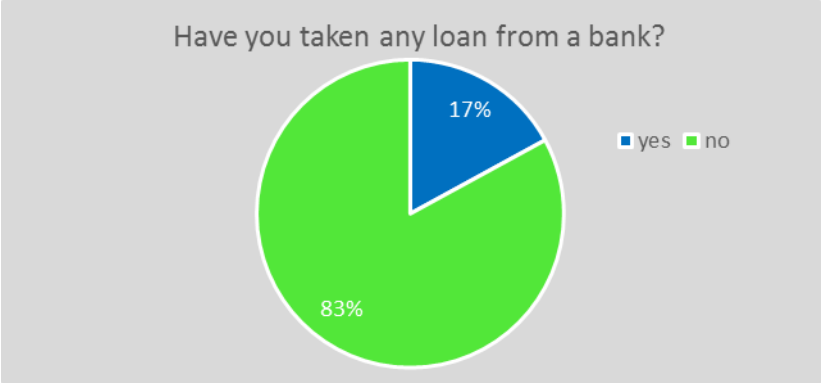
Visa has pioneered some best practices in delivering cash in emergencies, with a particular focus on the role that new technologies including digital currency which can play in improving the delivery of money. In 2010 after catastrophic flooding impacted 20 million people, Visa and its partner financial institutions helped the government of Pakistan deliver emergency cash aid via the Watan Visa prepaid debit card, reaching more than 2 million families and ensuring that flood victims received financial help quickly and securely.

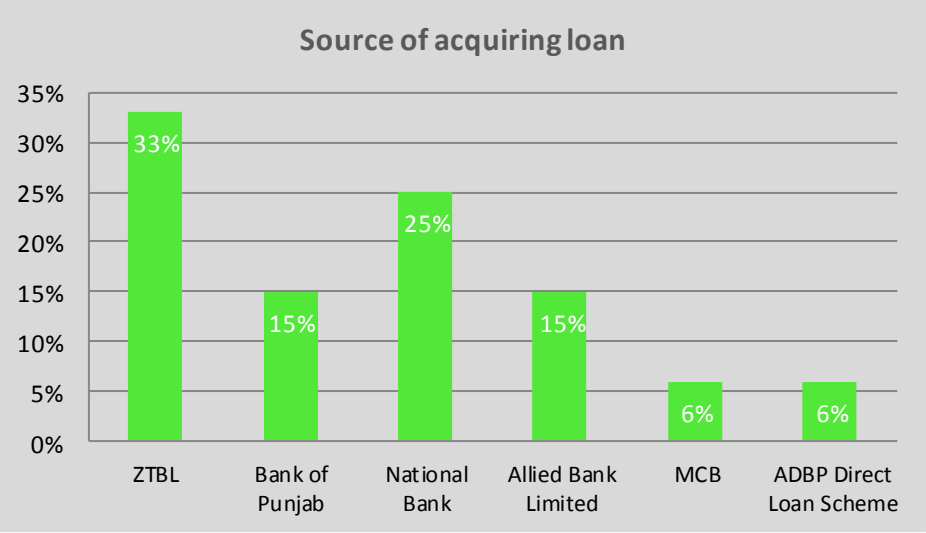
Various interventions by MNCs and corporations noted above, mark important milestones in private sector's role and current engagement in resilience building through their value chains in the context of climate change. In almost all instances, private sector companies have partnered with non-governmental institutions and development agencies in developing and implementing various adaptation and resilience building initiatives indicating successful synergies and partnerships.

4.2. *Financial sector's role and current engagement:*

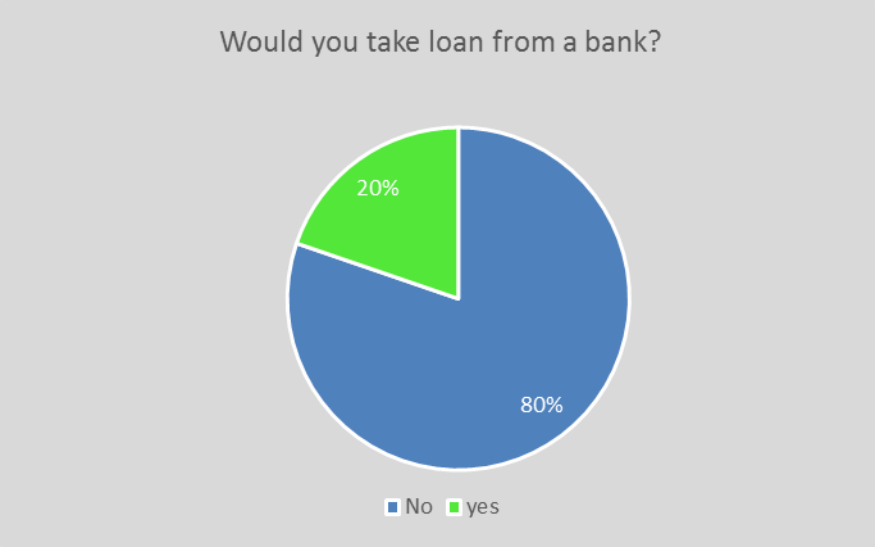
As part of the scoping study, a short closed ended questionnaire was administered to growers and the lower end market intermediaries to assess their access to and utilization of various financial services, particularly in the context of climate change and extreme climate events. Parallel to this strand, detailed interviews were also conducted with various representatives of public sector financial institutions, private banks, insurance companies and micro finance institutions (MFIs).

Only 17% of the total respondent group reported to have sought financial assistance in the form of loan while the majority (83%) said that they had never accessed any financial institutions for a loan. Non institutional borrowing, including loans from family and friends, middlemen (arties) etc, was carried out in most cases to cover shortfall in expenses. Out of those who had reported to avail institutional borrowing, one third (33%) had acquired the loan through ZTBL, followed by 25% who reportedly acquired it through National Bank of Pakistan.





When asked if they wanted to avail a borrowing facility from a bank, majority of the respondents who had not sought institutionalized borrowing appeared to be reluctant in doing so.



Among the various reasons cited for reluctance in availing institutional borrowing, access to banks due to limited reach of banks branch networks, the condition for collateral as well as the transaction costs associated with borrowing such as the relatively longer time frames banks require to issue a loan, appeared to be the main challenges. There also appeared to be limited awareness among the respondents regarding climate risk specific financial products and services. None of the respondents reported to have availed any climate risk/ hazard specific financial service.

The interviews with the various financial institutions revealed limited outreach in the target districts validating the earlier finding from the demand side perspective. Except for Khushaali Bank which prioritizes opening up bank branches in areas prone to natural hazards, none of the commercial banks interviewed had a criteria for outreach to disaster affected areas in place. While the banks are mandated by the State Bank of Pakistan to earmark a proportion of their total loan portfolio for agriculture sector, it was noted that in most cases it was availed by bigger landholders. The Bank of Punjab, for example, extends its *Kissan Dost Short Term Running Finance Facility* to farmers either owning at least 50 acres of agriculture land in his own name or in case of lease, with a proper lease agreement in place.

None of the banks interviewed reported to factor in climate risk as a risk factor. All risks were stated to rest with the borrower or insurer.

The findings also indicate that currently there are very limited climate risks/ hazards specific products and financial services. The Zarai Taraqiyati Bank Limited (ZTBL) for example, had a climate change department which was later wound up as the Bank didn't see it as 'viable' business. The commercial banks interviewed also had a very limited range of innovative financial products and services catering to small holder farmers in the context of their resilience building and adaption to climate variations.

On a policy level, several SBP regulations govern the climate risk/ hazard event specific schemes/ services for farmers. However, the net benefit to small holders is not discernable because of both the demand and supply side deficits. As noted earlier, limited awareness of and access to financial services for the small holders depresses the demand factor. On the supply side, financial institutions, particularly banks have yet to tap the base of pyramid market with customized products especially in the context of climate risks. A lack of agricultural insurance coverage mechanisms also appears to contribute to banks' skepticism over the safety of investments made in the sector.

Interviews with several major insurance companies also reveal a similar pattern. Most of the insurance companies do not directly insure agriculture products for instance crops and livestock unless they are financed by the banking institution. Among the few stand-alone initiatives for agriculture sector specific insurance schemes, one example was presented by United Insurance Company Limited (UICL), whereby the company has signed MoUs with several NGOs. Farmers financed through the NGOs are provided insurance coverage by UICL. The insurance premium is 4-5% of the yield value, the payment for which is split between the NGO and borrower.

In the following section, several climate risks/ hazard events specific schemes/ services for farmers by the State Bank of Pakistan have been listed.

Crop Loan Insurance Scheme (CLIS)

The Central Bank of Pakistan (SBP) is working closely with private financial institutions (10 insurance companies and 20 banks) to develop a market-driven rural finance market. An important initiative in this regard was the introduction of a market-based crop loan insurance scheme. SBP launched the Crop Loan Insurance scheme (CLIS) recently for five major crops Wheat, Cotton, Sugarcane, Rice and Maize in collaboration with banks and leading insurance companies. The scheme was made mandatory by the government for the agri borrowers of banks for the five major crops, i.e., wheat, rice, sugarcane, cotton, and maize from Rabi Season 2008. Subsequently, the mandatory CLIS was

extended to the agri borrowers of MFIs. The scheme covers crop losses from time of sowing or transplanting till harvesting against excessive rain, hail, frost, flood, drought, and crop related diseases like viral and bacterial attacks or damage by locusts. The amount of indemnity is outstanding agri loans of the borrower against the crop. 'Calamity declaration' by the Revenue Department, Government of Pakistan is the trigger point for payment of claims, followed by overall and specific farm surveys by the insurance company. In case there is a loss of more than 50% in terms of area yield outcome, the insurance trigger is activated. The scheme is market-based; however, the federal government pays the premium for small/subsistence farmers.

Refinance Scheme for Revival of SMEs & Agricultural Activities in Flood Affected Areas:

In line with the Government of Pakistan's policy for revival of economic activities and SBP's relief measures for improving access to financing in flood affected areas, the scheme has been launched by SBP for districts notified as flood affected by the National Disaster Management Authority. PKR.10 billion were allocated for the scheme which are being used for providing funding at concessional/ affordable rates for agri. production/ working capital finance to farmers and SMEs in flood affected areas through banks. The facility was available for all farmers including owners, owner cum tenants and tenants. Banks provided agri. /SME loans as per their credit policy and SBP regulations. Banks have been encouraged to arrange for the insurance of loans provided under the scheme whereas loan insurance for five major crops viz. wheat, rice, cotton, sugarcane and maize was mandatory to avoid risk of losses due to natural calamities. Refinance is being provided to banks at a rate of 5% while banks can charge a maximum spread of 3% from the borrower.

Writing-Off of Irrecoverable Loans, Advances or Financing - Consumer Financing:

Through a notification[11] issued to all banks in November 2014, the SBP extended the policy coverage for writing off loans to include natural calamities and directed banks/ DFIs to write off irrecoverable / bad loans, advances or financing with the approval of respective Board of Directors (BOD) under a well-defined and transparent write off policy. The policy covers financial relief in the form of write off of principal, debited mark-up/profit and reversal/waiver/remission of undebited mark-up and other charges etc.

[11] SBP notification 24 Nov, 2014. BPRD Circular No. 12 of 2014

A Public Private Partnership for developing innovative financial products

IFAD and PPAF, through a strategic partnership with the Securities and Exchange Commission of Pakistan, have embarked on the design of an index-based crop insurance and livestock insurance product under the Program for Increasing Sustainable Microfinance (PRISM). Prepared in collaboration with the Meteorological Department and the Livestock Research Institute, the insurance product is based on the needs of small and marginal income farmers. These are the first-ever indexed and hybrid weather micro insurance products that facilitate and compensate small farmers in Pakistan. The product is being piloted and rolled-out as a market based commercially viable model.[12] It is currently focused on drought only (rainfall trigger) and will be tested on rain fed wheat and groundnut[13].

4.3. Stakeholders Overview – NGOs, Research and Extension Organizations:

Examining the policy context, it is noted that while the role of private sector is recognized in the areas of disaster risk management and resilience building, there are no clear frameworks for private sector engagement. Pakistan's National Disaster Risk Reduction Policy (2013) acknowledges the '*negligible involvement of the private sector in DRR'*, yet a clear strategy to mobilize the private sector is missing in most policy frameworks.

The cost of adapting to climate change in Pakistan is estimated to be USD 6-14 billion per year until 2050. The Climate Change Policy (2012) also refers to tapping the potential of private sector's investment in adaption and mitigation as one of its 11 policy objectives: *"To foster the development of appropriate economic incentives to encourage public and private sector investment in both adaptation and mitigation measures."* However, practical measures and policy incentives are yet to be implemented to leverage the potential of the private sector.

The findings of the scoping study clearly indicate a gap in service provision and engagement between various public sector research organizations and extension departments and the grass roots level farmer communities. Across the value chains, none of the respondents could recall any engagement with local extension officers in the context of awareness creation on climate risks or acquiring knowledge on adaptation and resilience building measures. The engagement and

[12] The author could not find an evaluation study assessing the success of the project.
[13] Private sector engagement in disaster resilience and climate change adaptation. Country case studies. DFID

particularly the impact and use of research carried out by the national and provincial level research institutions was not discernable in the farmer communities visited during the course of the study.

Of the various initiatives of PARC reviewed, the Agricultural Innovation Program (AIP) for Pakistan specifically mentions a component for climate change resilience and adaptation in Pakistan's agricultural sector.

Agricultural Innovation Program (AIP) for Pakistan

In conjunction with the International Maize and Wheat Improvement Center (CIMMYT) and the PARC, USAID has launched the Agricultural Innovation Program to expand the use of modern technologies in Pakistan's agriculture sector. Through this new four-year, USD 30 million project, USAID will sponsor research to encourage adoption of new technologies in agriculture. The goal of AIP is to increase crop productivity and production value of livestock, horticultural, and cereal crops through targeted commissioned projects.

AIP aims to have measurable impact on agricultural growth, food security for the poor, component of climate change resilience and adaptation in Pakistan's agricultural sector. The program aims to invest heavily in capacity strengthening to assist Pakistan in revitalizing its national research system and integrating the private and public sectors around pro-poor science, technology and innovation. A key component of the projects aims for the establishment of Provincial Agricultural Research Boards in Balochistan, Khyber Pakhtunkhwa and Sindh on the lines of Punjab Agricultural Research Board (PARB).

On the agriculture extension side, Punjab has recently initiated revamping of it extension services. This recent initiative aims to improve the Extension Delivery System through introduction of innovation techniques of information and communication technologies (ICT). A key feature of the project is the establishment of an Agriculture Extension ICT hub with integrated ICT resources like SMS, website and call centers to facilitate farmers.

In general, however, extensions services appeared to be an under invested area in other provinces with no notable initiatives taken recently for improving the quality and coverage of the public sector agriculture extension services.

Examining the engagement of NGOs with small holder grower communities in the context of resilience building in the target districts, the findings note that in the districts in Punjab, a few organizations are engaged in piecemeal activities working with the grass roots communities. Most of their work centers around training initiatives for farmers on livestock management, agriculture techniques and water management. Organizations like NRSP, in addition to technical assistance also provide micro credit facility to farmers for purchasing agriculture inputs.

Most of their current work entails direct engagement with the farmer community with no linkages with other stakeholders in the agribusiness sector. None of the organizations interviewed were engaged in a resilience building initiative involving private sector companies.

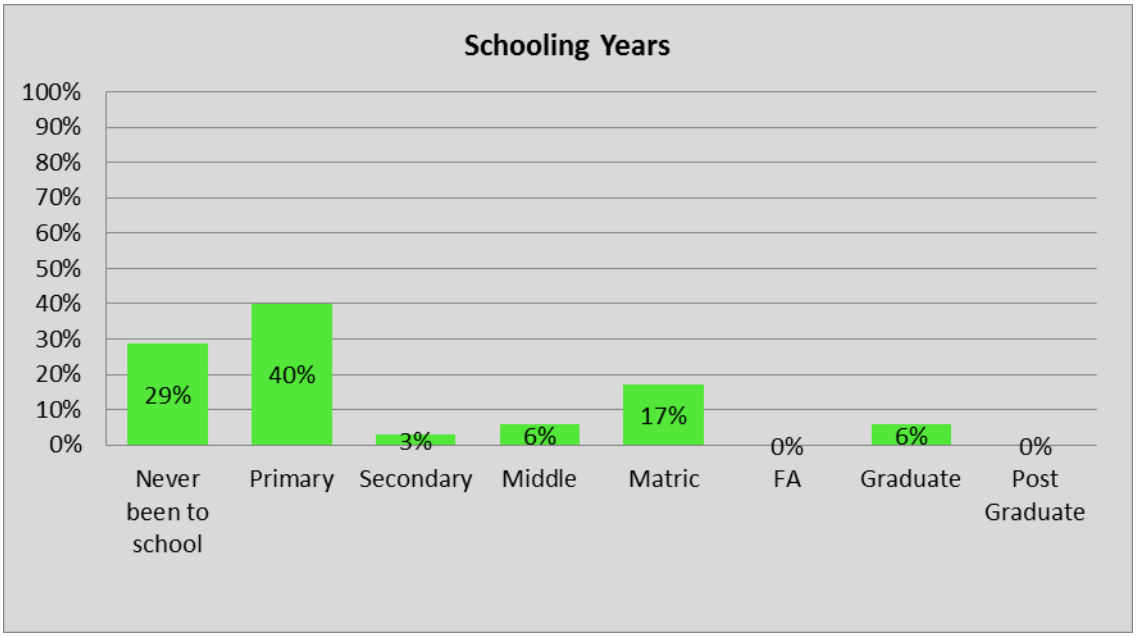
5. DETAILED ANALYSIS OF VALUE CHAINS

This section presents a detailed analysis of the primary data collected during the course of study. The analysis is present value chain wise. It captures key dimensions in current level of awareness on climate risks, adaptation practices in place and level of engagement among various value chain actors and stakeholders in the context of resilience building.

5.1 Key Demographics and Market Features

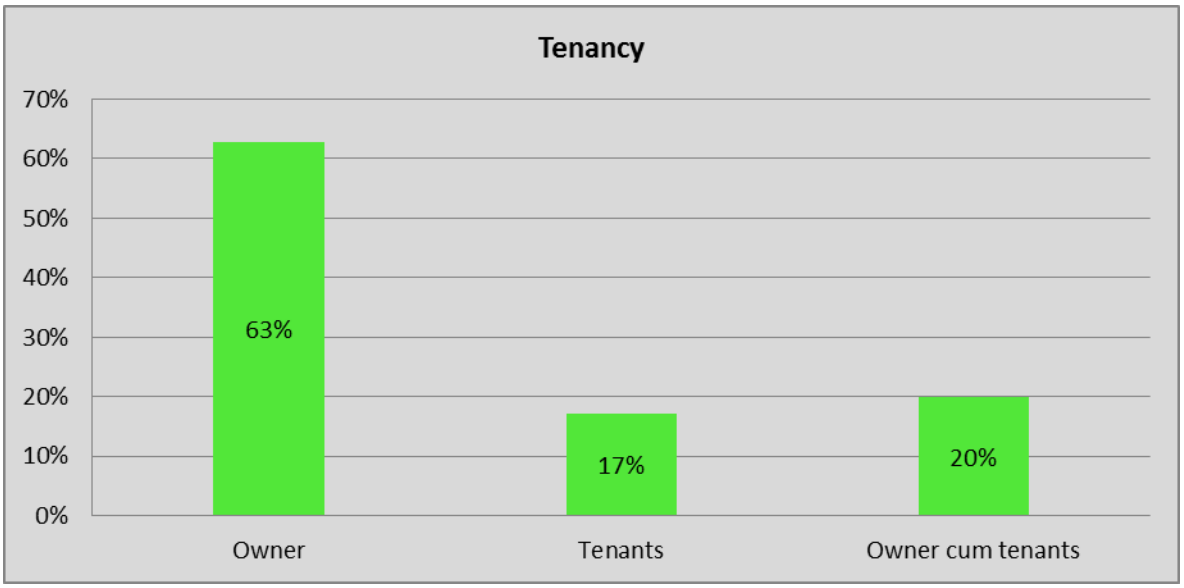
Education

Examining the key demographics, the findings note that education level of the respondents was low across the value chains with 71% of the respondents receiving no or less than 5 years of schooling..



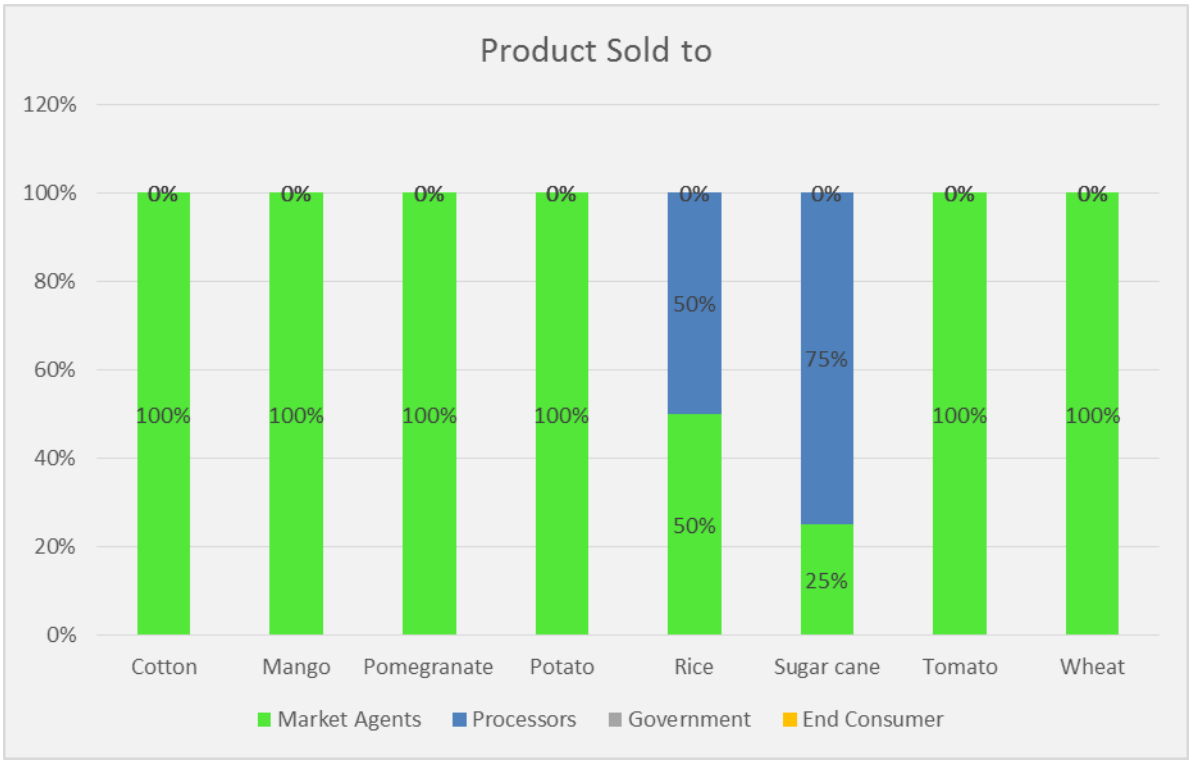
Tenancy

The demographics of tenancy was specifically targeted towards the respondents of the growers group and the key findings depict that 63% of the growers are owners of the land they cultivate, 17% are tenants and the remaining 20% are owners cum tenants. As noted from the responses, the average land holding size is 15.5 acres.



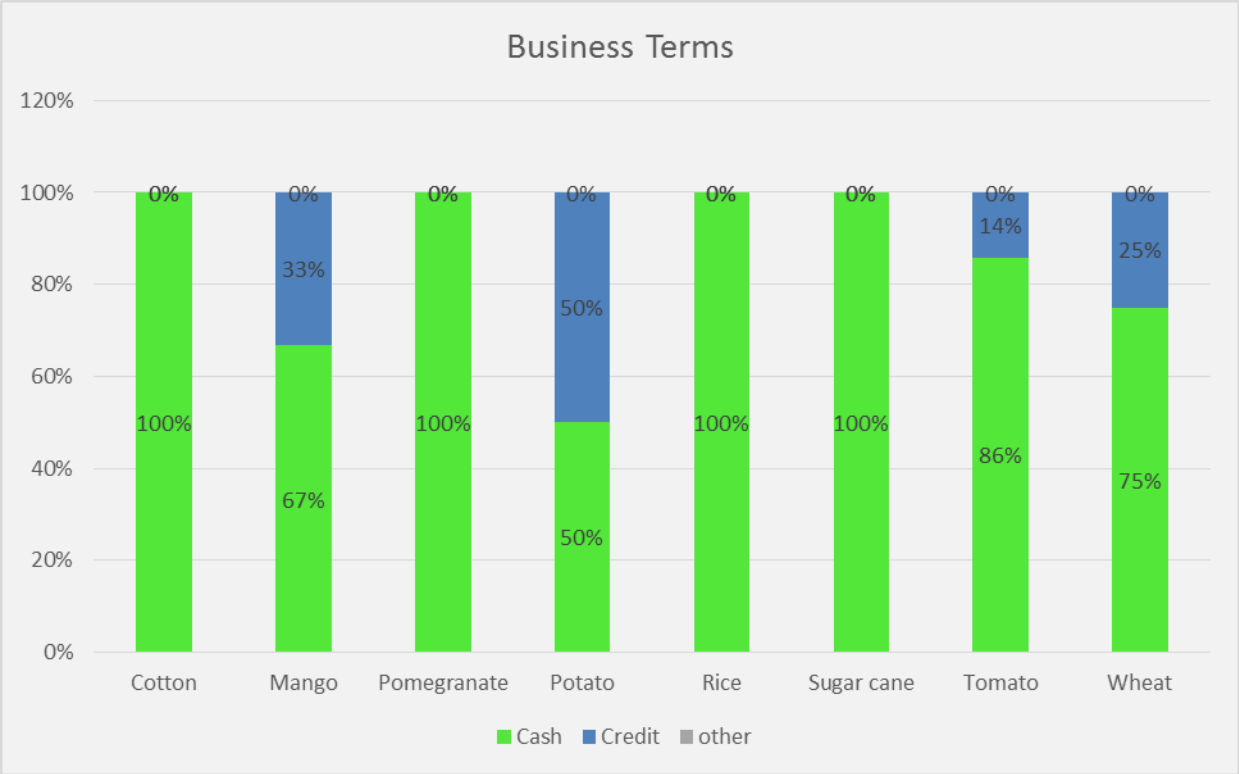
Business Engagement

The general trend across all the value chains indicates that growers have direct business engagement with the market agents only and not with other actors especially at the higher end of the value chain. The only exception noted was sugar cane and rice where growers appeared to also engage directly with the processors.



Terms of Business

The business terms were noted to be largely informal and in the form of cash with a limited trend for credit between the value chain actors. The trade in terms of credit was also highly informal as it was based on personal relationships and not on formal documentation for the growers at the lower rung.



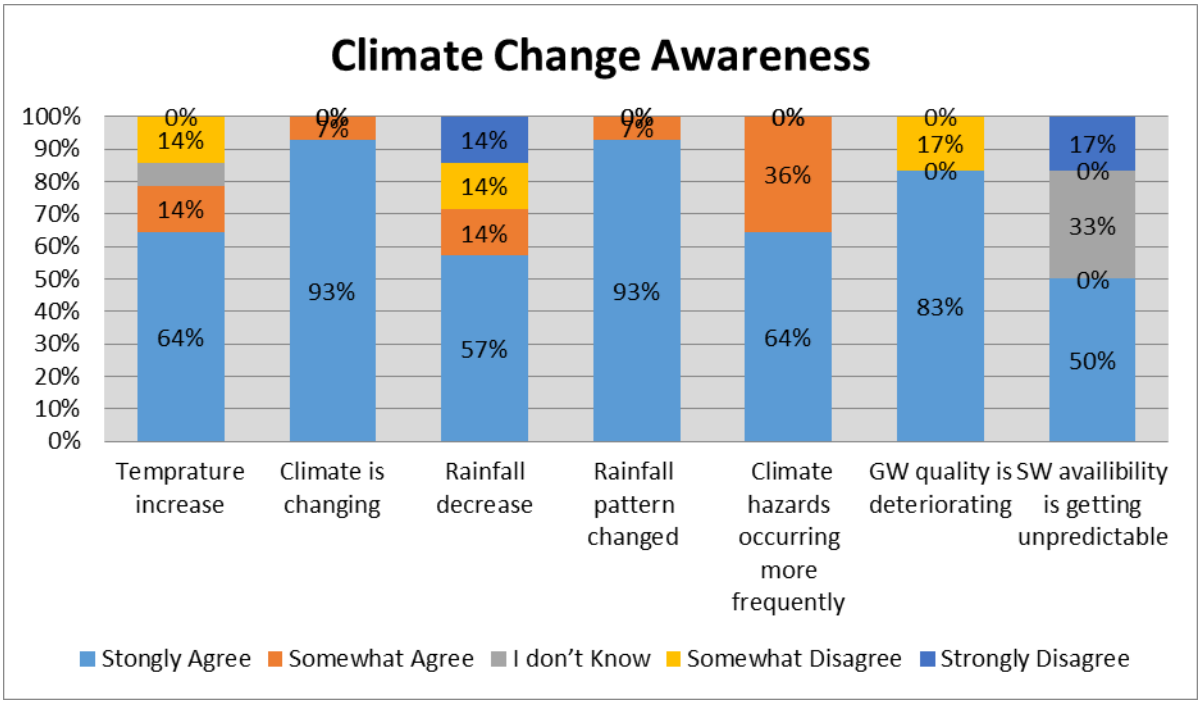
5.2 Detailed Analysis - Value Chains

Topline findings indicate that in general the awareness around the issue of climate change centers mostly at the lowest rung of the value chain i.e. the growers. There is a receding trend in terms of information and knowledge on disaster risks and climate change issues at the higher end of value chains. This was especially noted at the larger private sector enterprise level where the respondents appeared to be least informed about these issues. Generally, the higher end of the value chain demonstrated a low level of awareness and concern with the implications of climate change and the climatic hazards unless they had a direct impact on their business.

Rice

Rice is a significant cash crop of Pakistan and its contribution is 3.1% of the value added in agriculture and 0.7% of GDP. Rice has been a major source of foreign exchange earnings and ranks as the second staple food grain crop in Pakistan. The yield of rice has increased as compared to the previous year because of high market rates however the quality if yield has deteriorated due to excessive rains and pest attck. [14]

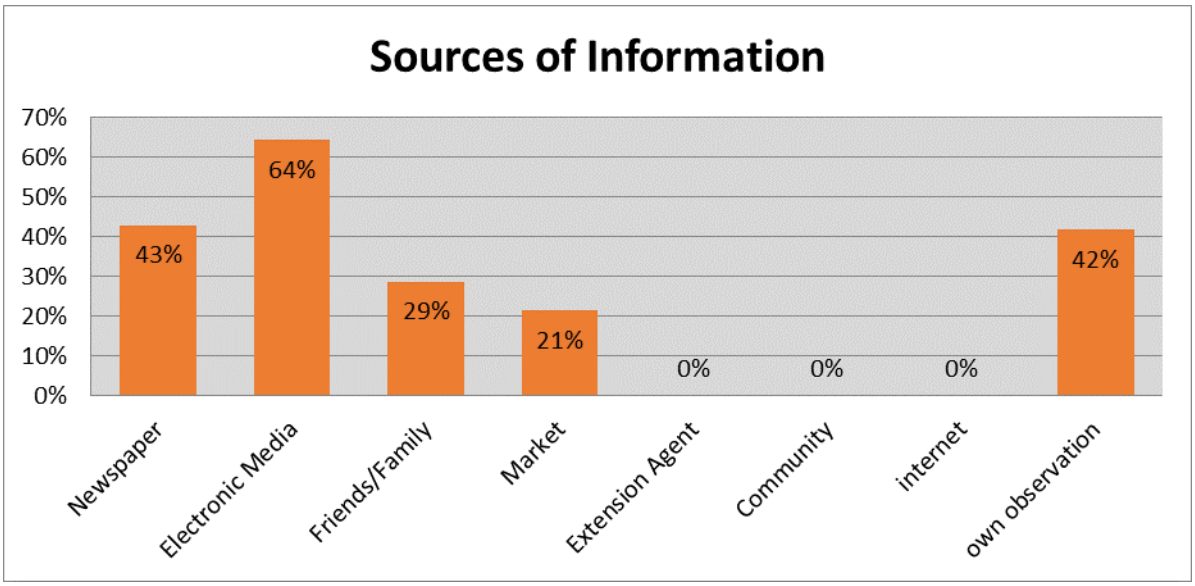
In terms of climate change awareness, the respondents appeared to have a sufficient level of awareness regarding some key issues. This can be attributed to the fact that rice is a water intensive crop and the key indicators of climate change awareness included rainfall quantity and patterns, ground water quality and surface water availability.

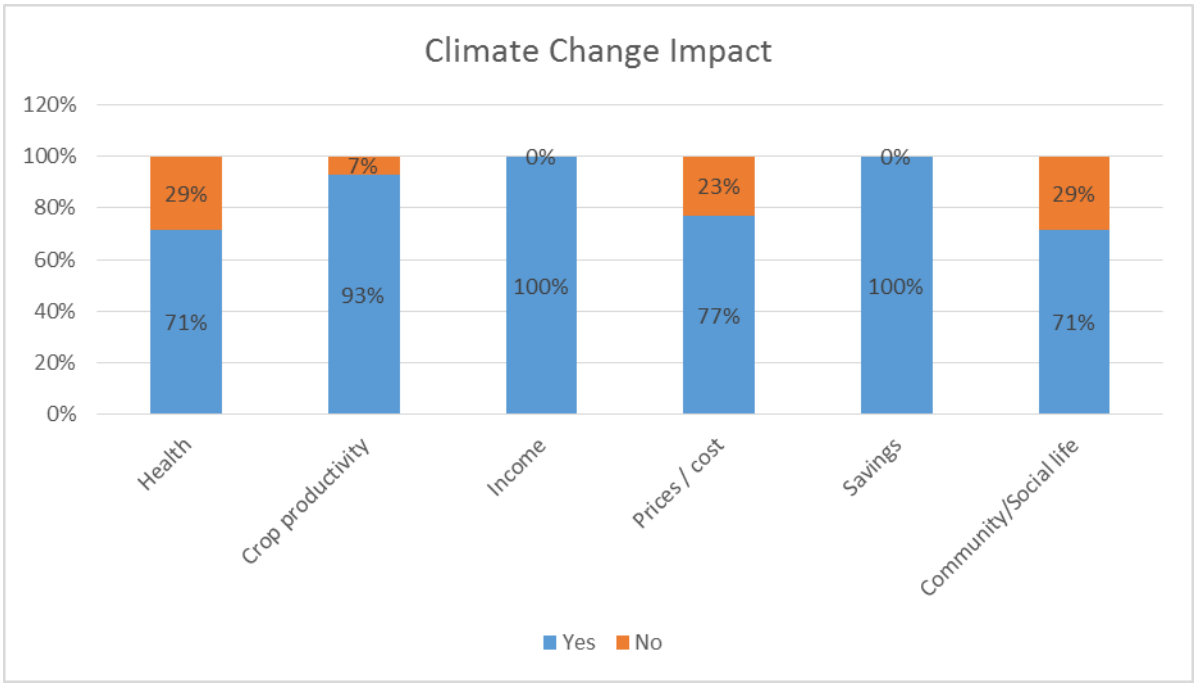


For each indicator of climate change awareness the response recorded was that more than 50% of the respondents strongly agreed with the occurrence each indicator. This can translate into the fact that the value chain of rice will be most responsive to adaptation techniques. The sources of

[14] Economic survey of Pakistan 2013-14, Government of Pakistan.

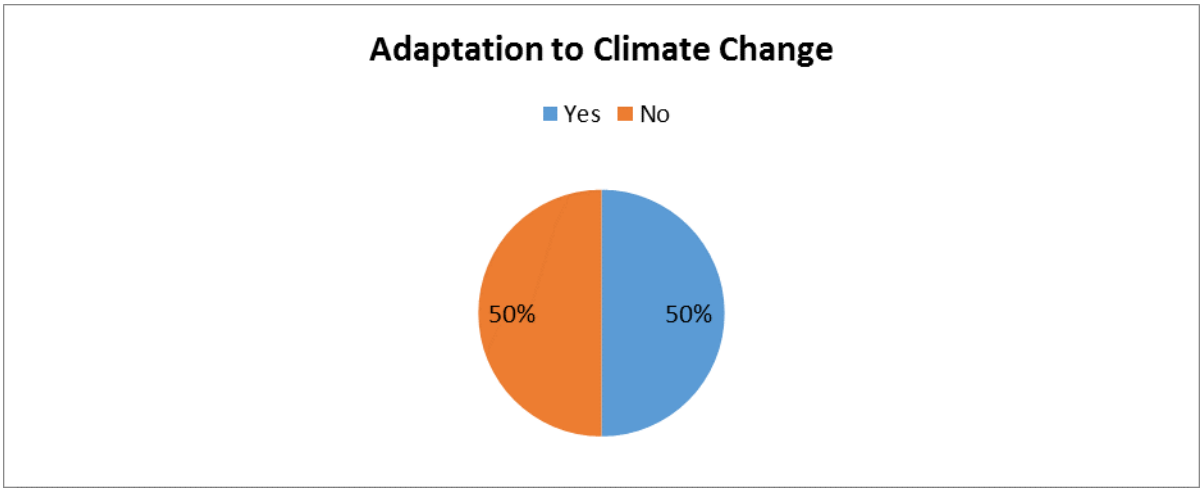
information for climate change embark upon the fact that electronic media plays a fundamental role in disseminating information regarding climate change. This can be in terms of rainfall prediction, expected rising temperatures or even in terms of early warning system for floods. Another source that was highlighted was personal observations, where people relied on their personal observations regarding climate change in terms of rainfall intensity and changes in temperatures for the current month in comparison to previous years.

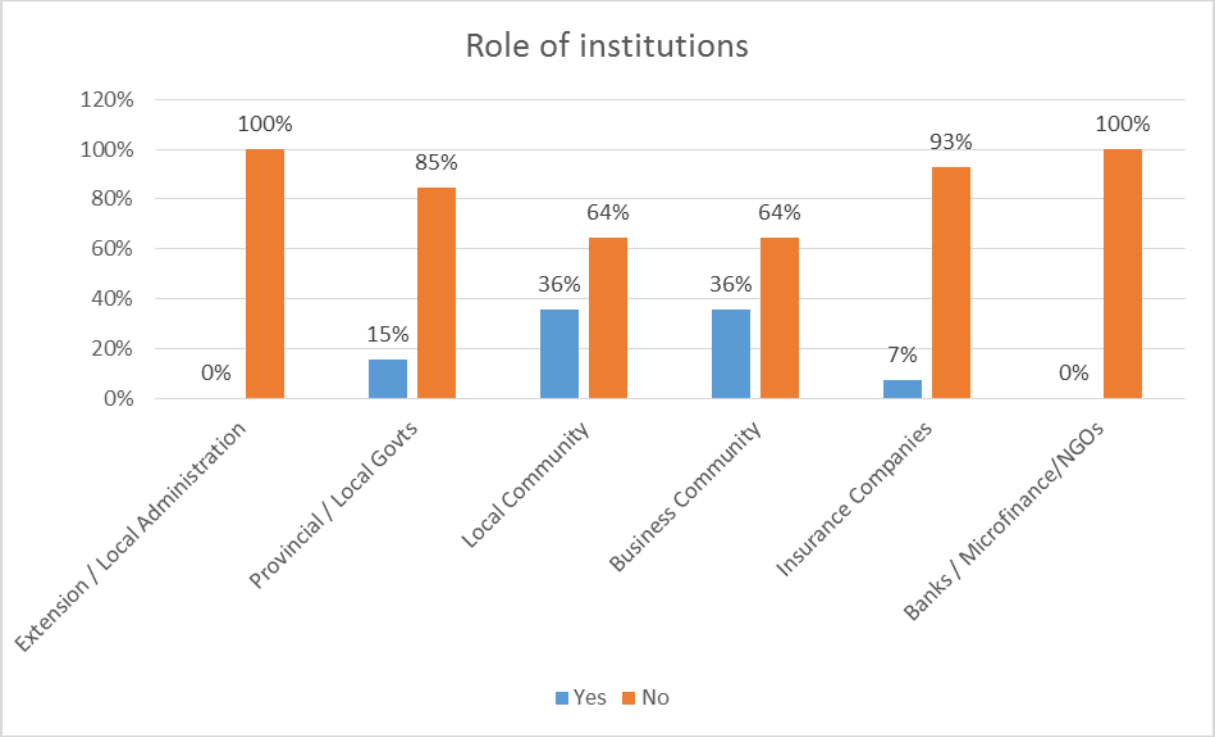




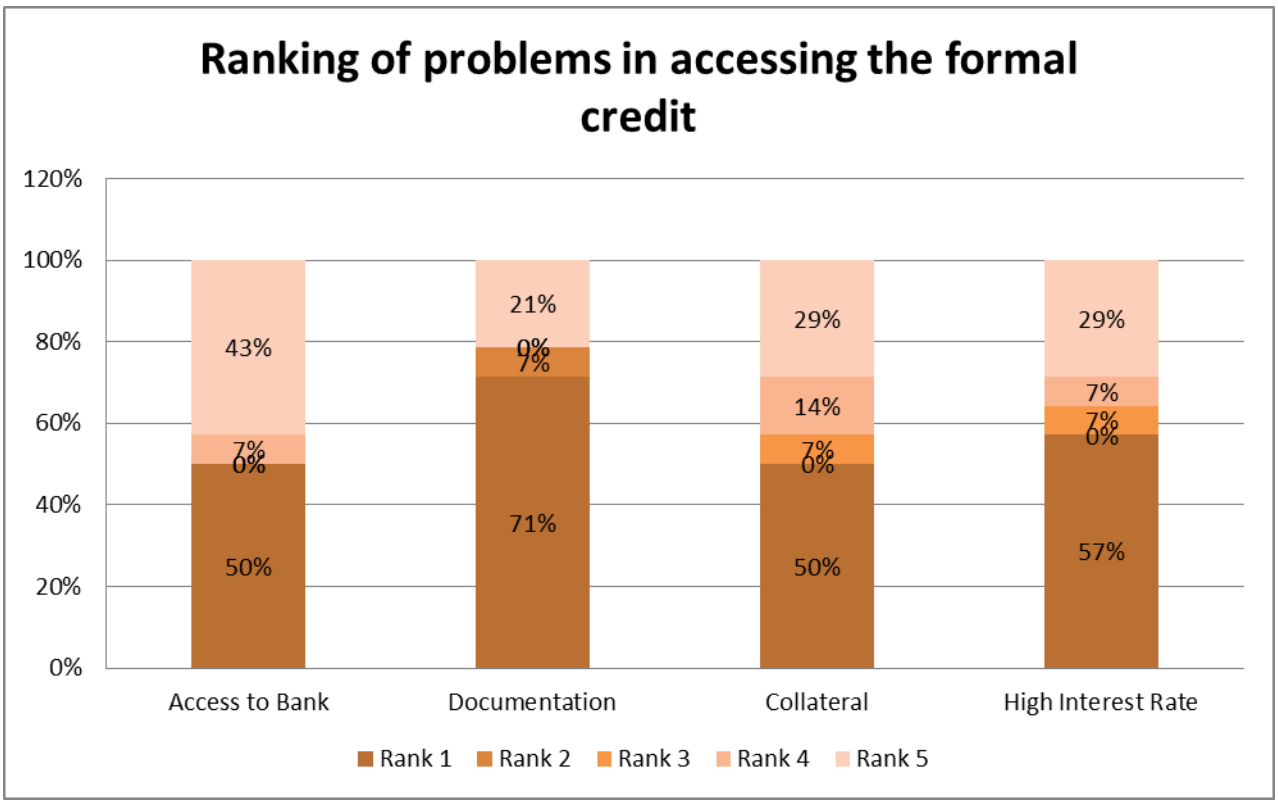
Climate change impacts are mostly noted in terms of negative impact on are income, savings and crop productivity. In terms of adaptation to climate change, 50% of the respondents claimed to adapt to the impacts of climate change.

The responses to roles of institutions to climate change adaptation strongly suggests an absence of planned or anticipated adaptation to the climatic vulnerabilities and hazards exposing the institutional ineffectiveness in promoting such strategies or actions. The local community and business community emerged as the two major institutions that played a minor role in adaptation techniques.





The respondents of the value chain rice face numerous difficulties in accessing the formal credit. The respondents ranked their difficulties in this domain and the results noted evidently that in the case of rice, documentation of the formal credit is the key challenge of the respondents. Around 71% of the respondents ranked documentation as the fundamental hindrance in accessibility of formal credit. In in-depth interviews with the respondents the complications in the documentation process were attributed to the English language as being a barrier and hidden charges which the respondents were unable to comprehend in the documentation process.

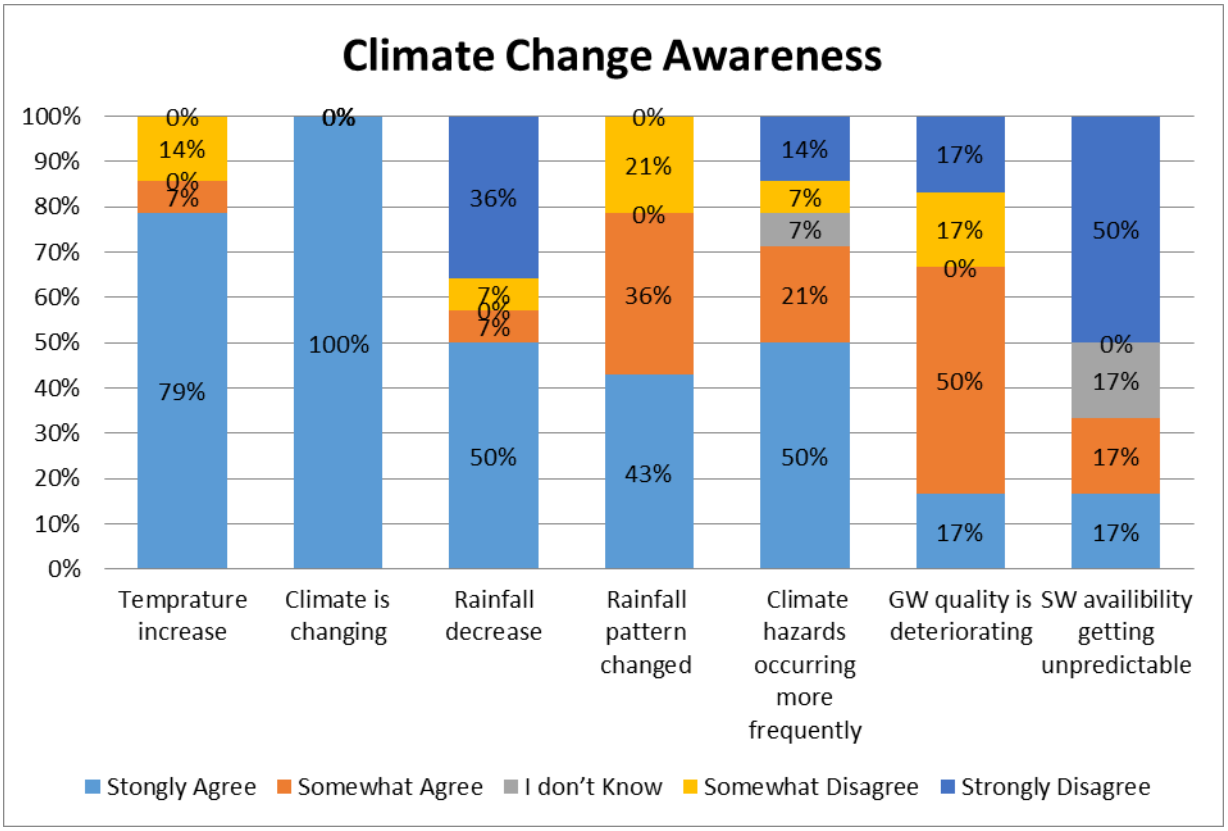


Wheat

Wheat is the principal food grain of Pakistan because it is the staple diet of the population and occupies significance in terms of agricultural policy. Wheat contributes 10.3 percent to the value added in agriculture and 2.2 percent to GDP. The sowing area of wheat has increased in the past year and its yield was 1.2 percent more than the target originally set. This can be attributed to the fact that cotton matured early and more wheat was sown instead.[15]

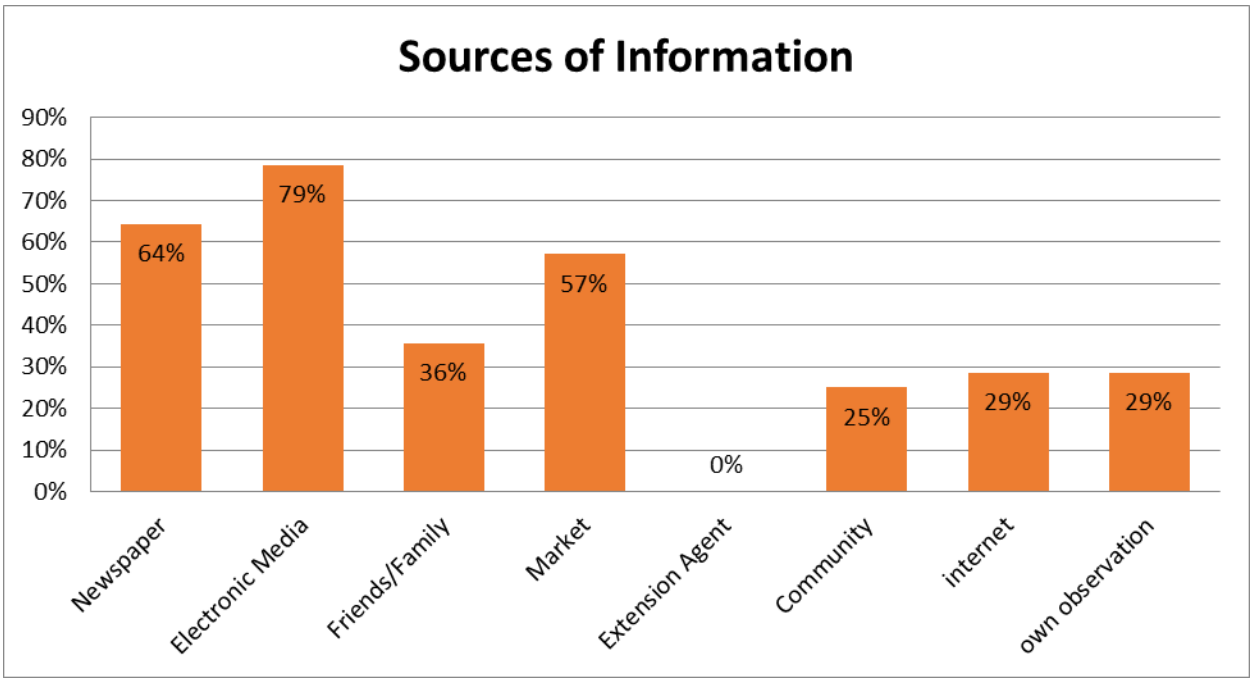
Wheat is the largest food crop in Pakistan. It contributes 2.8 percent to GDP. Its total cultivated area during the year 2008-09 is reported 9062 thousand hectors. In terms of climate change awareness, the respondents agree less with indicators related to water and more with climate change in general. Temperature increase is also a major indicator for awareness of climate change in wheat. The indicators related to water quality and availability note very low awareness.

[15] Economic survey of Pakistan 2013-14, Government of Pakistan.

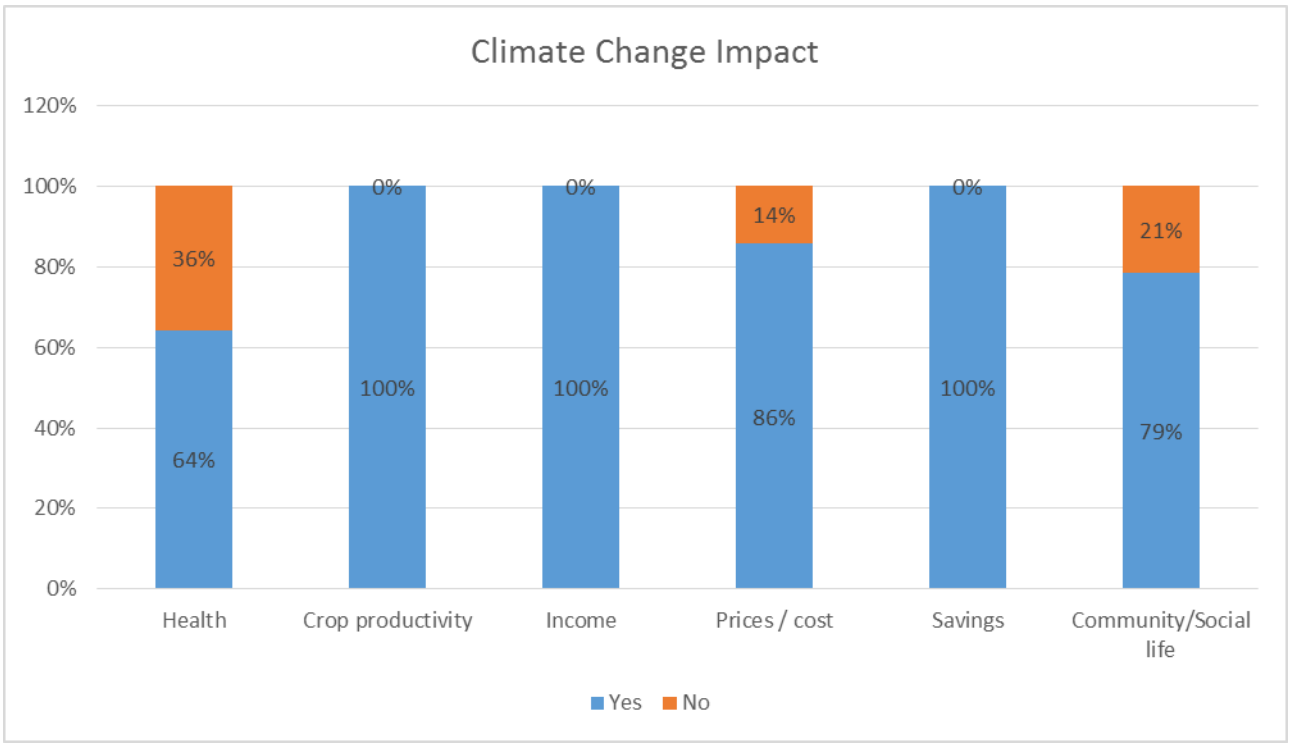


The major sources of information for climate change as depicted in the value chain of wheat are electronic media followed by newspaper and the market. As also noted earlier, the extension agent

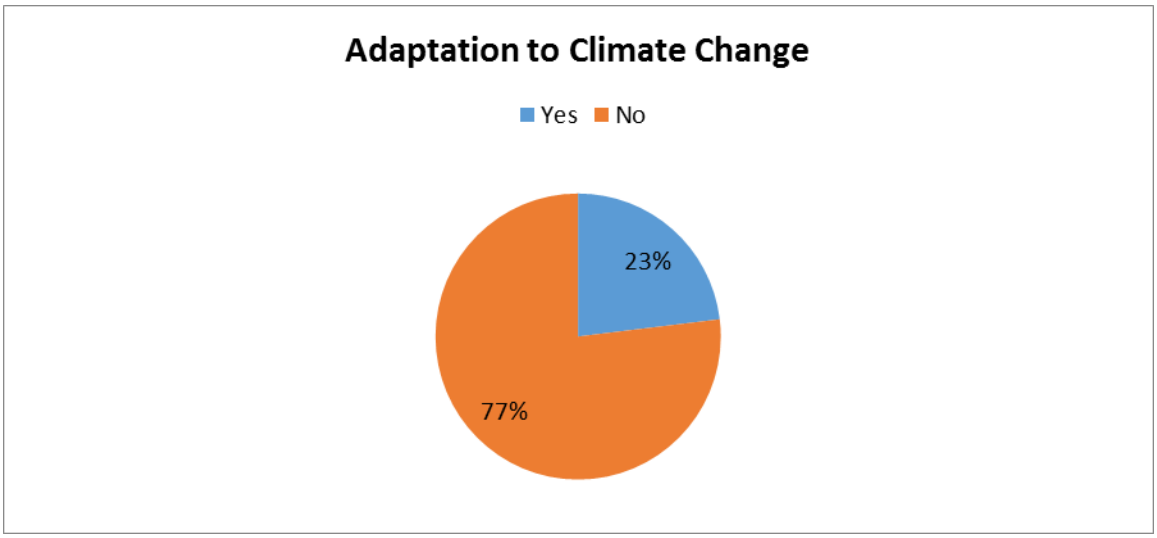
had no role to play in dissemination of climate change awareness amongst the respondent group.

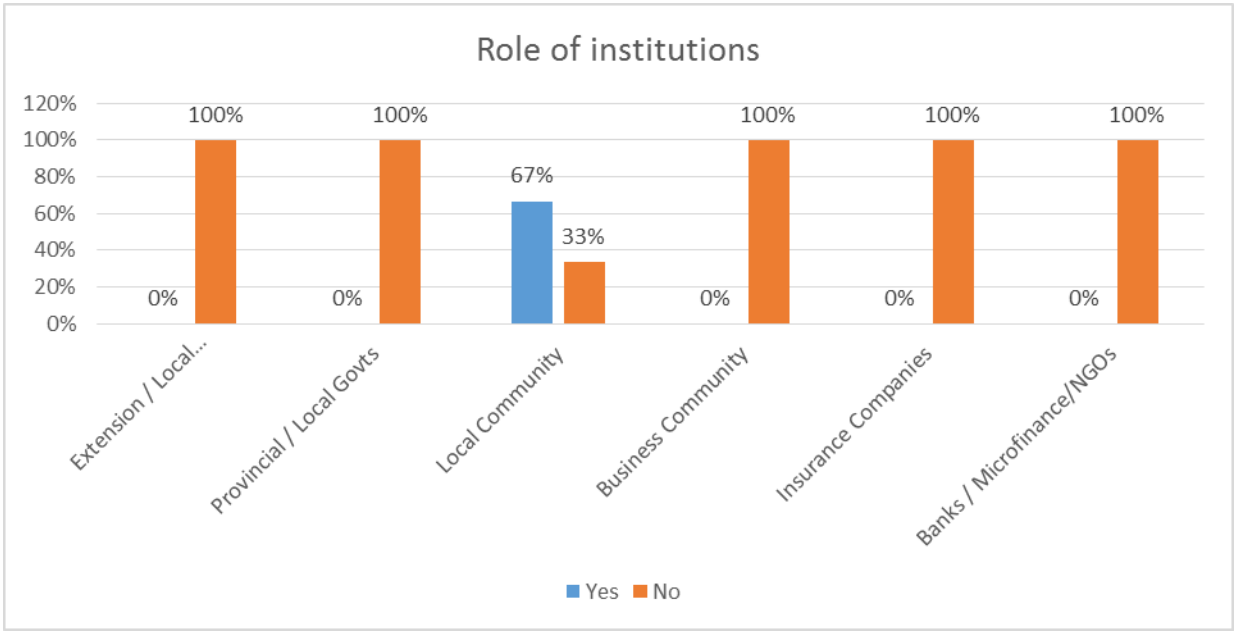


The trend in climate change impact notes the segments of life most severely affected and agreed upon by all the respondents are income, crop productivity and savings.

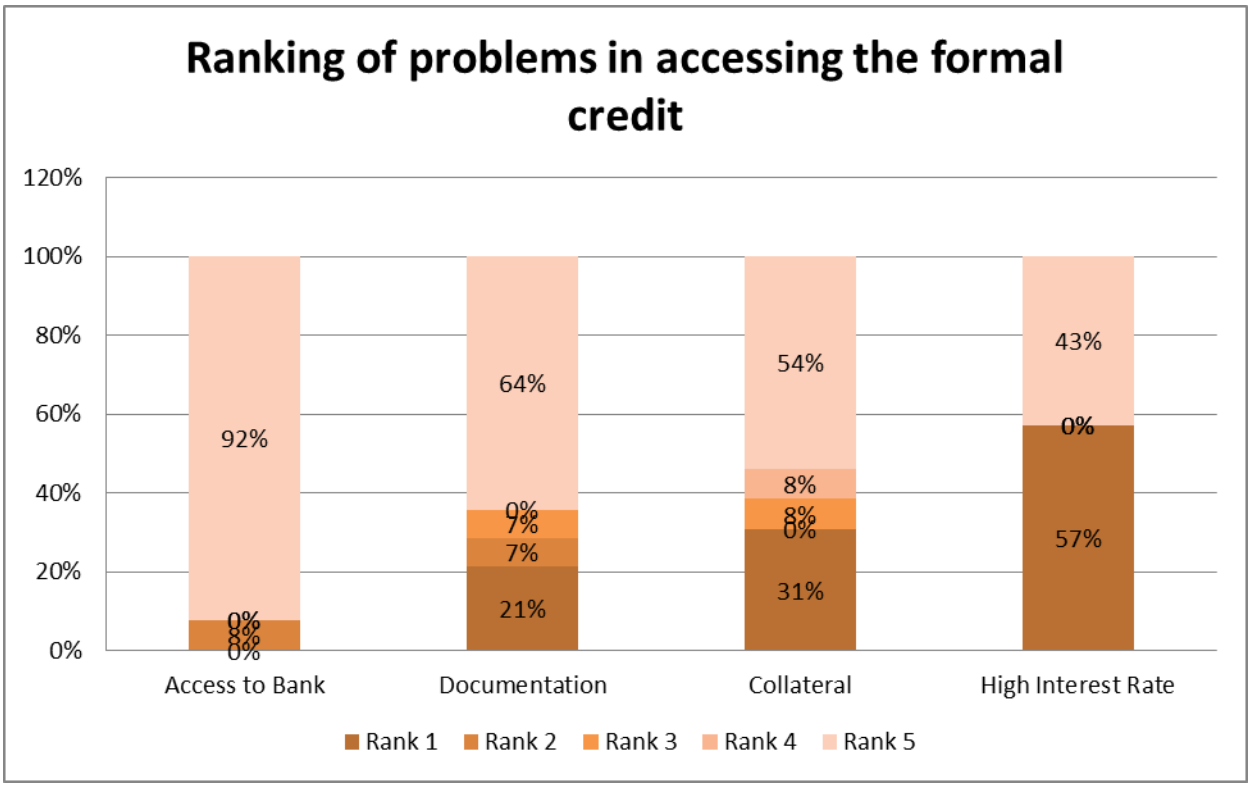


Majority of the respondents were reportedly not employing any adaptation techniques to mitigate the impacts of climate change. The adaptation approach is mainly in the form of reactive measures and not sustainable. The role of institutions was only highlighted in terms of community assistance otherwise there was absolutely no role of any other institution.





The most cited reason for inaccessibility to formal credit is high interest rate for the majority of the respondents; this is followed by collateral and documentation

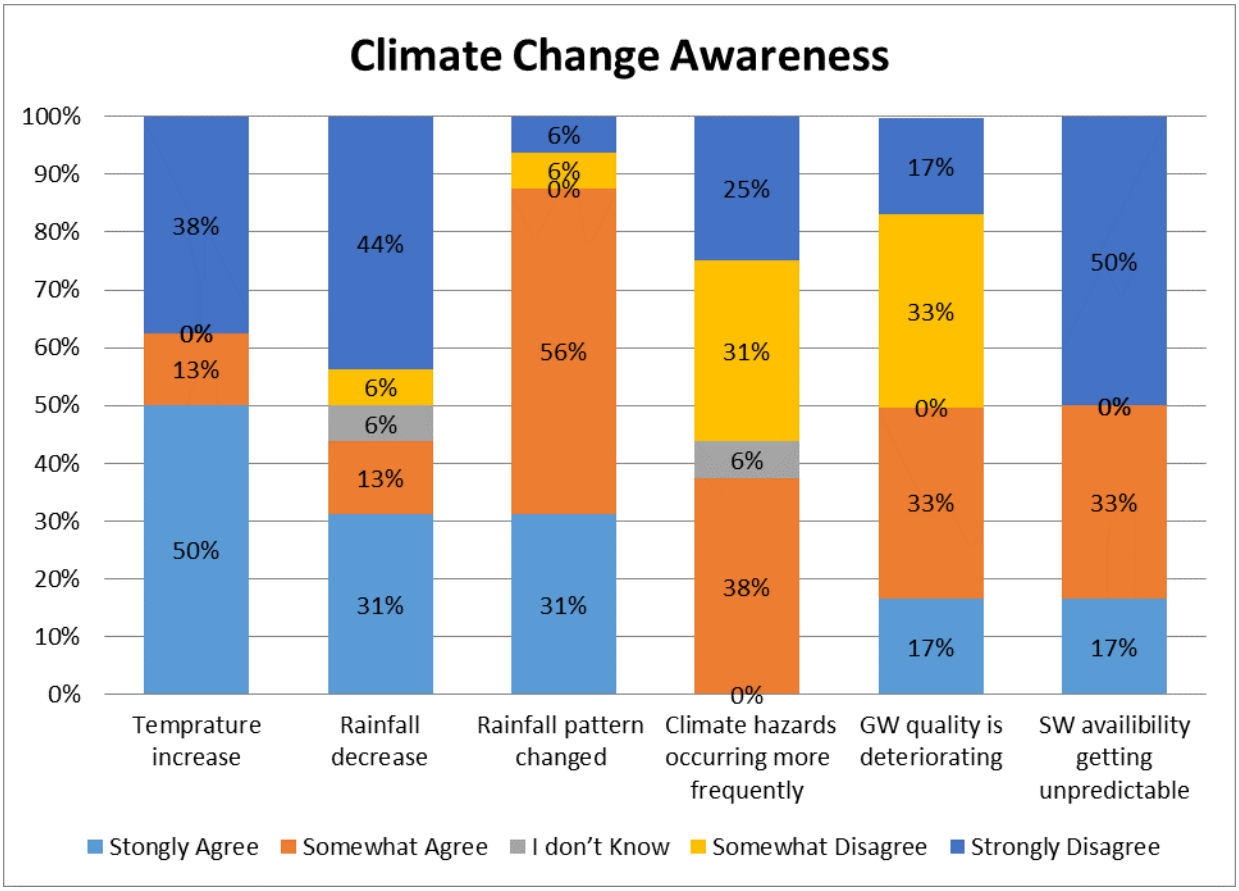


Cotton

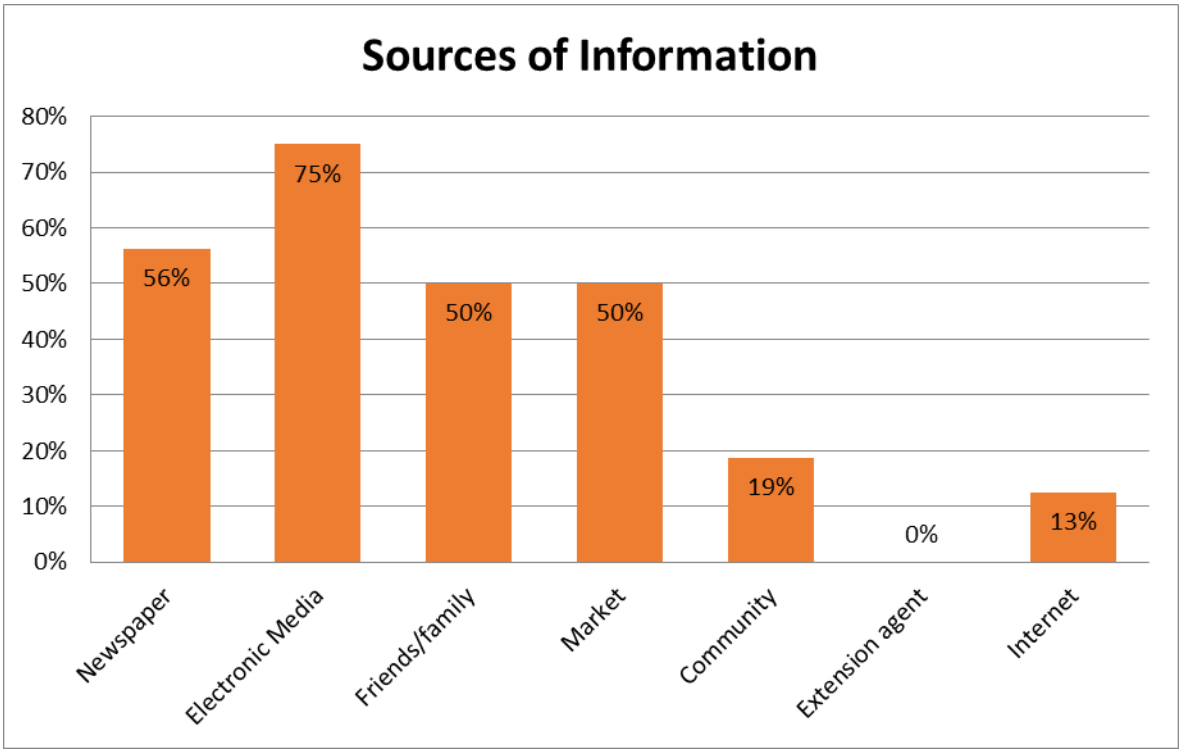
Cotton crop significantly contributes to the economy by providing raw material to the textile industry, such as cotton lint as an export item. It contributes 1.4 percent in the GDP and 6.7percent in agriculture value addition. The area of production for cotton has decreased over the past few years because of decline in local and international prices and farmers have substituted the crop with others like maize and rice.[16]

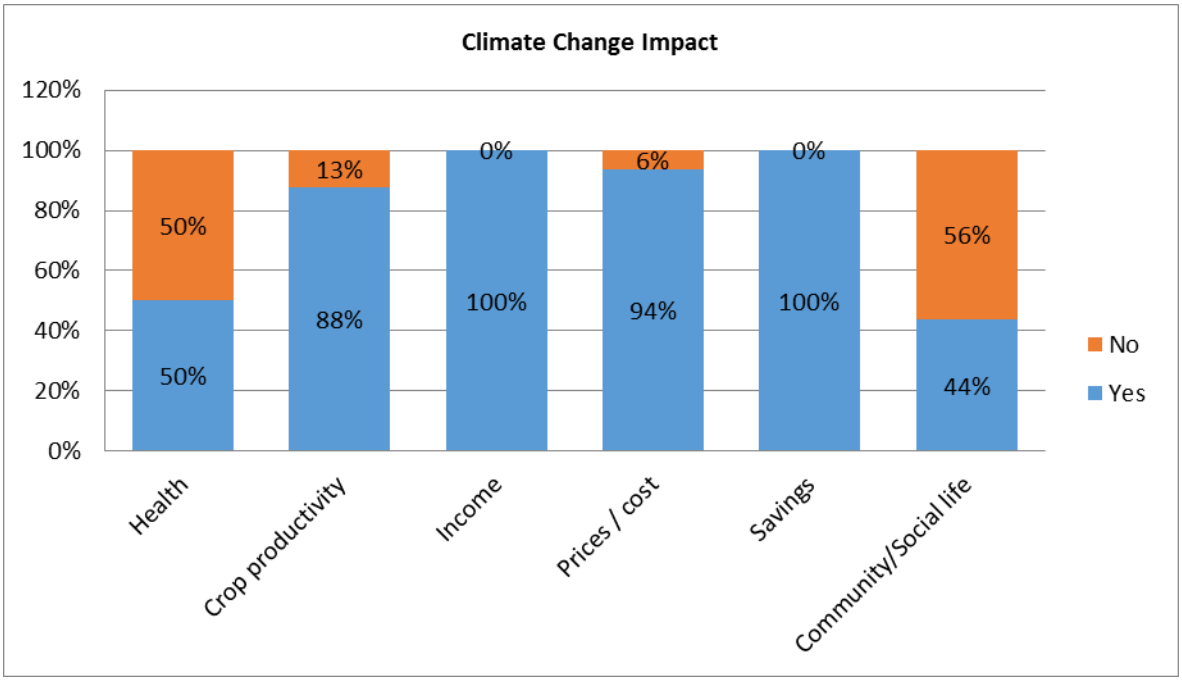
[16] Economic survey of Pakistan 2013-14, Government of Pakistan.

The analysis of climate change awareness in the value chain of cotton notes limited awareness of the respondents.



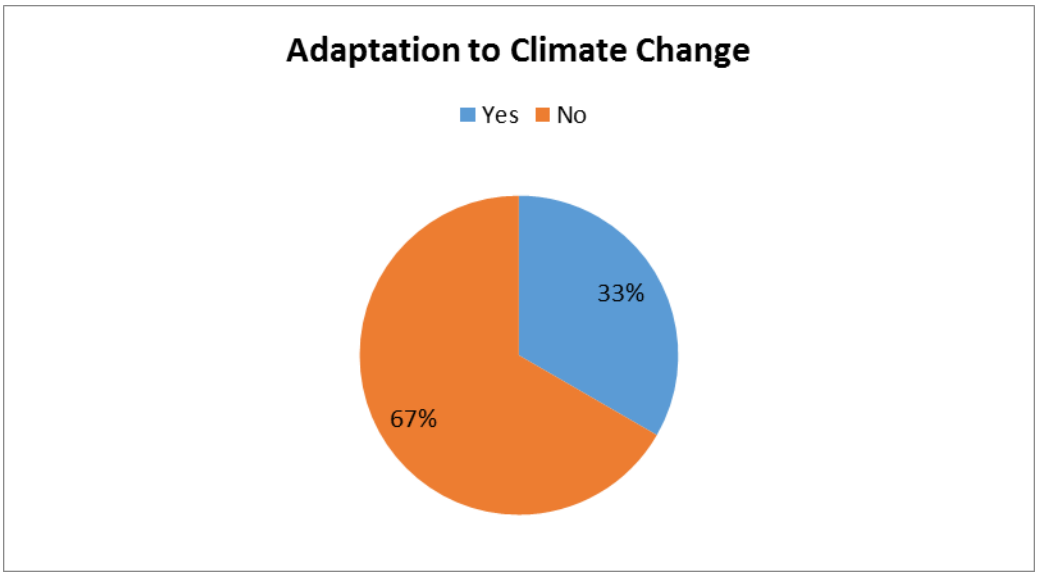
Electronic media was noted to be key source of information followed by newspapers, and informal channels. The other source of information that was highlighted is the internet which can be attributed to the processors like mill owners and ginners that were more progressive in terms of technology use.

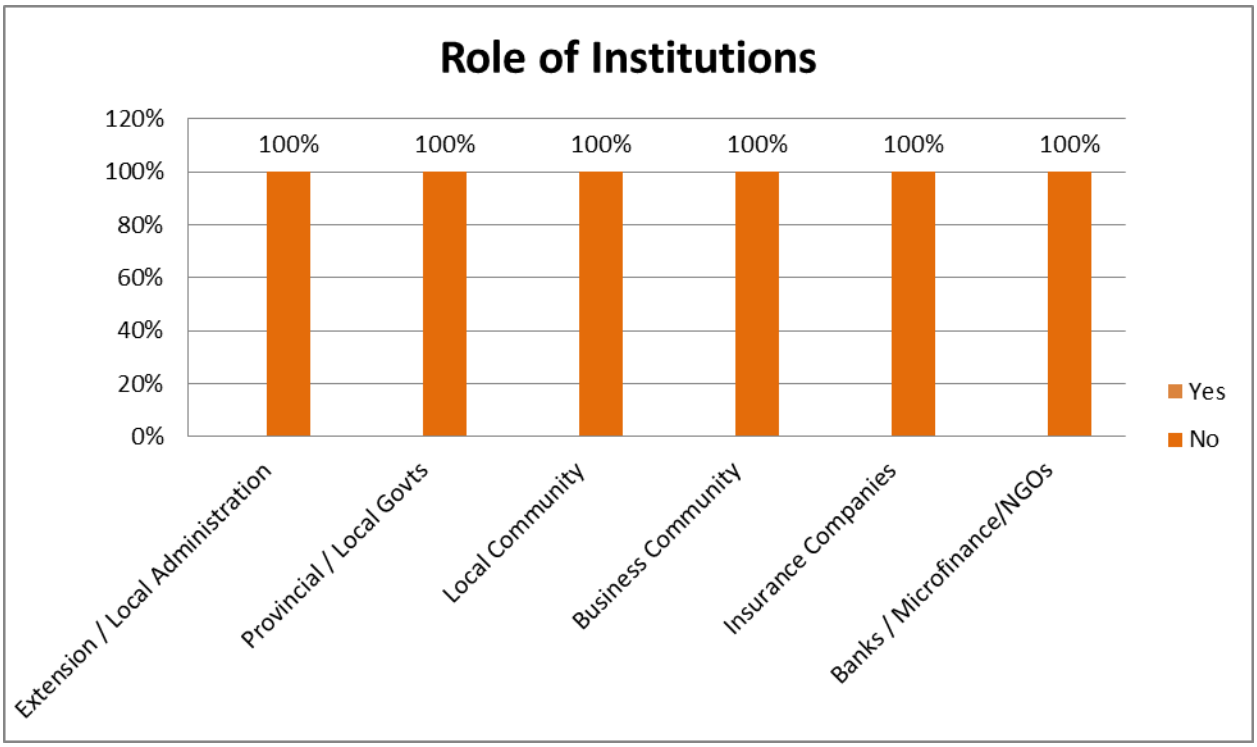

Sources of Information
80%
70%
60%
50%
40%
30%
20%
10%
0%
56%
75%
50%
50%
19%
0%
13%
Newspaper
Electronic Media
Friends/family
Market
Community
Extension agent
Internet


Climate Change Impact
120%
100%
80%
60%
40%
20%
0%
50%
50%
13%
88%
0%
100%
6%
94%
0%
100%
56%
44%
No
Yes
Health
Crop productivity
Income
Prices / cost
Savings
Community/Social life

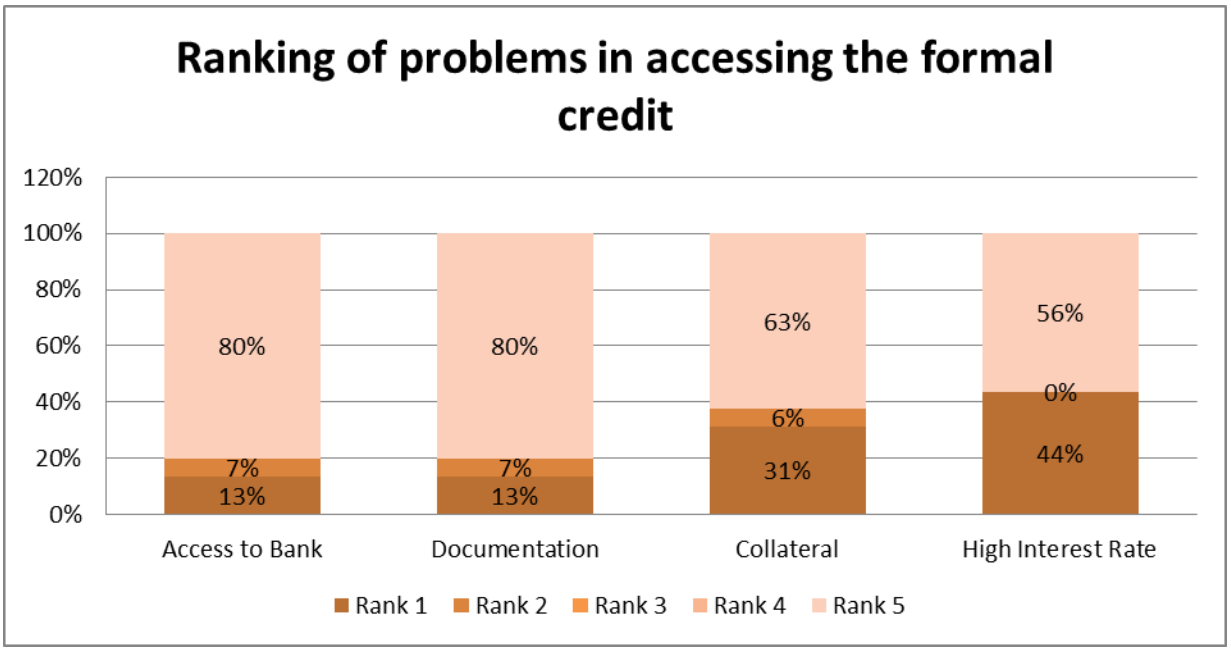
The climate change impact affected income and savings the most, followed by cost/prices. More than 80% of the respondents also claimed the impact of climate change on crop productivity as well.

In terms of adaptation to climate change the majority of the respondent groups claimed no adaptation to climate change. No role of any institution in adaptation was reported by the respondents.



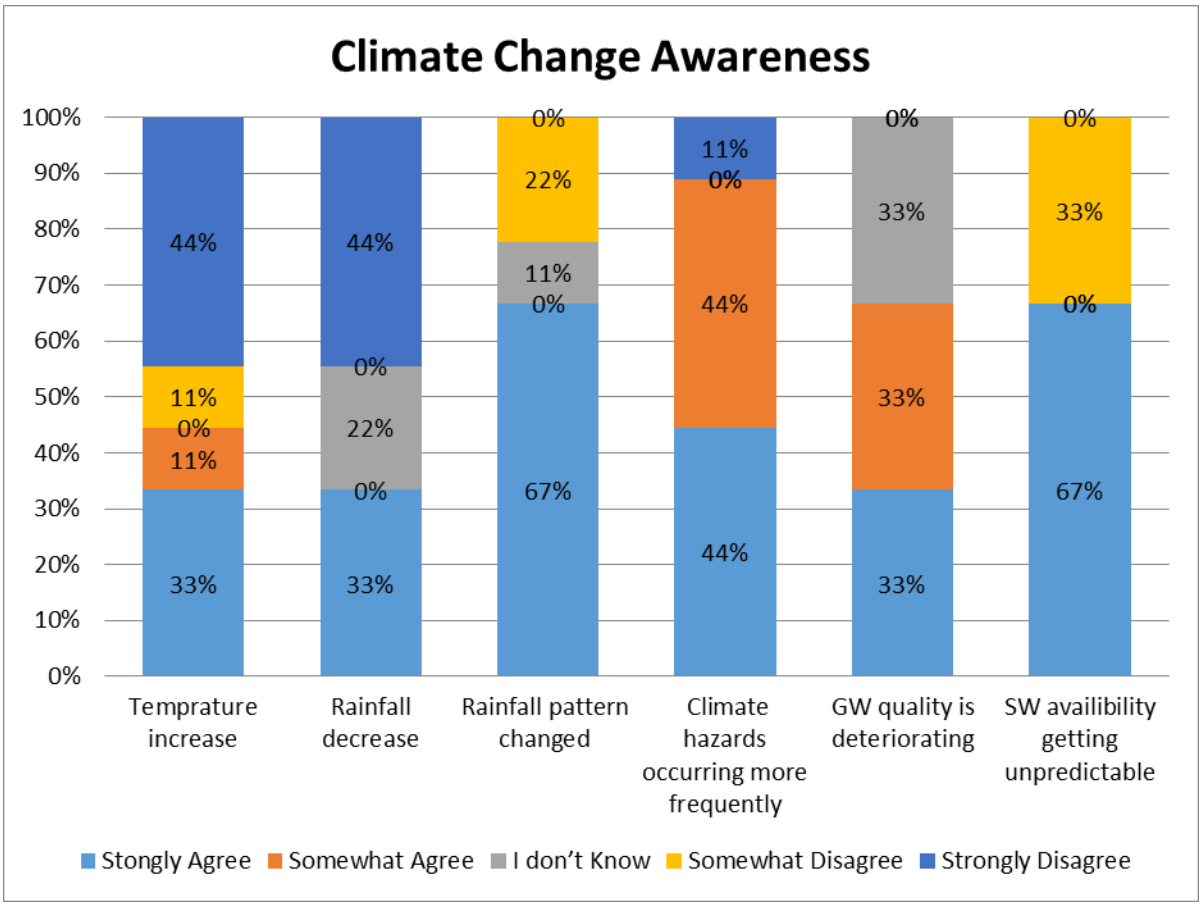


In terms of formal credit availability, the majority of the respondents ranked all the problems as not being vital in accessibility. However, high interest rate was rated by 44% as the fundamental reason for not accessing formal credit. Another finding that can be noted is that the processors in cotton like the mill owners and ginners refrained from credit and cited religious belief as the key reason.

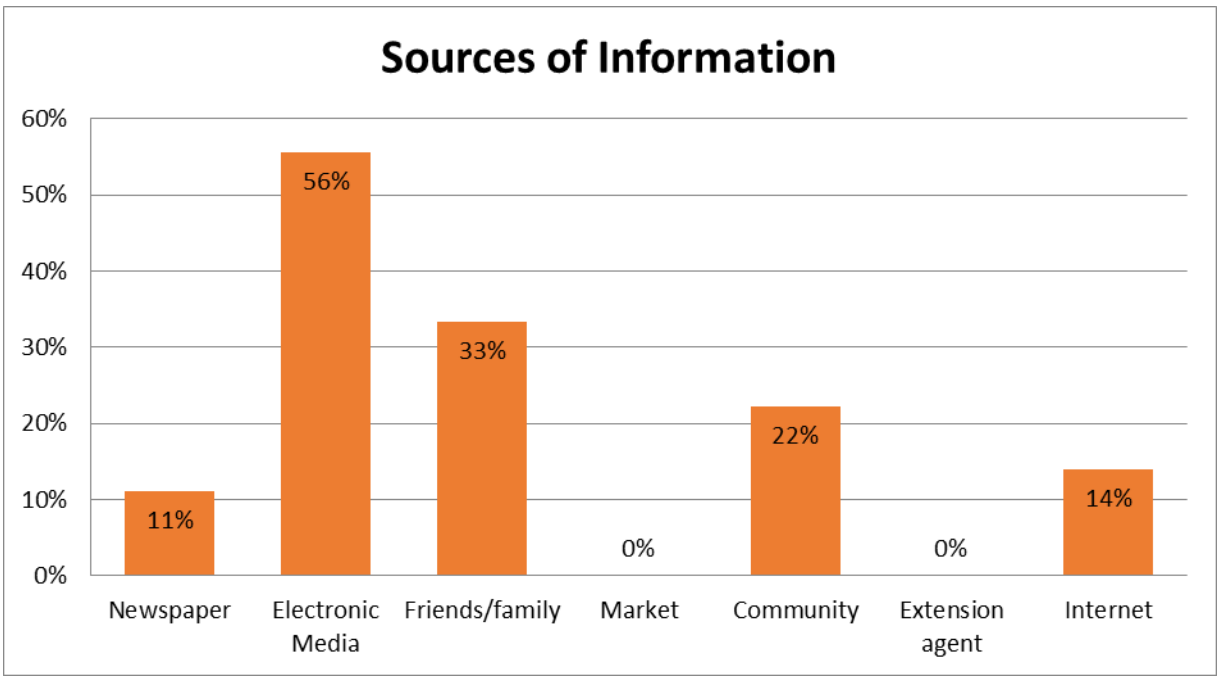


Potato:

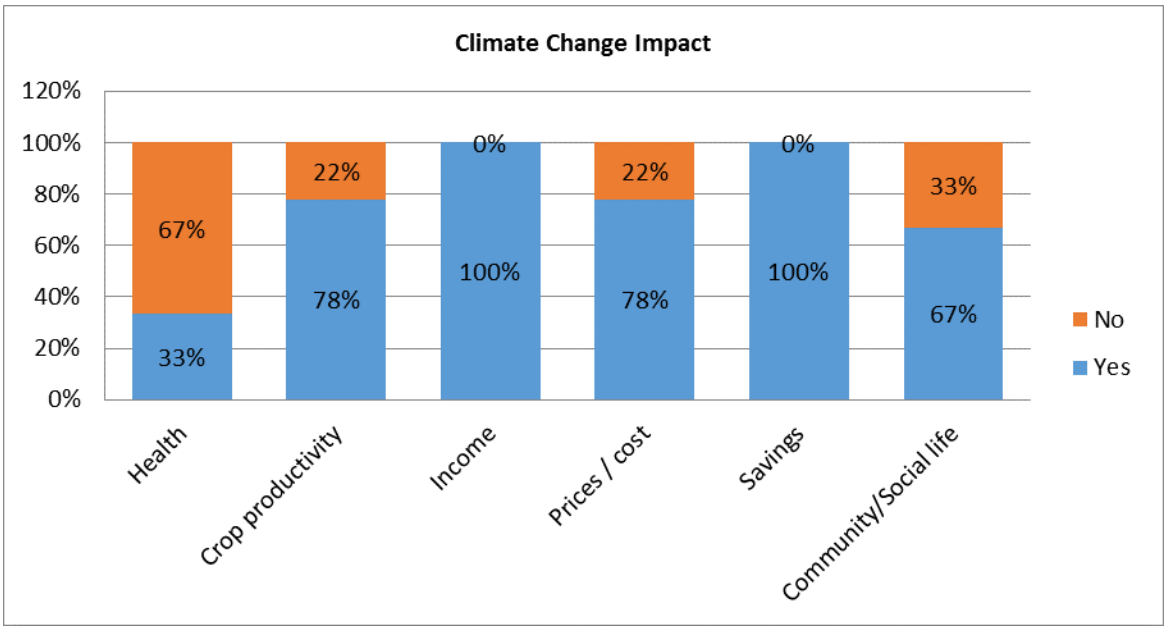
The climate change awareness in the value chain for potato is significantly low with the exception of some level of awareness on change in rainfall pattern and unpredictability in water availability. The majority of the respondents strongly agree with the fact that the rainfall pattern has changed with the passage of time however a small percentage agrees that rainfall has decreased. The majority of the respondents also communicated that temperature is decreasing as compared to previous season of potato which starts from December and ends in April. This can be attributed to the current situation of rainfall recorded in the month of April, which had not been the case in the previous years.



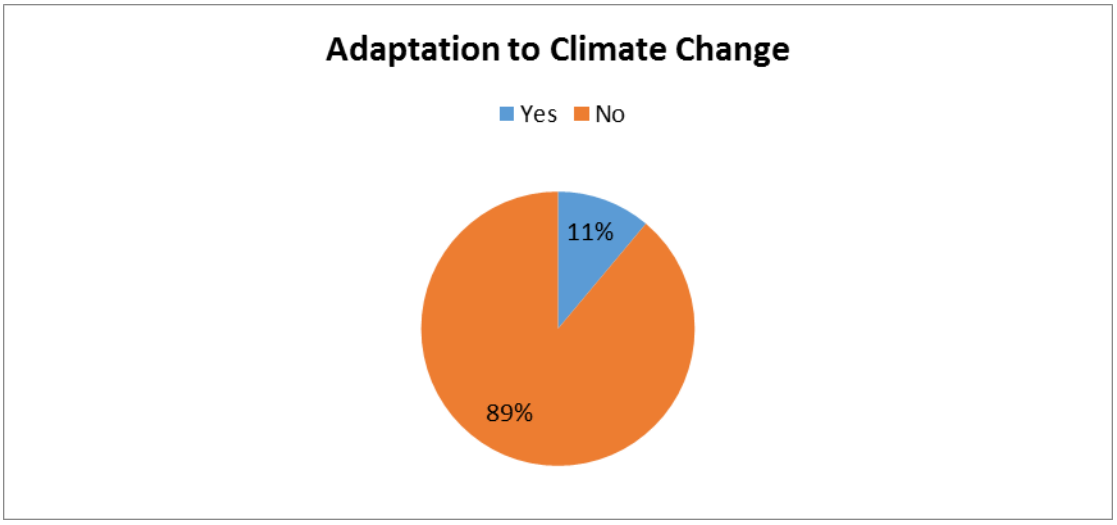
The source of information for the respondent group of the potato value chain is predominantly the electronic media followed by friends/family. Extension agents are not reported to share information in the context of climate change whereas the internet is another source that is accessed for information.

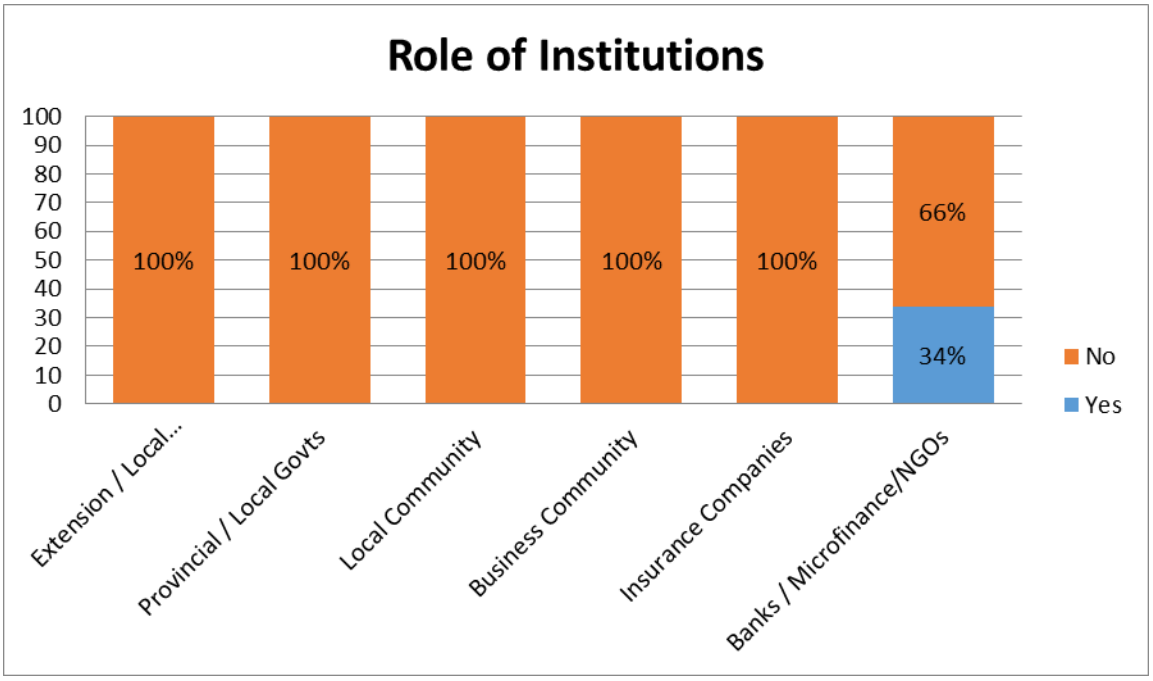


The impact of climate change is mostly identified in the form of decrease in income and savings followed by crop productivity.

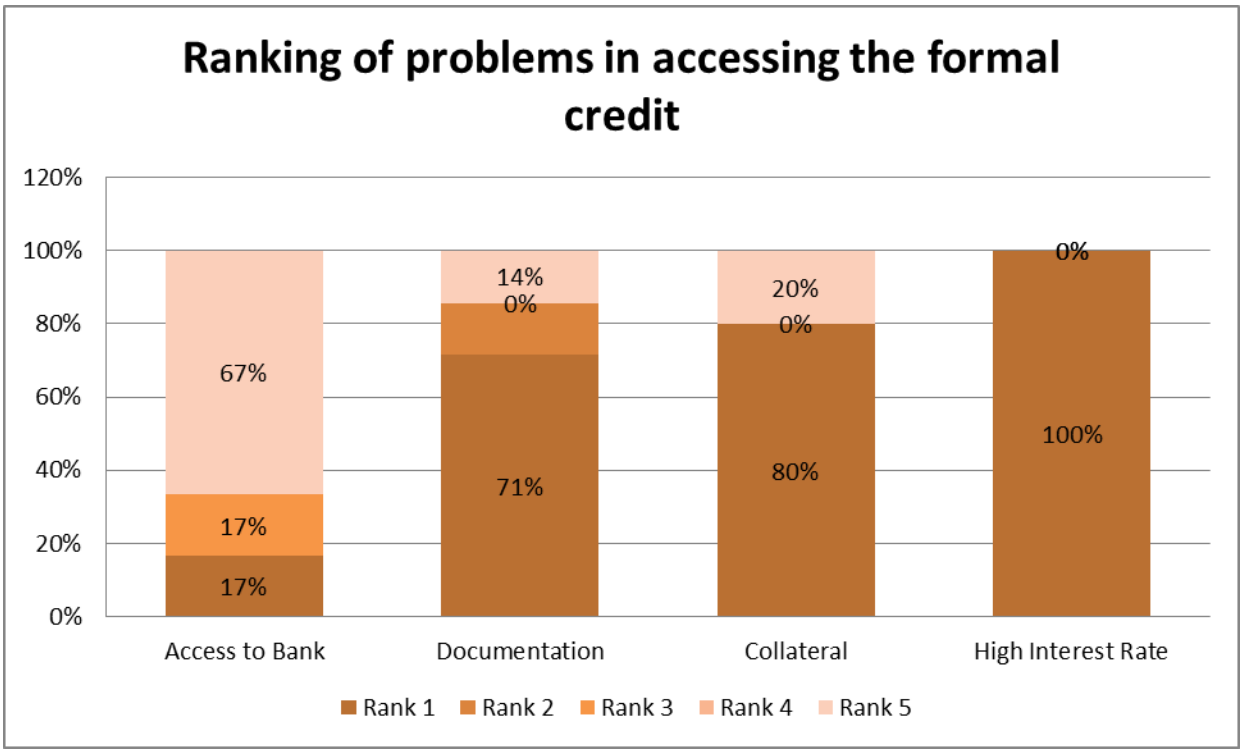


The adaptation to climate change is insignificant. Only 11% of the respondents reported to use some type of adaptation measures based on their own experiential knowledge. The role of institutions in resilience building is noted to be negligible.



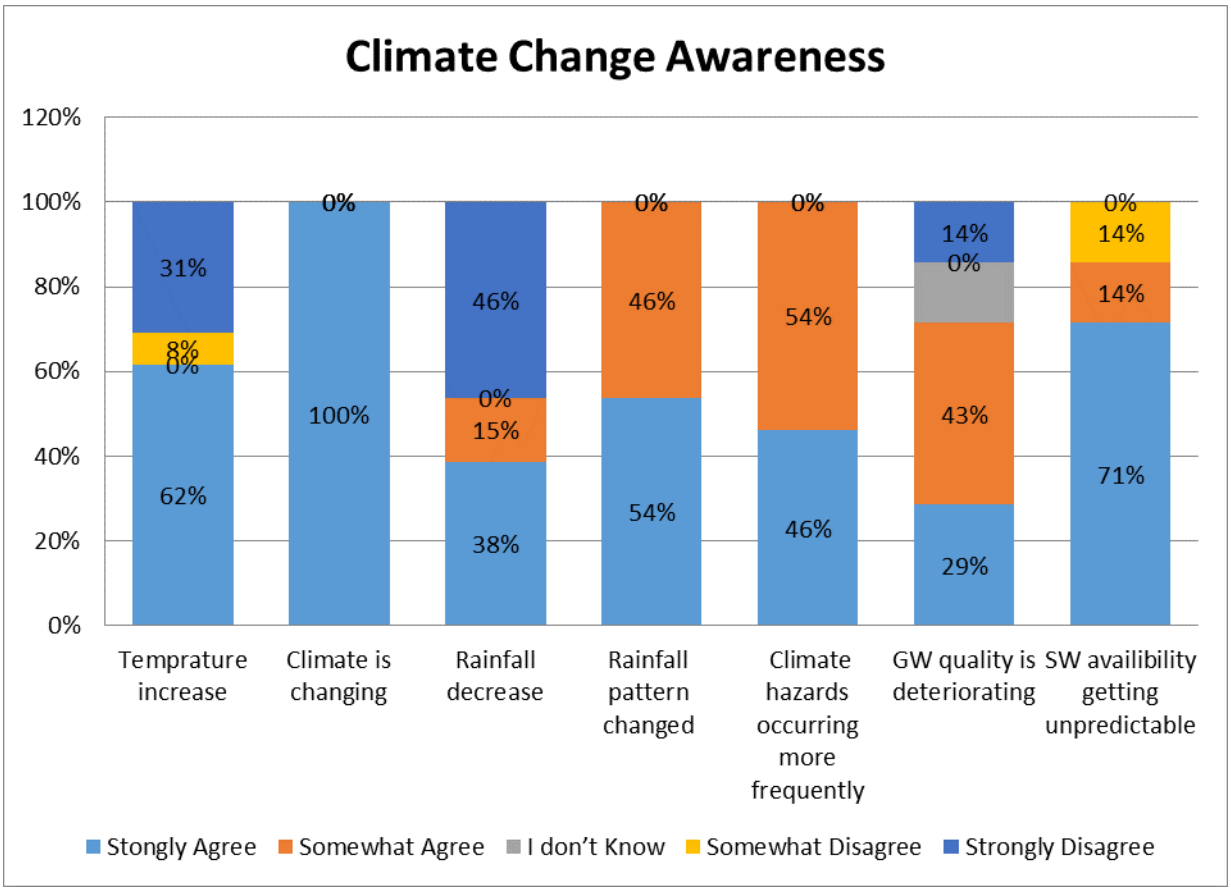


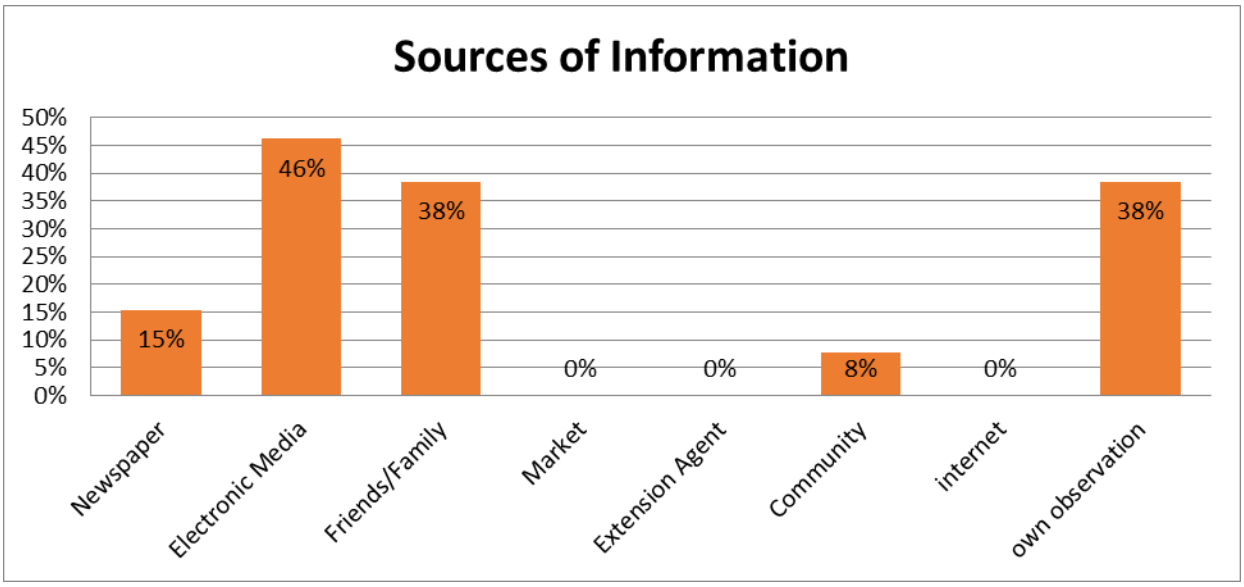
All the respondents across the value chain ranked high interest rate as the sole factor discouraging them from accessing loans from institutions.



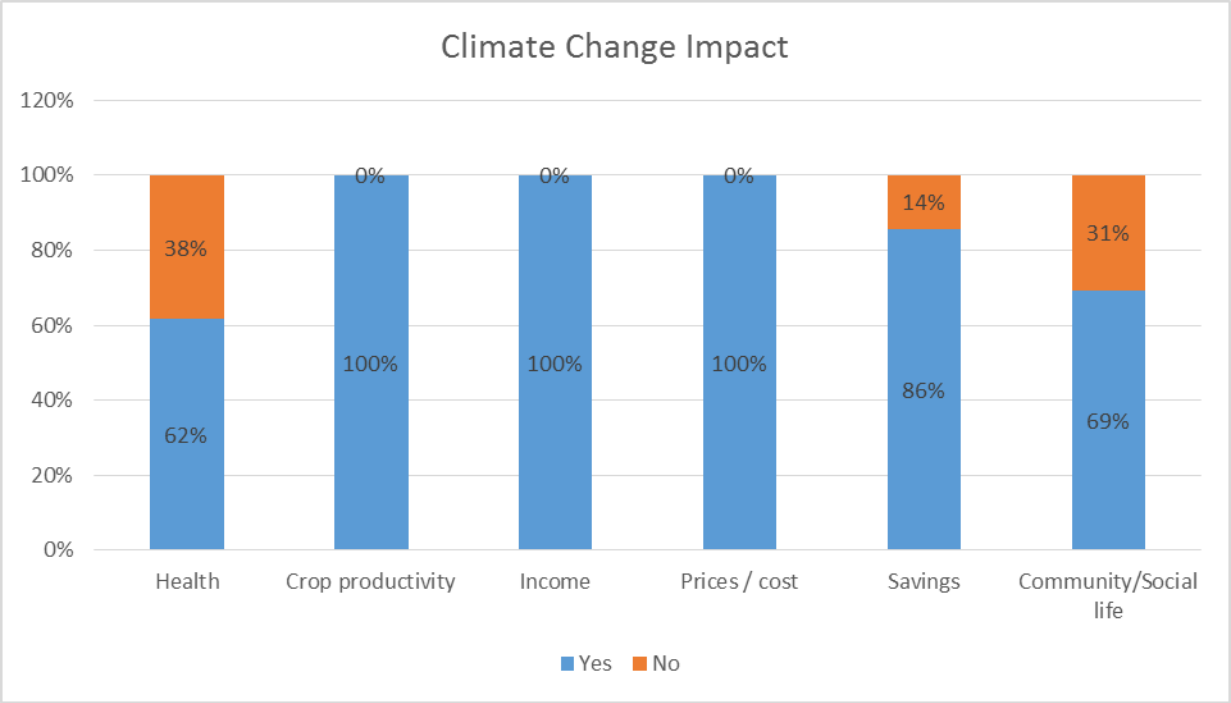
Tomato:

In case of tomato, the climate change awareness is noted to be moderate overall but high in terms water availability and increase in temperature. The majority also agrees with changes in rainfall pattern and climate hazards occurring more frequently. Electronic media was cited as the main source of information followed by own observation.

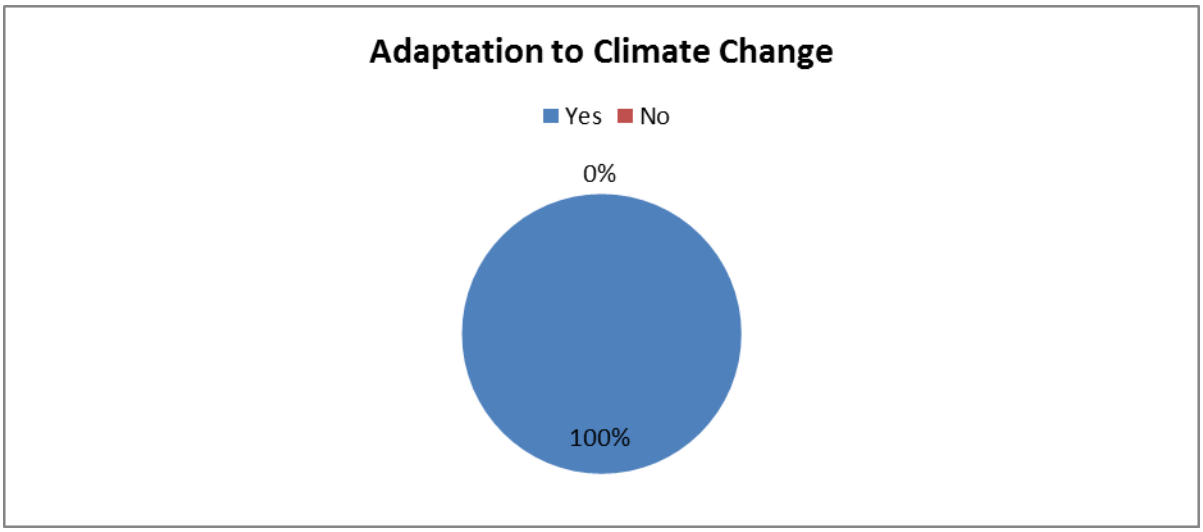


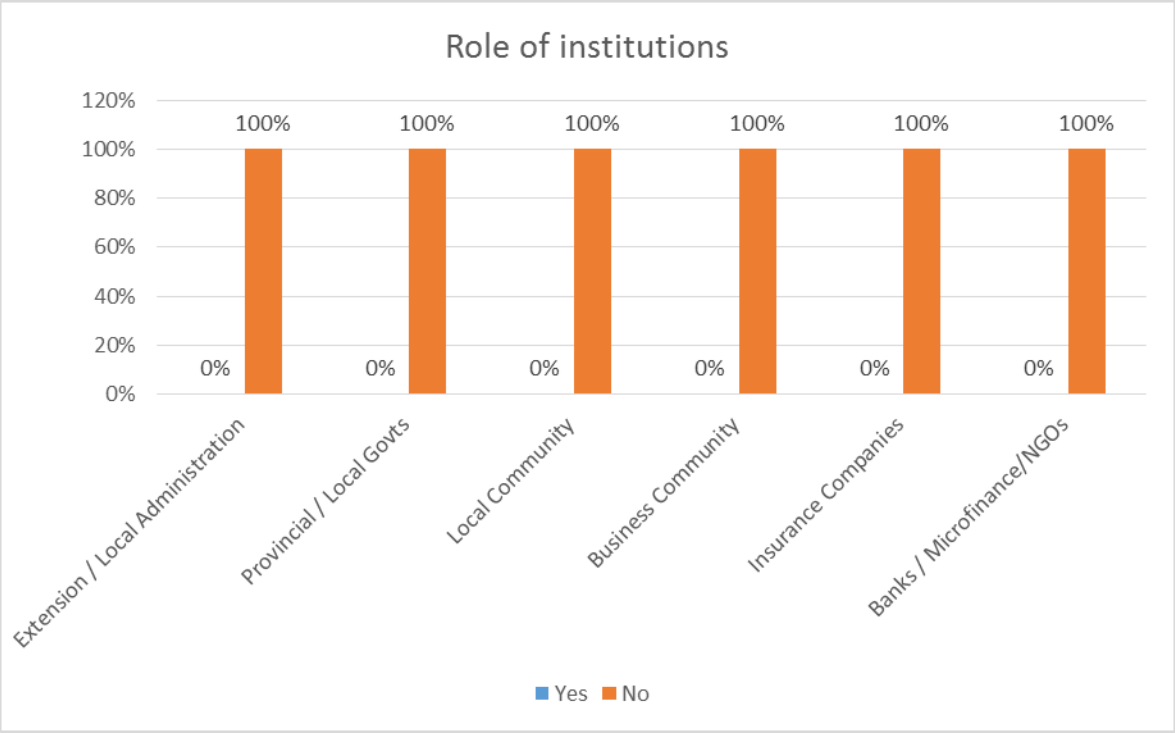


The impact of climate change is noted to be predominantly on income, price, savings and crop productivity of the respondents.

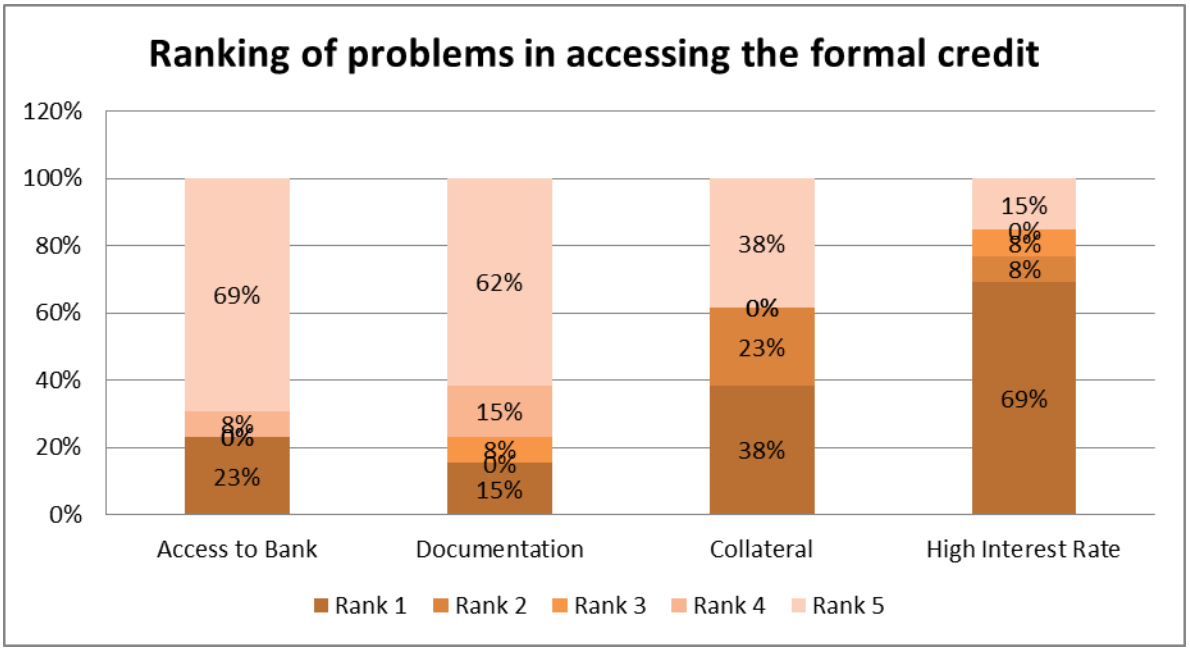


All the respondents across the tomato value chain claimed to undertake some adaptation measures to climate change, however, they viewed the role of other institutions as negligible in this regard. All the respondents claimed to adopt adaptation measures based on their own experiential knowledge.





High interest rate followed by the requirement of collateral was cited as the most significant reason for the inability to access formal credit. Access to the bank and documentation were noted as not being extremely important for the respondents as a hindrance to acquire credit.

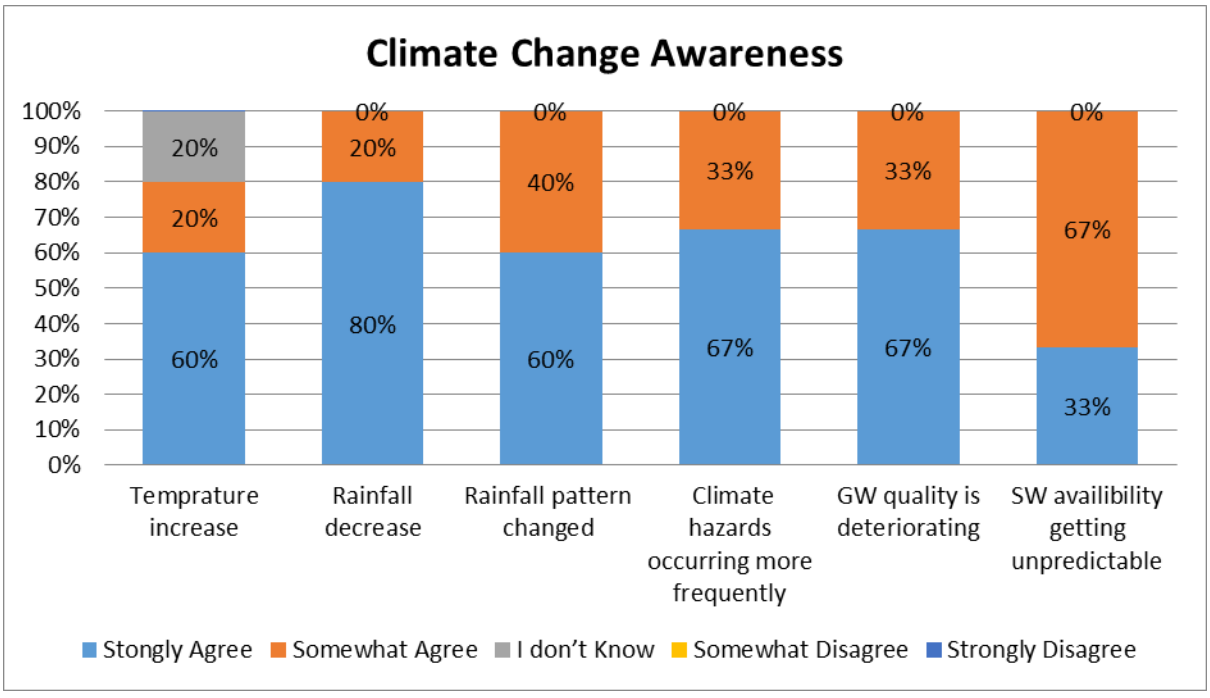


Sugarcane

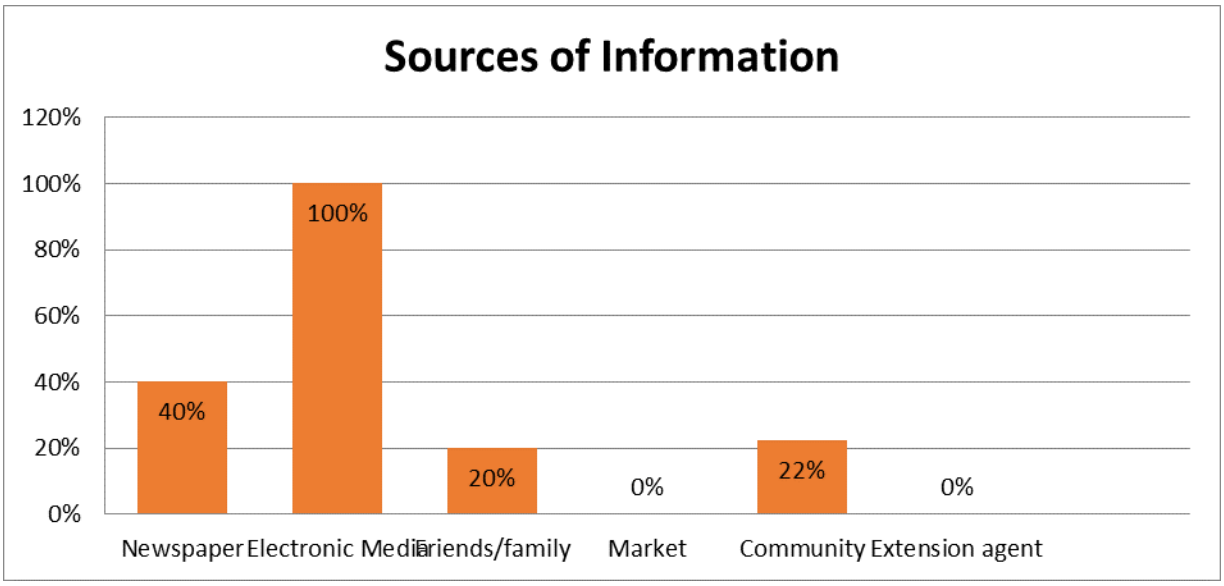
Sugarcane is a t cash crop and contributes substantially to the economy of Pakistan. It also provides raw material for the sugar industry in Pakistan and contributes 3.4 percent in agricultural value addition and 0.7 percent in GDP. Sugarcane is also a source of foreign exchange because in the year 2013-14 it earned $236.8 million. Sugarcane production was 2.3 percent more than the target set originally for the year. This can be attributed to the fact that weather has become more favorable and soil fertility has increased due to the occurrence of the recent floods.[17]

The production of sugarcane for the year 2012-13 is reported at 62.5 million tones, although the set target was 59 million tones for 2012-13 it shows a healthy performance of 5.9 percent and if compared with last year which was 58.4 million tones it can be translated as an increase of 7.0 percent. [18]

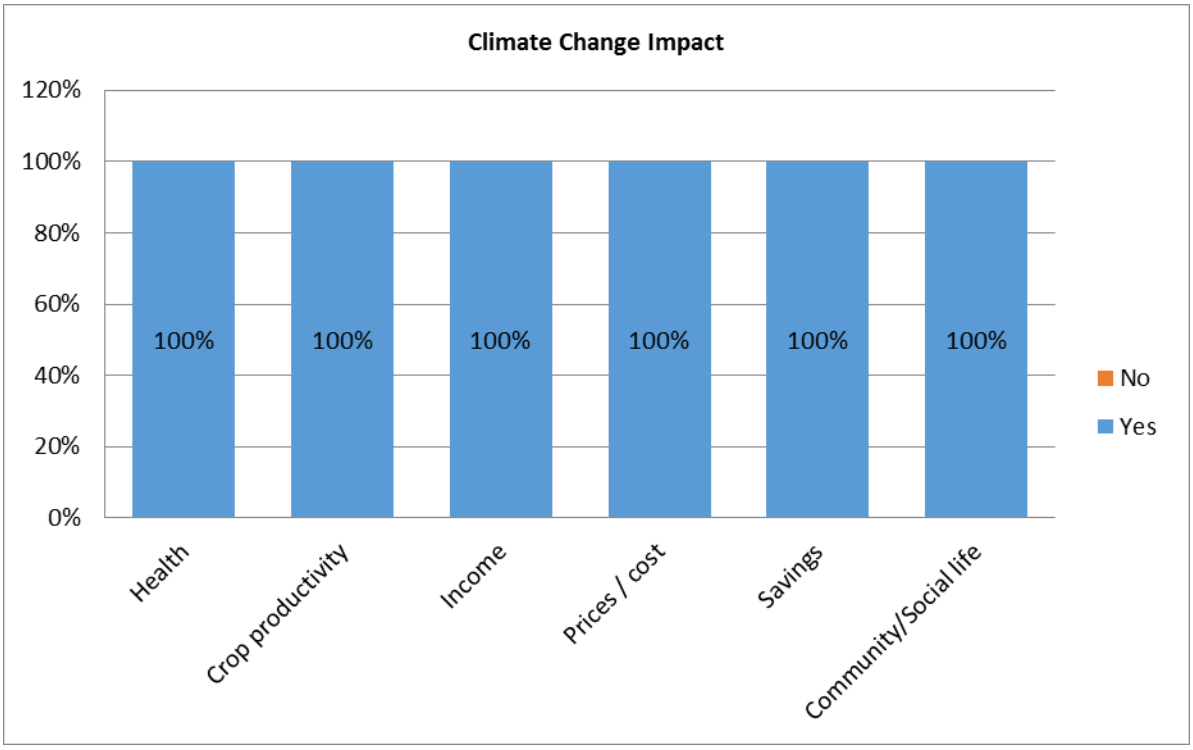
The respondents can be noted as highly aware of climate change in terms of decrease in rainfall, high temperatures, frequent occurrence of rain and quality of ground water. The sources of information accessed indicate the electronic media being the foremost choice.



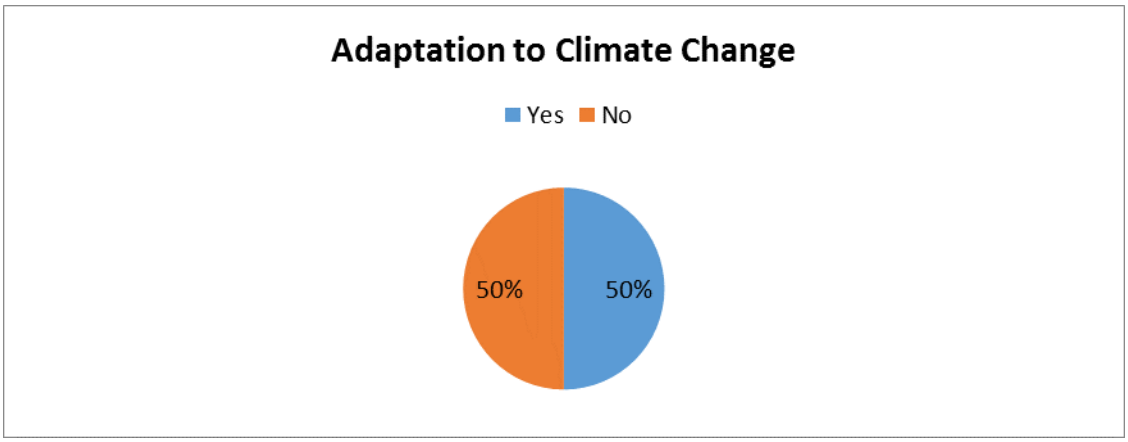
[17] Economic Survey 2013-14, Government of Pakistan
[18] Economic Survey 2012-13, Government of Pakistan

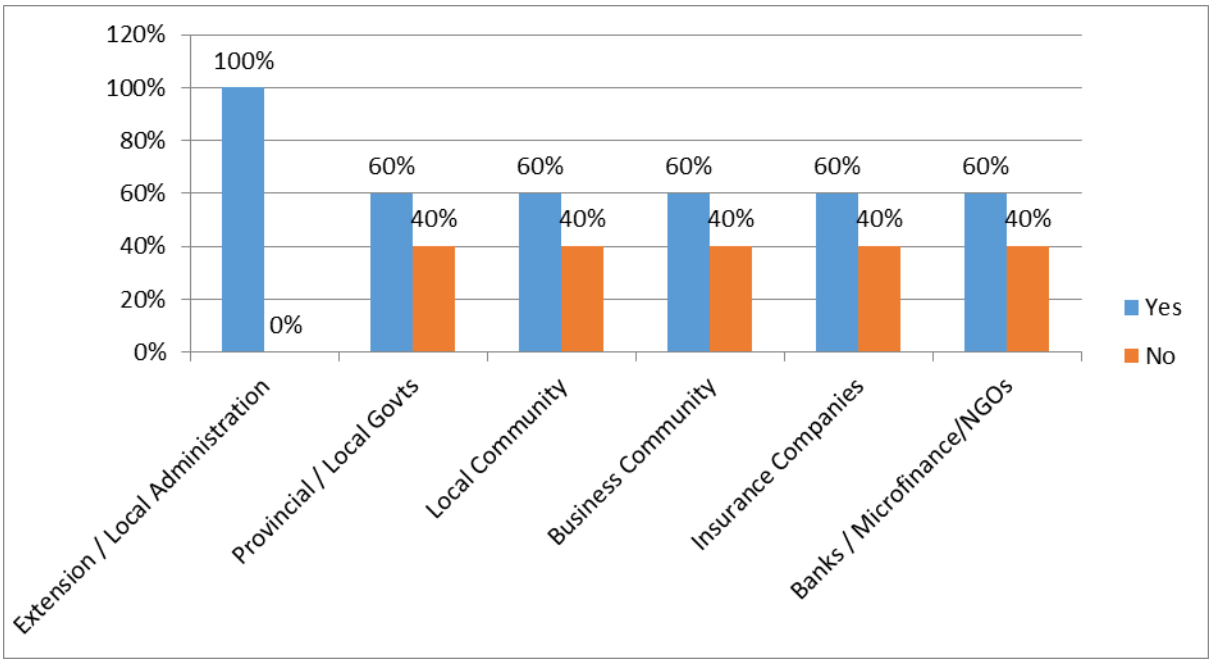


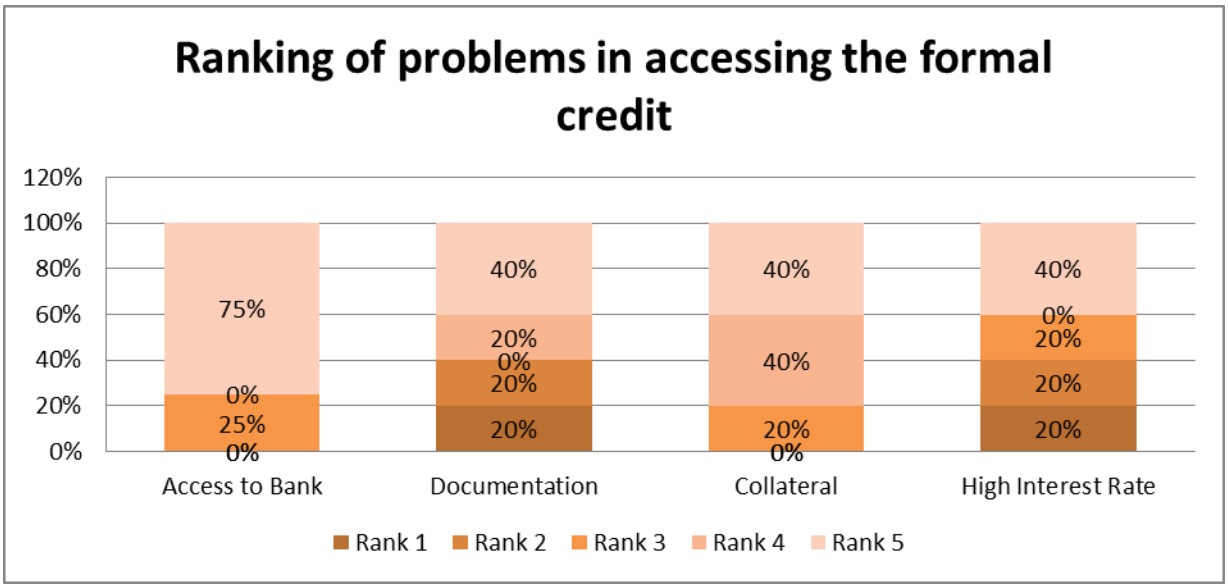
The climate change impact is noted to negatively impact all aspects from health to crop productivity and community life.



Half of the respondents claim to adaptation to climate change and they claim the moderate contribution of various institutions such as local governments, community, business community, insurance companies and the financial institutions, however the role of the extension department can be observed as being nonexistent.



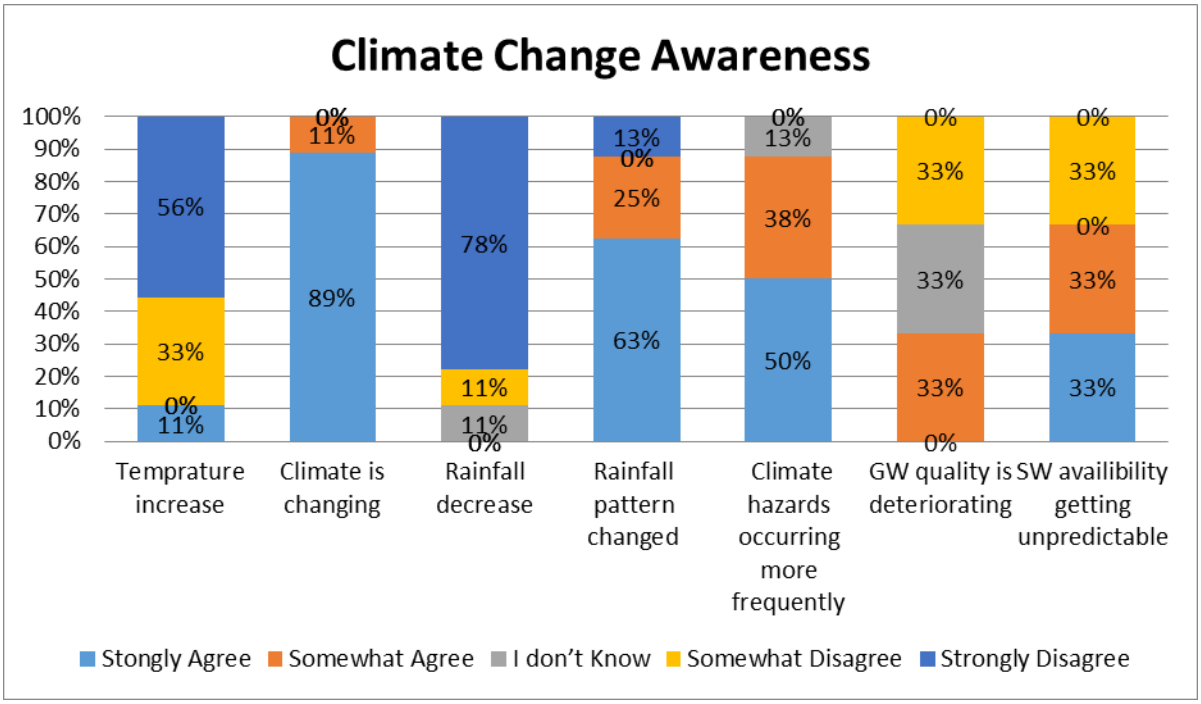


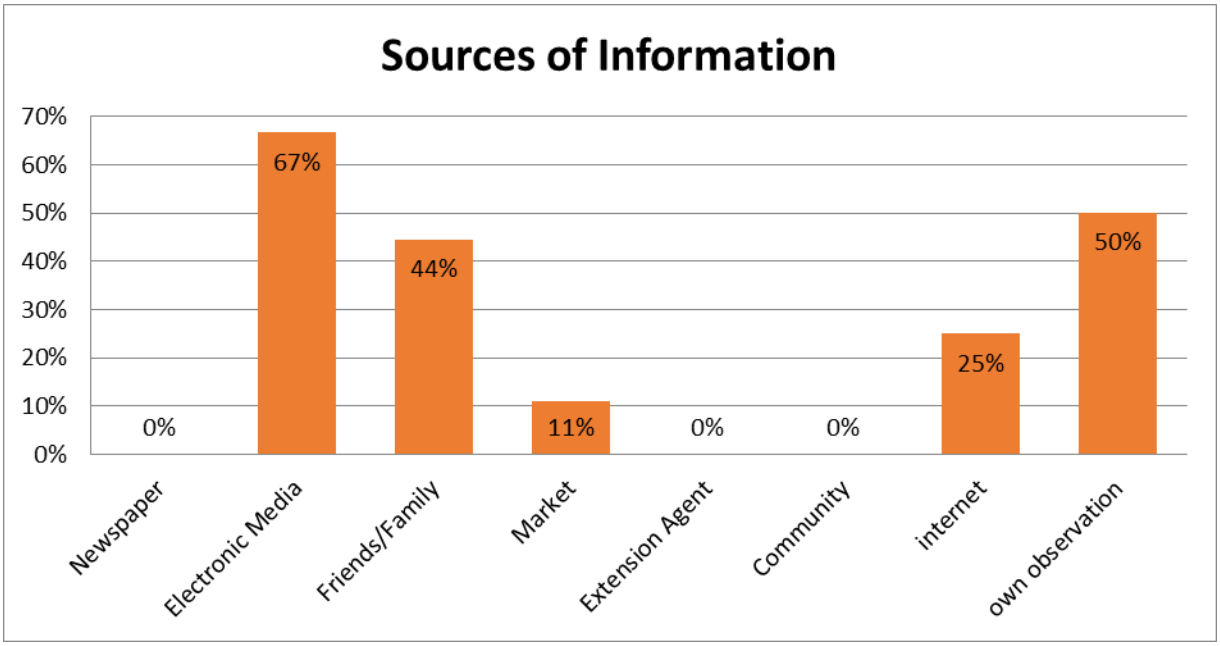


Mango

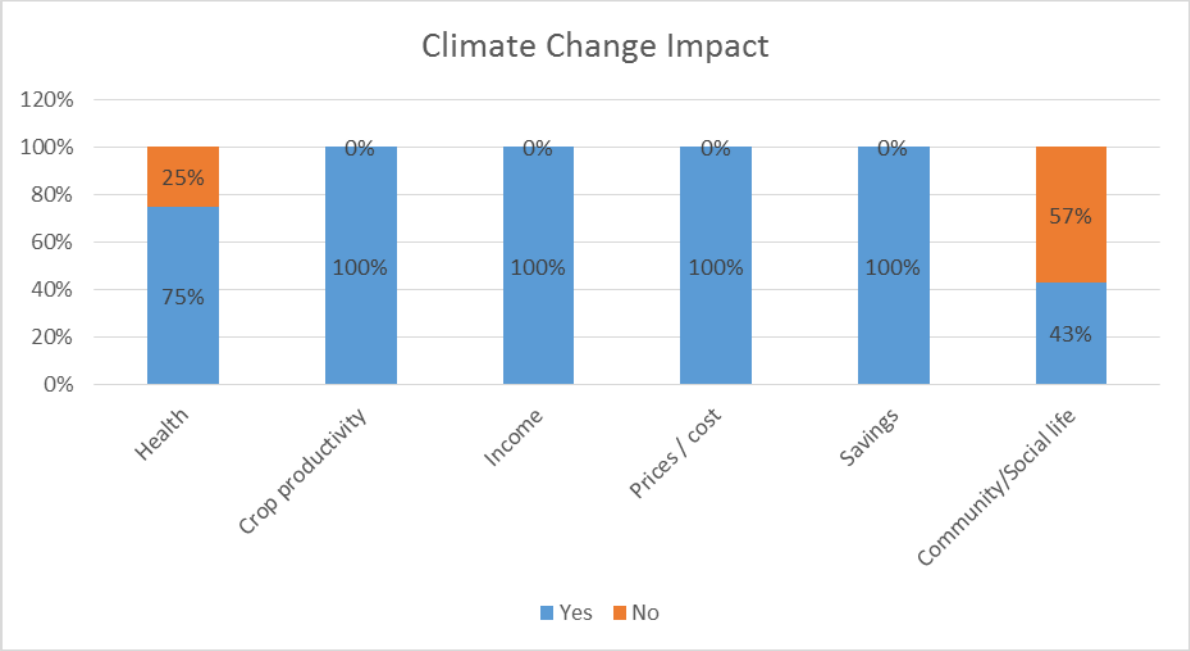
Mango is one of the fruit value chain studied in Muzzafargarh which is a disaster prone area and has a history of natural calamities specifically in the form of floods.

The respondent group for the value chain of mango demonstrates limited knowledge in terms of climate change awareness except in the general sense of the fact that on the whole climate is changing. It is to be noted that the majority strongly disagrees with the fact that rainfall is decreasing because the growing season of mango is from April to May and specifically for with reference to the unusual increase in rainfall in April this year the yield of mango has been negatively affected.

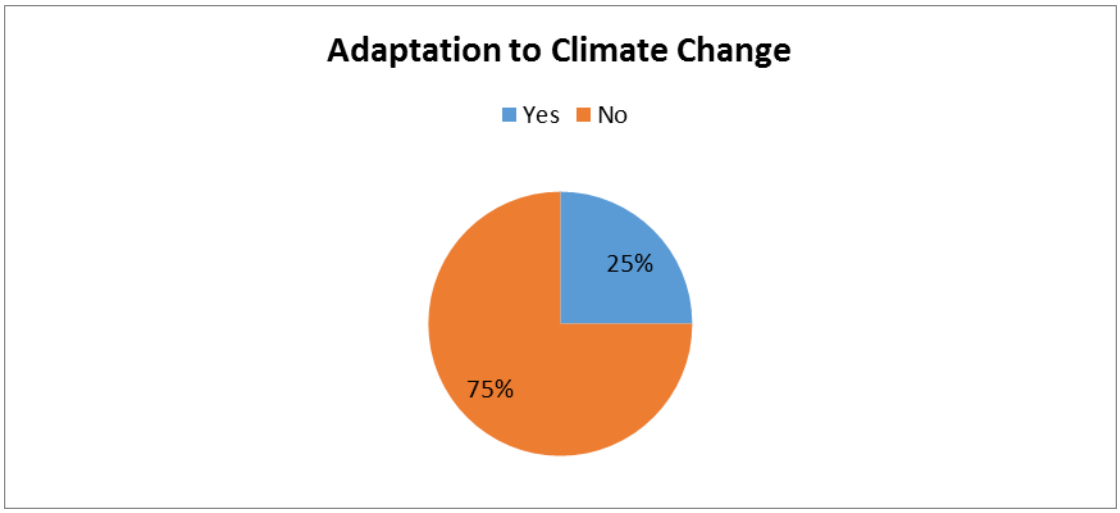


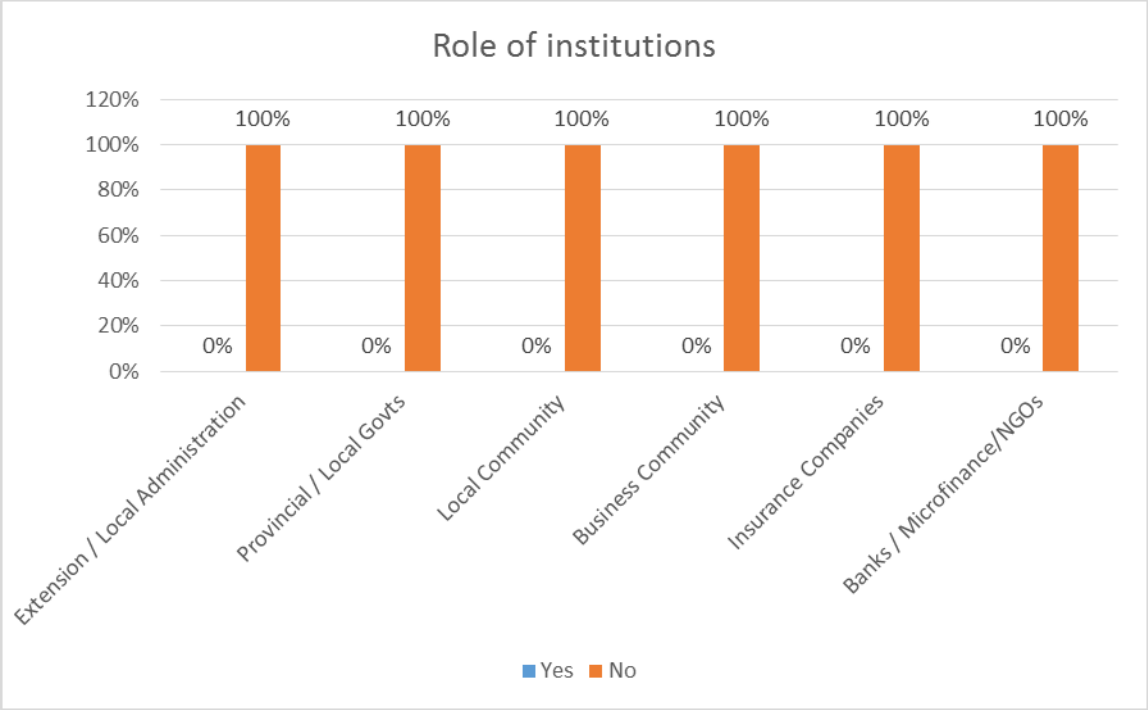


The sources of information for climate change for the majority of the respondents are the electronic media and own observations. Climate change is noted to have a negative impact for the stakeholders in the value chain of mango in terms of crop productivity, income, prices and savings.

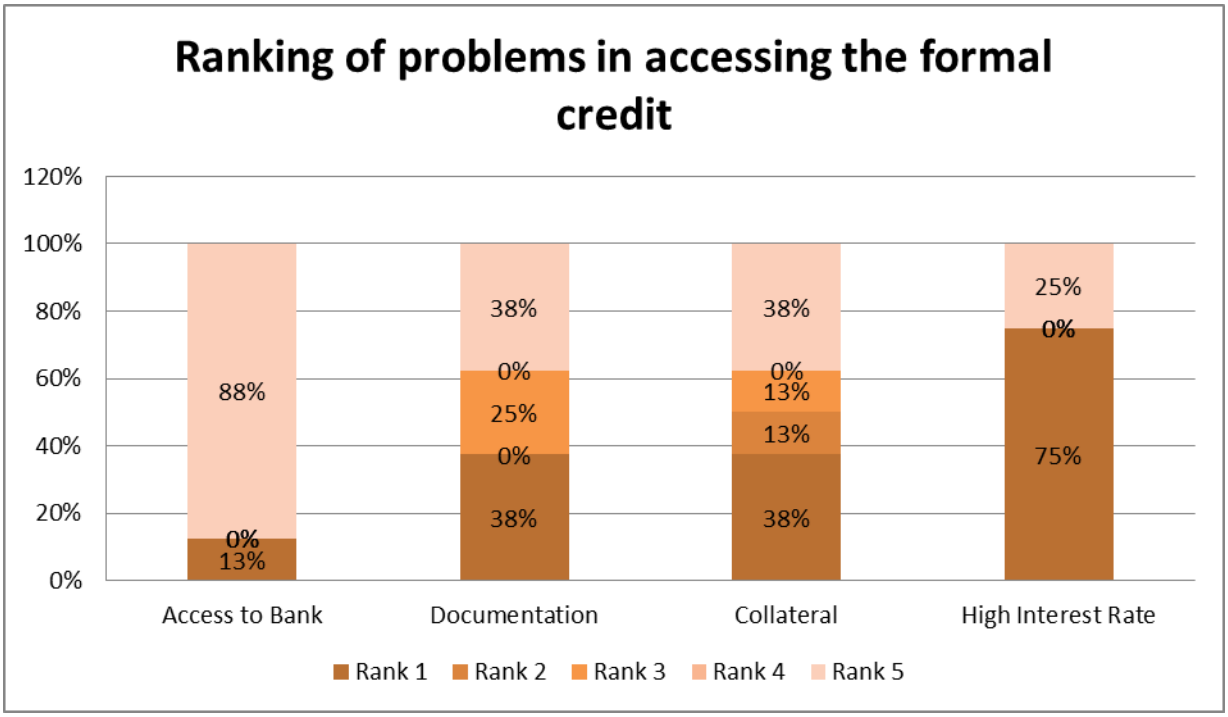


Only one fourth (25%) of the respondents reported to carry out adaptation measures based on own observation and experience.





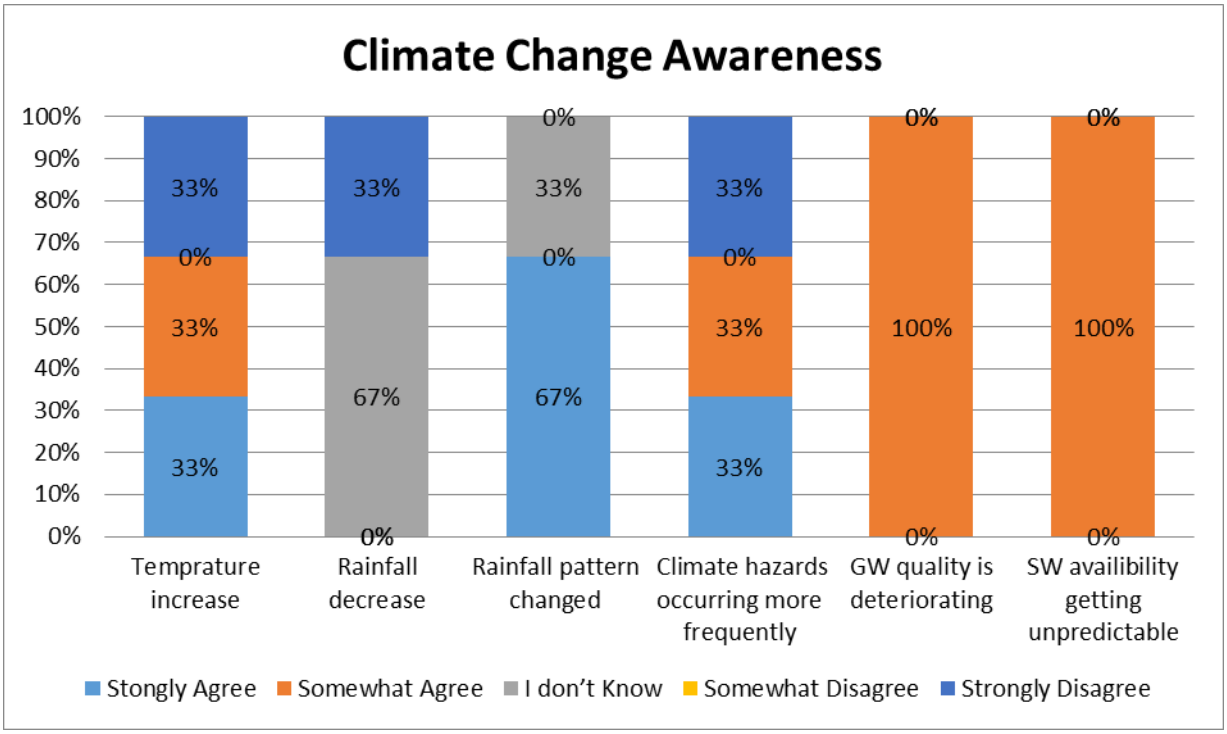
Access to financial services is reportedly hampered by high interest rate as the key reason.



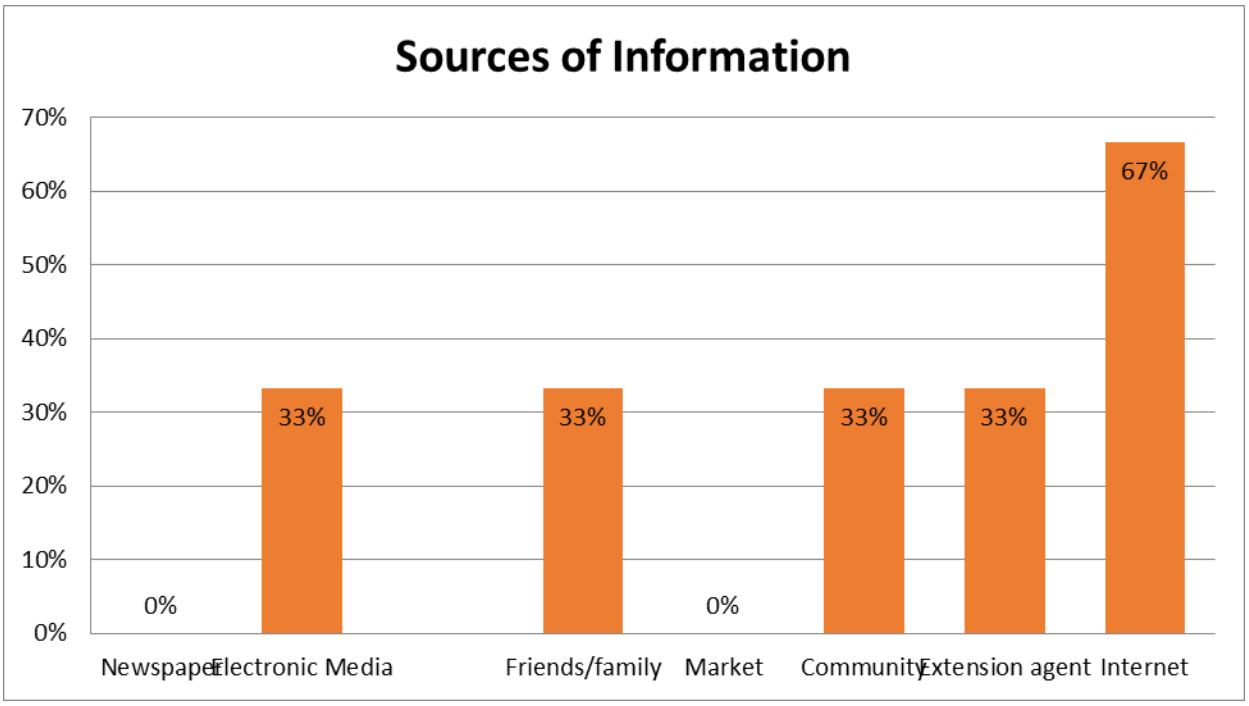
Pomegranate

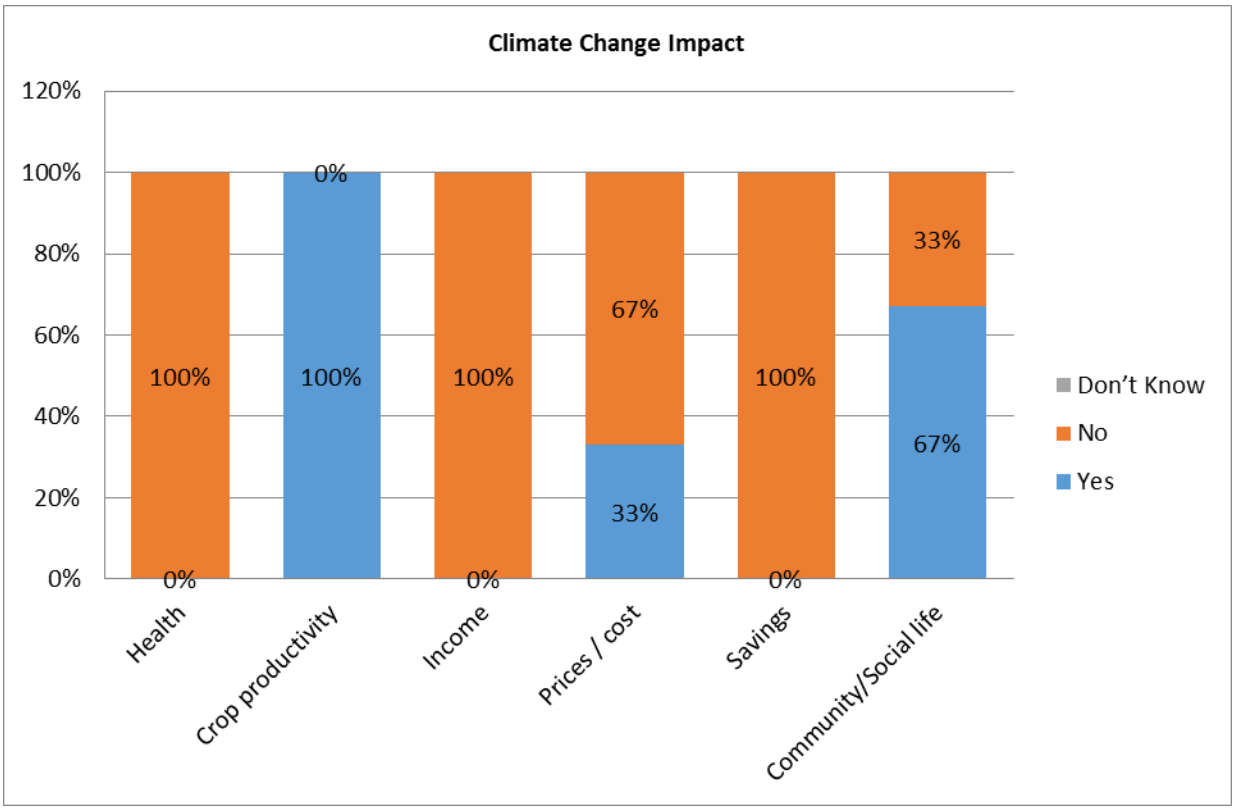
One of the major challenges confronted during the field research was gaining access to some of the respondents, particularly pomegranate growers in Muzzafargarh. This may pertain to the fact that pomegranate orchards have declined drastically due to a heavy loss of in the past few years due to an attack of the leaf footed plant bug[19].

The respondents of the value chain of pomegranate appeared aware of the phenomenon of climate change, mostly on the elements linked to water, climate hazards and rise in temperatures.



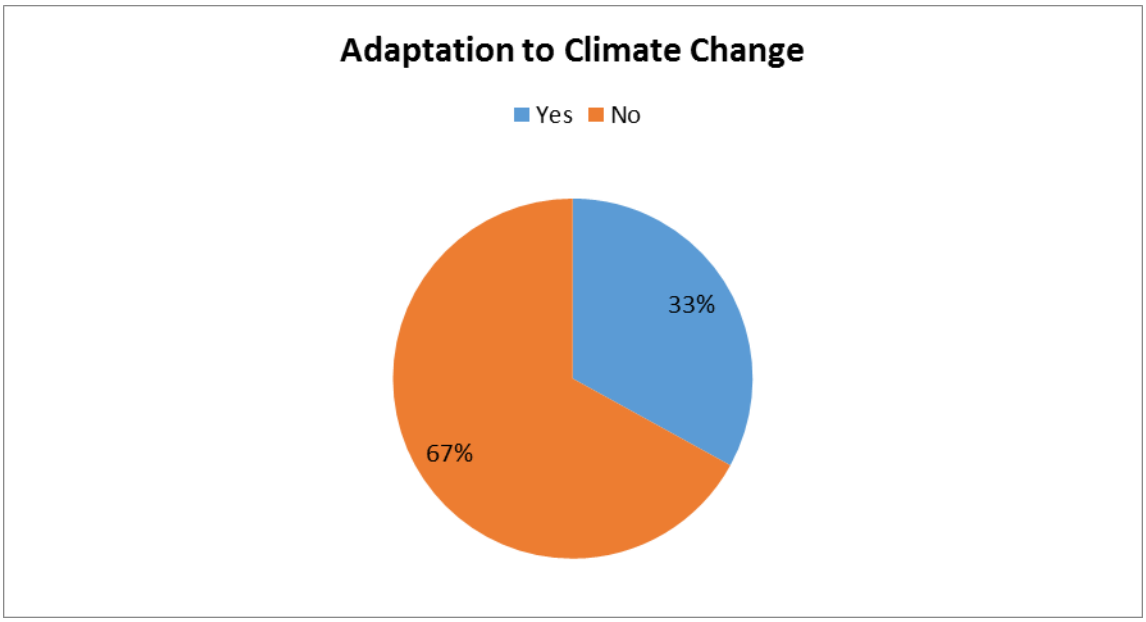
[19] Integrated pest management link: (http://www.ipm.ucdavis.edu/PMG/r621300811.html)

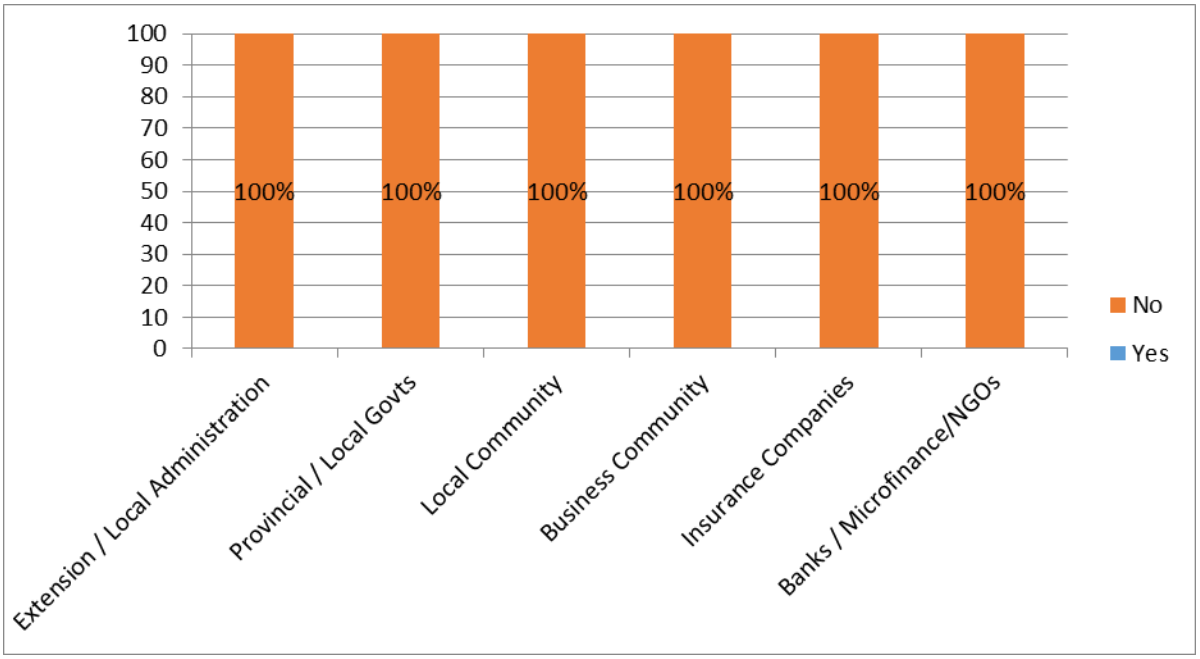

Sources of Information
70%
60%
50%
40%
30%
20%
10%
0%
0%
33%
33%
0%
33%
33%
67%
Newspaper
Electronic Media
Friends/family
Market
Community
Extension agent
Internet


Climate Change Impact
120%
100%
80%
60%
40%
20%
0%
100%
0%
0%
100%
100%
0%
100%
0%
67%
33%
100%
0%
33%
67%
Health
Crop productivity
Income
Prices / cost
Savings
Community/Social life
Don't Know
No
Yes

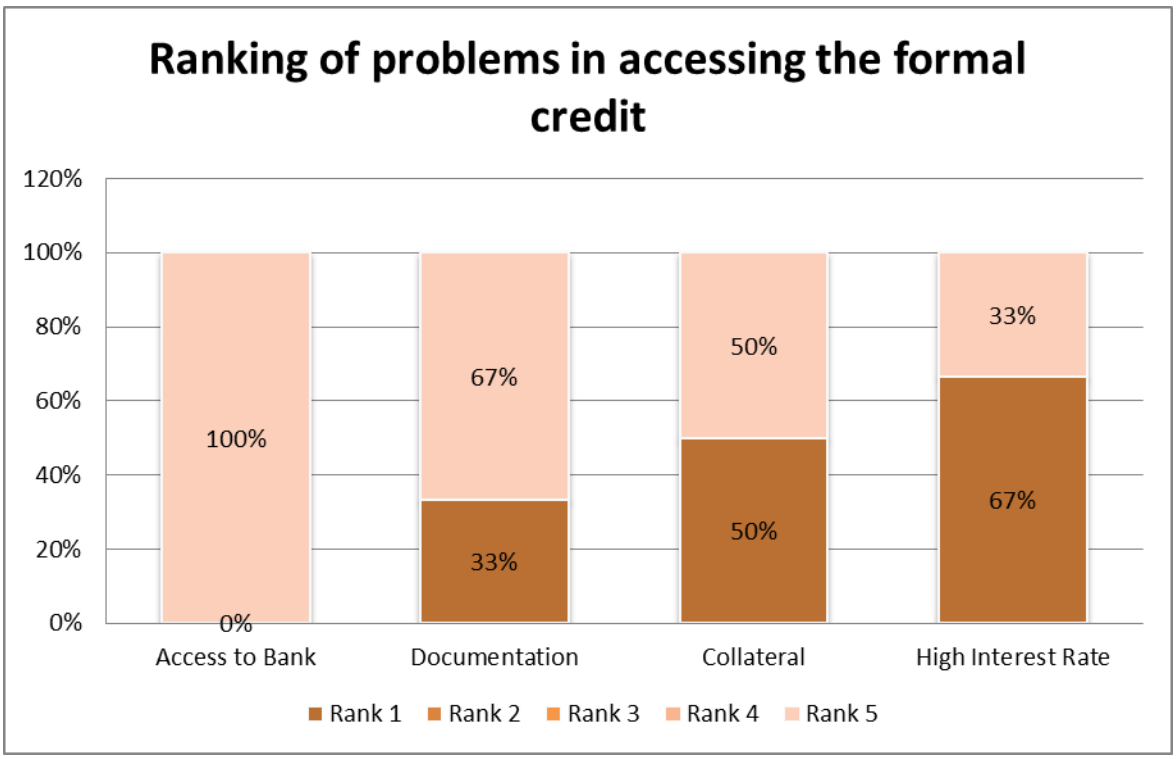
Climate change impact can be associated only with crop productivity and not on any other segment with the exception of community and social life. This may be attributed to the fact that crop production of pomegranate has declined significantly in the past few years.

The majority of the respondents did not adapt to the effects of climate change and those that practiced adaptation measures evaluated the role of institution as negligible.



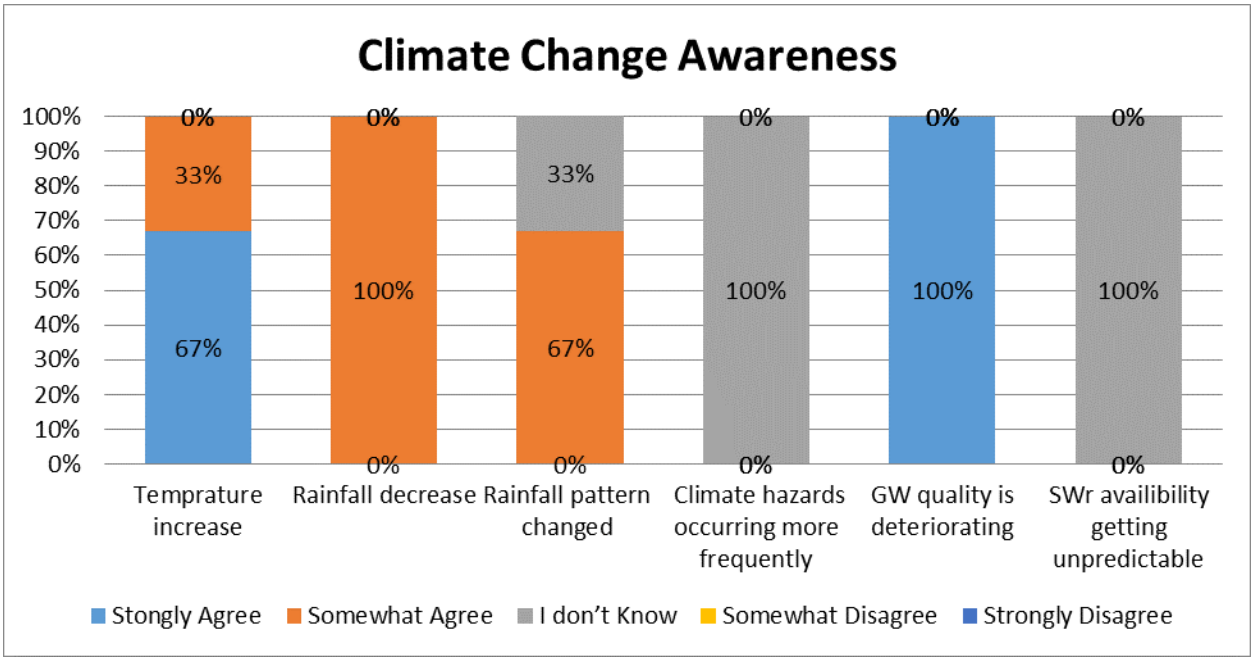


In accessing formal credit, the problem ranked as most difficult by all the stakeholders is accessibility to the bank. This can be attributed to the fact that pomegranate orchards are located in Ali Pur which is in the outskirts of Muzzafargarh and outreach of institutions is restricted.

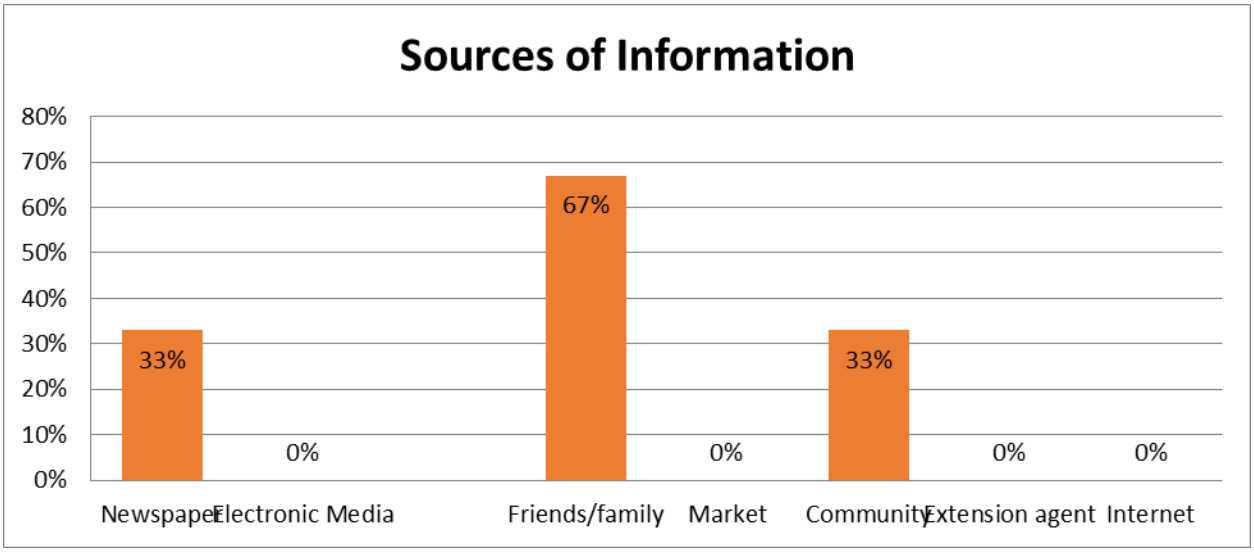


Mustard

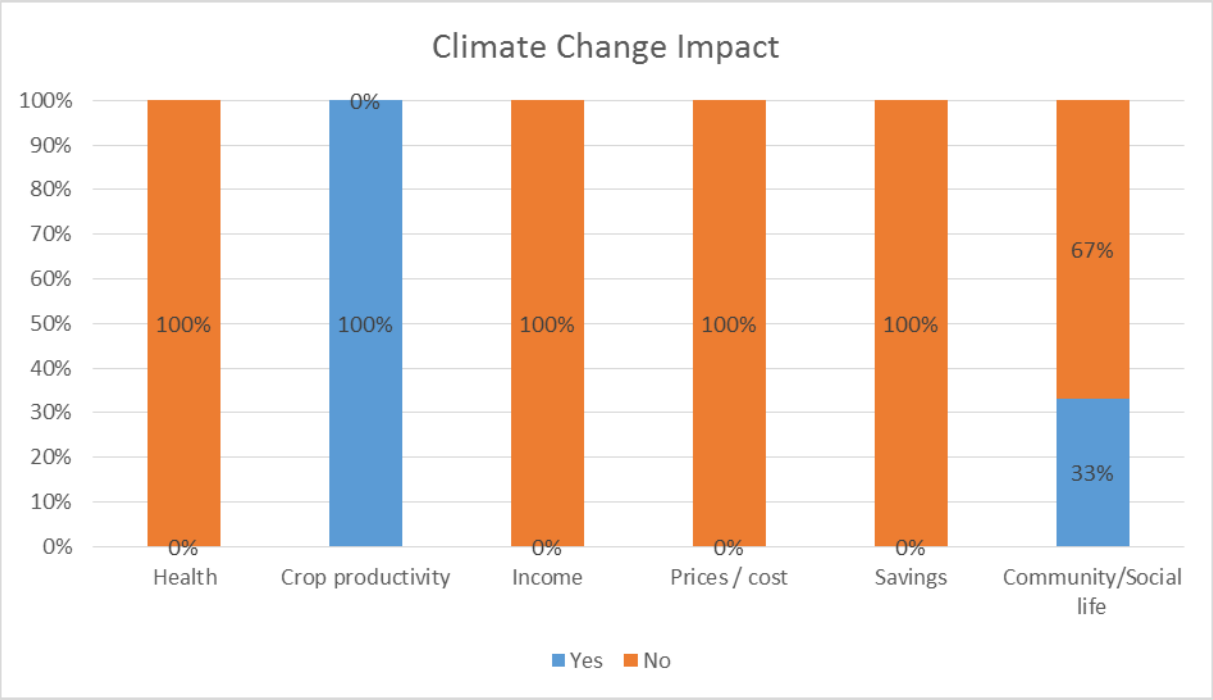
The mustard value chain was studied in Khairpur, Sindh and the target respondent group was the growers, market agents and the processors. The respondents across the value chain of mustard appeared to be least informed of climate change risk.



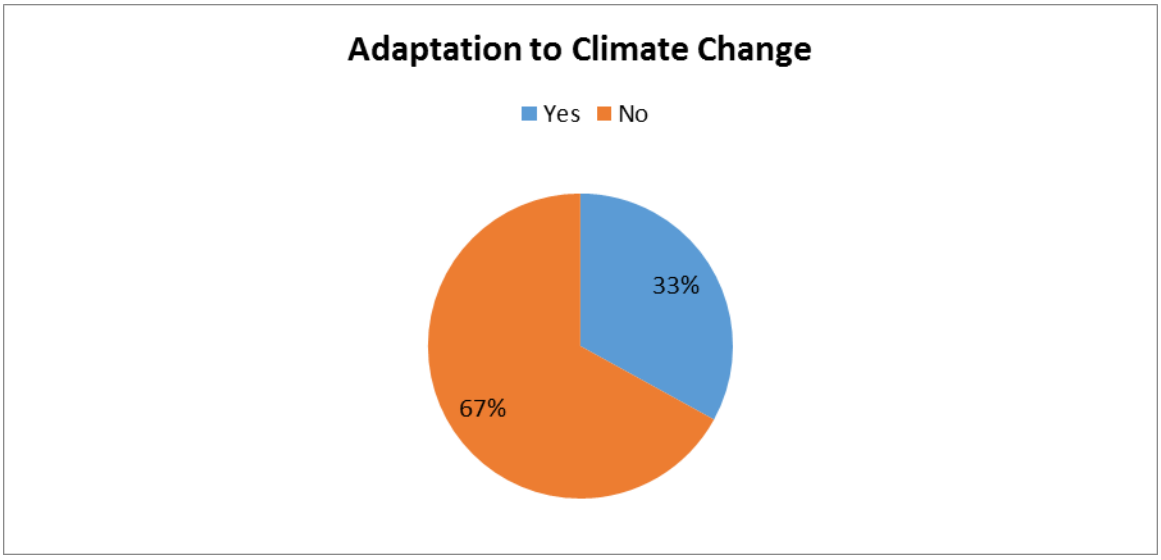
The source of information noted to be the most accessed is informal channels.

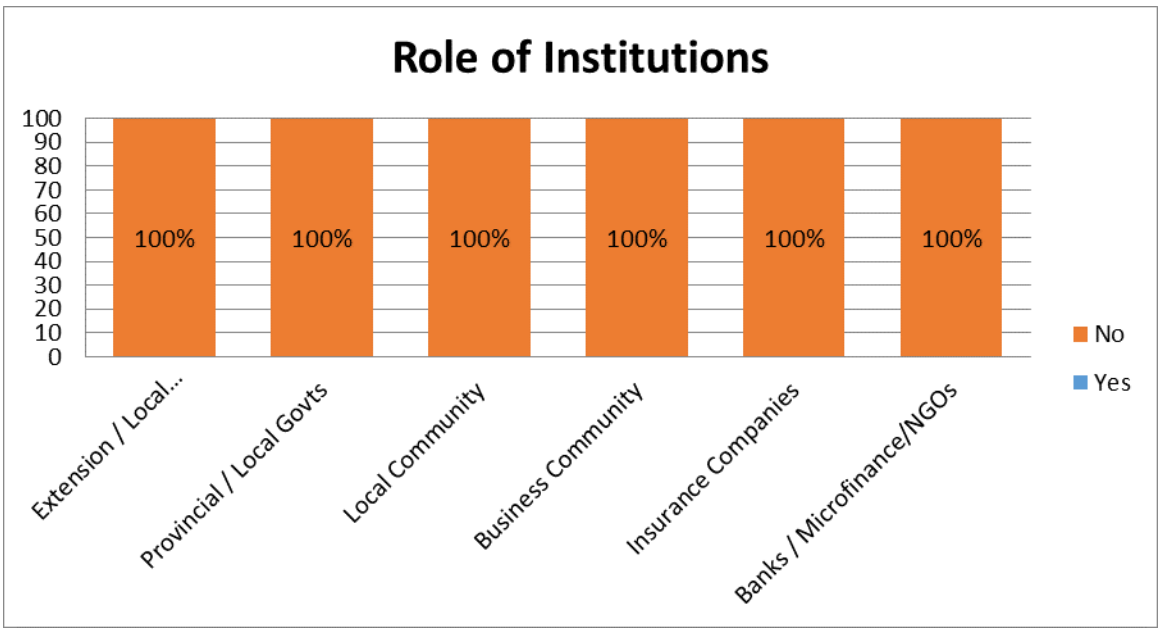


Climate change impact is felt most on income, savings, health, prices and cost

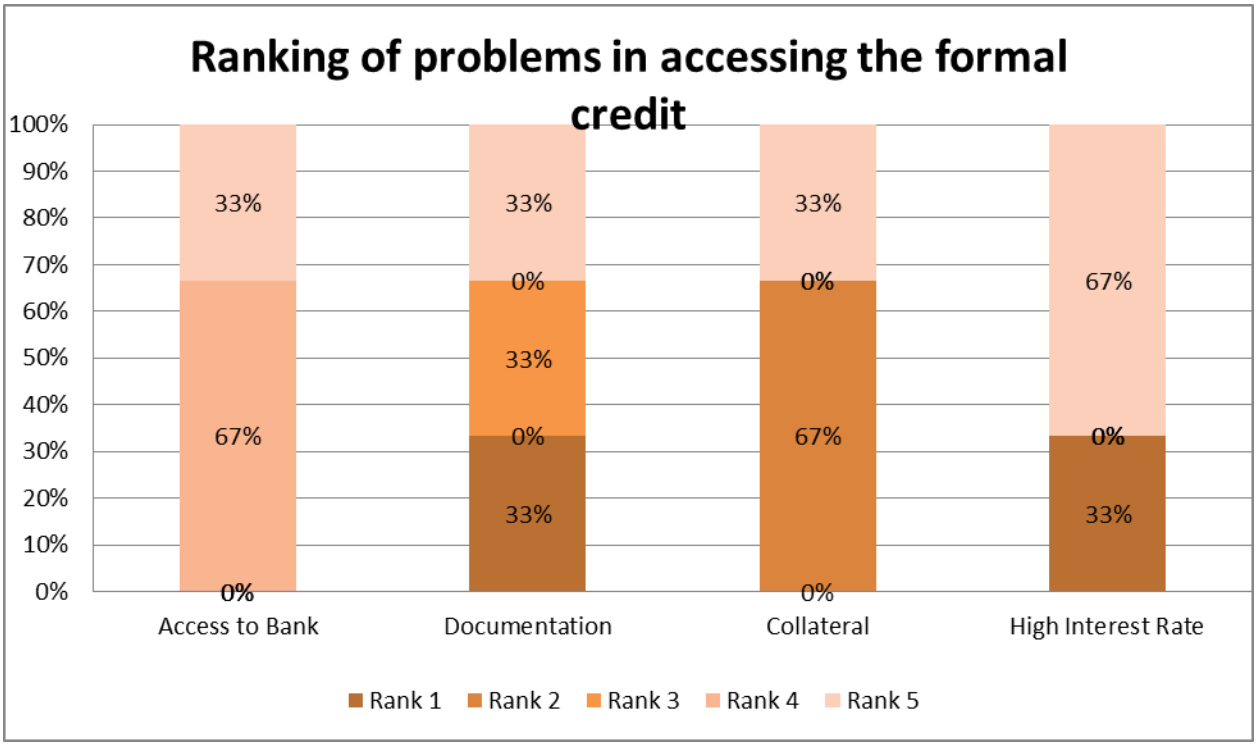


The majority of the respondents (67%) claim that they adapt to climate change however all of them said that there is no role of any institution in building their reliance.





In terms of problems in accessing the formal credit, collateral was the most significant hindrance for the majority of the respondents because they were unable to provide documents of landholdings as collateral.



6. KEY RECOMMENDATIONS

This section presents some recommendations and potential way forward based on the findings of the scoping study.

1. *Knowledge and capacity building :*

The first set of recommendations cover the broad strand of knowledge building and capacity building across the various stakeholder groups. At the grass roots level, ***capacity building initiatives with growers and small holders*** need to be designed focusing on creating awareness on climate change issues. As indicated earlier, currently this knowledge is experiential and has not been acquired through formal/ institutional channels. The orientation and awareness programs can be followed up with skill based trainings on adaption and resilience building measures. While some of the areas ***like water management can be cross cutting, customized trainings according to the needs of the value chains*** should be developed.

The capacity building initiatives need to be extended to the ***existing extension services infrastructure operating at provincial government levels*** who serve as key institutional access points to the farming communities through their extensive outreach and network at the grassroots level. However, as the findings note, this institution is under-utilized and not fully leveraged to serve as a major source of knowledge dissemination and skill development in the context of climate change. There is a need, therefore, to improve agricultural extension services through capacity building of extension service providers especially in the areas of ***climate hazard awareness and responses***.

Outreach and capacity building programs should also be extended to ***business entities at the top end of value chains, particularly local companies.*** For a business to act within its extended supply chain or community it requires better information and an appreciation of the business case for investment. The findings note that moving up the value chain, there is a gap in information and awareness regarding climate risks leading to shifting responsibilities of resilience building to public sector only. Awareness raising programs, especially focusing on ***making a business case for resilience building***, need to be developed and implemented across the top end value chain actors.

2. *Technology Innovation and Deployment – Pilots for Demonstration Effect:*

As indicated by the findings, private sector's engagement in resilience building has been limited except for a few sustainability initiatives by MNCs. Therefore, there is little on ground which can be showcased as replicable models. There is a need to build models for climate-smart agriculture that make climate resilience a long-term business for the private sector. One way forward is to pilot demonstration projects incubating key technologies including efficient irrigation products, crop types and agricultural techniques etc. One of the delivery options for piloting demonstration projects can be through private sector engagement leveraging existing sustainability programs of MNCs as noted in the earlier sections.

3. *Cross-regional Collaboration:*

The findings indicate that a number of large MNCs operating in diverse areas are engaged in various resilience building interventions and sustainability initiatives as part of their core business strategy. However, their programming is rather limited in Pakistan compared to other countries in the region. There is, thus, an opportunity to advocate for upscale and replication of their work in Pakistan, building upon similar experiences in the region.

4. *Access to insurance and financial services:*

One major component in resilience building in the agriculture sector relates to risk transfers. The local financial market, however, is not inclusive currently and does not cater to the small holders in the agriculture sector who face the maximum risk in case of climate hazards and do not have the adaptation capabilities. Resilience incentivizing financial products, particularly micro insurance solutions for small holders for climate risks and extreme events can fill the current void in the agriculture sector. There is a need to support development of new disaster risk finance products and Risk transfer mechanisms (e.g. insurance, reinsurance, insurance pools, catastrophe bonds, micro insurance and weather derivatives)

This may require a pilot initiative to assess the viability of such solutions before upscale. A parallel investment will also need to be undertaken in developing capacity of the local financial sector to support resilience actions.

5. *Develop a Resilience Window in Research Organizations:*

Research organizations in the public sector currently do not have sufficient programs focusing on climate change and resilience actions. There is a need to advocate for creating a dedicated cell or section focusing on the climate change issues. In order to carry out market based research, these institutions can also be linked with private sector companies. A close collaboration should be developed between extension institutions and the research organizations so that they can complement each other's work.

6. *Developing multi-stakeholder Partnerships:*

Best practices in the realm of private sector climate resilience indicate that synergies across sectors, public sector, private companies and development agencies lead to transformational results. Engagement of a wider set of stakeholders, co-investments and joint programming has a larger potential to effect change and sustain in the long run. For institutional support and buy-in on private sector climate resilience, it is also worthwhile to leverage institutional platforms like Chambers of Commerce, Employers Federation of Pakistan (EFP), All Pakistan Textile Mills Association (APTMA) etc. Employers' organizations have been successfully mobilized in the past to support issues including abolition of child labour in the soccer industry etc. Their support can be crucial in introducing climate resilience issues on a wider, institutional scale within the private sector.

Annexure

References

1. International Food Policy Research Institute (IFPRI) report on Agriculture Resilience.
2. Amir, P. (2009). Climate change: Vulnerabilities in agriculture in Pakistan. A booklet published by IUCN and Ministry of Environment, Govt. of Pakistan
3. Pakistan, (2011), Economic Survey of Pakistan 2010-11, Ministry of Finance, Govt. of Pakistan, Islamabad, Pakistan.
4. Salik, K. M. (2012). Livelihoods, agriculture and climate change: Threats, prospects and areas of cooperation. Pakistan-India Track II Dialogue on Climate Change, Islamabad, Pakistan
5. Pontes, R.J., Freeman, J., Oliveira-Lima, J.W., Hodgson, J.C. and Spielman, A. (2000), Vector densities that potentiate dengue outbreaks in a Brazilian city. American Journal of Tropical Medicine an Hygiene, 62:378-383
6. Farooqi, A.B., Khan, A.H., and Mir, H. (2005), Climate change perspective in Pakistan, Pak. Journal of Meteorology, 2(3)
7. Azmat, H. (2003), Impact of La Nina on Pakistan Winter Precipitation, WMOESCAP TSU Quarterly Bulletin.
8. Hanif, U., Syed, S.H., Ahmad, R. and Kausar, A.M. (2011), Effect of climate change on agricultural sector of Punjab, 27th Annual General Meeting of PSDE, PIDE, Islamabad.
9. Engro Corp Annual and Sustainability Report 2012
10. Private sector engagement in disaster resilience and climate change adaptation. Country case studies. DFID
11. Economic survey of Pakistan 2013-14, Government of Pakistan.