

## Credit Risk Management Practices Used by Banks in Agricultural Finance: A Case Study of Pakistan

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### Abstract

**Purpose:** Agricultural sector is an important sector of Pakistan's economy. Agriculture plays a significant role in the economic development of Pakistan. Its contribution to GDP is about 23% and approximately 60% of Pakistan's total population live in the rural areas and most of them earn their livelihood from agriculture. Due to the green revolution, rapid changes have been occurring in production technologies, and methods have been changed. As more capital is required to adopt these methods and technologies, so the small farmers cannot afford these methods. They need finances for production and investment purpose. The small farmer has very limited ability to agricultural finance for both production and investment needs and they are facing a shortfall of credit. Banks hesitate to grant agriculture credit because of higher credit risk. The main purpose of this research paper is to find out the credit risk faced by the banks of Pakistan and risk management techniques used by these banks.

**Research methodology:** This research is basically quantitative in nature, and a Standard questionnaire is used for the collection of data on credit risk and its management techniques from the banks. A sample of 45 bank branches of 17 banks that grant agriculture credit has been taken and questionnaire were being filled by credit officers of the agricultural sections of these banks. The Frequency distribution technique was applied through SPSS 17 to analyze and finalize the results.

**Findings:** The major findings of this research are: 82.2% of banks had faced the situation of credit risk in which farmers failed to pay back the credit to the bank. 53.3% respondents considered the production, price and policy risk together affect all the farmers in a particular geographical area. 35% considered "willful rejection risk" as an important risk that arises due to an individual farmer. 60% respondents use the crop insurance for the management of production risk. 48.9% bank used no technique for the management of price risk. 75.6% respondents suggest that the improvement in laws and policies on land ownership will help in credit risk management. 60% respondent does not insure the life of a farmer. 77.8% use collateral management for the management of "willful rejection risk". According to 75.6% respondent's fire/theft insurance of agricultural asset will help to manage this risk.

**Originality /Value:** The value of this research paper is that it gives us an idea about the credit risk faced and its management techniques used by the banks of Pakistan. It also gives us an idea about the credit risk management techniques which are being used in the world but not in the Pakistan.

**Research Implications:** The research implications of this paper are to increase the understanding of factors which are the basis for credit risk in agricultural financing and its management techniques used by the banks of Pakistan.

**Paper Type:** Research Paper

**Keywords:** agricultural finance, credit risk, Risk management practices, crop insurance, highly correlated risk, localized risk, price smoothing.

### 1.Introduction

The Agricultural sector is an important sector of Pakistan's economy. It can be said as a backbone of our economy. According to Pakistan Bureau of Statistic its contribution to our Gross domestic product is about 23 percent and about 68 percent of total Pakistan's population is directly or indirectly involved in farming and non-farming agricultural activities. It provides employment to almost 45 percent of the labor force of Pakistan.

Agriculture sector of Pakistan is actively contributing in export earnings of Pakistan. Only food sector contribution in total export of Pakistan is 17.50 percent in 2010-11. Agriculture sector of Pakistan is also actively contributing in industrial development. It is a major supplier of raw material for many industries. Because almost 60 percent of Pakistan's industry is agro based which depends upon agriculture for raw material supply e.g. textile and sugar industry. Due to this reason any factors that affect the agriculture affect the population and the economy as a whole.

Farmers require fertilizers, quality seeds, modern machinery, innovative techniques of production, labor, timely provision of adequate water, storage facilities etc. Which required funds but most of the farmers are small and do not have enough funds according to their requirements. Due to this reasons this need is fulfilled by financial institutions, government banks, commercial banks, cooperative societies, NGO's or informal sources e.g. family, friends, relatives and social circles. But financial institutions are major source of fund supply in Pakistan (Burki, 2007).

Some specialized financial institutions are working in Pakistan for the supply of agriculture finance i.e. Zarai Taraqiati Bank LTD. Commercial Bank's agriculture credit departments are also providing loans for this purpose (Burki, 2007). According to Pakistan Economic Survey 2012-13 during July-March 2012-13 credit of about Rs 231 billion was provided to agriculture sector of Pakistan and there is an increment of 17 percent as compared to Rs 197.4 billion of last year. The distribution of agriculture credit according to the institution is as follows:

Institution	Amount
Commercial Banks	Rs. 123.7 billion
Zarai Taraqiati Bank Limited (ZTBL)	Rs. 38.0 billion
Domestic Private Banks	Rs. 51.0 billion
Microfinance Banks (MFBs)	Rs. 13.0 billion
Punjab Provincial Cooperative Bank Limited (PPCBL).	Rs. 5.4 billion

It is really true that credit supply has increased, but it is still not sufficient to meet the need of the agriculture sector of Pakistan. The reason behind this is that there are many risks involved in agriculture sectors that why financial institutions hesitate to provide credit to the agriculture sector.

The structure of the of the paper will be as follows, The first section describes the brief introduction, and the Second section is the literature review in which risk, credit risk, localized and highly correlated risks in agriculture and risk management techniques are being discussed. In the 3<sup>rd</sup> section network diagram is presented, and in the fourth section results and discussion is given. The last section presents conclusion and recommendations.

## 2. Literature Review

According to Business Dictionary.Com "A probability or threat of damage, injury, liability, loss or any negative occurrence that is causes by external and internal vulnerabilities, and may be avoided through preemptive action." Risk is the possibility that an event will take place. It is mostly used to express the possibility that a particular outcome will come after a particular experience (Burt, 2001). Risk is the probability ,that the results of any act could bring unpleasant outcomes. Due to this outcome it is possibility of direct loss of earning or capital or it may affect the ability of bank to meet its business objectives (Burki, 2007). Risk can be described as the probability of accordance of unfavorable outcomes due to uncertain and flawed knowledge in making decision (Drollette, 2009).

Default risk is also known as credit risk e.g. the probability of loss due to borrowers inability to pay back the borrowed amount (principal and interest or any one of both ) to financial institution according to predefined terms and condition (Tanninen, 2013). According to Sherrie Scott credit risk management is the main cover for the lender financial institution to protect itself against the borrowers who are unsuccessful to meet the condition of loan or other owed funds that were extended to them. The success of banks depends upon that they manage their credit and take accounted risks that they can handle. Agricultural risks occur due to the happening of uncertain event which we cannot perfectly predict for example changes in weather condition, price fluctuations and uncertain demand of product in the market. Risks in Agricultural can be of two types i.e. Localized risks which affect the individual farmer or lender for example death or illness of a farmer, and incorrectly estimating the credit worthiness of farmers by the lenders, willfully rejection from farmer side to pay credit and wrong estimation from lender side to estimate the cost of loan.(Nair, 2009). Assets risk is mostly faced by the business and it include the loss of asset due to asset theft, fire, and different other reasons (Ngathou, Bukenya, & Chembezi, 2006).

The second type of risk is "Highly correlated risk". This includes the risks which affect the whole community as a whole for example price risk, weather risk, market risk, production risk and drought in a large geographic area.

Production risk occurs due to unpredictable nature of weather e.g. heavy rain, flood, drought, hail and attack of pests and large no of factors which create unpredictability about the crop production and livestock (Hardaker, 2004). Animals affected by diseases can reduce the growth rate of livestock in the country and this problem can also increase market risk, because restriction on the export of animals can be imposed due to affected animals (Reas, 2010). This risk cuts back the farmer's capacity to pay back the loan and increase the default ratio of farmers and due to this reason lenders hesitate to award loan to farmers and these risks are difficult to manage.

Price Risk is the risk due to inability of farmer to know about the price of input e.g. seed, pesticides, fertilizer and water/electricity and also the prices of the output in the market. Farmers cannot predict about the price in the start of cultivation because agriculture crops are of long duration and it is not possible for farmers to rightfully estimate the price of inputs and output. The competition in the local and international market has also increased this risk. Exchange rate risk also increases the price risk (Hardaker, 2004). Prices of inputs in agriculture sector are also affected due to gap between input purchase decision and production decision. It means how much we want to produce (Reas, 2010). Especially the prices of agriculture output is based on the demand and supply forces when demand of agricultural output is low, price will also be low, but when demand is high, price will also be high. Nature of commodity is also a risky factor when commodity is of perishable nature e.g. milk, and its storage cost is high, the price will be more volatile but when commodity can be stored easily and at low cost like wheat, then price will be comparatively high because farmer has the option to store it for more time duration. (Reas, 2010).

Institutional/Policy Risk includes Government policies, which are another source of risk for the farmer. The change in any rule and regulation may have a negative or positive impact on the farm product and ultimately have an effect on the profitability of farmers e.g. any change in tax laws or change in various subsidy payments will affect the farmer's position. Historically the farmer is negatively affected due to law of prohibition of pesticide utilization in the farm and owners of poultry farms are also negatively affected due to prohibition of using drugs and other medicines for the prevention of diseases. Political risks are also included in these kinds of risks. The government's failure to make an agreement with foreign governments to do an agreement which is favorable for the agriculture is also called government risk. Risk of breach of agreement between the organizations is also a type of institutional risk e.g. breach of agreement between the parties in management of supply chain is also a reason of more risk in the modern age of agriculture business (Hardaker, 2004).

## **2.2. Risk Management**

For price risk management two main instruments are used, i.e. future and option contracts that allow agent to cover that risk. In future contract both parties decide an agreed price, and on that price both makes the purchase and sale of agriculture commodities. Option is an agreement between two parties in which buyer or seller has the option to buy or sell a commodity at some future date but it is the right, not an obligation for buyer or seller on the contrary, in future contract it is the obligation which buyer(seller) has to fulfill at any cost (Fissha, 2009). Contract farming is another technique to manage price risk in which farmer may contract with a contractor to deliver the specific quality, quantity and other specification at a specific price. The contractor can also provide credit to farmer at some specified interest rate and can deduct the original amount of credit plus interest at the time of purchase of crop (Larson, Anderson, & Varangis, 2004). Out grower schemes are another form of contract forming in which contract is made for the long term. The contractor may make contract to grow same crop at the specified area. In which it can offer the basic input and advisory services to farmer. The specifications of packaging requirement can also be specified at some predetermined price. These types of contracts are usually done by big supermarkets (Jessop & Harms, 2012).

Another technique which is mostly used in developed countries is agricultural factoring, in which factoring company delivers almost 70 percent of price of crop to farmers. It is mostly used for tea crop because it takes some time to sell the product. Farmers don't sell crops at lower price due to low demand at that time due to need of funds. Invoice is issued by factoring company when farmer sells the crop and original amount plus 2.50 percent is automatically deposited into the account of the factoring company. Warehouse receipt is also another arrangement, which helps the farmer to manage price risk. The customers deposit its crop in the warehouse and get a receipt and by depositing receipts into bank he can get loan 70 percent of the whole deposited crop. It is mostly used in grain. It helps farmers to not sale crop when price are low in the market. When farmer sell the crop it make the principal plus interest payment into the bank by this way he can make more profit (Jessop & Harms, 2012).

Price smoothing is another techniques which is being used in the world to manage the price risk in which price of commodity, usually cotton, is set by taking five year average price. If the prices of cotton increase in the world market the increased price is deposited in the price smoothing fund if the price decreased the balance is paid to farmer from the price smoothing fund. It is an important technique to manage price risk (Jessop & Harms, 2012).

Production Risk can be managed by offering crop insurance in agriculture sector. Any loss to crop is compensated by insurance company, but this is very risky task and most of insurance programmes fail in the world. This thing can only be successful with the help of government and other international organizations

through subsidies (Narayana, 1992). Traditional crop insurance is affected by moral hazard and adverse selection of insurance contract. In both cases the reason of loss is that the farmer has better knowledge of crop and land fertility than the insurance provider and they are in a better position to take more actions to take more payout from the insurance provider (Larson et al., 2004). Diversification of crop is an important technique at farm level to manage the production risk because if one crop fails due to bad weather or pests attack it can be compensated by another crop (Jessop & Harms, 2012).

Index insurance is another recent development in agriculture insurance. It is an instrument in which payment to the farmer is linked with the threshold when the index crosses that threshold payment to farmer is made without the excess of loss. This type of insurance contract decreases the moral hazard and risk of adverse selection of insurance contract. In index insurance contract different threshold are define with increase payment as risk event increase. The index can be calculated on the bases of rainfall, moisture, event of locusts, level of water in river, temperature of sea surface, hail, etc. For index insurance calculation of weather index different types of weather stations are used (Jessop & Harms, 2012).

Contingences Fund for disaster relief management can be created by the government in order to compensate the farmer in case of disaster. This fund helps farmers to prevent themselves against the bad luck/fortune (Fissha, 2009).

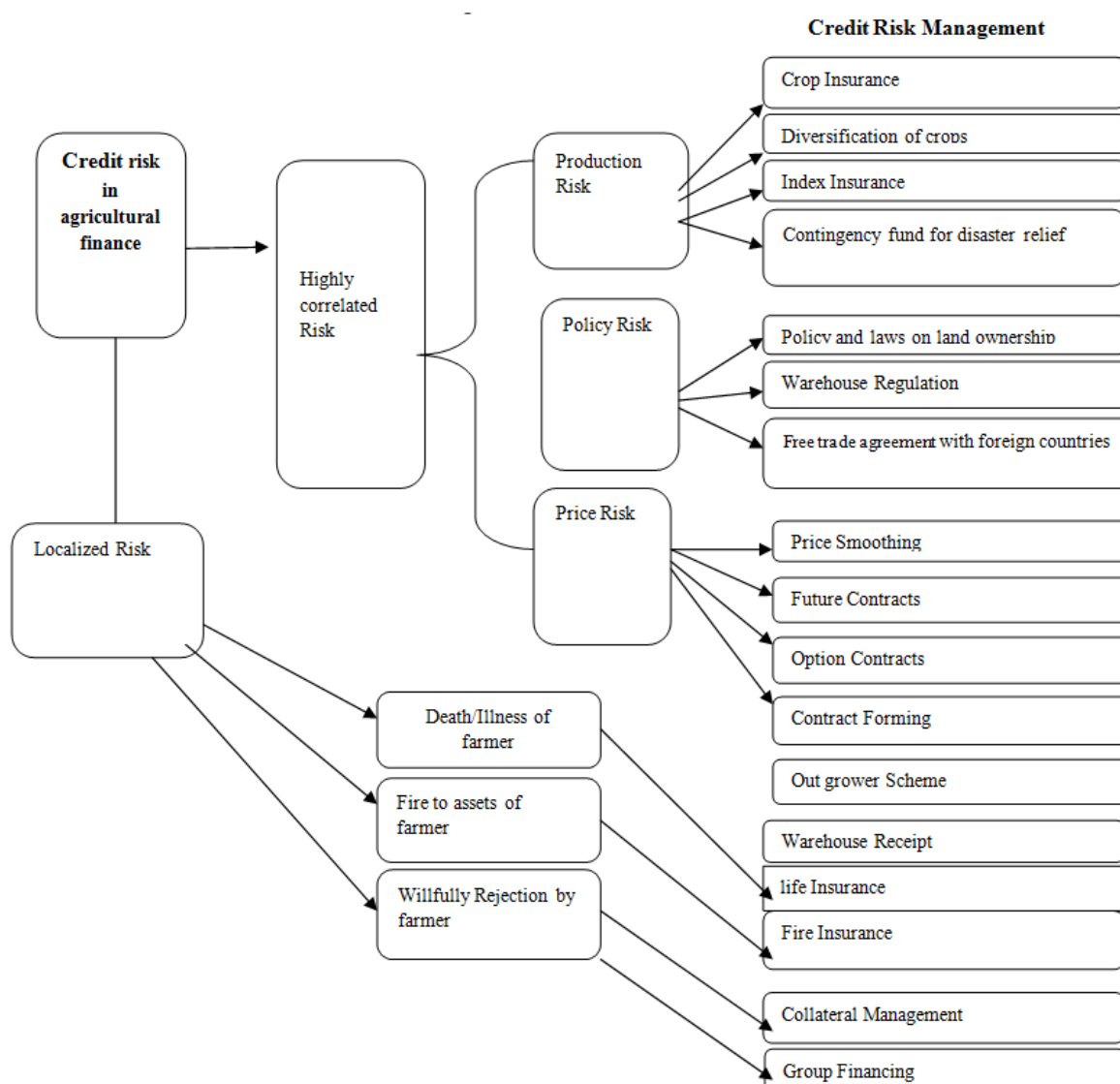
Policy risk can be managed in different ways. Government should introduce policies and laws which are related to landowners and other policies which are related to agriculture sector. The land serves as collateral security in agricultural finance when proper legislation is done access to agriculture finance can be increased. The warehouse receipt in also a burning issue, government has to introduce proper legislation to solve these types of issues.. The free trade agreement should be made with foreign countries in order to increase the export of agriculture products. The government has to introduce proper legislation regarding the institutional reforms (Jessop & Harms, 2012).

### **2.3 Management of localized Risk In agricultural Finance:**

The risk faced by the individual farmer or financial institution is called localized risk. Here are some measures to manage the localized risks. Collateral management is easy for the bank or financial institution when it accepts immovable security e.g. land, building, etc. as collateral than the movable security e.g. car because there are some risks which are associated with movable security. So bank or financial institution should accept immoveable security as collateral for big, medium and long duration loans and movable securities can be accepted for short term loans ( Mustafa, Ali & awaideh, Ali & awaideh, 2011). For short term financing, group financing can be used in case farmers do not have moveable or immovable security as collateral. In group financing, monitoring and financing costs are low because of group member are responsible for each other (Finance, 2012-13).

In order to cover loss due to fire, fire insurance is used such as loss of agricultural machinery, building and loss of grains. The losses due to fire are paid by the insurance company. In Morocco the area of grain for fire insurance does not exceed 200000 ha in case of good farming season .(Mustafa, Ali & awaideh, 2011). The banks demand insurance to cover the risks related to life of farmer and for the investment project before awarding loan to the borrower essentially for investment purpose loans. The requirements of insurance are necessary to cover the whole amount of credit and remained enforce until the whole amount is recovered. The premium for insurance is paid by the farmer and in case of farmer failure to pay partial or whole amount due to death or disability of farmer, payment is recovered from the insurance company ( Mustafa, Ali & awaideh, Ali & awaideh, 2011)

### Conceptual framework of the Research



**Fig:** Summary of credit risk management practices used in extending agricultural financing by the Banks of Pakistan

### 3. Research Methodology:

The research is quantitative in nature. Survey research methodology is being used in the research paper. A standard questionnaire is used for collection of responses from the Bank's Agri Credit Department. Standard questionnaire will be used for the collection of responses from the banks about the risks being faced and techniques which can be employed for the management of credit risk in payment of agricultural credit. Area of study is Pakistan, but due to scarcity of time and resources Pakistan is selected for this purpose. A Random sample is taken. The sample consists of 45 branches of Two specialized banks Zarai Taraqiati Bank and Punjab Provisional Cooperative Banks Limited and five major commercial banks (United Bank Limited, Allied Bank Limited, National Bank of Pakistan, Muslim Commercial Bank Limited, Habib Bank Limited) and ten domestic, commercial banks (Askari Bank Limited, Bank of Punjab, Bank AL-Habib, Bank AL-Falah, The Bank of Khyber, Faysal Bank, Sindh Bank, KASB Bank, Soneri Bank, Silk Bank Limited). The sample has been taken from the above mentioned bank's branches in District Bahawalpur and Rahim Yar Khan. The software which is used for data analysis is SPSS. The Frequency distribution is used for analysis.

#### 4. Results and Discussion:

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less than 5 years	19	42.2	42.2	42.2
	5-10 years	19	42.2	42.2	84.4
	11-15 years	1	2.2	2.2	86.7
	16-20 years	1	2.2	2.2	88.9
	over 20 years	5	11.1	11.1	100.0
	Total	45	100.0	100.0	

In the table 1 the frequency distribution of respondents by work experience in the bank is given. It shows that large portion of respondents i.e. 42.2% have work experience of less than 5 years the other 42.2% have experience of 5-10 years in the bank. Only 2.2% respondents have experience of 11-15 years and 16-20 years respectively. Respondents which consist experience over 20 years are 11.1%.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	37	82.2	82.2	82.2
	No	8	17.8	17.8	100.0
	Total	45	100.0	100.0	

Table 2 shows the distribution of respondents on the basis of credit risk faced by the banks in agricultural finance. Large portions 82.2% of respondent have faced the situation of credit risk (farmers failed to pay back credit to banks). Only 17.8% had not faced the situation of credit risk. This indicates the presence of credit risk in the banks of Pakistan.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Production Risk	10	22.2	22.2	22.2
	Price Risk	6	13.3	13.3	35.6
	Policy Risk	5	11.1	11.1	46.7
	All of the above	24	53.3	53.3	100.0
	Total	45	100.0	100.0	

Distribution of respondents on the basis of perception of highly correlated risks (Risk that affect all the farmers in a particular geographical area) is illustrated in table 3. A large portion of respondents (53.3 percent) considered all of above (production, price and policy risks) as highly correlated risk. On the other hand 22.2% respondents considered production risk as highly correlated risk. Only 11.1% are considering policy risk as highly correlated risk. According to 13.3% respondents' price risk is the risk that affects all the farmer in particular geographical area.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Death of farmer	3	6.7	6.7	6.7
	Illness of farmer	2	4.4	4.4	11.1
	Fire/ theft of assets	2	4.4	4.4	15.6
	willfully rejection by farmers	16	35.6	35.6	51.1
	both 1&2	8	17.8	17.8	68.9
	all of the above	14	31.1	31.1	100.0
	Total	45	100.0	100.0	

The distribution of respondents on the basis of the perception of localized risk is shown in table 4. According to 35.6% respondents willfully rejection by the farmer is the risk that arises due to individual farmers. 6.7% respondents considered the death of farmer as localized risk, and 4.4% respondents felt illness of farmer as localized risk. 4.4% perceived fire/theft of asset as localized risk, while 17.8% respondents perceived both death and illness of farmer as localized risk. A large portion of respondents (31.1%) considered all the above discussed risk (death, illness, fire/theft of asset and willfully rejection by farmer) as localized risk.

**Table 5 The Distribution of respondents on the basis of adoption of production risk management techniques**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Crop Insurance	27	60.0	60.0	60.0
	Contingency fund for disaster relief	2	4.4	4.4	64.4
	Both 1&2	11	24.4	24.4	88.9
	Other	5	11.1	11.1	100.0
	Total	45	100.0	100.0	

The table 5 shows the distribution of respondents according to production risk management technique adoption. A large portion of respondent 60% considered crop insurance as production risk management technique. Only 4.4 % considered contingency fund for disaster relief as production risk management technique. No respondents rely only on diversification of crop for production risk management. Sixty percent of the respondents manage the production risk by insuring the crop. On the other hand 11.1% and 24.4% respondents ,respectively use other techniques and both crop insurance and diversification of crop for production risk management.

**Table 6 Distribution of respondents on the basis of adoption of price risk management techniques**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Price Smoothing	9	20.0	20.0	20.0
	Future Contracts	10	22.2	22.2	42.2
	Option contracts	1	2.2	2.2	44.4
	Contract farming	2	4.4	4.4	48.9
	Warehouse Receipt	1	2.2	2.2	51.1
	None	22	48.9	48.9	100.0
	Total	45	100.0	100.0	

Table 6 illustrates the frequency distribution of respondents on the basis of adoption of price risk management techniques. A large portion of the respondents (48.9%) are not employing any technique for the management of price risk in agricultural finance. Twenty percent says that it depends upon the price smoothing for the management of price risk in agricultural finance. Only 22.2% considered future contract, 2.2% considered option contract, 4.4% considered contract farming and 2.2% considered warehouse receipt as the important technique for the management of price risk in agricultural finance.

**Table 7 Distribution of respondents on the basis of response about the policy making regarding credit risk management**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Improvement in policies and laws on Land ownership	34	75.6	75.6	75.6
	Policy making regarding warehouse receipt	6	13.3	13.3	88.9
	Free trade agreement with foreign countries	5	11.1	11.1	100.0
	Total	45	100.0	100.0	

The table 7 shows the distribution of respondent on the basis of their responses for policy making to manage the policy risk in agricultural finance. A large portion of respondents (75.6% ) viewed that improvement in policies and laws on land ownership will be helpful in the management of credit risk. According to 13.3% respondents policies regarding the warehouse receipt should be made. Only 11.1% respondents were in the favor of free trade agreement with foreign countries.

**Table 8 Distribution of respondent on the basis of usage of Life Insurance for farmerers**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	18	40.0	40.0	40.0
	no	27	60.0	60.0	100.0
	Total	45	100.0	100.0	

It is depicted from the above table that a large portion of respondents (60%) is not doing life insurance of the farmer for the management of death/illness risk. Only 40% of respondents are employing life insurance for farmers while awarding agricultural credit.

**Table 9 Distribution of respondent by adoption of techniques for the management of willfully rejection risk**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Group financing	2	4.4	4.4	4.4
	Collateral management	35	77.8	77.8	82.2
	Both 1&2	6	13.3	13.3	95.6
	Other	2	4.4	4.4	100.0
	Total	45	100.0	100.0	

In table 9 the distribution of respondents on the basis of adoption of techniques for management of willfully rejection risk is shown. A very large portion of respondents is using the collateral management technique for the management of willfully rejection risk by the farmer. While 4.4% used group financing, 13.3% used both group financing and collateral management and 4.4% used other techniques for the management of this risk.

**Table 10 Distribution of respondents on the basis of usage of insurance for the management of theft/fire of asset risk**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	34	75.6	75.6	75.6
	no	11	24.4	24.4	100.0
	Total	45	100.0	100.0	

It is clear from the table 10 that A large portion of respondents (75.6%) is using insurance of assets for the management of fire/theft risk. Only 24.4% of respondents are not employing any insurance for the management of this risk.

### 5. Conclusion:

The banks of Pakistan are facing the problem of credit risk in agricultural finance. About 82.2% banks have faced this kind of situation. According to 53.3% respondents production risk, price risk and policy risk are risks that are affecting all the farmers in the particular geographical area. The willfully rejection, death/illness, fire/theft of asset are the risks that affect the individual farmer. Most banks (about 60%) are using the crop insurance as an important production risk management technique. About 48.9% respondents are not using any technique for the management of price risk and other respondents are relying on price smoothing, future contracts, contract farming. According to the views of 75.6% respondents, the government should improve the laws and policies regarding the land ownership. Sixty percent banks do not insure the life of a farmer in order to cover the death or illness risk of the farmer. Most of the banks (about 77.8%) are using collateral management for the management of willfully rejection risk and about 75.6% insured the agricultural assets in order to cover the fire/theft of farmer's assets risks.

### 5.1 Suggestions:

- The Government should make policies and laws regarding the warehouse receipt because it is one of the innovative techniques which is being used in the world for the management of price risk in agricultural finance.
- Courses regarding the management of credit risk in agricultural finance should be included in the university and college level.
- The State Bank of Pakistan should expand its program of training of agricultural staff of commercial banks. The commercial banks should also initiate its own programs for the training and development of agricultural credit department staff.
- Before awarding the credit for agricultural purpose farmer history should be tracked carefully.
- Banks should charge a variable interest rate like if farmer deposits the credit before the due date then the interest rate should be reduced. It will motivate the farmer.
- The use of credit should be properly monitored so that misuse can be prevented, because sometime farmers used it for domestic purpose e.g. marriage.
- Attention on the education of farmer should be given.
- Government should also facilitate the index insurance in Pakistan, which will help in the management of production risk.

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