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Gender Dimension of Risk Management Strategies among Arable Crop Farmers in Ekiti State, Nigeria

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Abstract

The study examined the gender dimension of Risk Management Strategies (RMS) among arable crop farmers in Ekiti State, Nigeria. Using simple random sampling, 175 (Male=106; Female=69) farmers were sampled from 3 LGAs in Ekiti State. An interview schedule was used for data collection and data were analysed using means, Pearson Product Moment Correlation and regression. Males and females were aged 57.05±8.89 and 52.06±9.021 years, respectively. The majority were married (male, 94.3%; female, 89.0%), formally educated (male, 94.3%; female, 98.6%) with an average household size of 6.17±1.53 persons for males and 5.91±1.35 persons for females. The average years of experience in arable crop farming was 21.47±8.83 years for males and 17.93±6.97 years for females. Males experienced a higher cost of inputs (Males, $\bar{x}$=1.83; Female, $\bar{x}$=1.74). Females suffered higher pest infestation (Female, $\bar{x}$=1.74; Male, $\bar{x}$=1.56). disease outbreak (Female, $\bar{x}$=1.48; Male, $\bar{x}$=1.42), market unpredictability (Female, $\bar{x}$=1.84; Male, $\bar{x}$=1.68). Risk effects include decreased yield (Females, $\bar{x}$=1.46; Males, $\bar{x}$=1.42) and crop damage/failure (Females. $\bar{x}$=1.46; Males, $\bar{x}$=1.44). Foremost RMS include agrochemicals use (Male, $\bar{x}$=1.80; Female, $\bar{x}$=1.88), improved seeds (Male, $\bar{x}$=1.71; Female, $\bar{x}$=1.90), improved marketing skills (Male, $\bar{x}$=1.50; Female, $\bar{x}$=1.67). Males diversify more (Male, $\bar{x}$=1.54; Female, $\bar{x}$=1.49). Significant relationship exists between farm risks, perceived effects of risks and RMS for males and females. Significant factors predicting RMS were marital status, household size, production risks, human/personal risks, price/market risks, institutional risks, and perceived risk effects among males; while hired labour, human/personal risks, price/market risks, and perceived risk effects among females. The study recommends that gender-specific risk management strategies training programs should be organised for farmers.

Keywords: Gender, Farm risks, Risks effect, Arable crop farmers, Risk management strategies

Introduction

The agricultural sector in Nigeria plays a crucial role in the nation's economy and it is the one of the major avenues is through arable crop farming. Arable crop farming provides livelihood opportunities for the teeming population in Nigeria. A report by Sasu (2023) stated that agriculture contributed 23 percent to Nigeria's GDP and that the arable land area in Nigeria is 34 million hectares with 6.5 million allotted to permanent crops and 28.6 million allotted to grassland. Arable crop farming is a sub-sector in agriculture involving the cultivation of annual crops like maize, yam, cassava, beans, wheat, rice, cocoyam, and soybeans, among others. Arable crops are essential food sources that support the food security of millions of people in Nigeria. They are excellent sources of nutrients important for overall body growth and support rural livelihoods. Arable crop farming ensures the sustainable production of a healthy diet and also serves as a fundamental source of income for rural communities. As rightly noted by Giller, Delaune, Silva, Descheemaeker, van de Ven, Schut et al (2021) agriculture will remain a major pillar of rural livelihoods in developing nations. Most of the arable crops produced in Nigeria are primarily consumed as food, though some are notable for their industrial uses.

Despite the potential of arable crops, their production usually involves various risks. The array of risks that arable crop farmers encounter often threatens crop productivity, profitability and rural livelihood sustainability. In arable crop production, risks connote uncertainties that happen by chance. Farm risks are usually characterised by dangers or failure. The various farm risks encountered by arable crop farmers include soil degradation, drought, increased temperatures, excessive rainfall, flooding, earthquakes, other climatic effects, unfavourable market prices of farm crops, inability to access credit, market inaccessibility, high cost of inputs, and insecurity, among others. United States Department of Agriculture - USDA (2024) classifies risks in agriculture as production risks, human or personal risks, price or market risks, financial risks and institutional risks. These arrays of risks negatively affect arable crop farming productivity and sustainability. Farm risks lead to decreased crop yield, food insecurity, decrease in income/profit, and migration, among others. Omotesho, Olaghere, Daramola and Adenuga (2020) noted that in the past few years, Nigeria has witnessed flooding, drought, crop diseases, pest infestation, and fluctuations in the prices of agricultural outputs and inputs. Hence, risk management strategies become paramount in mitigating farm risks. Risk management strategies are essential for agriculture sustainability, the nation's food security, and the livelihoods of arable crop farmers.

The production of arable crops in Nigeria depends largely on rural farmers with small farm holdings, with women playing a crucial role in production and processing. According to Njuki, Eissler, Malapit, Meinzen-Dick, Bryan and Quisumbing (2022), women play essential roles at every stage of the agricultural value chain. Despite the importance of women's critical roles in agriculture and households' food security, they frequently encounter obstacles that limit their ability to enhance food production, improve income, ensure healthy diets, and ultimately contribute to household livelihood. It is believed that empowering women and achieving gender equality in food systems can lead to increased food security and better nutrition (Njuki 2021 in Njuki et al. 2022). Most times, inequality exists between males and females for access to resources, information, and technology, this always necessitates different risk responses. According to USDA (2024), risk management strategies vary because each farm varies in its risk exposure, and ability to bear risks. Thus, identifying and examining the gender dimension of farm risks and the strategies used to manage these risks is crucial to making informed and gender-sensitive policies that are effective and inclusive.

Previous studies on farm risks and risk management strategies had been conducted in other States of the federation such as Ogun, Kwara, Abia, and Imo States (Ayinde, Olarewaju, Chimeze, Omotesho, Ogunlade and Olaoye, 2023; Nyong, E. E. and Bassey, D.E. 2019; Omotesho et al., 2020; Aminu, Balogun and Oke, 2019; Ibeagwa, Ehirim, Ben-Chendo, Ukoha, Osuji, Maduike, Okwara and Martins, 2019; Ndem and Osondu, 2018). However, there are dearths of studies engendering risk management utilisation among arable crop farmers in Ekiti State, Nigeria. So, findings from this study contribute to the existing literature on gender and risk management in arable crop farming in the study area by providing insights into the gender dimension of unique risks faced by male and female arable crop farmers and their risk management strategies. The outcome of this study is useful in designing and implementing risk management interventions for arable crop farmers considering the gender dimensions of these risks. The study examined arable crop farmers' risks, perceived effects of risks on production and risk management strategies. The factors influencing risk management strategies utilisation were also assessed.

Materials and Methods

The study was conducted in Ekiti State, Southwest Nigeria. The state is located at latitudes 70°151′ and 80°51′ north of the Equator and longitudes 40°51′ and 50°451′ East of the Greenwich meridian and it covers a land area of 5887.890 sq km. Agriculture is the predominant occupation of the people in Ekiti state. Arable crops produced include maize, rice, cassava, yam, sweet potato, tomatoes, vegetables, okra, pepper, and garden egg, among others.

The field survey was carried out in 2023. The study population consist of all arable crop farmers in

Ekiti state. Arable crops are widely cultivated in Ekiti State. A multistage sampling procedure was used to select respondents for this study. In the first stage, Ekiti state has 16 local government areas (LGAs), simple random sampling was used to select 20% of the LGAs to give three LGAs namely; Ado-Ekiti, Ikere and Ise/Orun LGAs. In the second stage, two (2) communities were randomly selected from each LGA to give a total of six (6) communities. Ago-aduloju and Igirigiri communities were randomly selected in Ado-Ekiti LGA, Ayede and Oko-Aso communities were randomly selected in Ikere LGA, while Ogbese and Obada communities were randomly selected in Ise-Orun LGA. From the list of arable crop farmers in each community from the respective LGA secretariat, 10% of arable crop farmers (Agoaduloju=50, Igirigiri=15, Ayede=25, Oko-Aso=20, Ogbese=40, Obada=25) were sampled in each community. A total of 175 (Male=106; Female=69) arable crop farmers were sampled for this study.

Farm risk frequency of occurrence was measured on a 3-point scale of Always, Seldom and Never with scores of 2, 1 and 0 assigned, respectively. Farm risks were assessed under the following categories: production risks, human/personal risks, price/market risks, financial risks, and institutional risks. The perceived effect of farm risks on crop production was measured on a 3-point scale of To a large extent, To a lesser extent, and Not an effect with scores of 2, 1 and 0 assigned respectively. Risk management strategies utilisation was measured on a 3-point scale of Always, Sometimes and Never with scores of 2, 1 and 0 assigned, respectively. Risk management strategies were assessed under the following categories: protective strategies, alleviation strategies; coping strategies, and financial strategies. Data was collected with the aid of an interview schedule and analysed using means, PPMC and linear regression.

Linear regression model for factors influencing risk management strategies utilisation is expressed as:

$$Y = a+b_1X_1,\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots+b_nX_n+e$$

Where Y = Risk Management Strategies Utilisation (score value) a = Constant term

$b_1, b_2 \ldots b_n$ = Regression coefficient e = error

$X_1, X_2 \ldots X_n$ = Regression parameters which were:

X_1 = Age (actual value)
X_2 = Marital Status (Married=1, Otherwise=0)
X_3 = Education (Formally Educated=1, Otherwise=0)
X_4 = Household size (actual value)
X_5 = Year of experience (actual value)
X_6 = Hired labour (Yes=1, No=0)
X_7 = Production risks (score value)
X_8 = Human/personal risks (score value)
X_9 = Price/market risks (score value)
X_{10} = Financial risks (score value)
X_{11} = Institutional risks (score value)
X_{12} = Perceived effect of risks (score value)

Results and discussion : Personal characteristics of arable crop farmers

The result in Table 1 presents the distribution of arable crop farmers based on their personal characteristics. The age category of 54.7% males and 44.9% females were between 51 to 60 years. The average age for males and females was 57.05±8.89 and 52.06±9.021 years, respectively. The result indicates that most crop farmers are above 50 years and the mean age obtained signifies an ageing farming population in the study area. Similarly, Aminu, Balogun and Oke (2019); Nyong, E. E. and Bassey, D.E. (2019)reported a mean age of 51.8 among arable crop farmers in Odogbolu LGA in Ogun State, Nigeria. The majority of the males (94.3%) and females (89.0%) were married. This indicates that the majority of the farmers are shouldering **r**esponsibility for their families. The use of risk management strategies will lead to increased production and income for farmers which are important in meeting households' needs. It was found that 94.3% of males and 98.6% of females were formally educated with more than half of the males (56.6%) and females (60.9%) having secondary school education. The result implies that most arable crop farmers in the study area are not illiterate and have average English communication skills. The educational background of farmers serves as a foundation for more understanding of the risk factors in crop production. Education increase farmers' access to information on risk management strategies and it gives farmers the ability to implement these strategies. Likewise, Ibeagwa et al. (2019) reported over 90% of arable crop farmers being formally educated in Imo State, Nigeria.

The average household size was 6.17±1.53 persons for males and 5.91±1.35 persons for females. The result from this study agrees with Ogunjinmi, Fakoya, Banmeke, Fapojuwo and Ogunjinmi (2022) who reported an average household size of 6 persons among farmers in a study conducted on gender roles and livelihood activities in Ekiti and Ogun States, Nigeria. The average years of experience in arable crop farming was 21.47±8.83 years for males and 17.93±6.97 years for females. It can be inferred from the result that arable crop farmers had spent considerable amount of time engaging in crop production in the study area. The male farmers' mean age obtained in this study aligns with the average age of male small-scale maize farmers reported by Ayinde et al. (2023) in Kwara State, Nigeria, but at variance with females ' average age. The majority of the males (84.0%) and females (82.6%) made use of hired labour for their crop farming activities. Also, more than half of the males (66.0%) and females (62.3%) indicated using family members as source of labour. The results reveal prominent source of labour among arable crop farmers to be hired labour and family. This agrees with the study of Ndem and Osondu (2018); Nyong, E. E. and Bassey, D.E. (2019) who reported hired and family labour as the major source of labour among cassava farmers in Abia State, Nigeria. The main source of land for crop farming activities for males was rent (50.0%), family land (41.5%), land bought (21.7%) and inherited land (20.3%). For females, the major sources of land for crop farming were family lands (71.0%), inherited lands (43.5%), rented lands (36.2%) and land gifted (20.3%). The results indicated that most females have access to land for arable crop farming, but it is not certain if the land they have access to is sufficient for their crop farming activities.

Table 1: Personal characteristics of arable crop farmers

Variables	Male (106)			Female (69)		
Age	**Freq.**	**%**	**Mean±SD**	**Freq.**	**%**	**Mean±SD**
< 31	2	1.9	57.05±8.90	2	2.9	52.06±9.02
31 – 40	6	5.7		6	8.7	
41 – 50	10	9.4		20	29.0	
51 – 60	58	54.7		31	44.9	
> 60	30	28.3		10	14.5	
Marital status						
Widow/widower	3	2.8		3	4.3	
Divorced	0	0.0		5	7.2	

Married	100	94.3		60	87.0	
Single	3	2.8		1	1.4	
Educational level						
Tertiary	24	22.6		14	20.3	
Secondary	60	56.6		42	60.9	
Primary	16	15.1		12	17.4	
No formal education	6	5.7		1	1.4	
Household size						
1-3	6	5.7	6.17±1.53	2	2.9	5.91±1.35
4-6	48	45.3		44	63.8	
7-9	52	49.1		23	33.3	
Years of experience						
< 10	2	1.9	21.47±8.83	2	2.9	17.93±6.98
10 – 19	48	45.3		43	62.3	
20 – 29	34	32.1		16	23.2	
30 and above	22	20.8		8	11.6	
Sources of labour						
Family	70	66		43	62.3	
Friend	4	3.8		2	2.9	
Hired	89	84		57	82.6	
Others	2	1.9		4	5.8	
Sources of land						
Bought	23	21.7		6	8.7	
Inherited	14	20.3		30	43.5	
Family	44	41.5		49	71.0	
Rent	53	50.0		25	36.2	
Communal	7	6.6		9	13.0	
Gift	5	4.7		14	20.3	

Source: Field survey, 2023

Farm risks encountered by arable crop farmers

The major risks assessed were production, human/personal, price/market, financial and institutional risks. The results in Table 2 show that production risks highly exposed to by arable crop farmers were the high cost of inputs and pest infestation and it ranked 1st ($\bar{x}$=1.83) and 2nd ($\bar{x}$=1.56), respectively among males, while both variables ranked 1st among the females ($\bar{x}$=1.74). From these results, it was glaring that males experienced the risk of high cost of inputs more than females. However, females suffered more pest infestation incidences than males. Similarly, Aminu, Balogun and Oke (2019) reported pests and diseases as one of the major production risks experienced by arable crop farmers. The majority of the respondents (Male, $\bar{x}$=1.08; Female, $\bar{x}$=1.04) indicated that they face adverse weather conditions. In recent years, climate change has resulted in adverse weather conditions that do not favour increased crop production. Corroborating this, Tajudeen (2022) attests that extreme weather events necessitated by climate change do not favour crop productivity because of decreased crop yield, declining soil fertility, the spread of pests, and increasing soil erosion, among others. Poor quality seeds were the least production risk indicated by males ($\bar{x}$=0.68) and females ($\bar{x}$=0.65). This implies that farmers have good seeds for their farming activities, but require resources and a favourable environment for their farm enterprises to thrive. Males encountered more risk of inadequate soil nutrients than females (Male,

$\bar{x}$=1.29; Female, $\bar{x}$=1.16). The findings from this study align with Omotesho et al. (2020) who reported farm risks among arable crop farmers in Kwara State, Nigeria including pest, disease outbreaks, sudden input price changes, and soil quality reduction.

Human/personal risks encountered by farmers were ill health (Male, $\bar{x}$=1.26; Female, $\bar{x}$=1.25), labour shortages (Male, $\bar{x}$=1.39; Female, $\bar{x}$=1.36) and theft (Male, $\bar{x}$=1.37; Female, $\bar{x}$=1.45). Labour shortages are the foremost human risk for males, and theft is the prominent human risk for females. Males experienced ill health and labour shortages more than females, while females experienced theft more than males. The price/market risks encountered by arable crop farmers include market unpredictability, high cost of transportation and produce price fluctuations. The female gender experienced market unpredictability (Male, $\bar{x}$=1.68; Female, $\bar{x}$=1.84) and high cost of transportation (Male, $\bar{x}$=1.65; Female, $\bar{x}$=1.70) more relative to the male gender. This corroborates Egwu (2021) who reported transportation problems as one of the farm risks encountered in a study conducted among smallholder rice farmers in Ebonyi State. Transportation-associated issues make the distribution of agricultural produce difficult, resulting in wastage of produce and significant loss of income for farmers. Both males ($\bar{x}$=1.68) and females ($\bar{x}$=1.67) encounter produce price fluctuations. Likewise, Omotesho et al. (2020) reported changes in the market price of output as a risk identified by arable crop farmers in Kwara State, Nigeria, though their results were not engendered. Produce price fluctuations can lead to unpredictable income, inability to cover production costs, underproduction and collapse of local agricultural enterprises.

Furthermore, the results in Table 1 show that the financial risks females experience increased input costs (Male, $\bar{x}$=1.52; Female, $\bar{x}$=1.62) and unexpected changes in crop prices (Male, $\bar{x}$=1.54; Female, $\bar{x}$=1.59) more compared to the males. The foremost institutional risk among males ($\bar{x}$=1.86) and females ($\bar{x}$=1.91) was inability to access agricultural loan and subsidies and the females experience this risk more. Also, the results show that females ($\bar{x}$=1.68) encountered the risk of insufficient infrastructure more than males ($\bar{x}$=1.50). The indication from females ($\bar{x}$=1.64) on the risk of changes in government policies was higher relative to the males ($\bar{x}$=1.48). Similarly, Omotesho et al. (2020) identify change in government policy as one of the farm risks among arable crop farmers in Kwara State, Nigeria. The results of this study indicate that unfavourable government policies subject farmers to risks which affect their production efficiency.

Table 2: Major risks encountered by arable crop farmers

S/N	Major risks	Male		Female	
	Production risks	$\bar{x}$	**SD**	$\bar{x}$	**SD**
1	Pest infestation	1.56	0.60	1.74	0.50
2	Diseases outbreak	1.42	0.51	1.48	0.53
3	High cost of inputs	1.83	0.45	1.74	0.50
4	Adverse weather conditions (flood, soil erosion, drought etc)	1.08	0.38	1.04	0.36
5	Irregular rainfall	1.10	0.60	1.26	0.50
6	Excessive rainfall	1.14	0.42	1.14	0.43
7	Inadequate soil nutrients	1.29	0.69	1.16	0.56
8	Equipment breakdown	1.25	0.53	1.16	0.59
9	Poor quality seeds	0.83	0.56	0.87	0.54
	Human/Personal risk				
10	Ill health	1.26	0.52	1.25	0.47
11	Labour shortages	1.39	0.56	1.36	0.62
12	Theft	1.37	0.52	1.45	0.53
13	Inadequate Technical knowledge	0.68	0.69	0.65	0.76
	Price/Market risk				
14	Limited market access	1.23	0.42	1.17	0.38
15	Produce price fluctuations	1.68	0.489	1.67	0.48

16	Market unpredictability	1.68	0.526	1.84	0.41
17	Low produce price	1.05	0.575	0.96	0.61
18	High cost of transportation	1.65	0.498	1.70	0.49
19	Customers refusing to pay when produce are sold on credit	1.08	0.417	1.13	0.34
	Financial risk				
20	Increased input costs	1.52	0.521	1.62	0.49
21	High interest rate	1.29	0.568	1.41	0.65
22	Lack of insurance	1.10	0.729	1.03	0.75
23	Unexpected changes in crop prices	1.54	0.555	1.59	0.49
24	Lack of access to loan	1.78	0.437	1.84	0.37
25	Inability to repay loan	1.16	0.745	1.22	0.75
	Institutional risk				
26	Changes in Government policies	1.48	0.621	1.64	0.51
27	Lack of agric loan and subsidies	1.63	0.522	1.72	0.48
28	Inability to access agric loan and subsidies	1.86	0.392	1.91	0.28
29	Ineffective extension services	0.75	0.811	0.51	0.66
30	Insufficient infrastructures	1.50	0.665	1.68	0.56

Source: Field survey, 2023; SD=Standard Deviation

Perceived effects of risks on arable crop farmers' production

From the result in Table 3, it was found that females ($\bar{x}$=1.46) experienced decreased yield than males ($\bar{x}$=1.42). Similarly, females ($\bar{x}$=1.46) experience increased crop damage/failure relative to males ($\bar{x}$=1.44). Furthermore, most of the farmers indicated experiencing delayed production with the males ($\bar{x}$=1.23) experiencing more delay in production relative to females ($\bar{x}$=1.07). Findings from this study imply that males and females experienced negative effects of farm risks on their production but at varying degrees when each individual's effect is examined. The results of this study align with the submission of USDA (2024), that farm production risks affect both the quantity and quality of agricultural commodities.

Table 3: Effects of risks on arable crop production

S/N	Effects of risks on production	Male		Female	
		$\bar{x}$	SD	$\bar{x}$	SD
1	Low output/crop yield	1.42	0.49	1.46	0.50
2	Delayed production	1.23	0.56	1.07	0.49
3	Stunted growth	1.24	0.56	1.20	0.50
4	Crop damage/failure	1.44	0.63	1.46	0.60
5	Low price of produce	1.21	0.55	1.29	0.64

Source: Field survey, 2023; SD=Standard Deviation

Risk management strategies utilisation among arable crop farmers

The results in Table 4 show the various risk management strategies by arable crop farmers. The foremost protective strategies utilised by arable crop farmers were the use of agro-chemicals (Male, $\bar{x}$=1.80; Female, $\bar{x}$=1.88), use of improved seeds (Male, $\bar{x}$=1.71; Female, $\bar{x}$=1.90) and extension contacts (Male, $\bar{x}$=1.70; Female, $\bar{x}$=1.72). It was discovered that females utilised these aforementioned protective strategies more than males. Aminu, Balogun and Oke (2019) also reported the major risk management strategies by arable crop farmers to be agro-chemicals. The use of agro-chemicals becomes necessary as one of the major production risks encountered by farmers is pest infestation. In the same vein, Egwu (2021) reported the use of pesticides, herbicides and fertilizer as measures of risk management by smallholder rice farmers in Ebonyi State, Nigeria.

The major alleviation strategies employed were use of resistant varieties (Male, $\bar{x}$=1.78; Female, $\bar{x}$=1.75), seeking help from cooperative societies (Male, $\bar{x}$=1.68; Female, $\bar{x}$=1.71), use of advisory

services (Male, $\bar{x}$=1.67; Female, $\bar{x}$=1.70) and engaging in non-farm income generating activities (Male, $\bar{x}$=1.54; Female, $\bar{x}$=1.52). Males employed the use of resistant varieties and engaging in non-farm income-generating activities more compared to females. But females' frequency of seeking help from cooperative societies and the use of advisory services was higher relative to males.

Furthermore, arable crop farmers utilised some coping strategies to mitigate the risks encountered. The foremost coping strategies used were hired labour (Male, $\bar{x}$=1.66; Female, $\bar{x}$=1.68), engaging in off-farming activities (Male, $\bar{x}$=1.40; Female, $\bar{x}$=1.41), and reduced consumption (Male, $\bar{x}$=1.35; Female, $\bar{x}$=1.28). It was discovered that the frequency at which males had to reduce consumption was higher than females. Some financial management strategies that were of help to arable crop farmers include diversification into other farm enterprises (Male, $\bar{x}$=1.54; Female, $\bar{x}$=1.49), improved marketing skills (Male, $\bar{x}$=1.50; Female, $\bar{x}$=1.67), adjustment of operating costs (Male, $\bar{x}$=1.47; Female, $\bar{x}$=1.43), and selling assets to reduce debt (Male, $\bar{x}$=1.24; Female, $\bar{x}$=1.22). The rate at which males diversified into other farm enterprises, adjusted operating costs, and sold assets to reduce debt was higher than females. The result aligns with Ayinde et al. (2023) who reported that a higher percentage of male farmers diversified into other farm-related activities as a risk management strategy than female farmers. According to the Centre for Agricultural Food and the Environment (2024), production risks can be managed by diversifying farm enterprises, irrigation, construction of drainages, increasing production, and crop rotation, among others. However, the improved marketing skills of females were higher relative to males. This aligns with the submission of Ritson (2024) that women are the superior marketing gender.

Table 4: Risk Management Strategies utilized by arable crop farmers

S/N	Risk Management strategies	Male		Female	
	Protective strategies	$\bar{x}$	SD	$\bar{x}$	SD
1	Use of fertilizers and manure	1.45	0.60	1.38	0.55
2	Use of agro-chemicals	1.80	0.40	1.88	0.32
3	Irrigation	1.21	0.70	0.97	0.72
4	Extension contacts	1.70	0.46	1.72	0.45
5	Use of improved seeds	1.71	0.47	1.90	0.30
6	Crop processing	1.21	0.40	1.14	0.35
7	Sell at decreased price	1.15	0.47	1.19	0.52
	Alleviation strategies				
8	On-farm sales	1.30	0.57	1.35	0.63
9	Non-farm income	1.54	0.63	1.52	0.67
10	Use of resistant varieties	1.78	0.47	1.75	0.43
11	Cooperative society	1.68	0.46	1.71	0.45
12	Traditional medicine	1.07	0.42	1.07	0.49
13	Self-medication	0.87	0.74	0.97	0.78
14	Visit clinics/hospitals	1.34	0.53	1.32	0.50
15	Sales partition	1.09	0.62	1.09	0.45
16	Spend more time on management	1.41	0.49	1.48	0.53
17	Use advisory services	1.67	0.56	1.70	0.52
	Coping strategy				
18	Off-farming activities	1.40	0.51	1.41	0.57
19	Borrowing	0.90	0.67	0.78	0.69
20	Reduced consumption	1.35	0.58	1.28	0.59
21	Hired labour	1.66	0.51	1.68	0.55
22	Sales of property	0.92	0.74	0.75	0.73

	Financial strategy				
23	Sell assets to reduce debt	1.24	0.76	1.22	0.85
24	Diversify into other farm enterprises	1.54	0.52	1.49	0.53
25	Adjust operating costs	1.47	0.50	1.43	0.52
26	Improve marketing skills	1.50	0.57	1.67	0.56

Source: Field survey, 2023; SD=Standard Deviation

Factors influencing risk management strategies utilisation

Regression analysis was used to ascertain factors influencing risk management strategies utilisation among the arable crop farmers. Table 5 reveals that the F value of 9.407 was significant at 1% level for males with an R^2 value of 0.548 depicting that 54.8% of the risk management utilisation by males can be explained by the independent variables in the regression model. The F value of 13.091 was significant at 1% level for females with an R^2 value of 0.737 indicating that 73.7% of the risk management utilisation by females can be explained by the independent variables. Overall, the F value of 18.983 was significant at 1% level with an R^2 value of 0.584 connoting that the independent variables can explain 58.4% of the variation in the risk management utilisation by arable crop farmers. The significant factors predicting risk management utilisation among males were marital status (β=0.174), household size (β=-0.295), production risks (β=0.248), human/personal risks (β=0.257), price/market risks (β=0.638), institutional risks (β=-0.368), and perceived effect of risks (β=0.211). The significant factors contributing to risk management utilisation among females were hired labour (β=0.300), human/personal risks (β=0.381), price/market risks (β=0.484), and perceived effect of risks (β=0.396). On the overall, age (β=0.235), household size (β=-0.241), hired labour production risks (β=0.248), human/personal risks (β=0.257), price/market risks (β=0.638), institutional risks (β=-0.368), and perceived effect of risks (β=0.211) significantly contributed to risk management utilisation among arable crop farmers.

Table 5: Contribution of independent variables to risk management strategies utilisation

Variables	**Male**			**Female**			**Overall**		
	β	**T**	**Std. Error**	**β**	**t**	**Std. Error**	**β**	**t**	**Std. Error**
(Constant)		1.077	5.236		0.032	7.836		2.013	3.999
Age	0.245	1.827	0.063	0.119	0.944	0.068	0.235	2.552*	0.044
Marital status	0.174	2.033*	1.536	-0.089	-0.995	1.275	0.071	1.189	0.938
Education level	-0.107	-1.294	1.478	0.029	0.361	3.280	-0.065	-1.162	1.257
Household size	-0.295	-2.473*	0.304	0.014	0.115	0.431	-0.241	-3.056**	0.226
Year of experience	-0.151	-1.303	0.054	-0.078	-0.678	0.080	-0.131	-1.577	0.044
Hired labour	0.025	0.342	0.836	0.300	3.491**	1.056	0.123	2.273*	0.634
Production risk	0.248	3.198**	0.255	0.117	1.646	0.140	0.157	2.975**	0.127
Human/personal risk	0.257	3.066**	0.279	0.381	3.891**	0.326	0.341	5.366**	0.211
Price/market risk	0.638	6.149**	0.335	0.484	5.310**	0.358	0.589	8.671**	0.238
Financial risk	0.095	1.159	0.281	-0.025	-0.290	0.340	-0.009	-0.152	0.205
Institutional risk	-0.368	-3.643**	0.346	-0.082	-.917	0.466	-0.240	-3.490**	0.272
Perceived effect of risks	0.211	2.470*	0.266	0.396	4.210**	0.330	0.305	4.925**	0.203
Parameters									
F		9.407**			13.091**			18.983**	
Sig.		0.000[c]			0.000[b]			0.000[b]	
R		0.740[b]			0.859[a]			0.764[a]	

R Square	0.548	0.737	0.584
Adjusted R^2	0.490	0.681	0.554
Std. Error of the Estimate	2.974	2.733	2.959

***Significant at p≤0.05; **Significant at p≤0.01**
Source: Field survey, 2023

Relationship between farm risks, perceived effects of risks on arable crop production and risk management strategies utilisation

Table 6 reveals that a significant relationship exists between farm risks (r=0.429), perceived effects of risks on arable crop production (r=0.347) and risk management used among males. Likewise, for females, a significant relationship exists between farm risks (r=0.552), perceived effects of risks on arable crop production (r=0.579) and risk management utilisation. Similarly, overall, there was a significant relationship between farm risks (r=0.457), perceived effects of risks on arable crop production (r=0.454) and risk management utilisation. Findings from this study indicate that farm risks and perceived effects of risks on production had a significant effect on farmers' utilisation of risk management strategies. The positive correlation coefficient obtained indicates that arable crop farmers who experienced more farm risks and witnessed the effects of risks on their production utilised risk management strategies more.

Table 6: PPMC analysis between the perceived farm risks, effects of risks on arable crop production and risk management strategies utilisation

Variables	r-value
Male	
Farm risks and utilization	0.429**
Perceived effects of risks on arable crop production and utilization	0.347**
Female	
Farm risks and utilization	0.552**
Perceived effects of risks on arable crop production and utilization	0.579**
Overall	
Farm risks and utilization	0.457**
Perceived effects of risks on arable crop production and utilization	0.454**

****Significant at p≤0.01**
Source: Field survey, 2023

Conclusion and recommendations

Arable crop farming population in the study area was tending towards old age, farmers were averagely educated and had been engaging in arable crop farming for about 20 years. The study concluded that both males and females encountered various risks ranging from production, human, marketing, and financial to institutional risks in their crop farming activities. Crop damage and low crop yield were the prominent perceived production effects of risks experienced by farmers with females showing higher risk effects. Risk management strategies used range from protective strategies to alleviation strategies, coping strategies and financial strategies. Some disparities were observed between males and females when individual farm risks and management strategies were examined. The occurrence of production risks such as pest infestation and disease outbreaks were higher for females, while the males experienced higher costs of inputs, inadequate soil nutrients and equipment breakdown. The females demonstrated having improved marketing skills better than the males. The frequency at which males diversify into other farm enterprises, engage in non-farm income generating activities, adjust operating costs and selling assets to reduce debt was higher compared to females. The study established that females use agrochemicals, seek help from cooperative societies, use advisory services and have extension

contact more than males. The results of this study highlight the importance of implementing risk management policies that take into account gender-specific considerations to strengthen the resilience of arable crop farmers. The study recommends that government and non-government agricultural-related institutions assist in organising gender-specific risk management training programs for arable crop farmers; subsidise input costs; marketing skill development, especially for males; and motivate and empower women in agriculture to discover and create additional sources of income. The study also recommends that governmental organizations and NGOs involve women in decision-making and policy processes related to agricultural risk management.

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