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# Influence of personality traits and family income on farmers' psychological distress on agriculture: The significance of educational background

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# Abstract

Kenya's agricultural sector has not only performed poorly over the past 25 years, but it has also been declining. The health risks associated with agriculture have been the subject of several studies worldwide, but little is known about the stresses that farmers face in developing countries. The current study aimed to investigate how personality types and certain demographic factors affecting farmers' psychological distress in Kenya. The study used a cross-sectional survey design with 320 farmers (207 men and 113 women; ages 20 to 60; M = 49.8 SD = 14.7) who were conveniently and purposefully sampled from three major farm regions in Kisii County, Kenya. Multiple regression analysis was used to stratify the data by educational status. Results showed that psychological discomfort was predicted by low family income and high neuroticism among less educated farmers but not in their more educated counterparts. Psychological distress inversely correlated with income (r = -.27, p =.001) and positively correlated with neuroticism (r =.28, p <.001) among farmers with less education. No correlation between psychological distress and extraversion (r = -.02, p =.77), agreeableness (r =.15, p =.053), conscientiousness (r = -.02, p =.75), or openness (r = -.04, p =.65), neuroticism (r =.06, p =.52), openness (r = -.11, p =.23), and income (r = -.11, p =.23). The outcomes suggest that economic variables and personality tendency may make less educated farmers more susceptible to psychological suffering. The negative impacts of neuroticism and poor income on emotional wellbeing may be lessened if farmers become more literate.

Keywords: Agrarian; Mental Health; Productivity; Personality Types; Psychological Suffering; Stresses;

# 1. Introduction

Kenya has a \$95.5 billion GDP, making it a country that is developing. Kenya's economy depends heavily on the agriculture sector, which accounts for 51% of GDP, 26% of which comes directly and another 26% indirectly (World Bank, 2019). Sixty percent of Kenyans are employed in the agricultural industry, which also accounts for sixty-five percent of Kenya's total exports. Small-scale farmers who own an average of 0.2 to 3 hectares dominate the agricultural sector, despite it being the major employer. When compared to large-scale producers, the production of small-scale farmers accounts for about 78% of all agricultural output. Rather than food crops like grains, horticulture and cash crops account for a larger portion of Kenya's agricultural GDP. Not required for commercial projects, the industry is dominated by impoverished individuals attempting to make a life.

Agricultural expansion and commerce have garnered significant attention, especially in emerging nations, because of their potential to lower poverty rates (Ouma, Kimani & Manyasa, 2016). Given that the majority of people in the world's poorest places earn their living from agriculture or occupations related to it, it has been determined that this is the most effective way to combat poverty in rural areas (Gunnarsson & Wingbong, 2015). Thus, besides enhancing the welfare

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and general development of individuals, investing in agriculture to achieve good performance and growth greatly reduces hunger.

Heavy reliance on human labor may exhaust personal resources and have an adverse effect on farmers' overall health because Kenya's agricultural sector is extremely less mechanized. A lot of farmworkers still slump, toil, work with the soil, climb, cultivate the land, carry heavy loads, harvest, and handle pesticides directly because farming is still primarily an agricultural and less mechanized system. When combined, these issues may lead to significant financial hardship, physical fatigue, and, invariably, increased distress, which in turn may result in emotional distress among farmworkers (Omwenga & Kayusi, 2024). Farmers may have mild or chronic psychological distress, which can show up as a variety of symptoms, including decreased appetite, fatigue, irritability, weight loss, difficulty concentrating, difficulty sleeping, low self-esteem, substance addiction, and other issues (Logstein, 2016).

Most people define psychological distress as a state of emotional pain and discomfort that affects a person's ability to function. Stress, anxiety, and depression are all examples of the non-specific syndrome known as psychological distress (Preville, Boyer, Potvin, Perreauult & Legare, 2015). It is a serious public health concern worldwide and is frequently utilized as a risk factor for poor mental health (Newbury-Birch & Kamali, 2017). According to research, one of the main risk factors for the onset of depression is psychological distress (Markou & Cryan, 2022). Both developed and developing countries have high prevalence rates among the general population, which are influenced by a number of variables, including age, gender, occupation, personality qualities, and governmental policies for the populace (Esch, Stefano, Fricchione & Benson, 2022)

Previous research has explicitly revealed a connection between occupational pressures specific to farmers and psychological distress (Marja, Simola & Birgitta, 2019). For instance, the 59th round of the National Sample Survey (2015) found that around two-thirds of farmers are dissatisfied with their occupation and that more than 48% of farmers are indebted (Deshpande and Prabhu, 2015) In recent years, farmers' debt profile has grown dramatically, rising approximately 5% a year (Briggeman, 2010). Many of the difficulties that farmers face is related to money, which makes them quite distressed and is typically an indication of low socioeconomic standing (Dixon, Gulliver & Gibbon, 2014). Additional difficulties include health issues (Brew, Inder, Allen, Thomas & Kelly, 2016), climate fluctuation (Daghagh, Wheeler & Zuo, 2019), government policies and involvement (Olowogbon, Yoder, Fakayode & Falola, 2019), a lack of social support, which leads to social isolation (McPhedran & Leo, 2013), and a number of other issues.

According to Olowogbon et al. (2019), a sample of Nigerian farmers' well-being was impacted by agricultural stressors such as low harvest anxiety, labor shortages, unfavorable government policies, inadequate transportation infrastructure, delayed access to farm inputs, poor market proximity, long hours of farm labor, limited access to credit facilities, limited access to market information, and long hours of labor. While some studies found that age, gender, and educational attainment of individuals contribute to the perception of stressors leading to psychological distress (Kane, 2018), other studies found that physical tiredness is a primary stressor (Katalin, 2012). Research has also shown that because farmers experience a lot of physical and financial stress, their mental health is worse than that of the general population (Olowogbon, 2019).

Income and personality traits have been found to be important determinants of psychological distress in the general population in previous research. In a recent study, Nouri et al. (2019) discovered that, although in a sample of the general population, participants with higher extraversion scores had lower levels of depression and a lower risk of psychological distress, while higher neuroticism predicts psychological distress and depression. The substantial impact of personality on psychological discomfort in the general population was validated by another research (Liu, Gillespie, Zhu, Duffy & Martin, 2018). Numerous studies have shown how family wealth affects the psychological well-being of farmers. For instance, Feng et al. (2015) demonstrated that among farmers, psychological discomfort was highly influenced by family wealth.

According to the World Development Report (2019), economic growth in the agricultural sector is at least twice as effective as economic growth in the non-agricultural sectors at reducing poverty, with the latter being ten times more effective in Sub-Saharan Africa. Four "transmission mechanisms," namely: increased rural household incomes; affordable food for urban and rural poor; influence on economic growth and emergence of non-farming sector opportunities; and stimulating and sustaining the transition, as the economy modifications structurally, explain the links within agricultural growth and productivity, poverty reduction, and welfare improvement (Cervantes-Godoy & Dewbre, 2017). Diverse researchers have looked at the connection between agricultural output and growth and the reduction of poverty and welfare, and they have reached diverse results. Agriculture does have a vital role in reducing poverty, despite the fact that it is not a magic bullet (Cuong, 2016).

The foundation of this study was Bandura's Social Cognitive Theory (Bandura, 1986), which postulates that socioenvironmental and personal factors influence health-enhancing or health-compromising behaviors, which in turn impact mental health status. Bandura went on to say that the relationships between the environment and behavior are significantly mediated by individual cognitive processes. In this instance, a farmer's personality, behavior, and family income can be mediated by their educational attainment. The current study is based on the fact that numerous studies have demonstrated that personality influences different types of psychological maladjustment (Kotov, Gamez, Schmidt and Watson, 2019) and that personality explains a great deal of diversity in human mental health, including depression, loneliness, and anxiety (Cheng & Furnham, 2018). Higher education is associated with a lower level of psychological distress, which further highlights the significance of education in mental health issues (Aye, Lien, Stigum, Win & Bjertness, 2020). High levels of education, however, have also been shown to be associated with a considerable risk to people's mental health (Molarius & Granströ, 2018).

# 1.1. Aims and Hypotheses

The present study intends to investigate whether personality and income are associated with psychological distress differently among farmers with low and high levels of education, taking into account the role that education plays in shaping an individual's degree of mental health. Personality traits and family income are thought to predict psychological suffering in distinct ways for farmers with high and low levels of schooling. The current study is noteworthy because there doesn't seem to be much research on how personality traits and income affect farmers' psychological distress levels, and no study has shown that the conceptual frameworks of low and highly educated farmers differ in how personality and income are related to psychological distress (Fig 1).





Note: Fig. 1 hypothesized that wealth and personality traits will influence psychological distress manifestations in distinct ways for farmers with and without high literacy levels.

# 1.2. Significance of the study

The purpose of this study was to ascertain, using the significance of educational background, the impact of personality traits and family income on farmers' psychological distress related to agriculture. Therefore, it is important because it aims to present empirical evidence of the sector or factors that are influencing the development of personality traits and household income in spite of the agricultural sector's poor and deteriorating performance. In addition to the Kenyan government, the study will be helpful to county governments, the private sector, and nongovernmental organizations. It will provide information for the design and formulation of national policies and programs that will boost performance in the sector or factors that are contributing to the development of positive psychological matters and in the agricultural sector to achieve sustainable development.

# 2. Literature review

In the East African Community (EAC), agriculture is essential to job creation, economic expansion, food security, and the fight against poverty. About 70% of the rural population in the area is employed in this industry, with women making

up the majority (Karugia, Massawe, Guthiga & Macharia, 2019). Rural areas are home to about 75% of the region's population. Kenya is the third least urbanized nation in East Africa, after Burundi and Uganda, which are first and second, respectively, and Tanzania, which has the second-largest population. Kenya has the second-highest agricultural value added as a proportion of GDP among the five East African nations, after Burundi.

The proportion of agriculture in Sub-Saharan Africa's output appears to have decreased since 1970; for example, it dropped from over half of the output in the 1970s to one-third in 2010. Compared to the rest of Sub-Saharan Africa, the EAC has a greater drop. For instance, the proportion of agriculture to the overall output of the region decreased from 36% in 2000 to 28% in 2010 (Gigineishvili, Mauro & Wang, 2019). All East African nations have seen a general fall in the value added of their agricultural output, but Tanzania, Burundi, and Uganda have all had particularly steep declines. In Tanzania, for example, the percentage decreased from 45 percent in 1993 to 30 percent in 2013, whereas in Burundi, the percentage decreased from 59 percent in 1983 to 38 percent in 2013. From 1983 to 2013, Kenya's agricultural value added as a percentage of GDP decreased by just 5%. For example, it went from 35% in 1983 to 30% in 2013. Aggrey (2019) demonstrated that the structural change in the economy a move away from the agricultural sector and toward other sectors as well as the low price of fundamental agricultural commodities on the global market were the main causes of Uganda's decrease in agriculture and value added as a percentage of GDP.

Meertens (2020) pointed out that the Bretton Woods institutions' implementation of Structural Adjustment Programs, which decreased the role of government in the agricultural sector and eliminated agricultural input subsidies starting in 1991, were to blame for Tanzania's decline in agriculture and value added as a percentage of GDP. This, in turn, raised production costs. The fall in agricultural GDP is attributed to political instability and poor governance, which have led to Burundi's declining economic growth (Nkurunziza & Ngaruko, 2022). However, the total decrease in agricultural production across East Africa does not necessarily indicate that the industry is becoming less significant. In contrast, the loss is only relative because the sector's absolute contribution has grown over time, and productivity has slightly increased (Karugia, Massawe, Guthiga & Macharia, 2019).

In addition to growing over time since the EAC was reestablished in 2000, intra-EAC trade, which is primarily agricultural, is noted for having the second-highest share in Africa, after SADC, when compared to other African Regional Economic Communities (African Economic Outlook, 2016). More than 40% of all intraregional commerce in the EAC is in the agriculture sector, according to Ouma, Kimani, and Manyasa (2016). Despite being low when compared to other regions worldwide, intra-regional commerce in the EAC has been steadily increasing (East Africa Community commerce report, 2014). The value of this commerce, for instance, increased from \$1.3 billion in 2003 to \$1.5 billion in 2004, from \$1.8 billion in 2005 to \$2 billion in 2007, and finally to \$2.7 billion in 2018 (East Africa Community, 2018).

Several research and reports have also shown and demonstrated improvements in household income and psychosocial welfare. According to data from the Kenya Integrated Household and Budget Survey (KIHBS), households in 2016 were less likely to be living in poverty than those in the 1990s. Poverty is still mostly a rural issue, but it has been on the decline. In 2015, the average monthly expenditure for food and non-food expenses per adult was 6,673 Kenya shillings for urban households and 2,331 Kenya shillings for rural households. These figures represent improvements above those from 1997 and 2005. As a measure of food poverty, the proportion of households that reported being able to fulfill their basic daily energy requirements increased from 58% in 1997 to 64% in 2005 and then to 68% in 2015 (KIHBS, 2006; 2018). While the national absolute poverty rate decreased from 52 percent in 1997 to 46 percent in 2005 and then to 36 percent in 2015, the percentage of poor households decreased from 46 percent to 38 percent to 27 percent in 1997, 2005, and 2015, respectively (KIHBS, 2006; 2018). Notably, from almost 50% in 2005 to 40% in 2015, the rural poverty rate for persons decreased more quickly than the core-urban rate (KIHBS, 2006; 2018).

Omolo (2013) pointed out that trade liberalization was responsible for the psycho-social and welfare improvements and favorable changes in income and consumption spending that were observed in both urban and rural families. Inequality has decreased throughout time as well, although despite efforts to reduce it, it is still high in the nation. For instance, the two highest quintiles control a significant portion of household spending (KIHBS, 2018). The bottom quintile barely controls 4.1% of overall expenditures, but the fifth and fourth quintiles control roughly 55.9% of total expenditures (KIHBS, 2018). The final consumption spending of households has been steadily rising over time, suggesting that household income psycho personality traits and wellbeing has generally improved.

Since 1989, households' final consumption expenditures have been rising, with a notable spike occurring between 2003 and 2015. Factors like free and subsidized basic and secondary education, pro-poor policies and initiatives, and decentralization, which established financing windows that permitted the equal distribution of resources, have all been blamed for this dramatic and progressive rise. A sizable number of households' disposable income rose as a result of

these circumstances, initiatives, and policies (KIHBS, 2006; 2018). Over time, the economy has seen positive improvement despite the agriculture sector's poor performance and decline. According to data from the United Nations Development Programme (UNDP), Kenya has made remarkable strides in human development since 1990. This is seen from the fact that the nation only recently joined the group of nations with a medium level of human development in 2015. Welfare has also improved dramatically at the household level. For example, the percentage of households that reported being able to meet their basic daily energy requirements a measure of food poverty rose from 58% in 1997 to 64% in 2005 and then to 68% in 2015.

Furthermore, between 1997 and 2015, household poverty decreased from 46% to 38% to 27%, correspondingly (KIHBS, 2006; 2018). Omolo (2013) pointed out that trade liberalization was responsible for the favorable shifts in income and consumption that were observed in both rural and urban households. This suggests that despite the agriculture sector's poor performance and decline, the nation has seen improvements in development, individual personality traits, and psycho-social health over time.

### 3. Methodology

#### 3.1. Samples and Procedure

A total of 320 farmers were chosen using the snow-balling technique from the population of three major farm regions in Kisii County, Kenya, using a cross-sectional survey design. The participants ranged in age from 20 to 60 years (M = 49.8; SD = 14.7; Male = 207, Female = 113). According to the level of family income distribution in shillings, 126 (39.4%) earn between 8,000 and 30,000 per month, 139 (43.4%) earn between 31,000 and 40,000, 48 (15%) earn between 41,000 and 50,000, 5 (1.6%) earn between 51,000 and 60,000, and 2 (0.6%) earn above 61,000. 53 (16.6%) had no education, 137 (42.8%) had a primary school certificate, 61 (19%) had a secondary school certificate, 38 (11.9%) had an ordinary national diploma or national diploma education, and 31 (9.7%) had a bachelor's degree or university degree. 164 (51.3%) of them identified as Christians, 15 (4.7%) as Traditionalists, and 141 (44.1%) as Pagans. 236 (82.2%) were Abagusii, 21 (6.6%) were Luo, and 63 (19.7%) were Abakuria, according to their ethnicity classification.

Permission for the research was given by the Pwani University psychology department's ethics and research committee. The heads of each village and the chiefs verbally gave their informed consent, and each participant gave their informed consent before to completing the questionnaire. Following their regular agricultural practices, the farmers were contacted in their individual houses. The researchers took into account helping some individuals who were either illiterate or partially illiterate to read and interpret some of the challenging items on the questionnaire after they consented to participate in the study.

#### 3.2. Data analysis

#### 3.2.1. Socio-demographic Information

#### The Big Five Personality Test

A 10-item Big Five Personality Inventory was used to measure personality (Rammstedt & John, 2017). A 5-point Likert scale, with 1 denoting "strongly disagree" and 5 denoting "strongly agree," is used to measure it. "I see myself as someone who is generally trusting" and "I see myself as someone who is reserved" are examples of scale items. The scale's ten measures evaluate five dimensions: neuroticism (4, 9), conscientiousness (3, 8), agreeableness (2, 7), extraversion (1, 6), and openness (5, 10). The scale has been proven to be valid and trustworthy in a number of research involving the Kenyan population (Olawa & Idemudia, 2019).

#### Psychological Distress Scale (K10 scale)

The Kessler Psychological Distress Scale was used to measure psychological distress (Kessler, Mroczek & Arbor, 2020). The 10-item scale, which is assessed on a 5-point Likert scale from "none of the time (1)" to "all of the time (5)," is intended to provide a general assessment of distress by asking about anxiety and depression symptoms that an individual has encountered in the past month. Examples are the questions, "How often did you feel anxious during the past month?" and "How often did you feel exhausted without a valid reason?" The dependability coefficient was reported by the authors to be .91. The dependability coefficient for the current study was .76.

### 3.3. Statistical Analysis

The statistical package for social sciences (SPSS) software, version 24.0, was used to analyze the data. Descriptive statistics were utilized to get the scores for frequency, mean, and standard deviation. Using Person's correlation, bivariate connections between the research variables were determined. To evaluate the predictive power of income and personality traits on psychological discomfort, multiple regression analysis was used. Since the percentage of cases with missing scores was less than 15%, mean values were used to replace the missing data. Given that skewness scores range from -1 to +1, as shown by preliminary data analysis, the data distribution was moderately normal *(Table 1)*.

# 4. Results

*Table 2* displays, stratified by education, the bivariate connections between the research variables. Psychological distress was shown to be inversely correlated with income (r = -0.27, p = 0.001) and positively correlated with neuroticism (r = 0.28, p < 0.001) among farmers with less education. In particular, psychological anguish was positively correlated with lesser income. However, there was no correlation between psychological distress and extraversion (r = -0.02, p = 0.77), agreeableness (r = 0.15, p = 0.053), conscientiousness (r = -0.02, p = 0.75), or openness (r = 0.03, p = 0.68). All predictor variables, such as extraversion (r = 0.13, p = 0.13), agreeableness (r = 0.02, p = 0.84), conscientiousness (r = -0.04, p = 0.65), neuroticism (r = 0.06, p = 0.52), openness (r = -0.11, p = 0.23), and income (r = -0.11, p = 0.23), do not significantly correlate with psychological distress in farmers with higher educational attainment.

Stratified by educational level, the multiple regression findings for psychological distress are displayed in *Table 3*. In farmers with no schooling or a lower level of education, the combined effect of income and personality traits was significant on psychological distress [F (6,164) = 4.13, p =0.001], with a variation of 13%. Income ( $\beta$  = -0.18, p =0.02) and neuroticism ( $\beta$  =0.26, p =0.001) were the only independent variables that were significant in the model. The combined and independent effects of wealth and personality traits, however, did not significantly affect psychological distress among farmers with higher levels of education [F (6, 122) =0.98, p =0.44, R2 =0.05].

Table 1 Distribution of Social-demographics

N = 320	n	%
Sex	-	-
Male	207	64.7
Female	113	35.3
Age		
20-29	73	22.8
30-39	111	34.7
40-49	85	26.5
> 5	51	15.3
Religious affiliation	-	-
Christianity	164	51.3
Pagan	141	44.1
Traditional	15	4.7
Ethnicity	-	-
Abagusii	236	82.2
Abakuria	63	19.7
Luo	21	6.6
Family income (in Naira)	-	-
8,000-30,000	126	39.4

31,000-40,000	139	43.4
41,000-50,000	48	15
51,000-60,000	5	1.6
61,000 above	2	0.6

**Table 2** Correlations between the study variables categorized by educational level, with lower (below the diagonal) andhigher (above the diagonal) levels.

	1	2	3	4	5	6	7	8	9
Mean			47.91	6.02	6.59	7.01	6.45	7.41	22.13
SD			12.31	3.79	2.67	2.79	2.10	2.17	8.02
Sex (1)		0.08	-0.34**	0.05	-0.07	0.09	0.15	-0.15	0.19
Income (2)	-0.07		0.05	0.19	-0.03	-0.14	-0.17	04	-0.03
Age (3)	-0.15	0.37**		-0.09	.002	-0.08	-0.05	-0.05	-0.14
Extraversion (4)	0.07	-0.04	-0.06		-0.15	-0.11	-0.23*	-0.34**	0.16
Agreeableness (5)	-0.02	0.11	-0.09	-0.08		0.26*	0.47**	0.23**	0.04
Conscientiousness (6)	-0.08	0.09	0.07	0.12	0.03		0.35**	0.15	-0.07
Neuroticism (7)	-0.02	-0.07	-0.25**	0.09	0.19*	0.23**		0.24*	0.07
Openness (8)	0.02	0.07	-0.13	-0.09	-0.04	0.13	0.34**		-0.13
Psychological distress (9)	0.05	0.04	-0.27**	-0.03	0.17	-0.03	0.31**	0.05	

Sex (0 = male, 1 = male); Income (0 = lower income, higher income). \*\*p < 0.01; \*p < 0.05

Table 3 A regression model that looks at psychological distress predictors by educational attainment.

Variables	No education/Lower education level			Upper education level			
-	В	SEB	В	В	SEB	В	
Extraversion	0.13	0.23	-0.09	0.25	0.21	0.19	
Agreeableness	0.35	0.31	0.13	0.09	0.34	0.04	
Conscientiousness	-0.21	0.27	-0.09	-0.25	0.37	-0.10	
Neuroticism	0.79	0.25	0.29**	0.34	0.31	0.14	
Openness	-0.22	0.25	-0.09	-0.29	0.29	-0.12	
Income	-1.99	0.88	-0.21*	-1.19	1.67	-0.13	
R	-	0.39	-	-	0.24	-	
R <sup>2</sup>	-	0.16	-	-	0.07	-	
F	-	4.19**	-	-	0.99	-	

# 5. Discussion

Psychological discomfort in the general population has been linked to income levels and personality traits, according to previous research. We are uncertain, therefore, as to whether these correlations hold true for farmers and whether they vary depending on educational attainment. The goal of the current study was to add to the body of literature by

examining the differences in the relationships between psychological distress and income levels and personality traits depending on educational attainment. The results of this study suggested that the less educated farmers' psychological suffering was independently predicted by their family income. This aligns with previous and current research in this field that has repeatedly concluded that these two variables are related. For instance, Sakurai et al. (2010) discovered that among a sample of Japanese farmers, psychological discomfort was predicted by low income. Similar findings were found by another research (Olowogbon, Yoder, Fakayode & Falola, 2019; Phelps & Sheffield, 2001; and Deary, Willock & McGregor, 1997).

According to our findings, the only personality type that significantly predicted psychological distress among farmers was neuroticism out of the five. Results support recent research that suggests psychological discomfort in the general population is correlated with higher levels of neuroticism (Nouri, Feizi, Afshar, Keshtel & Adibi, 2019; Liu, Gillespie, Ye, Zhu, Duffy & Martin, 2018; and He, Fan, Yan, Huang, Wu & Cai, 2019). Therefore, farmers with lower levels of education and emotional instability are more likely to experience anxiety and depression. It was intriguing to discover that, although this study indicated that money and personality traits together had a significant impact on psychological distress, this effect was limited to farmers with little to no formal education. This emphasizes how important education is, even for farmers. Men with more education, for instance, report less psychological distress after losing their jobs, according to Monden, 2013).

The results have the theoretical implication that the expression of psychological distress among farmers with low levels of education may be influenced by neuroticism and income. It also suggests that poor income and neuroticism features may make farmers more susceptible to mental health issues if they are illiterate or have little education. Higher education may function as a buffer against the detrimental effects of neuroticism and financial hardships on mental health, therefore the effects of low income and neuroticism features on mental health issues among highly educated farmers may not be as great (Aye, Lien, Stigum & Win, 2020). One may get fresh and varied thoughts on coping mechanisms to combat distress as a result of higher education.

# 6. Conclusion

In conclusion, the current study shows that although family income level and neuroticism serve as indicators of psychological discomfort in farmers, they only predict psychological distress in farmers who have little formal education or low levels of neuroticism. Thus, it is advised that government organizations in charge of agriculture establish a centralized market (as opposed to individual sales) where pricing for farm produce sales can be set to reflect farmers' efforts. This is necessary since, according to the demographic distribution observed in this study, the majority of rural farmers lack literacy. As a result, the centralized market will serve as a check and balance on the prices at which retailers purchase farm produce from farmers, diminishing their anxiety and distress and enabling them to sell at a price that benefits both farmers and retailers who purchase in in large quantities. Additionally, there should be clinics in or near significant farm settlements that address issues related to both physical and mental health. Theft of agricultural produce, bad harvest anxiety, lack of resources and funding, and emotional instability are all common problems for farmers. Therefore, it is crucial that farmers have easy access to mental health services in order to enhance their psychological and emotional well-being.

# 6.1. Limitations and suggestions for further studies

Despite the value of the study's conclusions and suggestions, it is crucial to acknowledge its limitations. First, because the study methodology is cross-sectional and questionnaire-based, it is impossible to infer causal-effect correlations between variables. To get over this restriction, longitudinal research may be used in this field in the future. Second, given the large number of farmers in Kenya, our sample size (n = 320) can be seen as small. This might limit the findings' applicability to a larger group of farmers. A bigger sample size may be used in prospective research to improve the generalizability of results. Finally, because farming is mechanized in highly developed cultures as opposed to the traditional, unrefined methods still used in less developed ones, study findings might not apply to farmers in these countries. Therefore, in order to ascertain whether there would be variations in the results, this study should be repeated among farmers in developed countries.

# 6.2. Ethics approval and participation consent

Logistics refers to all of the procedures, actions, and activities a researcher must follow in order to successfully finish a research project. The Kisii University Ethics and Review Committee, which was approved by the Kisii County Director of Agriculture and the National Commission for Science, Technology, and Innovation (NACOSTI), provided the researcher with an ethical review certificate prior to the study. By not writing the respondents' names on the instruments, the researcher obtained their consent, which should be optional. All participants were kept anonymous

and secret due to the sensitive nature of the material, and only those who indicated an interest in taking part were contacted. Particularly in data collection, participant selection, interpretation, and report writing, integrity and transparency were upheld throughout the study.

#### **Compliance with ethical standards**

#### Disclosure of conflict of interest

No conflict of interest to be disclosed.

#### Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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