www.jard.edu.pl http://dx.doi.org/10.17306/J.JARD.2022.01568

Journal of Agribusiness and Rural Development

pISSN 1899-5241
eISSN 1899-5772

3(65) 2022, 189–195
Accepted for print: 12.07.2022

SOCIAL INEQUALITIES INFLUENCING AWARENESS OF GOOD AGRICULTURAL PRACTICES AMONG SMALLHOLDER FARMERS IN MURANG'A COUNTY IN KENYA

James Muhuni Mwangi✉, Preston Orieko Chitere, James Gichuru Kariuki

University of Nairobi, Kenya

Abstract. Awareness of GLOBAL G.A.P. standards is the bedrock for the growth of export horticulture as it provides livelihoods to many small-scale farmers in developing countries. However, non-compliance with food safety requirements has evoked questions about farmers' levels of awareness. Previous studies have overlooked the awareness-seeking behavior of smallholder farmers with diverse social characteristics. Therefore, this study was conducted in Murang'a County in Kenya to investigate the influence of social characteristics on awareness-exposure behavior among smallholder French bean farmers. The study systematically selected 115 small-scale French bean farmers. Questionnaires were administered through face-to-face interviews to elicit the data. Quantitative data were analyzed through descriptive and inferential statistics by employing Pearson's correlation and the Chi-square test. The study found that farmers differed in their awareness of different components that constitute GLOBAL G.A.P. Gender, farmer's position in household, occupation, and wealth status were among the social inequalities that had a significant influence on the awareness of GLOBAL G.A.P. standards. In addition, farmer's participation in awareness forums and affiliation with multiple sources of information on GLOBAL food safety standards had a significant influence on their level of awareness. This study recommends that proponents of farming innovations should always consider the socioeconomic status of potential adopters.

Keywords: awareness, good agricultural practices, exposure, social characteristics, social inequalities

INTRODUCTION

Global Food Safety Standards, also known as Good Agricultural Practices (GLOBAL G.A.P.), are a set of guidelines that control the production of food for export to western countries. Fruit and vegetable farmers are guided by 218 control points entailing traceability of farm produce, the health and safety of workers, the safety of the food grown, and the environment within the farming areas (de Battisti et al., 2009; Ouma, 2010; GLOBAL G.A.P., 2019). However, despite smallholder farmers' being aware of these standards, their implementation practices lack uniformity. There have been incidences of non-compliance with the standards and variations in farmers' levels of awareness of the different food safety standards (Muriithi et al., 2011; Kuwornu and Mustapha, 2013). Studies conducted in Kenya have found no association between awareness of pesticide handling practices and observation of GLOBAL G.A.P. requirements. The majority of farmers also seemed unaware of the correct meaning of all pictograms that were used to label pesticides, while few farmers adhered to pesticide application instructions (Macharia et al., 2013).

In Asia, smallholder farmers were unaware of the impacts of farm practices on food safety, environmental safety, workers' health, and the potential benefits of the food safety standards. Misunderstanding of

✉James Muhuni Mwangi, Department of Sociology, Social Work & African Women Studies, University of Nairobi, Kenya, e-mail: j.mwangi1277@gmail.com; http://orcid.org/0000-0002-3239-1240

GLOBAL G.A.P. requirements and resistance to change both led to non-compliance with food safety standards. Furthermore, having different sources of information affected uniformity in the application of pesticides (UNCTAD, 2007). It was also found that smallholder farmers who received most of their advice from pesticide traders engaged in inappropriate pesticide handling practices because the traders not only lacked proper information but misadvised the farmers (Macharia et al, 2013).

Although awareness is affected by the lack of spaces for discussing concerns and poor communication between farmers and contracting export companies (Dolan, 1995), the use of similar methods of disseminating information to reach out to all caliber of farmers regardless of their social status (Tallontire et al., 2013), the frequency of interaction with exporters (UNCTAD, 2007), and past involvement in the implementation of food safety standards (Kersting and Wollni, 2012; GLOBAL G.A.P., 2019), the literature has so far overlooked whether farmers' social characteristics influence their awareness/exposure seeking behavior.

This study was based on Rogers's diffusion of innovation perspective, which postulates that innovation-decision processes begin with the knowledge stage, which commences when potential adopters are exposed to innovations and the knowledge of how these function. Potential adopters gain awareness-knowledge through social processes that are linked to social and personality characteristics. In addition, awareness is dependent on change agents and the level of social participation of adopters (Rogers, 1983).

This study, therefore, endeavored to understand how the social status characteristics of smallholder farmers influences their level of awareness of GLOBAL G.A.P. standards. The study hypothesized that smallholder farmers differ in social characteristics, which in turn influences their awareness-seeking behavior. The research questions which guided this study were: 1. What is the relationship between the social characteristics of smallholder French bean farmers versus their level of awareness of GLOBAL food safety standards? 2. What is the relationship between smallholder farmers' sources of exposure/information versus their level of awareness of GLOBAL food safety standards?

The main objective of the study was to investigate the social status characteristics of smallholder farmers which had a significant influence on their awareness of GLOBAL G.A.P. Standards. The specific objectives were to

a) Examine the influence of smallholder farmers' social characteristics on their level of awareness of the GLOBAL G.A.P.
b) Determine which information-seeking behavior had a significant influence on smallholder farmers' level of awareness.

METHODOLOGY

Study area

The study was conducted in October and November of 2019, in Murang'a County – one of the major producers of French beans for export. The county is located in Central Kenya, between latitudes 0°34' South and 10°7' South and longitudes 36° East and 37°27' East (Murang'a County Government, 2014).

Sampling procedure and sample size

The study adopted a cross-sectional approach and combined mixed research methods. The systematic sampling method was used based on a target of 35% (163) of farmers, which led to the calculation of a sampling interval of 3 from the overall population of 466 French bean farmers, hence $K – N/n$, where: n – sample size, N – population, and K – sampling interval.

Methods of data collection and analysis

This study was purely empirical and relied on quantitative methods to find the relationship between the social characteristics of farmers and data on farmers' sources of exposure versus their level of awareness. A questionnaire was administered through face-to-face interviews to elicit the data from French bean farmers. The dependent variable (awareness of GLOBAL G.A.P. standards) was measured both as binaries and on an ordinal scale (low or high). First, the respondents were asked to mention which GLOBAL G.A.P. standards they knew, and their responses were put on an ordinal scale depending on their level of awareness. The independent variables were measured by assessing their social characteristics, such as position in the household, age, gender, size of household, monthly income, occupation, and assets that constituted their wealth status. The overall monetary value of assets was scored and ranked to indicate the wealth status of the farmer. Other social variables that were investigated were the farmers' sources of information about GLOBAL G.A.P., their frequency, and forms of participation in diverse awareness forums, as well as

their interaction with various information agents. Each farmer's level of awareness was determined by aggregating and categorizing the number of standards they could recall. Thereafter, data on social-economic characteristics was cross-tabulated to find associations with the dependent variable, and this was done through the Chi-square test and Pearson's correlation using the Statistical Package for Social Scientists (IBM SPSS version 26).

RESULTS AND DISCUSSION

Social characteristics of French bean farmers

The study found that 68% of the sample was composed of male farmers and the other 32% female ones. Most respondents (88%) were married and 51% were aged 50 years and above. In addition, 44% had a secondary, 39% a primary, and 4% a college-level education. Only 13% had no formal education. The farmers' occupations varied from commercial (71%) and subsistence farming (23%) to business (3%) and casual employment (3%). Their incomes varied, with 59% earning less than 10,000 Kenya shillings, 28% 10,000-19,999 shillings, and 6% 30,000 shillings and above. Each farmer's wealth status was measured by assessing the assets they owned, such as livestock, cell phones, TVs, radios, bicycles, and cash savings. An aggregation of asset scores revealed that 53% had high, 27% average, and 20% low-value asset scores.

Awareness of good agricultural practices

The respondents were initially asked to name 5 mandatory food safety requirements which they were aware should be adopted when participating in French bean farming, and they mentioned a total of 29 practices. All the respondents knew about irrigation because French beans are planted during the dry months. In addition, 94% were aware of the recommended varieties of seeds, while 96% knew about fertilizer. Eighty-five percent knew the importance of seeking advice from extension agents before using agrochemicals, while differing numbers knew about the need for pest control to prevent crop damage by pests (64%), the purpose of grading harvested beans before delivery to buying centers (59%), keeping records for all farm activities (51%), hygiene practices that should be observed when harvesting French beans (60%), and why one should wear protective gear when spraying agrochemicals (39%). In addition, 39% were aware of pesticide spraying intervals before harvesting. Forty percent of the respondents were aware of recommended pesticides, 25% knew about the disposal of empty pesticide containers and another 25% mentioned the need for a toilet near French bean farms. In addition, 21% were aware of the need for having designated harvesting containers, while 12% knew why intercropping French beans with other crops was not suitable. All these practices were classified as shown in Table 1, which indicates that 76% of the farmers had a high level of awareness of the Global food safety standards.

Table 1. Respondents' level of awareness of good agricultural practices

Level of awareness	Number of respondents	Percent
Low (aware of 1-7 GAPs)	28	24
High (aware of 8 GAPs and above)	87	76
Total	115	100

Source: own elaboration.

Relationship between the social characteristics of farmers versus their level of awareness of GLOBAL GAP requirements

The study stated the null hypothesis that a farmer's socioeconomic characteristics (gender, farmer's position in the household, age, marital status, education, size of household, wealth status, occupation, and level of income) have no relationship with their level of awareness of GLOBAL G.A.P. standards. After cross tabulating the two variables, the study obtained Tables 2a and 2b and found the following:

Gender had a significant association with a farmer's level of awareness of GLOBAL G.A.P. standards (χ^2 = 7.765; df = 1; p = 0.005). The majority (78%) of the male farmers had a higher level of awareness than the females. Therefore, the study rejected the null hypothesis that there is no relationship between gender and awareness. Male farmers were likely to be inquisitive about innovations/new crops that generate high income. Kariuki (2013) confirmed this when he found that male farmers did this to continue enhancing their grip of power in the household.

A farmer's position in the household had a significant association with awareness (χ^2 = 8.647; df = 2; p = 0.013) because the majority (76%) of those associated with

Table 2a. Socioeconomic characteristics of farmers versus level of awareness

	Level of awareness		Total
	low	high	
Gender			
Male	13	65	78
Female	15	22	37
Total	28	87	115
Chi-square 7.765; *df* = 1; *p* = 0.005			
Farmers' position at household			
Male head	13	66	79
Female head	5	8	13
Wife	10	13	23
Total	28	87	115
Chi-square 8.647; *df* = 2; *p* = 0.013			
Marital status of respondent			
Single	1	3	4
Married	22	79	101
Separated/divorced	1	1	2
Widowed	4	4	8
Total	28	87	115
Chi-square 3.934; *df* = 3; *p* = 0.269			
Age			
Below 30 years	3	4	7
30–39 years	1	13	14
40–49 years	9	26	35
50 years and above	15	44	59
Total	28	87	115
Chi-square 3.624; *df* = 3; *p* = 0.305			
Level of education			
None	4	11	15
Primary	12	33	45
Secondary	11	40	51
College	1	3	4
Total	28	87	115
Chi-square 0.390; *df* = 3; *p* = 0.942			

Source: own elaboration.

Table 2b. Social characteristics of farmers versus the level of awareness

	Level of awareness		Total
	low	high	
Size of household			
Small (1–4 people)	10	26	36
Large (5 people and above)	18	61	79
Total	28	87	115
Chi-square 0.335; *df* = 1; *p* = 0.563			
Occupation			
Subsistence farming	13	14	27
Commercial farming	15	67	82
Total	28	81	109
Chi-square = 9.484; *df* = 1; *p* = 0.002			
Average income (Kenya shillings)			
Less than 9,999	21	47	68
10,000–19,999	6	26	32
20,000 and above	1	14	15
Total	28	87	115
Chi square = 4.667; *df* = 2; *p* = 0.097			
Assets			
Low (9 scores and below)	7	16	23
Average (10–13 scores)	16	23	39
High (14 scores and above)	5	48	53
Total	28	87	115
Chi square = 12.752; *df* = 2; *p* = 0.002			

Source: own elaboration.

a high level of awareness were male heads of household. Consequently, the study rejected the null hypothesis that a farmer's position in the household has no relationship with the level of awareness of GLOBAL G.A.P. standards.

Age had no significant association with a farmer's level of awareness (χ^2 = 3.624; *df* = 3; *p* = 0.305), and the study failed to reject the null hypothesis that there is no relationship between age and level of awareness. In contrast, Fan et al. (2015) found that elderly farmers had challenges following application instructions leading to incorrect pesticide use behavior.

A farmer's level of education had no significant relationship with awareness ($\chi^2 = 0.390$; $df = 3$; $p = 0.942$), and the study failed to reject the null hypothesis that a farmer's level of education has no association with awareness. However, Sharifzadeh et al. (2018) found that limited knowledge of the use of suitable amounts of pesticides and ignorance of recommendations was due to low levels of education and that high levels of education discouraged pesticide usage due to high levels of awareness of the harmful effects of pesticides on the environment.

Table 2b shows that occupation had a significant association with the farmers' level of awareness ($\chi^2 = 9.484$; $df = 1$; $p = 0.002$). Commercial farmers made up the majority (83%) of farmers who were associated with a high level of awareness. The study rejected the null hypothesis that there is no association between occupation and level of awareness of GLOBAL G.A.P.

A farmer's level of income had no significant relationship with a farmer's level of awareness ($\chi^2 = 4.667$; $df = 2$; $p = 0.097$). Therefore, the study failed to reject the null hypothesis that there is no relationship between a farmer's level of income and awareness of GLOBAL G.A.P. standards. However, Kassem et al. (2020) found that farmers with a higher income attached importance to awareness and information when making compliance decisions.

The **value of assets** owned had a significant association with a farmer's level of awareness ($\chi^2 = 12.752$; $df = 2$; $p = 0.002$) since the majority (55%) of the farmers with high levels of awareness also had high asset scores. Consequently, the study rejected the null hypothesis that there is no relationship between these two variables.

Farmer's exposure versus their level of awareness of GLOBAL G.A.P. standards

The null hypothesis was that farmers' exposure has no relationship with their level of awareness of GLOBAL G.A.P. standards. After cross-tabulating the data on exposure versus the farmers' level of awareness of GLOBAL G.A.P. standards, these are presented in Table 3, and indicate the following:

Participation in diverse awareness forums had a significant association ($\chi^2 = 19.211$; $df = 2$, $p = 0.000$) with a farmer's level of awareness. The farmers who participated in two or more awareness forums were associated with a higher level of awareness. The study, therefore, rejected the null hypothesis that there is no relationship between participation in diverse forums versus awareness.

Table 3. Farmer's exposure versus level of awareness of GLOBAL G.A.P. standards

	Level of Awareness		Total
	low	high	
Level of participation in awareness forums	15	12	27
Never			
Low (one awareness forum)	8	36	44
High (two or more awareness forums)	5	39	44
Total	28	87	115
Chi-square =19.211; $df = 2$, $p = 0.000$			
Frequency of participation in diverse awareness forums			
Frequently	10	49	59
Occasionally	2	15	17
Rarely	16	23	39
Total	28	87	115
Chi-square = 9.104; $df = 2$, $p = 0.011$			
Number of sources of information on GLOBAL G.A.P. standards			
None	6	3	9
Low (1–2 sources)	17	48	65
High (3 sources or more)	5	36	41
Total	28	87	115
Chi-square =12.153; $df = 2$, $p = 0.002$			

Source: own elaboration.

A farmer's **frequency of participation in diverse awareness forums** had a significant relationship with levels of awareness ($\chi^2 = 9.104$; $df = 2$, $p = 0.011$), and hence the study rejected the null hypothesis that there is no association between these two variables.

A farmer's number of sources of information (other farmers, exporters, government extension staff, brokers media) had a significant association with their level of awareness ($\chi^2 = 12.153$; $df = 2$, $p = 0.002$). Therefore, the study rejected the null hypothesis that there is no association between these two variables.

Table 4. Pearson's correlation of socioeconomic characteristics, farmer's exposure, and level of awareness of GLOBAL G.A.P. standards

	No. of GAPs	Age	HH size	Income	Years of education	Asset scores	Info sources	Freq of participation
No. of GAPs	1							
Age	–0.111	1						
Household size	–0.046	–0.034	1					
Income	0.183	–0.147	0.035	1				
Years of education	0.031	–0.147	–0.174	0.327**	1			
Asset scores	0.182	0.117	0.002	0.138	0.025	1		
Info sources	0.292**	0.164	0.067	–0.071	–0.17	0.142	1	
Freq of participation	0.325**	0.076	–0.018	0.08	–0.198*	0.214*	0.498**	1

*Correlation is significant at the 0.05 level (2-tailed).
** Correlation is significant at the 0.01 level (2-tailed).
Source: own elaboration.

Multiple correlations of social characteristics of farmers and their sources of exposure versus their level of awareness of food safety standards

The multivariate null hypothesis for the first and second objectives was that a farmer's social characteristics and sources of awareness have no significant association with their level of awareness. Cohen's guidelines were used to determine the effect size of the correlation, where 0.10 indicated a small effect which explained 1% of the total variance, 0.30 a medium effect explaining 9% of the total variance, and 0.50 a large effect explaining 25% of the variance (Gignac and Szodorai, 2016). Social characteristics and exposure variables were simultaneously subjected to Pearson's correlation, as shown in Table 4, which shows that there was a positive correlation between **assets/wealth scores** (r = 0.182) versus awareness and **level of income** (r = 0.183) versus awareness.

A farmer's **number of information sources** had a small positive effect (r = 0.292, $p < 0.01$) on awareness of GLOBAL G.A.P. standards. In addition, the **frequency of participation in diverse awareness forums** had a medium positive effect (r = 0.325, $p < 0.01$) on awareness.

CONCLUSION AND RECOMMENDATIONS

Conclusion

Social inequalities exist among smallholder farmers, and these are exacerbated by gender, occupation, and wealth status. Gender-based division of household roles influences how farmers interact with providers of GLOBAL G.A.P. information. Male heads of households are more likely to access information regarding the latest farming innovations because of their position in the household and their dominance in high-value crop farming, while women's affiliation to subsistence crops limited their interactions with extension agents.

Farmers who participate in commercial farming targeted at local market consumers are likely to seek awareness of Global food safety standards and their potential for income. In addition, wealthy farmers are likely to invest their resources to raise their level of awareness about Global GAPs and their income potential. Commercial and subsistence farming creates inequalities in awareness-seeking behavior. A farmer's intensity of participation in diverse awareness forums enhances further learning and their level of awareness.

Recommendations

This study recommends that for the successful creation of awareness about Global food safety practices, the

information should be tailored to the social statuses and farming practices of potential adopters.

Disseminators of GLOBAL G.A.P information and other farming innovations should always find extra means of passing messages to female farmers at the farm/household level and target subsistence farmers to increase their levels of awareness and participation.

REFERENCES

de Battisti, A.B., MacGregor, J., Graffman, A. (Eds.). (2009). Standard bearers. Horticulture exports and private standards in Africa. London; International Institute for Environment and Development (IIED). Retrieved from: https://www.researchgate.net/publication/320258158

Dolan, C. (1995). Contested terrain: Gender, labor and religious dynamics in horticultural exporting, Meru District, Kenya. (Working Paper No. 501). Retrieved from: https://opendocs.ids.ac.uk/opendocs/handle/123456789/1099

Fan, L., Niu, H., Yang, X., Qin, W., Bento, C., Ritsema, C., Violette, G. (2015). Factors affecting farmers' behaviour in pesticide use: Insights from a field study in northern China. Sci. Total Env., 537, 360–368; http://dx.doi.org/10.1016/j.scitotenv.2015.07.150 0048-9697/

Gignac, G.E., Szodorai, E.T. (2016). Effect size guidelines for individual differences researchers. Pers. Indiv. Differ., 102, 74–78. http://dx.doi.org/10.1016/j.paid.2016.06.069

GLOBAL G.A.P. (2019). GLOBAL G.A.P. TOUR stop conference on our experts in your region. Conference proceedings of GLOBAL G.A.P. conference held at KALRO headquarters, Nairobi, Kenya. Retrieved from https://www.GLOBALGAP.org/uk_en/media-events/tour/tour-2019/tour-2019-kenya/

Kariuki, J.G. (2013). The gender implications of men's shift from cash-crop farming to dairy farming in Central Kenya. Int. J. Soc. Sci. Entrep., 1(5), 631–646.

Kassem, H.S., Alotaibi, B.A., Aldosari, A.O., Herab, A., Ghozy, R. (2020). Factors influencing smallholder orange farmers for compliance with GobalGAP standards. Saudi J. Biol. Sci., 28, 1365–1373. https://doi.org/10.1016/j.sjbs.2020.11.070

Kersting, S., Wollni, M. (2012). New Institutional arrangements and standard adoption: Evidence from small-scale fruit and vegetable farmers in Thailand. Food Pol., 37(4), 452–462. DOI 10.1016/j.foodpol.2012.04.005

Kuwornu, J.K., Mustapha, S. (2013). Global GAP standard compliance and smallholder pineapple farmers' access to export markets: Implications for incomes. J. Econ. Behav. Stud., 5(2), 69–81.

Macharia, I. Mithöfer, D., Waibel, H. (2013). Pesticide handling practices by vegetable farmer in Kenya. Env. Dev. Sustain., (15), 887–902. DOI 10.1007/s10668-012-9417-x

Murang'a County Government (2014). First County Integrated Development Plan. Murang'a County. Republic of Kenya. Retrieved from www.kpda.or.ke/documents/CIDP/Murang'a.pdf

Muriithi, B., Mburu, J., Ngigi, M. (2011). Constraints and determinants of compliance with EurepGAP standards: A case of smallholder French bean exporters in Kirinyaga District, Kenya. Agribusiness, 27(2), 193–204.

Ouma, S. (2010). GLOBAL standards, local realities: Private agrifood governance and the restructuring of the Kenyan Horticulture Industry. Econ. Geogr., 86(2), 197–222. https://doi.org/10.1111/j.1944-8287.2009.01065.x

Rogers, M. E. (1983). Diffusion of Innovations. 3rd Edition. The Free Press, New York, USA.

Sharifzadeh, M.S., Abdollahzadeh, G., Damalas, C.A. Rohollah, R. (2018). Farmers' criteria for pesticide selection and use in the pest control process. Agriculture, 8, 24; doi: 10.3390/agriculture8020024

Tallontire, A., Opondo, M., Nelson, V. (2013). Contingent spaces for smallholder participation in GLOBAL GAP: Insights from Kenyan horticulture value chains. Geogr. J., 180(4), 353–364. https://doi.org/10.1111/geoj.12047

UNCTAD (2007). Challenges and opportunities arising from private standards on food safety and environment for exporters of fresh fruit and vegetables in Asia: Experiences of Malaysia, Thailand and Viet Nam. United Nations. New York. USA. Retrieved from: https://unctad.org/en/Docs/ditcted20076_en.pdf