

QUALITY COMPLIANCE OF FRUITS AND VEGETABLES SOLD AT STREET VENDING SITES of TSHWANE, SOUTH AFRICA

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ABSTRACT

The selling of fruits and vegetables in the street is a common phenomenon in developing countries due to high levels of unemployment. In South Africa, street vending of fruits and vegetables brings valuable income to many impoverished households, thereby improving the livelihoods of people who are not formally employed. The Agricultural Product Standards Act No. 119 of 1990 of South Africa provides for the standardisation of quality norms for agricultural produce. Enforcing the Agricultural Product Standards Act is essential to ensure that agricultural produce sold in the streets is regulated and controlled so it is safe throughout the supply chain from the farm to the vending site. The purpose of this research was to investigate quality compliance of fresh fruits and vegetables sold by street vendors in the Tshwane metropolis, South Africa. A cross-sectional study survey was conducted in which stratified random sampling was used to sample 200 fresh fruit and vegetable vendors. Their knowledge of the requirements of the Agricultural Product Standards Act of South Africa was analysed. The compliance of their produce with quality regulations and the level of monitoring by authorities were also evaluated. Most respondents (89%) did not know about the Act. Only a small majority of fruit (51.5%) and vegetable (56%) retailers indicated that their agricultural products had been monitored. A large majority of fruits (86% to 99.8%) and vegetables (85.4% to 97.5%) met all the quality requirements in the Act. In general, a fair proportion of fruits (58%) and vegetables (65%) complied with the requirements of the Act. There was a significant positive correlation ($p \leq 0.05$) between monitoring by officials and the level of compliance. Only a small percentage of fresh fruits and vegetables vending sites are monitored by authorities. This paper is of interest to stakeholders in street vending of agricultural food produce because it raises awareness of areas of non-compliance and a need for effective compliance. Awareness and adequate enforcement can translate into selling and consuming agricultural high quality and safe food produce on the streets of Tshwane metropolis.

Key words: agriculture, produce, fruits, vegetable, safety, quality, monitoring, inspection



INTRODUCTION

The Agricultural Product Standards Act 119 of 1990 of South Africa (“the Act”), provides for the standardisation of requirements pertaining to the quality, grading and packaging of agricultural produce and related products in South African markets. In South Africa, the enforcement of the standard is the prerogative of the Sub-directorate: Agricultural Product Quality Assurance of the Department of Agriculture, Land Reform and Rural Development [1]. Fresh produce plays a vital role in the diet of human beings [2]. Therefore, the quality of agricultural fresh produce sold at street-vending sites is the main factor that influences the price and the decision to purchase by consumers [3]. The initial quality parameters of fresh produce are attained during harvesting and any poor quality at this stage cannot be enhanced post-harvest [4]. Furthermore, improper handling and packaging of fresh produce can have negative effects on its quality. For example, bruises on fruits and vegetables can become contaminated with microorganisms, possibly constituting a health hazard to consumers [5]. Furthermore, bruised fruits and vegetables can deteriorate quickly thereby affecting their shelf life, which in turn may result in economic losses for the vendors [6].

Non-compliance with quality regulations by farmers and street vendors and lack of monitoring and enforcement by competent authorities can negatively influence the quality of agricultural produce sold to consumers [7]. The lack of consistent monitoring by competent authorities often favours non-compliance with quality regulations in general and consequently with quality norms for fruits and vegetables. Non-compliance can also be in the form of high levels of chemical residues such as pesticides on fruits and vegetables that can compromise the health of consumers [8].

It is worth noting that selling fruits and vegetables on the street is a common phenomenon in developing countries, principally due to high levels of unemployment in the formal sector [9]. This can be due to inadequate basic qualifications (such as Matric) and skills and a lack of job opportunities in some cases [10]. Street vending in general has a significant positive impact on the economy of many developing countries [11]. In South Africa, street vending of fruits and vegetables brings valuable income to many impoverished households, thereby improving the livelihoods of many people who are not formally employed [12]. Enforcing the Agricultural Product Standards Act is essential to ensure that agricultural produce sold on the streets is regulated and controlled so it is safe throughout the supply chain from the farm to the vending site. The purpose of this study was to investigate whether fresh fruits and vegetables sold in the Tshwane metropolis complied with the Act.

RESEARCH METHODOLOGY

Research design and sampling

The study was conducted in the Tshwane (Pretoria) metropolis, the capital city of South Africa, where selling of fruits and vegetables on the streets is common. A cross-sectional survey design with a stratified sampling approach was used to select street vendors of fruit and vegetables. The research area was divided into five strata representing areas of high street-food vending activity. A total of 200 vendors, 40 per



stratum, were selected randomly from an existing list and the sample size was estimated using the Cochran form for unknown population [13]. A total of 464 fruit and 398 vegetable products of any type being sold by the vendors were selected and observed using the checklist.

Data collection and analysis

The research instruments used for data collection were a questionnaire and a checklist. The questionnaire contained questions on the socio-demographic and vending profile of the respondents and their knowledge of the existence and purpose of the Agricultural Product Standards Act. The checklist contained the quality criteria for fresh fruit and vegetable produce prescribed by the Act [14–25]. Data were collected by means of face-to-face interviews and personal observations. The reliability and validity of the different sections of the research instrument were determined and Cronbach's α for the different constructs ranged from 0.689 to 0.821. Ethical approval for this study (2017/CAES/024) was obtained from the CAES HREC ethics committee, University of South Africa. Written informed consent was obtained from each participant prior to data collection. The compliance scores of fruits and vegetables were determined by adding all the quality criteria that were met by each sample. A score of 1(one) was allocated for meeting each quality criterion, otherwise a score of zero was allocated. The quality compliance was categorised as Low (0–12 points); Moderate (12–20 points); and High (21–25 points). Cross-tabulation and Spearman's correlation were used to determine the relationship between variables. Statistical significance was determined ($P \leq 0.05$).

RESULTS AND DISCUSSION

Socio-demographic details of respondents

The majority of respondents were men (64.5%) while 35.5% were women (Table 1). It seems that men cope better with the harsh labour-intensive street vending environment, which is compounded by insecurities and fear of harassment by criminals especially at night [26, 27]. The majority of the respondents were single (55.5%) while the rest were either married (39.5%), divorced (0.5%) or widowed (4.5%) (Table 1). The majority of unmarried participants were young people who have no formal employment and try to make a living by selling street food [39]. This is consistent with the findings of studies conducted in the streets of Kigali, Rwanda [28] and Enugu City, Nigeria [29], where most street vendors were single.

The vast majority of respondents were black (97.5%) and most (59%) were older than 45 years (Table 1). Most did not have Matric (72.5%); only a few had a higher education certificate/diploma/degree (27.5%). The reason for this could be that they had not attended school at all or had dropped out [29]. Many black South Africans did not have the opportunity to go to school during the apartheid era, when they were socially, politically and economically excluded [30]. Currently, in South Africa individuals need to have at least a Matric certificate to get a job that pays a minimum wage; for those who do not, street vending is the quickest and easiest way of making money, as in many developing countries [10, 11]. This is in line with studies conducted



in Brazil and Vietnam in which the majority of street vendors were found to be school leavers without formal qualifications [27, 31].

The characteristics of agricultural food produce vending sites

The majority of respondents (83.5%) were selling produce at registered street vending sites, which included taxi/bus/train station hubs, while the rest (16.5%) sold their produce at unregistered street vending sites (Table 2). This could be because street vendors are required by South African law to register their site with the relevant municipality. Unregistered street vendors are likely to be forcefully evicted by law enforcement agents [29, 32]. The majority of respondents (78%) worked between six and seven days a week (Table 2) because street vending is their only source of income and the higher the number of selling days the higher the income generated [32], considering that demand exists daily [26]. Majority of the respondents (73.5%) had been selling agricultural food produce for a living for more than five years and 44.5% for more than 10 years (Table 2). The reason could be limited job opportunities, considering most of them did not possess a formal qualification [28].

Knowledge of the existence and purpose of the Agricultural Product Standards Act

The vast majority of respondents (89%) did not know about the Act and 88% did not even know which department enforces it. Only 9% correctly indicated that the Department of Agriculture, Land Reform and Rural Development enforces the Act. Furthermore, the majority (84%) did not know the purpose of the Act; only 13% correctly identified it (Table 3). The reason for this lack of awareness could be a lack of or inadequate training in agricultural produce [33]. The relevant authorities should educate and inform street vendors about relevant regulations and bylaws so that they adhere to them when conducting business in the streets [34, 35].

There was a significant positive correlation between knowing about the Act and knowing its purpose (Table 4). This indicates that if street vendors are made aware of the Act, there is a good chance that they will know its purpose and contents. Respondents at different education levels differed significantly with regard to knowing the purpose of the Act ($r = 0.629$, $p \leq 0.05$). The crosstab analysis showed that individuals with a certificate/diploma/degree (40%) followed by those with a Matric certificate (20%) were more knowledgeable about the purpose of the Act than those without a Matric certificate (9.7%) (Table 5). This could be because vendors with higher qualifications may possess relatively higher aptitude and be more likely to read and gather information. Health authorities and other relevant stakeholders could use alternative ways to convey information such as infographics, audios and videos to educate the less literate vendors about the Act [33, 36].

Knowledge of the requirements of the Agricultural Product Standards Act

Generally, most respondents were knowledgeable about the quality requirements for agricultural food produce prescribed in the Act. Most respondents (87%) knew that 'free of infestation and injury' is the minimum requirement; a small majority (62%) knew that the quality of food produce sold at the markets is considered consistent only when it has been graded/classified. Similarly, the majority (75%) knew that the reason for grading food produce is to 'boost consumer confidence and ensure market

transparency' (Table 6). The reason why most respondents knew the minimum quality requirements could be that nowadays consumers are better informed and demand quality produce; hence, vendors are forced to seek knowledge on the quality requirements of products [37]. Minor deviations in the quality of produce can negatively affect consumers' decision to purchase; hence, a consumer's intention to buy depends on the quality of the produce at the point of sale [38]. In contrast, most respondents did not know the prescribed classes (grades) of fruits and vegetables sold at the markets (Table 6). This could be because they were not aware of the Act or unintentionally or deliberately ignored appropriate facts [39].

The vast majority of respondents (77.5%) correctly indicated 'display accurate and relevant information' as the main objective of the labelling requirements, that the information 'name, type, quantity and picking date' (70%) must appear on containers of fresh produce and that 'only produce of uniform size, quality, cultivar, ripeness and colour must be packed together' (75 %) (Table 6). This can be attributed to their experience of food retailing, since agricultural produce at local markets is often marked and packaged [37, 40]. Conversely, only a minority of respondents (46%) correctly indicated that 'preventing contamination of the produce' is the main purpose of packaging materials (Table 9). This can be attributed to lack of awareness of food packaging requirements and the need to convey mandatory information on packaging materials [41]. Only a small minority (15%) knew that an executive officer designated by the Minister of Agriculture is the person responsible (the agricultural food inspector) for ordering the seizure of non-compliant produce, and a minority (36.5%) knew that people who contravened or failed to comply with the provisions of the Act have committed an offence (Table 7). Again, the reason could be lack of knowledge [39].

Assessment of the compliance of fruits and vegetables sold

Only a small majority of fruit (51.5 %) and vegetable (56 %) street vendors indicated that their produce had been monitored by authorities in the past (Table 7). This could be attributed to lack of resources such as vehicles and insufficient numbers of inspectors to conduct monitoring and enforce regulations. Monitoring entails inspecting agricultural produce for any deviation from the quality criteria and may include analysing the chemical composition and microbiological contaminants of the products when necessary [41]. Lack of monitoring by authorities can result in the sale of non-conforming agricultural produce, such as that containing high levels of pesticide and phosphate residues [42, 43]. Regarding general compliance with the quality criteria of the Act, the majority of fruits (58%) and vegetables (65%) had high compliance; a few fruits (36%) and vegetables (13%) had moderate compliance and only 6% of the fruits had a low overall compliance compared to 22% of vegetables (Figures 1 and 2). The relatively high compliance could be because the majority of farmers want to comply with the grading, packing and labelling requirements of the Act in order to succeed in the formal sector, which requires strict compliance with quality regulations [3, 44]. Quality is significant in the promotion of food products (fruits and vegetables) in urban and rural populations [45]. Moreover, there was a significant positive correlation between monitoring by officials and the level of compliance of the fruits (0.520, $p \leq 0.01$) and vegetables (0.424, $p \leq 0.01$) sold with the quality criteria of the Act (Table 8). This indicates that monitoring is a major contributor to compliance with the Act

because it ensures the identification of deviations from the norm and the implementation of corrective action by competent authorities [46].

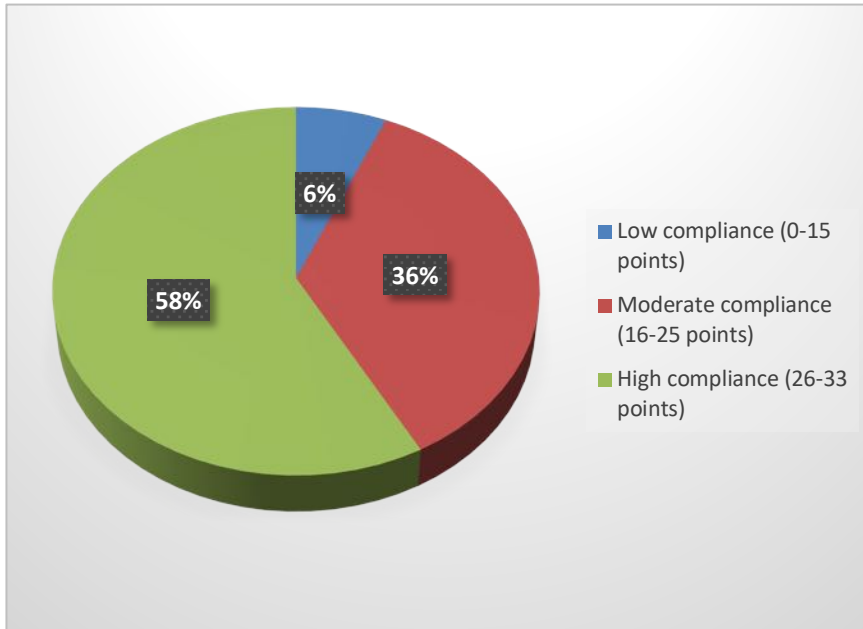


Figure 1: Overall compliance of fruit with the quality criteria of the Agricultural Product Standards Act

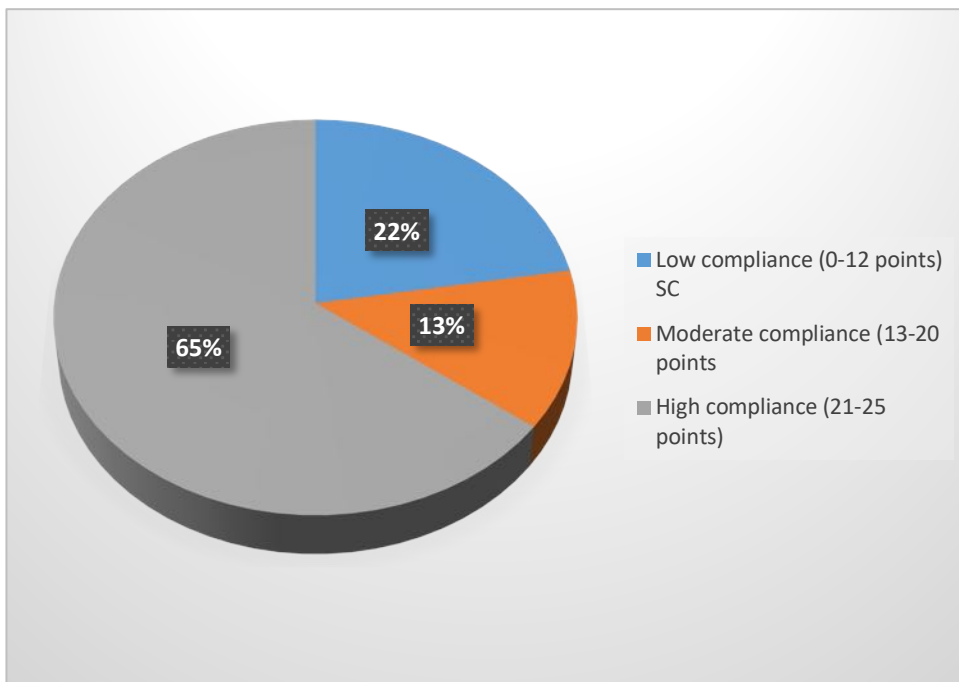


Figure 2: Overall compliance of vegetables with the quality criteria of the Agricultural Product Standards Act

CONCLUSION

The majority of the fruit and vegetable vending sites were registered and most of the fruits and vegetables sold complied with the quality requirements of the Act. However, the majority of street vendors did not know of the existence and purpose of the Act and only a small percentage of the vending sites were monitored by authorities. It is evident that continuous monitoring is required to ensure that deviations from quality norms are corrected and the safety and quality of produce sold by street vendors is assured. It is recommended that the Department of Agriculture, Land Reform and Rural Development registers all street vendors and trains them in the requirements of the Act. Thereafter, street vendors should be monitored and regulated to avoid non-compliance, which can compromise the health of consumers.

Author contributions

Nwamhlaba Cynthia Chauke: A Master's student who under supervision for her dissertation conceptualised the research, carried out data collection, interpreted the results and wrote the manuscript.

Frederick Tawi Tabit: The supervisor who guided the student through the conceptualisation of the research, data collection, results interpretation and writing of the manuscript.

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Conflict of interest

The authors declare no conflict of interest.



Table 1: Demographic information of respondents (N=200)

Variables		Frequency (%)
Gender	Male	129(64.5)
	Female	71(35.5)
Marital status	Single	111(55.5)
	Married	79(39.5)
	Divorced	1(0.5)
	Widow(er)	9 (4.5)
Academic level	Below Matric	145 (72.5)
	Matric certificate	50 (25)
	Certificate/diploma/degree	5 (2.5)
Race	African	195 (97.5)
	Coloured (mixed- race)	1 (0.5)
	Indian/Asian	1 (0.5)
	White	1 (0.5)
	Others	2 (1)
Age	18–25 years	23 (11.5)
	26–35 years	59 (29.5)
	36–45 years	58 (29)
	46–55 years	38 (19)
	56–65 years	17 (8.5)
	68–75 years	5 (2.5)

Table 2: The vending characteristics of respondents (N=200)

Vending sites	Registered	167 (83.5)
	Unregistered	33(16.5)
Days per week worked as a street vendor	1–2	3(1.5)
	3–5	41(20.5)
	6	97(48.5)
	7	59(29.5)
Number of years selling food produce for a living	Below 2 years	26(13)
	2–4 years	27(13.5)
	5–10 years	58(29)
	10–20 years	55(27.5)
	Above 20 years	34 (17)
Criteria for choosing where stock is bought	Grade	137 (68.5)
	Brand name	24 (12)
	Price	145 (72.5)
	Target market	10 (5)
	Perishability	14 (7)
	Other	6 (3)

Table 3: Respondents' knowledge of the existence and purpose of the Agricultural Product Standards Act of South Africa (N=199)

Research question	Answer	Frequency (%)
Awareness of the Agricultural Product Standards Act	Yes	22 (11)
	No	178 (89)
The department that enforces the Agricultural Product Standards Act	National Department of Health	4 (2)
	Department of Agriculture, Land Reform and Rural Development	18 (9)
	Department of fisheries and the environment	2 (1)
	No idea	176 (88)
The purpose of the Agricultural Product Standards Act	To provide for breeding, identification of genetically superior crops and animals.	2 (1)
	Prohibit sales of agricultural produce which do not comply with prescribed quality criteria.	26 (13)
	To provide measures to promote meat safety and the safety of animal products.	4(2)
	No idea	168 (84)

Table 4: Spearman’s correlation analysis between knowing of the existence of the Agricultural Product Standards Act and knowing the purpose of the Act (N= 199)

	Awareness of the Agricultural Product Standards Act	The department that enforces the Agricultural Product Standards Act	The purpose of the Agricultural Product Standards Act
Awareness of the Agricultural Product Standards Act	1.000	0.629**	0.202

** . Correlation is significant at the 0.01 level (2-tailed)

Table 5: Knowledge of the Agricultural Product Standards Act by educational qualification (N=199)

Knowledge parameters		Q1.3 Level of education			p-value
		Below Matric	Matric certi-ficate	Certificate /Diploma/ Degree	
The purpose of the Agricultural Product Standards Act	To provide for breeding, identification of genetically superior crops and animals.	1 (0.7)	1 (2)	0	0.047
	Prohibit sales of agricultural produce which do not comply with prescribed quality criteria.	14 (9.7)	10 (20)	2 (40)	
	To provide measures to promote meat safety and the safety of animal products.	3 (2.1)	1 (2)	0	
	No idea	127 (87.6)	38 (76.0)	3 (60)	
	Total	145v(100)	50v(100)	5v(100)	

NB: Correct response in bold; Significance at $p \leq 0.05$

Table 6: Respondents' knowledge of the quality and grading requirements of agricultural fresh produce according to the Agricultural Product Standards Act of South Africa (N=200)

Research question	Answers	Frequency (%)
2.3.1 Awareness of the minimum quality requirement for agricultural produce sold in the market	Free of infestation and injury	174 (87)
	Free of moisture	6 (3)
	Free from sunlight	3 (1.5)
	No idea	17 (8.5)
2.3.2 Awareness of consistent quality requirements for agricultural produce sold in the market	When it has been inspected	28 (14)
	When it has been cooked	1 (0.5)
	When it has been graded and classified	124 (62)
	When it has been refrigerated	11 (5.5)
	No idea	36 (18)
2.4.1 Awareness of the reason for grading agricultural food produce sold in the market	To ensure the proper shape and size of the produce	1 (0.5)
	Product type	11 (5.5)
	To boost consumers' confidence and ensure market transparency	150 (75)
	To safeguard the ingredients of produce	3 (1.5)
	No idea	35 (17.5)
2.4.2 The number of classes (grades) prescribed for fruit produce in the market	One	6 (3)
	Two	15 (7.)
	Three	49 (24.5)
	Four	28 (14)
	No idea	102 (51)
2.4.3 The number of classes (grades) prescribed for vegetable produce in the market	One	7 (3.5)
	Two	11 (5.5)
	Three	48 (24)
	Four	42 (21)
	No idea	92 (46)

Table 7: Respondents’ knowledge of compliance and penalty requirements of the Agricultural Product Standards Act of South Africa (N=200)

Research question	Answers	Frequency (%)
In terms of the Agricultural Product Standards Act, the authority with the prerogative to order the seizure of non-compliant fresh agricultural produce sold in the market	The South African Police Service	9(4.5)
	An executive officer designated by the minister of agriculture	30(15)
	The health inspector designated by the minister of health	44(22)
	No idea	117(58.5)
In terms of the Agricultural Product Standards Act, the guilty verdict for any person who violates the requirements of the Act	An offence	73(36.5)
	Bribery	5(2.5)
	Sin	2(1)
	Negligence	7 (3.5)
	No idea	113 (56.5)
In terms of the Agricultural Product Standards Act, the penalty that can be imposed by a magistrate’s court on a person who transgresses the Act	Liable to a suspension for a period not exceeding two years	5 (2.5)
	Liable to a special dispensation	7 (3.5)
	Liable to a warning	44 (22)
	Liable to a fine or to imprisonment for up to two years	27 (13.5)
	No idea	117 (58.5)
In terms of the Agricultural Product Standards Act, the correct appeal process for any person charged with transgressing the Agricultural Product Standards Act	Make an appeal at the police station	8 (4)
	Make an appeal at the court	3 (1.5)
	Make an appeal at the Director General of the Department of Agriculture, Land Reform and Rural Development	52 (26)
	No idea	137 (68.5)
Monitoring fruit in your vending site has been conducted in the past	Yes	103 (51.5)
	No	97 (49.5)
Monitoring vegetables in your vending site has been conducted in the past	Yes	112 (56)
	No	88 (44)

Table 8: Correlation between monitoring by officials and quality compliance score of vendors' fruit (N=464) and vegetables (N=398)

	Fruit Monitoring Score
The overall fruit compliance score	0.520**
	Vegetable Monitoring Score
The overall vegetable compliance score	0.424**

** . Correlation is significant at the 0.01 level (2-tailed), according to Spearman's correlation analysis

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