

Article

Perceptions of Smallholder Farmers towards Organic Farming in South Africa

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Abstract: In South Africa, smallholder farming is an important aspect of livelihood. More so, organic farming is increasingly becoming popular among farmers. However, many studies undertaken focused on the trade possibilities of the industry leaving the farmers' perceptions underrepresented. This study, therefore, aims to capture the farmers' opinions by evaluating the critical factors and policy implications of organic farming in the Limpopo Province of South Africa. A total of 220 semi-structured questionnaires were administered to smallholder farmers in the province. The results revealed that organic farming is gaining recognition according to 82.8% of the participants, and 86.6% believed that organic farming has high-profit returns. However, 88.4% of the respondents agreed that the required standards for organic farming are too restrictive while a further 74.6% indicated that organic farming certification is difficult to obtain. The results also indicated a statistically significant difference in the perceived benefits of organic farming ($p \leq 0.001$) and access to markets ($p = 0.042$). Based on the results, the study suggests more awareness, training and ease of certification as a way forward in changing the perceptions of the farmers in the province.

Keywords: agriculture; compost; farmers' certification; food production; organic farming; smallholder



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1. Introduction

A fundamental challenge facing human existence is meeting the food demands of the teeming population [1]. According to the United Nations, the present world population of approximately 7.7 billion is predicted to surge to 9.7 billion by 2050 [2]. The feeding of such a population requires an increase in agricultural production, but there are many limitations in the use of natural resources, energy and farmlands [3]. Well documented is the role of modern farming practices in the intensification of agricultural production and reduction of resource constraints through a feasible programme such as the Green Revolution and the use of genetic engineering, irrigation systems, machinery, and chemical inputs [4]. Nonetheless, the application of chemical inputs such as chemical fertilisers, pesticides and heavy metals has generated severe environmental and health concerns [5]. The adverse effects of the introduction of chemical inputs in farming include surface and groundwater contamination, emission of greenhouse gases, reduced biodiversity and soil degradation [6].

One input in ensuring sustainable farming and food production systems is the introduction of organic farming which has been regarded as a feasible option to the emanated crisis of modern farming [7]. Organic farming is a farming practice that is done without the use or application of synthetic chemicals such as genetically modified seeds, pesticides, fungicides, insecticides or fertilisers. Organic farming involves a wide range of techniques that help in reducing pollution, sustaining the ecosystem, improvement of production and quality nutrition associated with improved economic and social viability. This method has

proven to be a suitable method for sustainable agricultural development and practice [7]. Organic farming maintains and promotes soil, animal, plant and human health, sustains and enhances biodiversity and ecological systems. More so, it provides a well-balanced nutrient cycling and mineralisation with favourable microclimatic regimes thus affording farmers less risk. Widely acknowledged are the nutritive and health benefits of organic farming [8]. Remarkably, among policymakers, consumers, and producers in recent years are the increased popularity of organic farming. Continually rising since the last decade around the world is the growth and significant development of organic farming [7].

A survey conducted in 2019 by the Research Institute of Organic Agriculture indicated that the method is still practised in 181 countries, covering 69.8 million hectares of farmland and representing about 1.4% of the world's farmlands [9]. In 2017, China and Argentina witnessed 32% and 12% growth in organic farmland respectively, but there was a decrease in Ukraine, Iran, and Kazakhstan. During the same period, there was no growth rate observed in organic farmlands in Japan, Mexico, and the United States of America. Despite the negative or zero growth rate in these countries, consumers' predisposition to organic produce has increased tremendously [9]. The benefits of organic produce such as taste, food quality, health and environmental friendliness have increased the demand for these products [10]. In turn, a potential market for organic produce has been created due to demand [11]. In effect, since the last two decades, global sales of organic food have increased from US\$ 15 billion to US\$ 97 billion owing to interest in organic foods. More so, several countries are expanding their global organic market share [9].

Increasingly, the use of compost manure is considered a more credible option to chemical fertilisers but little is known regarding the factors that could encourage farmers to adopt the practice. Studies conducted on adopting compost as a farming method revealed that socio-economic and technical conditions differ on a country by country basis [12]. For example, some farmers rely on compost produced by themselves from crop residues and manure [12], others depend on factors such as availability of raw materials [13], and training in composting were a significant requisite for its adoption [14]. In some studies conducted in developed and developing countries, the results revealed that traditional supply-based policies alone may unlikely guarantee an appropriate technological innovation level by farmers [15]. For instance, in most tropical countries, failures recorded in composting aroused from the dearth of attention paid in the planning stage to understand the demand, economic and technical aspects involved in organic farming methods [16,17].

Gaps have been identified by a few studies in organic farming development approaches and suggested different implementation strategies such as the application of innovative technologies [18], local government guidance [19], scientific research support and implementation [4], support and subsidies from the government [20], regulatory standards, modification, management, and constraints of organic farming [21]. Other identified gaps point to green marketing [22], creating establishments for organic certification [23], and trade and financial policies [24]. Although the development of organic farming has not been all ideal, there are some supportive policies such as financial, legislative, communication, and action plans that have been implemented in developed countries regarding the advancement of organic farming [21]. Access to markets, appropriate training, access to consulting and extension services, and the presence of strong demand for organic produce [25,26]. Whereas, in developing countries, support from the government regarding organic farming varies from the developed countries. In developing countries, it is almost insignificant and no momentous operational policies and programmes are being implemented. It is thus vital to ascertain and determine strategies that can ease the progress of organic farming based on inclusive factors affecting organic farming.

Nevertheless, other socioeconomic and institutional factors such as farmers' age, educational level, access to information, access to credit, and land tenure are also relevant in exploring the adoption of organic farming innovations. This study, therefore aimed at examining the perceptions of smallholder farmers regarding organic farming in South Africa, using Limpopo Province as a case study. In fulfilling this aim, the central objective

of this study is to explore whether smallholder farmers in the province are willing to convert their farms to organic production and the underlying factors which can positively or negatively influence their perception. The certification system, production challenges, policy, marketing, and feasible interventions for instituting and strengthening organic agro-products supply are also considered. The hypothesis of this study is grounded on the premise that farmers are willing to partake in organic farming is determined by their perceptions, socio-economic, and other institutional factors.

2. Organic Farming in South Africa

In many sub-Saharan countries, most soils are characterised by low organic content matter, physical erosion, acidity, moisture stress, nutrient deficiencies, and crusting [27]. In some cases, these factors are accelerated by poor land management systems which have reduced agricultural production [28,29]. Although, attempts have been made to maximise agricultural productivity by intensifying the land areas under cultivation but had had similar effects [30]. It is estimated that about 60% of the arable land in the continent has been affected by land degradation, resulting in a net loss per annum of more than US\$ 68 billion in agricultural production [31]. More so, it is envisaged that if this pattern of land degradation continues in the continent, crop yields could be severely reduced [32].

There is a long history of organic farming in South Africa. The country was one of the founding members of the International Federation of Organic Movements (IFOAM). As of 2005, the value of organic farming produce in the country was estimated between R200 Million and R400 Million [33]. According to the World Bank collection of development indicators, in 2018, South Africa was reported to have about 9.9% of arable land [34]. According to the conservation organisation of the World Wide Fund for Nature (WWF), by 2050, South Africa will have to produce 50% more food to feed a projected population of 73 million people [35]. Therefore, it is crucial to ensure food security through the implementation of sustainable farming practices such as organic farming. In South Africa, the formal adoption of organic farming practices is low. Nonetheless, informal organic farming by subsistence and smallholder producers in the country may feed as much as two-thirds of the country's population [33]. Owing to the complexity of the country's agricultural sector, the government has envisioned that organic farming will be the mainstream system of agricultural practice in conforming to the agendas such as the proclaimed Green and Clean Economy, Clean Development Mechanism, and Sustainable Agriculture [33].

However, there is no comprehensive database to collate the actual number of organic farmers countrywide. A report by AgricOrbit [35], in 2011 indicated that there were around 167 certified producers of organic products, utilising 127,106 hectares of land, approximately 0.04% of all the agricultural land in the country. According to a study by Van Zyl [36], there are about 350 to 700 hectares of land certified for organic farming in the country with a turnover estimated in the region of R40 million. Parrot et al. [37], envisaged that 45,000 hectares of land are been utilised for organic farming, representing about 0.54% of the entire farming land in the country. A study by IFOAM indicated that about 500 certified organic farmers who produce crops on approximately 50,012 hectares of land exist in the country [9]. Organic produce from South Africa is primarily exported and sold at local markets. The crops mainly produced include vegetables, citrus, berries, subtropical fruits, herbs, rooibos tea, and wine [38].

In South Africa, a high level of fragmentation has characterised the organic farming sector, thus making the sector driven by private and Non-Governmental Organisations (NGOs). There was no particular organisation to represent the interests of the entire organic sector. The fragmentation of the sector originated due to the marginalisation of the agri-business, as only a few practitioners were alienated on the methodologies and means of organic farming. Organic South Africa (OSA), the erstwhile umbrella body for certified farmers became dysfunctional in 2006. This was a result of the culture of silos and the protection of intellectual boundaries developed between the different ethnic organic farming inclinations [33]. The course of building a robust national organisation with a

comprehensive coherent vision and governance practices is now underway through the Organic Sector Strategy Implementation Committee—South African Organic Sector Organisation (OSSIC—SAOSO). The committee aims to ensure a smooth process, advocating inclusivity and unity, with a clear vision and strong leadership. Numerous organisations which include the Organic Freedom Project (OFP), the Biodynamic Agricultural Association of South Africa (BDAASA) now participate in the process which is driven by the OSSIC—SAOSO forum. The drive of the forum is to ensure that organic substances and surplus producers are integrated, accommodated in the organic sector as full beneficiaries and members of the organic policy. Two distinctive groups have emerged with different agendas: The subsistence smallholder and surplus organic community of farmers primarily supplying the local market and third-party certified organic farmers catering for larger retailers and export markets [33].

In South Africa, adherence to private sectors and government institutions regarding organic farming are two international standards. These are the IFOAM and *Codex Alimentarius* (also known as “Codex”). Over the years, several standards regarding organic farming have been developed by the IFOAM. These basic standards are continuously developed to outline how organic products are produced, processed, and handled [39]. On their own, these standards however cannot be regarded as a certification but provide a framework for independent certification bodies to develop their own regional or national standards [39]. On the other hand, the Codex Alimentarius Commission is a joint venture of the Food and Agricultural Organisation (FAO)/World Health Organisation (WHO) Food Standards Programme which is tasked with developing food standards, guidelines, and code of practice in the food industry [40].

There is no official certification system yet in place. Inspection and certification of organic farmers in the country are done by international and domestic certification bodies [33]. Hence, not all organic farmers are certified as such, even though thousands of smallholder farmers have been practising the principles for several years where the principles of organic agriculture are followed which are the principles of health, ecology, fairness, and care. Individuals and organisations involved in the certification process oftentimes dismiss the validity of production systems of smallholder farmers as not complying with the principles of organic farming. This is mainly because of the difficulties of smallholder farmers in keeping records to a standard that the certification bodies can confirm there is compliance to organic principles [33].

There are two alternative certification pathway models created by IFOAM which is applied in South Africa. The first is the Group certification which is under a third-party certification system and the Participatory Guarantee System (PGS) which is a first-party certification model. The Group certification enables a group of smallholder farmers to collectively manage the production, processing handling, and marketing of their organic products under a co-operative or organisation. Under the scheme, there is a fundamental aspect of an internal control system that is set up to ensure compliance with the ethics of organic farming [39]. The Participatory Guarantee System is defined by the IFOAM as a locally focused quality assurance system that certifies producers based on the active participation of stakeholders and is built on social network, knowledge exchange, and foundation of trust [38]. The stakeholders involved contribute to developing and implementing the organic standards and procedures [41].

3. Materials and Methods

3.1. Study Area

Limpopo Province is the northern-most province of South Africa and covers 125,755 km² of the total land area of the country [42]. The province is divided into five administrative municipal districts namely; Mopani, Vhembe, Capricorn, Sekhukhune, and Waterberg Districts. Due to topographical zones difference in the province, the west is bounded by the northern Drakensburg escarpment, the Soutpansberg with steep peaks and slopes to the east, characterised by a flat undulating Lowveld plain. The Limpopo, Olifants, and

Letaba Rivers are the major sources of water and are relied on for irrigation. The climate spatially varies from being arid in the west, semi-arid in the east and temperate areas in the central zones. It offers extremely hot conditions, as it is intersected by the Tropic of Capricorn, with all-year sunshine. The climate type falls within the sub-tropical climate, with an average rainfall of 300–1000 mm per year [43]. During the summer months, the heat is often interrupted by rainfall and short thunderstorms (October to March). Average temperature can range from 27 °C to as high as 45 °C [43]. The mountainous areas receive an enormously amount of rainfall yearly, with an average of about 1329 mm [43]. The seasonal average humidity falls within 80% in the summer and about 38% in the winter [43]. The soils are characterised as sandy loamy in the west and north, red and black fertile clay in the Springbok flats. However, most parts of the province are dry with occasional drought season.

Agriculture is the mainstay of livelihood, as about 8 million hectares of land are used for agriculture. From which 67% is used for natural grazing, 10% as arable land, 10.4% as nature conservation, and 1.1% for forestry [42]. The province is the fourth largest accounting for more than 13% of the total population in the country and of which about 90.8% reside in former homelands or rural areas [42]. The agricultural production is diverse with a focus on field crops which is dominated by maize production. Although, citrus and vegetable production are the main farming enterprise in the province, contributing around 64% and 22% to gross income from agriculture [44]. The province was specifically selected because of the high concentration of organic farmers [33].

3.2. Data Collection

Participation in the study was solely voluntary and an informed consent form was signed by the researchers and the participating farmers before data collection. Primary data were elicited with a semi-structured self-administered questionnaire between October 2020 to June 2021 which is the planting and harvesting season. During the data collection, due to the COVID-19 pandemic, all preventive protocols of wearing a facemask, hand sanitizing, and keeping a social distance were applied. For clarity, repetition, and ambiguity to the ease of the farmers, the questionnaires were pretested with some farmers before the main survey. The pretesting revealed regrouping or rephrasing some questions which were amended to improve clearness. The questionnaire was divided into four sections. Section A entailed demographic and socio-economic characteristics information including gender, age, marital status, educational level, income earned, land ownership. Section B pertains to information relating to certification, changes in farming methods based on certification, market prices for organic produce. Section C includes questions on farmers' perceptions of organic farming, access to market, and attributes to organic farming. Section D consists of Likert-type questions, using three rating scales to measure the responses of the respondents. The questionnaires were administered in the English language for convenience and simplicity but where indispensable, interpreters were used in local dialects. Engaged research assistants to execute and oversee the administration of the questionnaires were trained to thoroughly monitor the data for quality control and assurance. Approximately, the average duration for administering a questionnaire was 35 min. Secondary data were sourced from unpublished materials, books, research reports, and journals related to organic farming, policies, and certification.

3.3. Sample Size and Procedure

The sampled population comprised of certified, transitional, and non-certified organic farmers in the Limpopo Province. To obtain the sample size, three factors were considered. Firstly, the desired confidence level (95%), secondly, the assumed proportion of the sample, and thirdly, the margin of error. A total of 220 farmers were surveyed using the sample size formula of Yamane [45] as:

$$n = \frac{N}{(1 + Ne^2)} \quad (1)$$

where:

n = Sample size

N = population size

e = Margin of Error (MoE), $e = 0.05$ Proportion of estimated sample

$$n = \frac{500}{(1 + 500(0.05)^2)} \quad (2)$$

$$= \frac{500}{2.25} \quad (3)$$

Sample size = 222.2 $\approx$ 220.

The study adopted a systematic random sampling procedure. The rationale of using the approach was to reduce the potential of human bias in the selection of the farmers with the assurance that the population will be evenly sampled [46]. The systematic random sampling method requires using a fixed element in selecting samples based on specific intervals until the desired sample size is achieved [47]. Systematically, the questionnaires were administered to every fifth farmer. The farmers could either be male or female. In a case where a farmer declined to participate, another farmer is systematically chosen.

3.4. Data Analysis

The collected data were cleaned, coded and statistical analysis was done using Statistical Package for Social Sciences (SPSS) version 24 developed by International Business Machine (Armonk, NY, USA). Descriptive statistics were applied in evaluating the significance of the variables. The analysis and presentation were quantitative and the results were portrayed in means, percentages, Chi-squares, standard deviations, t-test, Analysis of Variance (ANOVA), and significance intervals. The hypothesized assumption was accepted or rejected using a considered statistical significance level of 0.05 (95% confidence interval).

3.5. Ethical Clearance

This study was approved by the Ethical Committee of the University of Venda (certificate number: SES/16/GGIS/05/1511), to ascertain the avoidance of harm, informed consents of the participants were obtained before the commencement of the study. Necessary permissions were obtained from the local authorities.

4. Results

4.1. Socio-Economic and Demographic Profile of the Respondents

A total of 220 farmers participated in this study as presented in Table 1. The breakdown indicated that 36 were certified organic farmers, 86 are transitional and 98 are non-organic farmers. The gender status result indicated a statistical significance ($p \leq 0.001$). Within the certified group, 77.8% were males, 22.2% were females. The transitional group consists of 74.4% males and 25.6% females, while in the non-certified group, the result indicated 79.6% males and 20.4% females. This does not however indicate more males than females in the province but a result of a patriarchal character that remains pervasive in most rural communities. The respondents' age groups were classified into four categories: 21–30 years, 31–40 years, 41–50 years, and 51 years and above. There were more respondents and active farmers within the 41–50 years category at 69.4% for certified farmers, 53.4%, and 47.9% for transitional and non-certified farmers respectively. The age group category also revealed a statistical significance ($p = 0.042$).

The marital status revealed that most of the participants were married at 69.4% for certified farmers, 59.3% in the transitional group, and 60.2% for non-certified farmers. The result for educational level portrayed that most of the respondents' in the certified and transitional farmers group had secondary school education at 58.3% and 53.4% respectively, while there were more primary school leavers at 42% in the non-certified category. The years of farming experience indicated that most of the farmers have experience of 11–20 years at

33.2%, 44.2%, and 31.6% for certified, transitional and non-certified farmers respectively. The result for land ownership shows that most of the farmers own their farming plot at 72.2% by the certified farmers, 62.8% transitional, and 63.3% by the non-certified group. The size of farmland in hectares varies among the category of the participants of the survey. Most certified farmers at 50% own 3 hectares of land, and the same for transitional at 28%. The non-certified at 38.8% own between 2 hectares of land.

Vegetables are mostly grown by all three categories of the respondents at 50%, 44.2%, and 47%. The annual farm returns indicated that R21,000 to R30,000 is most earned by the participants of the survey at 44.4% for certified farmers, 30.2% for transitional, and 26.6% for non-certified farmers. Further, there was statistical significance at 0.05 for educational level, land ownership, farm size, and type of farm produce. There was no statistical significance for marital status, farming experience, and annual income earned by the farmers.

Table 1. Socio-economic and demographic status of the respondents.

Characteristics	Responses (Frequency and Percentage)			p-Value
	Certified (36)	Transitional (86)	Non-Certified (98)	
Gender				<0.001 _a *
Male	28 (77.8)	64 (74.4)	78 (79.6)	
Female	08 (22.2)	22 (25.6)	20 (20.4)	
Age				0.042 _b *
21–30	1 (2.8)	4 (4.7)	10 (10.2)	
31–40	4 (11.1)	22 (25.7)	28 (28.6)	
41–50	25 (69.4)	46 (53.4)	47 (48)	
51 and above	6 (16.7)	14 (16.2)	13 (13.2)	
Marital status				0.252 _a
Single	4 (11.1)	12 (14)	9 (9.2)	
Married	25 (69.4)	51 (59.3)	59 (60.2)	
Divorced	4 (11.1)	11 (12.7)	7 (7.2)	
Widow/Widower	3 (8.4)	12 (14)	23 (23.4)	
Educational level				0.004 _b *
No formal education	0 (0)	0 (0)	18 (18.4)	
Primary	2 (5.6)	14 (16.2)	42 (42.8)	
Secondary	21 (58.3)	46 (53.4)	30 (30.6)	
Basic degree	7 (19.4)	16 (18.7)	5 (5.1)	
Postgraduate	6 (16.7)	10 (11.7)	3 (3.1)	
Farming experience				0.233 _b
Less than 5 year	2 (5.6)	8 (9.4)	16 (16.3)	
6 to 10 years	6 (16.7)	14 (16.2)	26 (26.6)	
11 to 20 years	12 (33.2)	38 (44.2)	31 (31.6)	
21 to 30 years	10 (27.8)	12 (14)	15 (15.3)	
31 and above	6 (16.7)	14 (16.2)	10 (10.2)	
Land ownership				0.028 _b *
Own land	26 (72.2)	54 (62.8)	62 (63.3)	
Rented	6 (16.7)	18 (21)	12 (12.2)	
Own and rented	4 (11.1)	14 (16.2)	24 (24.5)	
Farm size (Hectare)				<0.001 _a *
≤1	0 (0)	6 (6.9)	18 (18.4)	
2	2 (5.6)	36 (41.7)	38 (38.8)	
3	18 (50)	24 (28)	24 (24.5)	
4	14 (38.8)	12 (14)	10 (10.2)	
5 and above	2 (5.6)	8 (9.4)	8 (8.1)	

Table 1. Cont.

Characteristics	Responses (Frequency and Percentage)			p-Value
	Certified (36)	Transitional (86)	Non-Certified (98)	
Type of produce				0.003 ^a *
Fruits	10 (27.8)	22 (25.6)	28 (28.5)	
Vegetables	18 (50)	38 (44.2)	46 (47)	
Both	8 (22.2)	26 (30.2)	24 (24.5)	
Annual farm income [#]				0.582 ^b
Less than R10,000	2 (5.6)	3 (3.4)	8 (8.1)	
R10,000 to R20,000	4 (11.1)	18 (21)	22 (22.4)	
R21,000 to R30,000	16 (44.4)	26 (30.2)	26 (26.6)	
R31,000 to R40,000	8 (22.2)	12 (14)	20 (20.4)	
R41,000 to R50,000	4 (11.1)	12 (14)	12 (12.2)	
R51,000 and above	2 (5.6)	15 (17.4)	10 (10.2)	

[#] 1USD equals R15.2 at the time of the study. ^a Independent *t* test, ^b Chi-square test, * statistically significant <0.05.

4.2. Marketing Channels for Farm Produce

Presented in Figure 1 is the marketing channel used by the farmers. Wholesaling and retailing being used by 64 of the surveyed farmers, and other means in the following order: wholesale 42, wholesale and farmers market 32, retailing and farmers market 28, retailing 22, farmers market 18 and other means at 14 being used by the farmers.

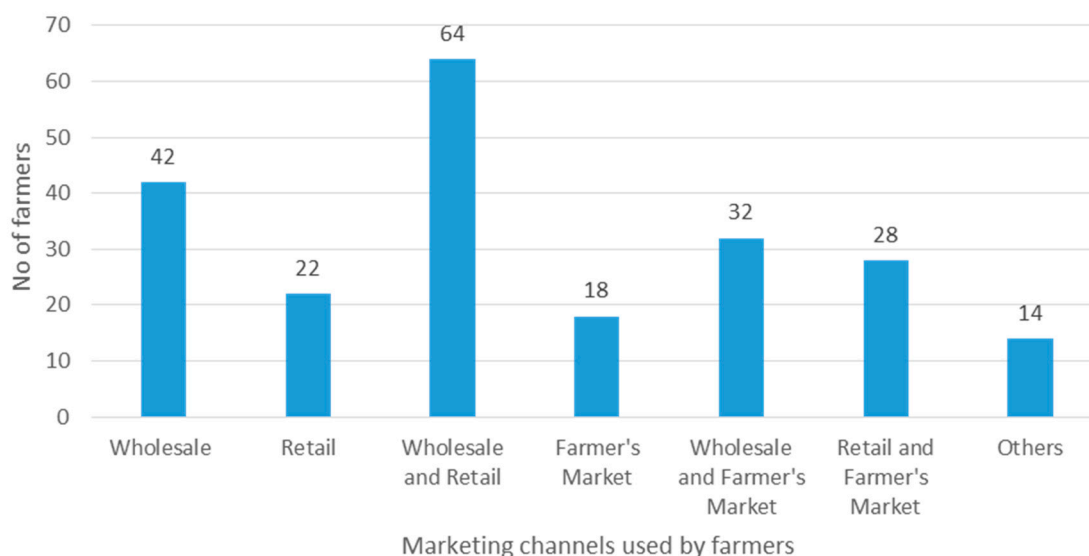


Figure 1. Farm produce marketing channels.

4.3. Perceptual Statement Regarding Organic Farming

The responses of the farmers using a three-rating scale Likert-type questions are presented in Table 2. The data shows that 82.4% of the farmers agreed that organic farming is environmentally friendly. The majority of the farmers at 92.6% believed that organic produce provides health benefits to the consumers. However, within the responses, 20% of the farmers believed that organic farming returns lower yields, even as 88.4% consider that the required standards in organic farming make it too restrictive to be practical. When practised, 86.6% agreed that organic farming produce has high profits returns even though 74.6% also agreed that certification is difficult to obtain.

Table 2. Distribution of perceptual statement of organic farming.

Perceptual Statement	Responses (%)		
	Agree	Disagree	Neutral
Organic farming is environmentally-friendly	82.4	10	7.6
It cannot control pests, diseases and weeds	83.8	5.6	10.6
It is more profitable than conventional farming systems	74	11.2	14.8
Organic produce has high profits returns	86.6	10.2	3.2
It is gaining popularity among local farmers	82.8	15	2.2
Required standards make it too restrictive to be practical	88.4	8.2	3.4
It is a thrilling new challenge to switch to organic farming	50.8	38.6	10.6
It provides the chance to make good use of farming skills	60.4	37.1	2.5
It requires high production costs	78.4	20.3	1.3
The method is labour intensive	56.8	33.2	10
There is high market competition for organic produce	72	22	6
Organic farming returns lower yields	20	60	20
Certification is difficult to obtain	74.6	15.2	10.2
Organic farming Cooperatives, technical support, and policies	60.5	28.5	11
It can mitigate climate change impacts	84.6	12.2	3.2
Organic produce provide health benefits to the consumers	92.6	5	2.4

4.4. Farmers' Perceptions towards Organic Farming

From the elicited data from the respondents and to gain an insight about the perceptions of farmers regarding organic farming, the statistically analysed results as presented in Table 3 indicated that there are no wide deviation in perception regarding the perceived benefits of organic farming at 0.721, 0.332 and 0.651 for certified, transitional and non-certified farmers respectively. The result however shows a statistical significance ($p \leq 0.001$) for the perceived benefits and organic farming. Results for other variables indicates also proximity in deviation for access to market, better farming option, improved farm image, high input costs, and cost of certification. A gap was observed in the transitional group for capital retention and economic benefits. The statistical test however indicated a significance level at 0.05 for access to market, high input cost, cost of certification and capital retention, and economic benefits. While no statistical significance was obtained for better farming options and improved farm image.

Table 3. Descriptive statistics of farmers' perceptions towards organic farming.

Variables	Producers	Mean	Standard Deviation	Standard Error Mean	X ²	p-Value
Perceived benefits						<0.001 _b *
	Certified	1.46	0.721	0.352	18.4	
	Transitional	1.94	0.432	0.022	2	
	Non-certified	1.22	0.651	0.145	4	
Access to markets						0.042 _a *
	Certified	1.53	0.663	0.211	22.4	
	Transitional	1.92	0.482	0.171	3	
	Non-certified	1.33	0.398	0.120	1	
Better farming option						0.072 _a
	Certified	1.29	0.648	0.241	22	
	Transitional	1.47	0.532	0.276	6	
	Non-certified	1.32	0.982	0.189	6	
Improved farm image						0.942 _b
	Certified	1.78	0.498	0.025	12	
	Transitional	1.52	0.673	0.199	1	
	Non-certified	1.21	0.745	0.251	4	

Table 3. Cont.

Variables	Producers	Mean	Standard Deviation	Standard Error Mean	X ²	p-Value
High input costs						0.021 _b *
	Certified	1.82	0.341	0.126	14	
	Transitional	1.43	0.428	0.173	4	
	Non-certified	1.62	0.584	0.277	2	
Cost of certification						<0.001 _b *
	Certified	1.37	0.554	0.019	21	
	Transitional	1.43	0.613	0.211	3	
	Non-certified	1.27	0.429	0.118	1	
Capital retention/ economic benefits						
	Certified	1.24	0.342	0.132	16	<0.001 _a *
	Transitional	1.44	0.081	0.182	4	
	Non-certified	1.18	0.627	0.662	3	

_a Independent *t* test, _b Chi-square test, * statistically significant < 0.05.

4.5. ANOVA Test for Differences in Farmers' Perceptions of Organic Farming

In evaluating the significance of differences of the variables used in determining farmers' perceptions regarding organic farming, a one-way ANOVA was performed to examine if the perceptual variables of the respondents could influence their perceptions of organic farming. The results as presented in Table 4 revealed that between and within groups, there was no statistical significance (0.05), for perceived benefits, access to markets, improved farm image, production costs, and capital rendition regarding organic farming. A statistical significance (0.05) was however associated with organic farming as a better farming option and cost of organic certification.

Table 4. ANOVA results on perceptual variables of organic farming in the study.

Variables	Count	Sum of Squares	Degree of Freedom	Mean Square	F-Ratio	p-Value
Perceived benefits of organic farming to conventional farming	Between Groups Within Groups	63.551 135.661	7 102	1.3321 1.6287	1.221	0.631
Access to markets for organic produce	Between Groups Within Groups	56.774 144.673	8 117	1.4538 1.2901	0.539	0.348
Organic farming as a better farming option	Between Groups Within Groups	82.445 147.871	6 98	1.0981 0.7753	0.922	0.006
Perceived improved farm image from organic farming	Between Groups Within Groups	74.228 184.661	10 132	1.6422 1.1876	0.615	0.737
Production costs associated with organic farming	Between Groups Within Groups	66.227 142.665	8 108	1.4892 1.1923	0.554	0.216
Cost of organic farming certification	Between Groups Within Groups	62.447 132.361	6 100.431	0.8824 0.3349	0.264	0.003
Capital retention/economic benefits of organic farming	Between Groups Within Groups	48.2 116.472	4 72.336	0.7342 0.3445	0.228	0.482

4.6. Survey of Perceived Benefits of Organic Farming by Farmers

The perceived benefits of organic farming differ among the farmers. The result as tabulated and presented in Table 5 shows that there is a statistical significance at 0.05 for premium prices for organic produce, social justice, international market (export), and climate change mitigation while no statistical significance was observed for organic and conventional markets for organic produce and domestic market (local).

Table 5. Descriptive statistics of perceived benefits of organic farming by farmers.

Benefits	Mean	Standard Deviation	Standard Error Mean	χ^2	<i>p</i> -Value
Premium prices	0.86	0.521	0.024	12.62	0.022
Organic and conventional markets	1.42	0.628	0.064	36.4	0.064
Social justice	1.68	0.332	0.051	28.6	0.044
International market (export)	1.32	0.155	0.032	12.2	0.028
Domestic market (local)	1.28	0.082	0.039	8.63	0.642
Climate change mitigation	1.46	0.122	0.024	12.84	0.034

4.7. Perceptual Attributes of Organic Farming

The attributes of organic farming are presented in Table 6. The result indicated that the respondents consider quality, environmental friendliness, chemical-free, and freshness as the utmost attributes. This is followed by health and nutritional benefits, available market/consumers demand, taste, and price/cost as the pushing attributes for organic produce.

Table 6. Perceptions of organic produce by farmers (Certified, Transitional and Non-certified).

Attributes	Responses		
	High	Medium	Low
Taste	188	28	4
Quality	208	10	2
Price/Cost	178	32	10
Health and nutritional benefits	192	20	8
Chemical-free	200	14	6
Environmental friendliness	206	10	4
Freshness	200	12	8
Available market/Consumers' demand	190	26	4

5. Discussion

The age of a farmer is one proxy factor used by scholars in determining interest and experience in farming. The majority of the farmers in the study fall within the age group of 41 to 50 years, which indicates a middle and active age group of the farmers. This age group can also be considered to be open-minded, innovative, and have more opportunities to access and adopt the technology of organic farming as a lucrative venture. This result corresponds with a study in India that found a similar age group in their study [48]. The educational level of the respondents was low with the majority attaining secondary school. This concurs with similar studies conducted in Nepal, Vietnam, and Syria [49–51]. The educational level of a farmer is positively associated with the adoption of organic farming because education provides key information, awareness, and a favourable attitude for the acceptance of new agricultural practices [52].

Marital status from the study indicated no statistical significance in line with the study reported by Azam & Banumathi [53], and Adesope et al. [54], but this does not truly signify that married couples cannot engage or succeed in organic farming. Years of experience in farming is a vital concern in the shift to organic farming. With most of the respondents having between 21 to 30 years of farming experience, this could pave a way for the push and more acceptance of organic farming in the province. A farmer's experience can swing the adoption of organic farming as a more experienced farmer can cope better with organic farming compared with farmers with lesser years of farming experience [54,55].

There is a high percentage of land ownership from the study result which can influence the adoption of organic farming in the province. Landholding is an important factor in farming. Land tenure is a very sensitive issue being debated in present-day South Africa. The government is pursuing a land redistribution programme that will promote and ensure equity in land ownership. The issue of land is very fundamental as land ownership is

considered a foremost hindrance to agricultural development [56]. The study indicated that the average farm size is between 2–3 hectares of land as farm size is proportional to land ownership. There is a positive correlation between converting to organic farming and farm size. A study in India indicated that large farm holding can result in a shift to organic farming [57]. More so, the fragmentation of land in the country particularly in the rural settlement has limited the expansion of large-scale farming systems and which could inhibit organic farming [58].

The cultivation of fruits and vegetables are the most common farming enterprise among the certified, transitional, and non-certified farmers in the province. The cultivation of organic produce will be a profitable venture in the province and beyond. It will certainly create room for more income generation through international export and domestic consumption as most consumers are now verging for organic produce. There is a steady and increase in demand for organic produce due to their health and nutritional benefits as well as other factors which include the produce being chemical-free [59]. Income earned by farmers from their products is a critical factor that may persuade farmers in adopting organic farming methods. The result of this study indicated no statistical significance on annual farm income. In literature, some scholars have mentioned a positive association between income and organic farming [60,61], while other studies indicated that income and profit are not favourable factors for farmers to engage in regarding organic farming [62,63].

Most of the farmers believed that organic farming methods cannot control weeds, diseases, and pests as organic pesticides are not readily available. This can however be overcome by the combination of indigenous, cultural practices and skills by growing varieties of crops. The management of pests and insects can be managed in biodiversity alteration through agronomic practices [64]. High production costs have been reported as a setback in the adventuring of organic farming. These can be adverted through the assistance of technical and production supports to the farmer. The bureaucratic processes in organic farming certification make it cumbersome for some farmers to handle. The cost of certification, the requirements, and cost to benefit ratio significantly affect farmers' perceptions [65]. The perceived benefits of organic farming differ among the farmers. Some ascribed to the internal benefits such as improved farm image and income through the premium prices attached to organic produce. While for other farmers, the external benefits of market access and social justice are their priority [66,67].

Access to market and a strong network for marketing channels have a strong influence on adopting organic farming [68]. The perception of premium prices reflects the quality of the product and the marketing channel for trading the produce which influences smallholder farmers' choice to adopt organic farming [69]. One factor affecting the perceptions of organic farmers is the perceived premium price for organic produce. This is not uncommon because most organic produce from South Africa is destined for exportation and high-value markets. A study by Harris et al. [70], indicated that percentage prices for organic produce are calculated higher than those from conventional produce. Thus, without such opportunity for smallholder farmers, it will be challenging to convince them about organic farming.

6. Conclusions and Policy Implications

Organic farming can play a significant and beneficial role for smallholder farmers once the critical factors are addressed. With the outlook of this study, organic farming offers good potential and opportunities for food security, income, health, and environmental benefits in Limpopo Province and South Africa. This thus accepts the stated hypothesis that farmers' willingness to partake in organic farming is based on their perceptions, socio-economic, and other institutional factors. However, the identified challenging factors need to be addressed to pave the way for a better-oriented organic sector. Further, the study highlighted the policy options and recommendations that can greatly influence the adoption and success of the sector.

The results from the study suggest that farmers in Limpopo Province are disposed to favourable perceptions towards organic farming and perhaps willing to convert to organic practices and methods. This is likely a good pre-condition for the development of organic farming in the province and possibly the country at large. Regrettably, the conversion to organic farming is still faced with some critical factors that need to be addressed through the development of practical and implementation policies. There is a need for adequate information and knowledge regarding organic farming in the province. One of the obstacles to organic farming is the lack of information.

There is a dearth of information about organic farming production methodologies as well as market and technical information. The introduction of organic farming is inhibited by the absence of knowledge about the concept of organic farming and the management of sustainable organic production schemes. These could be overcome through education and training instruments, as organic production involves high-level skills and efficient training programmes. To shape the future of organic farming in the province, the education of the farmers will play a big role. It is recommended that government and non-governmental organisations as stakeholders can organise an educational approach such as the Farmers Field Schools, a group-based approach as advocated by the Food and Agricultural Organisation as a form of adult education in agriculture.

To broaden this, awareness programmes concerning the benefits and principles of organic farming should be continuously highlighted to widen the information available. This could be achieved through print and social media. Organic markets are perceived as niche because certified organic produce fetches premium prices but this lucrative market is not easy to access because of the required standards. Although in South Africa at large, the market is robust but undeveloped because there are limited premiums for organic produce in the local markets. For the product to move in the greater value chain of the market, it is necessary that, in standards, there is no differentiation between export and local organic produce. The marketing channels are essential for long-term growth and can further be expanded whereby the products are easily accessible in supermarkets and specialised stores, even though a reasonable amount of the organic produce is sold to the public by local retailers.

A few certified organic smallholder farmers in the province through their cooperative receive some technical supports to implement the changes needed to convert to organic farming. This is however not enough to persuade other farmers. Technical supports such as best techniques and financial resources and incentive schemes should be made available to emerging farmers. The supports could be in the form of improved seedlings, bio-pesticides, organic fertiliser among others. More so, the fragmented organic sector in the country needs effective leadership that will champion the cause of the sector. A well-resourced credible organisation that is capable to advocate and represent the sector in a wide range of issues is lacking. Presently, structures within the sector advocate for their benefits and responsibilities.

It is recommended that as a sector, there is the need for an organisation that will promote harmony and unity among the stakeholders, facilitate and provide support over the establishment of a strong, credible, and unified body that will represent its interest and develop a regulatory framework to guide its principles. The body can also develop a consultative forum between the organic sector and government departments. The organisation can also help in easing the certification processes and inspections of smallholder organic farmers. The role of the organisation can also extend to ensuring the enforcement of labelling of the product such as “no-spray”. It can also extend to ensuring traceability and record-keeping of the production system as this will guarantee the quality, safety, terroir, origin of provenance, and local content as a way of campaigns and improving the marketing channels for smallholder farmers. Reform policy on land consolidation is recommended as this can push smallholder organic farmers into large-scale farmers.

Importantly, organic farming is a knowledge-intensive sector that depends on a great deal of development through research and technology. Some aspects of organic farming are

still major sources of disagreement and contentions which could be laid to rest by putting more emphasis and resource through research development. Holistically, research that deals with organic production systems are needed. The research could be from a short, medium to long term agenda that can sufficiently address the production techniques and practices, soil health and fertility management, pest and disease management, processing techniques, development of appropriate and effective production inputs, nutrition analysis in both macro and micronutrients, life-cycle analysis of all production methods and the integration of indigenous knowledge systems. The study was able to determine the best strategy for the development of organic farming and filled the gap in previous studies by identifying the critical factors affecting organic farming in the country using the Limpopo Province as a case study. South Africa as a country is suffering from a decrease in organic farming, the results however postulate a positive outlook for the Limpopo Province. Also, the article proposed a policy recommendation for decision-makers and the relevant stakeholders that will help upsurge organic farming in the province.

On the study limitations and future research directions, the propositions of this study are the foundational recap of the perceptions of organic farming in South Africa, using the Limpopo Province as a case study. The results, however, cannot be generalised for the entire country as only a province was used in the study because some provinces have shown different levels of commitment in advancing organic farming through their various agricultural departments. The study results, nonetheless, reveal the insightful nature of organic farming in the country. For instance, the issue of land expropriation is synonymous all over the country. To draw a generalised inference, larger sample size may be required in a descriptive study of this nature. Again, the study relied on a systematic sampling procedure which may not denote the perceptions of all the farmers in the province. Depended upon by the study were semi-structured self-administered questionnaires which may recall bias answers from the respondents due to social desirability as some may exaggerate their knowledge and perceptions. Another limitation was due to the COVID-19 pandemic which slowed the entire research. Although, this may also be a pointer for future research as most South Africans have been looking for ways to improve their health, and thus organic food may be one of the better options to do so. Future research could steam from using a larger sample and multi-group to test the stated hypotheses using other areas and methods.

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References

- Davis, K.F.; Gephardt, J.A.; Emeryb, K.A.; Leachc, A.M.; Gallowaya, J.N.; D'Odoricoa, P. Meeting future food demand with current agricultural resources. *Glob. Environ. Chang.* **2016**, *39*, 125–132. [\[CrossRef\]](#)
- United Nations Report, 2019. *World Population Prospects*; United Nations: New York, NY, USA, 2019.
- Bayramov, A. Review: Dubious nexus between natural resources and conflict. *J. Eurasian Stud.* **2018**, *9*, 72–81. [\[CrossRef\]](#)
- Tsvetkov, I.; Atanasov, A.; Vlahova, M.; Carlier, L.; Christov, N.; Lefort, F.; Rusanov, K.; Badjakov, L.; Dincheva, I.; Tchamitchian, M.; et al. Plant organic farming research- current status and opportunities for future development. *Biotechnol. Biotechnol. Equip.* **2018**, *32*, 241–260. [\[CrossRef\]](#)
- Udeigwe, T.K.; Teboh, J.M.; Eze, P.N.; Stietiya, M.H.; Kumar, V.; Hendrix, J.; Mascagni, H.J., Jr.; Ying, T.; Kandakji, T. Implications of leading crop production practices on environmental quality and human health. *J. Environ. Manag.* **2015**, *151*, 267–279. [\[CrossRef\]](#) [\[PubMed\]](#)
- Aghasafari, H.; Karbasi, A.; Mohammadi, H.; Calisti, R. Determination of best strategies for development of organic farming: A SWOT—Fuzzy Analytic Network Process Approach. *J. Clean. Prod.* **2020**, *277*, 124039. [\[CrossRef\]](#)
- Nandwani, D.; Jamarkattle, D.; Dahal, K.R.; Poudel, R. Attitudes of fruit and vegetable farmers towards organic farming in Kathmandu Valley, Nepal. *Sustainability* **2021**, *13*, 3888. [\[CrossRef\]](#)
- Popa, M.E.; Mitelut, A.C.; Popa, E.E.; Stan, A.; Popa, V.I. Organic foods contribution to nutritional quality and value. *Trends Food Sci. Technol.* **2019**, *84*, 15–18. [\[CrossRef\]](#)
- Willer, H.; Lernoud, J. *The World of Organic Agriculture: Statistics and Emerging Trends 2019*; Routledge: London UK, 2020.
- Jarczok-Guzy, M. Obstacles to the development of the organic food market in Poland and the possible directions of growth. *Food Sci. Nutr.* **2018**, *6*, 1462–1472. [\[CrossRef\]](#)
- Bondar, V. Organic grain production market of Ukraine: Prospects and trends. *Balt. J. Econ. Stud.* **2016**, *2*, 17–22. [\[CrossRef\]](#)
- Paul, J.; Sierra, J.; Causeret, F.; Guinde, L.; Blazy, J.M. Factors affecting the adoption of compost use by farmers in small tropical Caribbean Island. *J. Clean. Prod.* **2017**, *124*, 1387–1396. [\[CrossRef\]](#)
- Kassie, M.; Zikhali, P.; Manjur, K.; Edwards, S. Adoption of sustainable agriculture practices: Evidence from a semi arid region of Ethiopia. *Nat. Resour. Forum* **2009**, *33*, 189–198. [\[CrossRef\]](#)
- Supaporn, P.; Kobayashi, T.; Supawadee, C. Factors affecting farmers' decisions on utilization of rice straw compost in Northeastern Thailand. *J. Agric. Rural Agric. Dev. Trop.* **2013**, *114*, 21–27.
- Long, T.B.; Blok, V.; Coninx, I. Barriers to the adoption and diffusion of technological innovations for climate-smart agriculture in Europe: Evidence from The Netherlands, France, Switzerland and Italy. *J. Clean. Prod.* **2016**, *112*, 9–21. [\[CrossRef\]](#)
- Sotamenou, J.; Parrot, L. Sustainable urban agriculture and the adoption of composts in Cameroon. *Int. J. Agric. Sustain.* **2013**, *11*, 282–295. [\[CrossRef\]](#)
- Blazy, J.M.; Barlagne, C.; Sierra, J. Environmental and economic impacts of agri-environmental schemes designed in French West Indies to enhance soil sequestration and reduce pollution risks. A modelling approach. *Agric. Sys.* **2015**, *140*, 11–18. [\[CrossRef\]](#)
- Ferreira, S.; Oliveira, F.; Gomes da Silva, F.; Teixeira, M.; Gonçalves, M.; Eugénio, R.; Damásio, H.; Gonçalves, J.M. Assessment of factors constraining organic farming expansion in lis valley, Portugal. *AgriEngineering* **2020**, *2*, 111–127. [\[CrossRef\]](#)
- Qiao, Y.; Martin, F.; He, X.; Zhen, H.; Pan, X. The changing role of local government in organic agriculture development in Wanzai County, China. *Can. J. Dev. Stud.* **2019**, *40*, 64–77. [\[CrossRef\]](#)
- Adams-Inkoom, S. Encouraging Organic Agriculture: The Effects of Conversion Subsidies. Master's Thesis, South Dakota State University, Brookings, SD, USA, 2017.
- Brzezina, N.; Biely, K.; Helfgott, A.; Kopainsky, B.; Vervoort, J.; Mathijs, E. Development of organic farming in Europe at the crossroads: Looking for the way forward through system Archetypes lenses. *Sustainability* **2017**, *9*, 821. [\[CrossRef\]](#)
- Aceleanu, M.I. Sustainability and competitiveness of Romanian farms through organic agriculture. *Sustainability* **2016**, *8*, 245. [\[CrossRef\]](#)
- Adebisi, J.A. Organic Agriculture Development Strategies in Tunisia and Uganda: Lessons for African Organics. Master's Thesis, Iowa State University, Ames, IA, USA, 2014.
- KhezriNejhad, G.M.; Bakhshoudeh, M. A study of switching from conventional agriculture to organic agriculture in Iran: SWOT-ANP application. *J. Middle East Appl. Sci. Technol.* **2014**, *17*, 481–491.
- Schoonbeek, S.; Azadi, H.; Mahmoudi, H.; Derudder, B.; De Maeyer, P.; Witlox, F. Organic agriculture and undernourishment in developing countries: Main potentials and challenges. *Crit. Rev. Food Sci. Nutr.* **2013**, *53*, 917–928. [\[CrossRef\]](#)
- Thamaga-Chitja, J.; Hendriks, S.L. Emerging issues in smallholder organic production and marketing in South Africa. *Dev. S. Afr.* **2008**, *25*, 317–326. [\[CrossRef\]](#)
- Pender, J.; Gebremedhin, B. Determinants of agricultural land management practices and impacts on crop production and household income in the highlands of Tigray. Ethiopia. *J. Afr. Econ.* **2007**, *17*, 395–450. [\[CrossRef\]](#)
- Mensah-Bonsu, A.; Sarpong, D.; Al-Hassan, R.; Asuming-Brempong, S.; Egyir, I.; Kuwornu, J.; Osei-Asare, Y. Intensity of and factors affecting land and water management practices among smallholder maize farmers in Ghana. *Afr. J. Agric. Res. Eco.* **2017**, *12*, 142–157.
- Raufu, M.; Adetunji, M. Determinant of land management practices among crop farmers in southwestern Nigeria. *GJSFR* **2012**, *12*, 2249–4626.

30. Teklewold, H.; Kassie, M.; Shiferaw, B. Adoption of multiple sustainable agricultural practices in rural Ethiopia. *J. Agric. Econ.* **2013**, *64*, 597–623. [CrossRef]
31. Glatzel, K. No Ordinary Matter: Conserving, Restoring and Enhancing Africa's Soils. A Montpellier Panel Report. 2014. Available online: <https://www.mamopanel.org/resources/reports-and-briefings/no-ordinary-matter-conserving-restoring-and-enhanc/> (accessed on 21 August 2021).
32. Babalola, D.A.; Olayemi, J.K. Determinants of farmers' preference for sustainable land management practices for maize and cassava production in Ogun State, Nigeria. *J. Rural Stud.* **2014**, *2*, 233–247. [CrossRef]
33. Department of Agriculture, Fishery and Forestry (DAFF). *National Policy on Organic Production*; Confidential Discussion Paper (8th draft); Department of Agriculture, Fishery and Forestry (DAFF): Pretoria, South Africa, 2010.
34. Trading Economics. South Africa Arable Land. 2021. Available online: <https://tradingeconomics.com/south-africa/arable-land-percent-of-land-area-wb-data.html> (accessed on 21 July 2021).
35. AgricOrbit. A Look at Sustainable Farming Trends in South Africa. 2020. Available online: <https://www.agriorbit.com/a-closer-look-at-sustainable-farming-trends-in-south-africa/> (accessed on 21 July 2021).
36. Van Zyl, H. *Economic Opportunities in South Africa Organic Farming*; Department of Environmental Affairs and Tourism: Pretoria, South Africa, 2000.
37. Parrot, N.; Van Elzakker, B.; Eco, A. Organic and Like-Minded Movements in Africa. International Federation of Organic Agriculture Movement (IFOAM). 2003. Available online: https://www.ifoam.org/igo/africa_survey.pdf (accessed on 20 July 2021).
38. Institute for Natural Resources (INR). A Study to Develop a Value Chain Strategy for Sustainable Development and Growth of Organic Farming in South Africa: Institute of Natural resources. 2008. Available online: <https://www.inr.org.za/study-to-develop-a-value-chain-strategy-for-the-growth-and-development-of-organic-agriculture-in-south-africa/> (accessed on 14 August 2021).
39. Huber, B.; Schmid, O.; Kilcher, L. Standards and Regulations. In *The World of Organic Agriculture: Statistics and Emerging Trends 2008*; Earthscan: London UK, 2009.
40. Ponte, S. Standards and Sustainability in the Coffee Sector. International Institute for Sustainable Development. 2004. Available online: <https://www.iisd.org> (accessed on 10 August 2021).
41. Fonseca, M.F. Alternative certification and a network conformity assessment approach. IFOAM, Bonn, Germany, 2009. Available online: <http://www.ifoam.org/sites/default/pages/files/alternativecertificateandnetworkconformityassessmentapproach.pdf> (accessed on 22 July 2021).
42. Statistics South Africa (StatsSA). *Census 2001: Census in Brief*; Statistics South Africa: Pretoria, South Africa, 2003.
43. South Africa Channel (SAC). Available online: <https://www.southafrica.com/limpopo/climate/2010> (accessed on 26 June 2021).
44. Statistic South Africa (StatsSA). *Census of Commercial Agriculture 2017 Report*; Statistics South Africa: Pretoria, South Africa, 2018.
45. Yamane, T. *Statistics: An Introductory Analysis*, 2nd ed.; Harper and Row: New York, NY, USA, 1967.
46. Bernard, H.R. *Research Methods in Anthropology: Qualitative and Quantitative Approaches*; Rowman & Littlefield: Lanham, MD, USA, 2017.
47. Cohen, L.; Manion, L.; Morrison, K. *Research Methods in Education*; Routledge: London, UK, 2007.
48. Singh, S.; George, R. Organic farming: Awareness and beliefs of farmers in Uttarakhand, India. *J. Hum. Ecol.* **2012**, *37*, 139–149. [CrossRef]
49. Bhatta, G.D.; Doppler, W. Smallholder peri-urban organic farming in Nepal: A comparative analysis of farming systems. *J. Agric. Food Syst. Community Dev.* **2011**, *1*, 163–180. [CrossRef]
50. Issa, I.; Hamm, U. Adoption of organic farming as an opportunity for Syrian farmers of fresh fruit and vegetables: An application of the Theory of Planned Behaviour and Structural Equation Modelling. *Sustainability* **2017**, *9*, 2024. [CrossRef]
51. Rai, M.K.; Paudel, B.; Zhang, Y.; Khanal, N.R.; Nepal, P.; Koirala, H.L. Vegetable farming and farmers' livelihood: Insights from Kathmandu Valley, Nepal. *Sustainability* **2019**, *11*, 889. [CrossRef]
52. Caswell, M.; Fuglie, K.O.; Ingram, C.; Jans, S.; Kascak, C. *Adoption of Agricultural Production Practices: Lessons Learned from the US Department of Agriculture Area Studies Project*; United States Department of Agriculture, Economic Research Service: Washington, DC, USA, 2001.
53. Azam, M.; Banumathi, M. The role of demographic factors in adopting organic farming: A logistic model approach. *Int. J. Adv. Res.* **2015**, *3*, 713–720.
54. Adesope, O.; Matthews-Njoku, E.C.; Nkasiobi, O.; Ugwuja, V.C. Effect of socio-economic characteristics of farmers on their adoption of organic farming practices. In *Crop Production Technologies*; IntechOpen: London, UK, 2012; pp. 211–220. [CrossRef]
55. Liu, X.; Pattanaik, N.; Nelson, M.; Ibrahim, M. The choice to go organic: Evidence from small US farms. *Agric. Sci.* **2019**, *10*, 1566–1580. [CrossRef]
56. Ortman, G.; Machete, C. Problems and opportunities in South African Farming. In *The Challenges of Change. Farming, land, and the South African Economy*; Nieuwoudt, L., Groenewald, J., Eds.; University of Natal Press: Pietermaritzburg, South Africa, 2003.
57. Ghosh, M.K.; Soheli, M.H.; Ara, N.; Zahara, F.T.; Bin Nur, S.; Hasan, M. Farmers attitude towards organic farming: A case study in Chapainawabganj District. *Asian J. Adv. Agric. Res.* **2019**, *1*–7. [CrossRef]
58. Kemper, J.; Cowling, R.M.; Richardson, D.M.; Forsyth, G.G.; McKelly, D.H. Landscape fragmentation in South Coast Resnosterveld, South Africa, in relation to rainfall and topography. *Austral Ecol.* **2000**, *25*, 179–186. [CrossRef]

59. Nguyen, V.H.; Nguyen, T.P.L. Intention to accept organic agricultural production of Vietnamese farmers: An investigation using the Theory of Planned Behavior. *J. Asian Financ. Econ. Bus.* **2020**, *7*, 949–957. [[CrossRef](#)]
60. Khaledi, M.; Weseen, S.; Sawyer, E.; Ferguson, S.; Gray, R. Factors influencing partial and complete adoption of organic farming practices in Saskatchewan, Canada. *Can. J. Agric. Econ.* **2010**, *58*, 37–56. [[CrossRef](#)]
61. Malá, Z.; Malý, M. The determinants of adopting organic farming practices: A case study in the Czech Republic. *Agric. Econ.* **2013**, *59*, 19–28. [[CrossRef](#)]
62. Läpple, D.; van Rensburg, T. Adoption of organic farming: Are there differences between early and late adoption? *Ecol. Econ.* **2011**, *70*, 1406–1414. [[CrossRef](#)]
63. Koesling, M.; Flaten, O.; Lien, G. Factors influencing the conversion to organic farming in Norway. *Int. J. Agric. Resour. Gov. Ecol.* **2008**, *7*, 78–95. [[CrossRef](#)]
64. Singh, M.; Maharjan, K.L. Status and scope of organic farming in Nepal. In *Sustainability of Organic Farming in Nepal*; Singh, M., Maharjan, K.L., Eds.; Springer: Berlin/Heidelberg, Germany, 2017; pp. 21–36. [[CrossRef](#)]
65. Schulze, H.; Spiller, A. Farmers' acceptance of the organic certification system in Germany. A Partial Least Squares Model. *J. Int. Food Agribus. Mark.* **2010**, *22*, 7–36. [[CrossRef](#)]
66. Karipidis, P.; Athanassiadis, K.; Aggelopoulos, S.; Giompliakakis, E. Factors affecting the adoption of quality assurance systems in small food enterprise. *Food Control.* **2009**, *20*, 93–98. [[CrossRef](#)]
67. Bravo, C.P.; Spiller, A.; Vallalobos, P. Are organic growers satisfied with the certification system? A causal analysis of famers' perception in Chile. *Int. Food Agribus. Manag. Rev.* **2012**, *15*, 115–136.
68. Barrett, C.B.; Bachke, M.E.; Bellemare, M.F.; Michelson, H.C.; Narayanan, S.; Walker, T.F. Smallholder participation in contract farming: Comparative evidence from five countries. *World Dev.* **2012**, *40*, 715–730. [[CrossRef](#)]
69. Van Elzakker, B.; Tulip, A. Not Aid but Trade: Export of Organic Products from Africa. In: *The World Grows Organic*. In Proceedings of the 13th International IFOAM Conference, Basel, Switzerland, 25 August–2 September 2000; pp. 567–570.
70. Harris, P.; Browne, A.; Barret, H.; Cadoret, K. *Facilitating the Inclusion of the Resource-Poor in Organic Production and Trade: Opportunities and Constraints Posed by Certification*; UK Department for International Development, DFID: Coventry, UK, 2001.