

Youth participation in agriculture, accounting for entrepreneurial dimensions

**Authors:**Johannes I.F. Henning¹ Brent D. Jammer¹ Henry Jordaan¹ **Affiliations:**

¹Department of Agricultural Economics, Faculty of Natural and Agricultural Sciences, University of the Free State, Bloemfontein, South Africa

Corresponding author:

Johannes Henning,
henningjif@ufs.ac.za

Dates:

Received: 25 Aug. 2021

Accepted: 07 July 2022

Published: 08 Nov. 2022

How to cite this article:

Henning, J.I.F., Jammer, B.D. & Jordaan, H., 2022, 'Youth participation in agriculture, accounting for entrepreneurial dimensions', *Southern African Journal of Entrepreneurship and Small Business Management* 14(1), a461. <https://doi.org/10.4102/sajesbm.v14i1.461>

Copyright:

© 2022. The Authors.
Licensee: AOSIS. This work is licensed under the Creative Commons Attribution License.

Background: Despite the high youth unemployment levels, especially in sub-Saharan Africa, participation in the agricultural sector remains low. The agricultural sector provides valuable opportunities of employment, which could contribute towards relieving the high levels of unemployment and enhancing livelihoods of families in rural areas. Youth are also seen as the future of the agricultural sector and food production.

Aim: To determine whether entrepreneurial dimensions, along with assets within the sustainable livelihoods framework, influences participation of youth in the agricultural sector.

Setting: Focus is on youth and the influence of endogenous and exogenous factors on their participation in the agricultural sector.

Methods: Entrepreneurial dimensions of 440 youth participants were derived from statements related to entrepreneurial skills and competencies by means of principal component analysis and combined with factors from the sustainable livelihood framework in a multinomial logistic regression.

Results: It was found that the youth are heterogeneous in their endogenous and exogenous resources. Youth involved in the sector are more likely to have access to land and extension services, experience in the sector and support initiatives. In terms of entrepreneurial dimensions, youth involved are more inclined to believe in themselves and are more likely to take advantage of opportunities (pull entrepreneurship). The results show that policies and programmes should consider both endogenous and exogenous factors and combinations thereof to attract and enhance youth participation in the agricultural sector.

Conclusion: Policy and programme development should consider the heterogeneity of youth in terms of their access to resources and entrepreneurial dimensions to enhance their participation in the agricultural sector. Participation in agriculture requires more than only access to land, and other individual physical resources attention should also be given to endogenous factors of individuals and combinations of different resources.

Keywords: agriculture; food security; youth; entrepreneurship; sustainable livelihoods; sub-Saharan Africa.

Background and motivation

The agricultural sector provides a platform for improving the living standards of people in Africa, as well as around the globe, which eventually leads to economic growth (Wale, Chipfupa & Hadebe 2021). Modern agriculture is therefore playing a role towards achieving food security, especially in poverty-stricken households, as well as rendering employment opportunities in countries where unemployment is of much concern (Maconachie, Binns & Tengbe 2011; Ouko et al. 2022; Townsend et al. 2017; Wale et al. 2021). South Africa has not been spared and is experiencing a youth unemployment crisis (Metelerkamp, Drimie & Biggs 2019). Agriculture or agricultural entrepreneurship can minimise the scarcity of employment opportunities (Adeyanju, Mburu & Mignouna 2021), especially for women and youth in Southern Africa (Ama & Okurut 2013; Ouko et al. 2022; Townsend et al. 2017). Despite the advantages of getting involved or continuing in agriculture, the sector remains the last option for youth when making career choices (Gandure, Walker & Botha 2013), and youth are unwilling to participate or not interested in agricultural activities (ex. Elias et al. 2018; Ouko et al. 2022; Sumberg et al. 2017; Yeboah et al. 2017). This is rather concerning given the employment opportunities that the agricultural sector provides. Despite the reports of unwillingness or disinterest to consider the agricultural sector by

Read online:

Scan this QR code with your smart phone or mobile device to read online.

youth, Metelerkamp et al. (2019) found that some youth from three provinces are interested in participating in agriculture, which is also confirmed by Glover and Sumberg (2020), stating that evidence suggests that youth do find farming appealing. Agriculture and activities within the agricultural sector must be appealing to the youth (Adeyanju et al. 2021; Glover & Sumberg 2020), and focus should be placed on the ones who show interest in and willingness to participate in the agricultural sector. Importantly, young people have become a focus point for schemes and policies in recent years (Burchell & Coutts 2019; Glover & Sumberg 2020; Sumberg & Hunt 2019; Turolla et al. 2022), and investment in the agricultural sector is one strategy that is being employed to tackle youth unemployment (Turolla et al. 2022). Although governmental ventures are put in place to assist youth to become employed through agriculture, employment or youth entrepreneurship does not seem to make any significant contribution to enhance the livelihoods of youths (Kew et al. 2015). Yeboah et al. (2017) suggested that there is no alignment between the future which youth foresee for themselves compared with the image designed for them by policymakers. This indicates that these efforts and investments do not have the envisioned impact for youth in the agricultural sector (Magagula & Tsvakirai 2020). This ultimately leads to an increase in social problems, such as inequality and crime (Chindoga & Fatoki 2011), lack of skills, low self-esteem, marginalisation, poverty and squandering of human resources (Obayelu, Adepoju & Omirin 2019). According to Corrigan (2009), one of the most challenging socio-economic challenges facing South Africa is establishing viable rural livelihoods within communities; this can still be argued in the present day. Ventures of entrepreneurship in agriculture can be of utmost importance in livelihood-establishment through providing opportunities, employment and the acquiring of skills (Vogel 2017). Authorities should actively pursue the purpose of attracting youth towards entrepreneurship and involvement in agriculture, as well as equipping individuals with resources and knowledge (Tolamo 2012). This remains the case with the findings of Adeyanju et al. (2021) illustrating the need for government and other stakeholder to empower youth through agripreneurship by investing in training or educational programmes. Glover and Sumberg (2020) recommended that generalisation of youth should be avoided, and the necessary time and effort should be spent on understanding the heterogeneity of young people and their individual needs, while Yeboah et al. (2017) suggested that further reflection is required, which should provide different and more enhanced policy options.

Several opportunities exist for youth in agripreneurship; however, youth are hindered by internal and external barriers (Ouko et al. 2022). These barriers include, among others, negative perceptions towards the sector (Henning et al. 2022; Ouko et al. 2022) and a lack of access to skills and resources such as infrastructure, land, finances, networking and mentors (Kew et al. 2015; Ouko et al. 2022). The process of

establishing a business for entrepreneurs is difficult and often discourages individuals from becoming successful entrepreneurs, especially those lacking access to or ownership of resources. For gaining a better understanding of the people element of entrepreneurship, the identification of the sustainable livelihoods framework (SLF) can prove to be valuable, where psychological, human, natural, financial and physical capital have strong explanatory power for entrepreneurial spirit (Hadebe 2016).

Entrepreneurial and managerial competencies are part of the tools required to start and grow a business (Mitchelmore & Rowley 2010) while Dossou et al. (2021) further stated that literature shows that entrepreneurial orientation is key for the performance of a business. Key decisions must be made concerning business activities to achieve success and optimise opportunities as an entrepreneur. This indicates that individuals rely on personal attributes, such as decision-making abilities, to ensure long-term business growth. The ability to act on business opportunities by an entrepreneur requires certain skills and competencies possessed by an entrepreneur. South Africa faces a disconcerting scenario where a relatively lower level of opportunity-driven entrepreneurship activity abounds among unemployed youth (Steenkamp 2013). According to the 2012 Global Entrepreneurship Monitor Africa Report, South Africa had the lowest total of entrepreneurship activities among the monitored developing countries (Turton & Herrington 2013).

Youth have not bought into the government's effort, and the institutional and infrastructural investments from the government have not delivered as expected in terms of attracting youth to the sector (Magagula & Tsvakirai 2020). According to Magagula and Tsvakirai (2020), the low response could be because of preconceived ideas or the under-investigated impact of socio-economic factors, while Chipfupa and Tagwi (2021) stated that continuous negative observation or experiences by youth towards the agricultural sector will keep them away from the sector. Adequate livelihood assets often encourage involvement in agriculture, especially in the rural areas of South Africa (Wale & Chipfupa 2018). The inability of youth to exploit these opportunities and support programmes will continue to persist until entrepreneurial competencies and traits are improved among youth through entrepreneurial education programmes (Birdthistle, Costin & Hynes 2016). It is therefore important to get the youth involved in agriculture as a viable survival and livelihood strategy. To achieve this, youth livelihoods and entrepreneurial situation needs to be understood.

Youth entrepreneurial development are hindered by factors such as access to finance, lack of management, technical and marketing skills and access to infrastructure and markets (Kew et al. 2015; Ouko et al. 2022). Kew et al. (2015) further elaborated that although the obstacles faced by the youth could be relevant to all individuals, the youth are at a disadvantage compared with others because of their lack of asset accumulation, credit history and work experience. This

shows that as mentioned by Ouko et al. (2022), youth development is hindered by both exogenous and endogenous factors in their entrepreneurial development, behaviour and agricultural participation. Exogenous factors such as age (Nwibo, Mbam & Biam 2016), education (Ogunmodede, Ogunsanwo & Manyong 2020), marital status (Ogunmodede et al. 2020), gender (Ng'atigwa et al. 2020), credit (Wale et al. 2021) and land or land size (Ng'atigwa et al. 2020; Wale et al. 2021) have been found to have a negative impact on participation in the agricultural sector. On the other hand, age (Ogunmodede et al. 2020), gender (being male; Wale et al. 2021), household size (Nwibo et al. 2016), agribusiness experience (Ogunmodede et al. 2020), financial support from parents (Magagula & Tsvakirai 2020), agricultural studies (Magagula & Tsvakirai 2020) or education (Ng'atigwa et al. 2020; Nwibo et al. 2016), perceived economic benefits (Magagula & Tsvakirai 2020), access to extension services (Wale et al. 2021), cooperative membership (Wale et al. 2021), market access (Wale et al. 2021) and annual income (Nwibo et al. 2016; Wale et al. 2021) have been found to have a positive influence on participation in the agricultural sector. Little attention is given to how endogenous factors influence youth participation in the agricultural sector. This is confirmed by Iwara et al. (2021), stating that there is a normally a focus on exogenous factors and limited focus on endogenous attributes of individuals, while LaRue et al. (2021) stated that more research is required to understand the conditions under which youth would opt to enhance their livelihoods or make a decision between the livelihood options available to them.

Research by Dossou et al. (2021), Oseifuah (2010), Chindoga and Fatoki (2011) and Lebusa (2011) analysed factors such as entrepreneurial orientation dimensions, entrepreneurial education, self-efficacy and financial literacy and performance, and it was found that the improvement of these factors significantly improves the entrepreneurial competencies of an individual or firm. Wickramaratne, Kiminami and Yagi (2014) and Nieuwoudt, Henning and Jordaan (2017) investigated the influence of entrepreneurial competencies on resource management and business growth and on financial performance, respectively. Dossou et al. (2021) focused on entrepreneurial orientation of young women and agribusiness performance while Hadebe (2016) explored the relationship between sustainable livelihood assets and entrepreneurial characteristics. Magagula and Tsvakirai (2020) focused on youth perceptions of agriculture and cognitive processes on agribusiness participation and found that positive economic perception plays a role in intentions to participate in agribusiness. The perceptions of youth towards the programmes available to attract them towards the sector is also important, as confirmed by Adeyanju et al. (2021). The authors mention that youth perception towards agricultural programmes will determine their level of participation; consequently strategies are required to improve youth perception of agriculture. Wale et al. (2021) considered the enablers and inhibitors to on-farm entrepreneurship by using positive psychological capital (endogenous) as proxies for entrepreneurship. The research was, however, not focused on youth but rather smallholder

farmers with an average age of almost 50 and standard deviation of 12, indicating that very few youths were involved in this specific research. Mmbengwa, Qin and Nkobi (2021) further emphasised the limited research, explaining the importance of youth entrepreneurship in smallholder agriculture and the advantages thereof in reducing unemployment among youth. According to the authors, there remains limited research on determinants of youth entrepreneurship in the agricultural sector and its ultimate contribution towards young people's development. It is clear from the discussions and stated by Mmbengwa et al. (2021) that youth are faced with employment issues, and entrepreneurship within agriculture or food systems (value chains) could provide a valuable solution to these issues.

Iwara et al. (2021) stated that support to small enterprises in rural areas of South Africa is focused on exogenous factors and ignores endogenous attributes of individuals. From their research, it was found that endogenous factors should be combined with exogenous factors for successful entrepreneurship, and they found that the endogenous factors bridging networks, resilience, risk awareness, nonconforming and self-belief influence small business success in rural areas. Similarly, Mmbengwa et al. (2021) found that perseverance, personal motivation, creativity and a positive attitude are key to enhance youth entrepreneurial success within their study area of South Africa. Entrepreneurship is an important aspect to consider for the future of the sector, as the changing agricultural environment requires farmer to become more entrepreneurial (Sinyolo & Mudhara 2018). Individuals' endogenous factors has a similar role as exogenous factors towards enterprise success; however, endogenous factors have not been given much attention in research (Chipfupa & Tagwi 2021; Iwara et al. 2021). Endogenous factors (e.g. entrepreneurship or psychological capital) are important in successful business development and success, while access to resources has an important influence on attracting individuals towards participation or employment in the agricultural sector. However, a limited number of studies have been conducted on how endogenous factors associated with entrepreneurship, together with sustainable livelihood assets, might attract youth into agricultural involvement. The research aims to explore the influence of entrepreneurial dimensions included along with the assets of the SLF on youth participation in the agricultural sector. To achieve the aim of the research the following objectives are set: (1) explore the access to assets within the SLF, (2) determine entrepreneurial dimension of youth and (3) explore the influence of access to livelihood assets in combination with entrepreneurial dimensions on youth participation in the agricultural sector.

Data and procedures

Study area

The research was conducted in two regions within the Free State province of South Africa. The Free State province covers an area of approximately 129 825 km² with five districts, namely Xhariep, Mangaung, Lejweleputswa,

Thabo Mofutsanyana and Fezile Dabi. Municipalities SA (2016) indicated that the province has a population of 2.8 million and is ranked eighth in South Africa with regard to population size. Demographically, most of the residents in this province are black people (88.7%), followed by white people (8.9%), mixed-race people (1.8%) and Indian or Asian people (0.6%). In the province, government and previously disadvantaged individuals jointly owned approximately 7.8% of the agricultural land in 2016, as compared with the total of 26.7% of all agricultural land in South Africa. This is an increase in ownership of land from 1.6% in 1994 for the Free State province (Agri SA 2017). Given this brief background of the province, this study was conducted in two rural areas of the Free State province, namely Thaba Nchu in the Mangaung Metropolitan Municipality (MMM) and QwaQwa in the Thabo Mofutsanyana district.

The respective study areas were selected based on certain criteria with assistance from the Free State Department of Agriculture and Rural Development (FSDARD):

1. high unemployment rate among youth
2. limited research performed on youth in rain-fed farming
3. willingness of governmental extension officers to assist in the project
4. the fact that the two study areas are rain-fed farming areas.

QwaQwa, also called Basotho QwaQwa, was previously designated for the southern Sotho (often called Basuto) people. The area is in a section of the Drakensberg, being at the forefront among mountains at elevations from 1675 m to higher than 3050 m. QwaQwa borders Lesotho, as well as the province of Natal on the south-east. The area is well known for its mountainous scenery, bordering the Lesotho and Drakensburg mountains. QwaQwa forms part of the Thabo Mofutsanyana district and is administered by the Maluti-a-Phofung Local Municipality. According to Municipalities SA (2016), the majority (64.5%) of the population ranges between the ages of 15 and 64 years, with the minority of 5% being over 65 years of age. The unemployment rate for Maluti-a-Phofung is approximately 41.8%, with youth unemployment at 53%, according to Census 2011 (Maluti-a-Phofung Local Economic Development Strategy [MAPLEDS] 2015). QwaQwa receives an average annual rainfall of 900 mm, which makes the area suitable for rain-fed agriculture. The local economy is mostly based on subsistence agriculture, where maize, spinach, sorghum, potatoes, fruits and other vegetables are grown.

Thaba Nchu, located 63 km from Bloemfontein, is administered by the MMM. Thaba Nchu and the surrounding areas are former homeland areas, with the population largely made up of Tswana and Sotho people. With a land area size of 36.39 km², the rural town is surrounded by 42 villages, with arable land being utilised by residents for small-scale and domestic agriculture. The villages have a variety of economic activities, and mixed farming is practised in all villages, with livestock being the most practised agricultural activity in the area.

Annually, the area receives approximately 629 mm of rainfall. The Thaba Nchu region has been mentioned to comprise marginal land but has higher potential when used under different production systems. Viljoen et al. (2012) stated that the challenges experienced in Thaba Nchu and surrounding areas remain the same and include high rates of unemployment, urbanisation of farm workers, the exodus of skills from small and rural towns and active immigration to mines and economic centres. The farmers in the areas comprise mostly older individuals, a situation which influences the success of introducing new ideas, as it is believed that it is difficult for the older generation to adapt to the new or latest trends in farming methods (FSDARD 2018). Unemployment among the youth is also a problem in the area, at 37.2%, with the townships of Mangaung, Botshabelo and Thaba Nchu being mostly influenced (FSDARD 2018). In the Thaba Nchu greater area, especially the rural areas, it was mentioned that the observed levels of unemployment could be as high as 60% (FSDARD 2018). Most of the land in Thaba Nchu, the surrounding areas and in Maluti-a-Phofung belongs to the state. The area of Thaba Nchu includes areas of commonage, with land occupied under the Settlement Land Acquisition Grant and the Land Redistribution and Agricultural Development Programme being situated in between (Bureau for Food and Agricultural Policy [BFAP] 2013).

Sampling procedure and methods

Primary data were collected within the two rural areas of the Free State province by means of a structured questionnaire presented in key informant interviews and groups. Random sampling was used to interview individuals or groups between the ages of 18 and 36. Interviews were arranged as part of field visits, where the local extension officers from Thaba Nchu and QwaQwa would set up meetings between youth and the research team. Youth in general was targeted and not only those who are involved in the agricultural or related economic activities. All the respondents (440) took part in the interviews of their individual free will and could withdraw from participating any time during the interview or data collection session. Data were collected in the interval periods from August 2018 to February 2020. The collected data were anonymously captured (coded) in Microsoft Excel.

The entrepreneurial dimensions were determined by means of Principle Component Analysis (PCA). Respondents had to provide self-ratings of their possible behaviour for scenarios related to risk-taking, seizing opportunities, determination and problem-solving, independence, drive for achievement, innovation and creativity, locus of control and goal orientation (Wale & Chipfupa 2018). The PCA was performed using the Statistical Package for Social Sciences (IBM SPSS Statistics 27). The determination of which factor needs to be included in the components is based on an expressed eigenvalue which is greater than 1, as per the Kaiser–Guttman rule (Williams et al. 2010), which was also used in similar research (Cele & Wale 2020; Chipfupa & Wale 2018). According to Ahmad, Adnan and Adnan (2006), small eigenvalues are important regarding the indication of extreme multicollinearity, which

allows the exclusion of smaller eigenvalues in the analysis. Factor loadings equal to and greater than 0.4 were included (Cele & Wale 2020; Chipfupa & Wale 2018). On a note of caution, as explained by Cele and Wale (2020), self-rating Likert scale questions should be interpreted with a matter of caution, as there might always be a case of inflated indications by respondents, but this should not pose an issue with further regression analysis.

The four categories are based on the indication provided by the respondents on their level of involvement in the agricultural sector. It was found that the youth who are currently involved can be divided into three subgroups, those who are involved full-time in farming or related economic activities, involved in farming or related activities as part of a cooperative and lastly those involved as part of a family business. The base category for the research was chosen as those currently not engaged in farming or related economic activities, as the study wanted to explore whether there are differences between youth who are involved in the sector compared with those not involved. Given the nature of the dependent variable, multinomial logistic regression (Stata 15) was used to explore the relationship between the respondents' category of participation in agriculture, the entrepreneurial dimensions and livelihood assets. The multinomial logit regression model was used because the dependent variable consists of four categories (Rigby, Young & Burton 2001), which have no specific order or sequence. The multinomial model specification (Equation [1]):

$$Y_{ij} = \beta_0 + \sum_i^j \beta_j F_{ij} + \mu_i \quad [\text{Eqn } 1]$$

where Y_{ij} represents the dependant variable while $\sum_i^j \beta_j F_{ij}$ represents vector of variables (j) for the respondents (i) and μ_i the error term. The variables, as shown in Table 1, include factors associated with the SLF while the entrepreneurial characteristics, for the purpose of the regression analysis,

were represented by the principal components (Table 2) that were extracted. The dependent variable (Y_{ij}) was defined as:

$$Y = \begin{cases} 1 \text{ as individual fulltime farming or related economic} \\ \text{activities} \\ 2 \text{ if involved in farming or related activities as part of} \\ \text{cooperative} \\ 3 \text{ if into farming or related economic activities through} \\ \text{family business} \\ 0 \text{ if not currently engaged in farming or economic related} \\ \text{activities} \end{cases}$$

Descriptive statistics

Four main categories were used in stratified random sampling with a total sample size of 440 respondents. A total of 52% of the respondents were involved in agriculture and economically related activities; these include as an individual ($n = 55, 12.5\%$), as part of a cooperative ($n = 30, 6.8\%$) and lastly as part of a family business ($n = 144, 32.7\%$). The descriptive analysis of the variables used in the research are presented in Table 1. Chipfupa and Wale (2018) made it clear that small-scale farmers are not a homogenous group and are diverse in features and their access to resources. There were slightly more men than women who participated in the research, with an average age of 26 years of age. When the different categories of involvement are considered, more men than women indicated that they were involved in any of the categories while also being slightly older than those not involved. The experience of youth in the sector was also considered, as it could provide indications on whether any level of experience could potentially differentiate between the different participation levels. As expected, the experience

TABLE 1: Description of explanatory variables with their respective means (%) and standard deviations.

Variables	Involved as individual		Involved as part of cooperative		Involved as part of family		Not currently engaged	
	Mean (%)	Standard deviation	Mean (%)	Standard deviation	Mean (%)	Standard deviation	Mean (%)	Standard deviation
Age (years)	28.62	5.05	28.33	4.60	25.99	4.73	25.09	4.56
Gender (1 = male)	0.69	0.47	0.67	0.48	0.55	0.50	0.50	0.50
Household size (members)	4.13	2.06	4.53	1.74	4.20	2.23	4.35	1.99
Marriage (1 = single)	0.22	0.42	0.23	0.43	0.11	0.32	0.11	0.32
Agric tertiary qualification (1 = yes)	0.02	0.13	0.07	0.25	0.03	0.18	0.04	0.19
Farm experience (years)	5.18	4.69	4.00	4.74	3.70	4.84	0.65	1.75
Short-term training (1 = yes)	0.25	0.44	0.33	0.48	0.16	0.37	0.06	0.23
Beneficiary support programmes (1 = yes)	0.16	0.37	0.03	0.18	0.10	0.31	0.01	0.10
Land access (ha)	27.92	120.89	7.65	14.21	1.05	2.53	0.40	2.47
Livestock access (1 = yes)	0.51	0.50	0.30	0.47	0.50	0.50	0.15	0.35
Total household income (ZAR)	32417.27	47572.46	36323.67	77061.53	24493.50	40160.21	19031.99	24702.60
Grant buy input (1 = yes)	0.24	0.43	0.17	0.38	0.23	0.42	0.07	0.25
Savings (ZAR)	1260.91	6799.68	1252.33	3020.20	776.74	3237.42	231.75	953.88
Credit access (1 = yes)	0.05	0.23	0.10	0.31	0.08	0.28	0.05	0.22
Agricultural related cooperative (1 = yes)	0.22	0.42	0.77	0.43	0.17	0.38	0.04	0.20
Youth club or group (1 = yes)	0.11	0.31	0.23	0.43	0.15	0.35	0.04	0.20
Social media group(s) (1 = yes)	0.38	0.49	0.60	0.50	0.51	0.50	0.58	0.49
Extension contact (1 = yes)	0.56	0.50	0.60	0.50	0.40	0.49	0.17	0.37

Source: Survey data (2018–2020)

TABLE 2: Different dimensions of the youths' entrepreneurial drive.

Statements	Components								
	PC1	PC2	PC3	PC4	PC5	PC6	PC7	PC8	PC9
Continue being labour-intensive and forego the potential profits to adopt the new technology and retrench most of your workers?	0.769	-	-	-	-	-	-	-	-
Continue with the traditional methods?	0.684	-	-	-	-	-	-	-	-
Switch to modern technology?	-0.636	-	-	-	-	-	-	-	-
Work longer hours than usual, including weekends, or hire someone to get the job done?	-	0.717	-	-	-	-	-	-	-
Increase production and flood the market with your products?	-	0.622	-	-	-	-	-	-	-
Look for piecework or informal work and earn some money for yourself?	-	0.472	-	-	-	-	-	-	-
Rebrand your products, giving them a fresh and new look?	-	0.469	-	-	-	-	-	-	-
Cancel some contracts to minimise workload?	-	-0.440	-	-	-	-	-	-	-
Do business planning for your farming?	-	-	0.782	-	-	-	-	-	-
Do farming without a business plan?	-	-	-0.742	-	-	-	-	-	-
Need close assistance and mentorship from government and other stakeholders to successfully run the business?	-	-	-	-0.846	-	-	-	-	-
Successfully initiate and run the business with less assistance or mentorship?	-	-	-	0.832	-	-	-	-	-
Partner with people and utilise the opportunity while working?	-	-	-	-	0.739	-	-	-	-
Do nothing – opt out of business?	-	-	-	-	-0.565	-	-	-	-
Contract neighbour businesses to make up quantity?	-	-	-	-	-	0.702	-	-	-
Ask your family to give you money?	-	-	-	-	-	0.450	-	-	-
Continue with your job and ignore the opportunity?	-	-	-	-	-	-	-0.784	-	-
Quit the job and pursue the business opportunity?	-	-	-	-	-	-	0.683	-	-
Source finances from informal organisations like community cooperatives, stokvels and loan sharks?	-	-	-	-	-	-	-	0.731	-
Source finance from other formal organisations that offer financial support, for example, microfinance organisations?	-	-	-	-	-	-	-	0.545	-
Source out money from family and friends?	-	-	-	-	-	-	-	0.482	-
Choose an investment with 50% chance of losing everything and 50% chance that your money will be doubled?	-	-	-	-	-	-	-	-	0.763
Choose an investment with 100% guarantee that your money will generate a 15% return on investment?	-	-	-	-	-	-	-	-	-0.570
Eigenvalue	2.201	1.877	1.735	1.553	1.492	1.458	1.444	1.434	1.295
% of variance	9.171	7.820	7.228	6.470	6.215	6.073	6.018	5.976	5.396
Cumulative %	9.170	16.990	24.220	30.690	36.910	42.980	48.990	54.970	60.370

Source: Survey data (2018–2020)

Component less than 0.4 are not included. Variables shown in table relates to questions asked to a five-point Likert scale agreement.

of youth in the sector was low, at an average of two and a half years. It is further seen from the data that youth involved in the sector clearly had more experience than those who were not involved. Youth who were involved as individuals appeared to have greater access to natural and physical resources such as land and livestock. Participation in government or other programmes that are there to assist youth are illustrated by short-term training and being a beneficiary of government support programmes. Overall, there was very little participation in these, with those involved as individuals showing the highest participation in support programmes, while those involved as part of cooperatives had received more training. Wale and Chipfupa (2018) indicated that there is reliance on social grants as financial resources and lack of experience constrains in terms of other financial resources. The importance of grants in relation to agriculture in the households are illustrated by the variable 'grants to buy inputs', while the total household income for the year, savings and credit access the preceding 12 months of the interview were also considered in relation to financial resources. Generally, youth who were involved in the sector in any of the three categories indicated a better position in terms of resource access than those who were not involved.

Ethical considerations

The research project was approved by the General/Human Research Ethics Committee of the University of the Free State (reference number: UFS-HSD2018/0947/0310). Informed consent was obtained from the respondents.

Results

Dimensions of entrepreneurial characteristics

Table 2 presents the results of the PCA to extract the dimensions of entrepreneurial characteristics of the respondents. The PCA was found to be significant (Bartlett's test < 1%) and a Kaiser–Meyer–Olkin measure of sampling adequacy of 0.609, which is greater than 0.5. These indicate that the variable is correlated and that PCA could be applied to the specific data set (Cele & Wale 2020). Following the procedure, nine components were extracted with eigenvalues greater than one, explaining 60% of the variation of the variables.

Sumberg and Hunt (2019) provided examples in their review illustrating where young people are seen to be more open to new ideas and changes compared with older generations;

in agriculture, this can include the adoption of new farming technology, which can be used to modernise agribusinesses. The first dimension (PC1) relates to not making use of new technology and technological advances in daily practices. Instead of adapting and making use of advances in technology, this component relates to sticking to what is known even when this means lower profits. For these reasons, the component was named Traditional. The eigen value of Dimension 1 (PC1) was 2.201, and it explains 9.17% of the variance. Dimension 1 is opposite to entrepreneurial behaviour and should be handled accordingly. Youth are often seen as being innovative, creative and the creators of change; however, Sumberg and Hunt (2019) stated that youth would only be able to bring change to the agricultural sector if the sector is seen as profitable, competitive and productive for business. As explained by Kew et al. (2015), youth are resource-constrained, and Sumberg and Hunt (2019) further highlighted the importance of access to resources including (among other incentives) a supportive environment including policies, finances (credit and savings), insurance and empowerment and recognition of youth. Sumberg and Hunt (2019) concluded that although youth are often portrayed as innovative, entrepreneurial and agents of change, these claims are actually a very poor basis for policy and investment decisions. Entrepreneurs are also known to have a certain drive to achieve. The statements that load high in Dimension 2 (PC2) relate to such a drive to achieve and were named Commitment (eigenvalue 1.877 and explained 7.820% of the variance). The component relates to respondents being committed people who keep going instead of throwing in the towel. Dimension 3 (PC3) is closely related to having a set plan in place for the business by making use of a set business plan. Being visionary and goal orientated is provided as a trait of an entrepreneur by Wale and Chipfupa (2018). The component was named Goal-Orientated (eigenvalue of 1.735 and explains 7.228% of the variance).

Entrepreneurs are believed to have a high level of self-confidence. McElwee and Bosworth (2010) also highlighted that self-confidence is an important aspect for smallholder farmers. These aspects are highlighted in Dimension 4 (PC4), which indicates respondents' belief in their own ability to initiate and run a business and was named Self-Belief (eigenvalue 1.553, explained 6.470% of the variance). Singh (2013) not only highlighted self-belief but also mentioned that entrepreneurs could work through challenges and act proactively to pursue business opportunities. When one has identified possibilities and is determined to take advantage thereof while continuing with current operations, this is illustrated through Dimension 5 (PC5) – Determination (eigenvalue 1.492, explained 6.215% of variance).

Dimension 6 (PC6; eigenvalue of 1.458 and explains 6.073% of the variance) was named groupwork and networking. Man, Lau and Chan (2002) explained that relationship competencies involve making use of or combining external resources. Being able to cooperate, receive information and work with others are part of managing networks (Lans,

Verstegen & Mulder 2011). Man et al. (2002) and Lans et al. (2011) explained the importance and relevance of groupwork and networking as an entrepreneurial competence. Networking or sharing of resources and information plays an important role in identifying and taking advantage of opportunities. In some instances, individuals have a stable and secure employment position but then identify or become aware of a different business opportunity, which they decide to follow. These cases are referred to as the pull factor of entrepreneurship for seizing an opportunity by leaving their current position. This scenario was illustrated by the statements in Dimension 7 (PC7), which was named Pull Entrepreneurship (eigenvalue 1.444, variance explained 6.018%), also sometimes referred to as opportunity entrepreneurship (Berner, Gomez & Knorringa 2012). Dimension 8 (PC8) was named Perseverance, which has an eigen-value 1.434 and explained 5.976% of the variance. Risk-taking is considered a key element of entrepreneurial behaviour. To determine risk behaviour, the respondents were asked to consider two options: one which has a sure outcome while the other has a high risk of either losing everything invested or doubling the investment. Dimension 9 (PC9) has thus been named Risk (eigenvalue 1.295, variance explained 5.396%), as the dimension relates positively to choosing a riskier option. The following section presents a discussion of the results derived from the regression analysis.

Determinants of youth participation in agriculture

This research used a multinomial logit model to evaluate the influence of the variables mentioned in Table 3 on the level of participation of youth in agriculture. The multinomial logit, statistically significant at 1%, was estimated for four levels of agricultural participation, namely full-time in farming or related economic activities (as an individual), full-time in farming or related economic activities as member of a cooperative, partially into farming or related economic activities through family business and not currently engaged in farming or related economic activities (base category).

Turolla et al. (2022) indicated that respondents from their research indicate that entrepreneurs are youth who are involved in the agricultural business, which requires a business plan and accounting; this shows that they see entrepreneurs as individuals who plan. In terms of the entrepreneurial dimensions, the results show that youth who were involved as individuals in the sector were less likely to be *goal orientated* (5% level of significance); however, they were found to be more likely to engage in *pull entrepreneurship* activities (1% level of significance) compared with youth who were not currently involved. Although the result might be strange in terms of goal orientation and contrary to the view explained by Turolla et al. (2022), it does represent the feeling observed during the survey. Very few of the respondents did use business plans or future-orientated planning to guide their business.

TABLE 3: Factors affecting youth participation in agriculture.

Variable	Youth category					
	As individual		Part of cooperative		Part of family business	
	B	Standard error	B	Standard error	B	Standard error
Age	0.403	0.872	-0.411	1.290	-1.012	0.636
Gender	0.102	0.451	0.128	0.674	-0.565*	0.312
Hhsize	-1.027	1.335	3.061	1.976	-0.193	0.857
MarriageSt	-0.030	0.610	0.925	0.845	-0.044	0.473
Agrictert Educ	-2.003	1.421	-2.238*	1.307	-1.945**	0.833
Farmexp	10.599***	1.979	11.849***	2.483	10.105***	1.817
Businesstrain	0.601	0.623	2.032**	0.888	0.763	0.493
Supportprog	1.949*	1.037	-1.904	1.623	1.946**	0.898
Land	99.129***	35.719	95.912***	35.978	52.550	36.130
Livestock access	1.602***	0.455	0.339	0.705	1.673***	0.340
Total income	-1.628	2.914	-1.964	3.534	-2.006	2.262
Grant buy input	2.040***	0.570	1.189	0.837	1.599***	0.442
Savings	3.602	6.314	7.264	6.639	8.406	5.516
Credit access	0.118	0.910	-1.175	1.205	0.253	0.621
Cooperative	1.352*	0.715	4.963***	0.871	0.694	0.549
Youthclub	0.331	0.861	0.572	0.900	1.199**	0.598
Socialmedia	-1.365***	0.461	-0.396	0.688	-0.432	0.300
Extecont	1.568***	0.457	2.002***	0.673	1.065***	0.337
(PC1) Conventional	1.215	1.057	-0.048	1.514	-0.841	0.692
(PC2) Commitment	1.836	1.256	-2.993	1.847	-0.179	0.847
(PC3) Goal-orientated	-2.776**	1.163	-1.461	1.701	-0.912	0.896
(PC4) Self-belief	1.593	0.996	2.674*	1.428	0.784	0.673
(PC5) Determination	-1.446	1.281	-6.138***	2.130	-1.571*	0.906
(PC6) Networking	-1.038	1.159	-0.352	1.633	0.859	0.803
(PC7) Pull entrepreneur	2.537**	1.117	0.877	1.655	0.140	0.721
(PC8) Perseverance	-1.114	1.116	-0.280	1.558	-0.314	0.790
(PC9) Risk	0.916	1.175	-0.570	1.633	0.202	0.804
Intercept	-3.742*	2.067	-1.399	2.678	0.019	1.339

Source: Survey data (2018–2020)

Base category = Not currently engaged in agriculture or related economic activities.

***, ** and * represent statistical significance at 1%, 5% and 10%, respectively.

Hhsize, household size; MarriageSt, marital status; Agrictert Educ, agricultural tertiary education; Farmexp, farming experience; Businesstrain, business training; Supportprog, support programs; Youthclub, youth clubs; Socialmedia, social media; Extecont, extension contact.

Svotwa et al. (2022) suggested in their study that youth should be educated on how to develop business plans and make use of financial information relating to business decisions.

The results further showed that the youth involved as individuals were more likely to take advantage of identified opportunities (pull entrepreneurship) compared with the respondents who were not involved. This is an aspect which is very much associated with entrepreneurial behaviour, where individuals are looking for and are willing to take advantage of identified opportunities. This result relates to Iwara et al. (2021), where it was found that looking for unique or innovative ways to settle problems is important and that these individuals are opportunity driven and pacesetters. The authors further highlight that for an enterprise to perform well, certain levels of novelty are required that enable individuals to explore better options. Turolla et al. (2022) mentioned that self-identification of youth relates to their agribusiness aspirations or commitment towards their intended or current businesses in the agricultural sector. Some youth see agriculture as a forced choice with no alternative career path, while others take the agricultural career path by choice, and according to

Turolla et al. (2022), these youths normally have greater ambitions in agribusiness. Cele and Wale (2020) mentioned that most smallholder farmers can be categorised as survival entrepreneurs who are characterised by not wanting to expand their business (among other things); this could also mean that they are not willing to take advantage of opportunities as they arise. Attempts should thus be made to capacitate youth to identify novel opportunities, enhance their creative thinking and ensure that opportunities are available within the agricultural sector. This research shows that there is some possible intent from youth to take advantage of opportunities they identify. This could provide a valuable opportunity for governments and other role players to attract youth to the sector, as it shows that when youth are confronted and identify opportunity, they might be willing to grab the opportunity to their own benefit and their business' advantage.

It was found that *self-belief* was significant (1%) when youth involved in cooperatives are considered. Youth with higher measured levels of self-belief were more likely to participate in agriculture through cooperatives, relative to not being involved in farming or economic-related activities. When the youth choose to work on their own to obtain certain goals,

instead of accepting the deal to rely on others to complete the work, they are more likely to participate in agriculture as part of a cooperative, as opposed to not participating in agriculture. Entrepreneurs tend to have a strong belief in themselves to execute a task or tasks, rather than expecting someone else to do it for them (Bandura 1997). Iwara et al. (2021) stated that successful entrepreneurs have a strong internal belief to complete their task timeously. Not only is self-confidence a trait associated with entrepreneurs, but they are also known for being determined, hardworking individuals (Singh 2013).

Determination was found to be negatively significant (1%) for individuals who are involved in cooperatives compared with the ones who are not currently involved in the sector. A possible explanation could be that youth involved in cooperatives are aware that there are other individuals who can also assist and make up for 'slack' shown by a certain individual, whereas individuals who are on their own know that they cannot rely on any other person and must take the responsibility on themselves (determination). Another explanation could be that some of the respondents are only involved in the cooperative for the advantage provided and are not fully committed or determined to work towards the success of the cooperative, only for self-enhancement. The result, in a way, can be compared with Mmbengwa et al. (2021), who found that cooperatives are not a popular business structure in their study and youth involvement was very limited. The results indicate that differences in the entrepreneurial dimension of youth have an influence on their participation in the agriculture and related activities. This is very important, as it can provide guidance as to which programmes or activities should receive more attention when a certain group of youth are targeted in the development of policy, training or even information sessions. Iwara et al. (2021) proposed that endogenous attributes such as entrepreneurship play an important role in business success and that these attributes are normally not considered; the same can be said when the participation of youth are considered in the agricultural sector. These findings show that differences in endogenous factors do in fact play a role in participation of youth in the agricultural sector, confirming that endogenous factors do need to be considered not only for business success but also in attracting youth towards participating in the agricultural sector.

There are also several initiatives aimed at increasing the involvement of youth and females in the agricultural sector. The results indicate that men are less likely to be involved in the agricultural sector as part of a family business as opposed to being not involved in the agricultural sector (10%). The results indicate the importance of agricultural family businesses and the involvement of women. A possible reason is that men move to other industries which provide better remuneration (Mukwede 2018), leaving the women to manage and continue with the farming operations. Mueller, Doss and Quisumbing (2018) referred to the feminisation of agriculture, which is when men move from rural areas and the women remain on the farms. These results can also be an

indication of the scenario that women are more involved in family farming businesses and are taking a leading role because of other family members having other employment or occupations. Mukwede (2018) mentioned that this scenario could lead to greater participation of young people in female-headed households compared with male-headed households, as the women will depend on the young family members' abilities in terms of labour and assistance. This result is also in line with the discussion of Kew et al. (2015), stating that young women operate in the retail and agricultural sectors in Africa. The results indicate that programmes and policies should also be designed to meet the expectations and importantly empower women in the agricultural sector.

Hadebe (2016) stated that the migration of individuals with *tertiary qualifications* from the rural to the urban areas has increased; this shows that tertiary education could lead to less participation of higher-educated individuals in the rural areas. The results showed that youth respondents who had attained a tertiary education were less likely to be partially involved in agriculture through cooperatives (10%) and through family business (5%). This could also mean that they were not necessarily involved in the daily running of business and thus not required to be on site. This finding also confirms previous indications that individuals who are better educated might be less inclined to be involved in the agricultural sector (Ogunmodede et al. 2020). This result reflects a scenario where the reported negative image of the sector should be changed to show its potential and attract well-educated youth to ensure that they are willing and able to establish their own businesses in the agricultural sector, from primary production to value-adding activities along the value chain. Youth must be able to say with confidence and pride that they are the owners or participants in an agricultural business.

As expected, *farming experience* is significant in being involved in any form in the agricultural sector, at a 1% level. This confirms the findings of Piazza-Georgi (2000), Ogunmodede et al. (2020) and Fasakin et al. (2022), who stated that an increase in farming experience improves an individual's involvement in the field of agriculture. Ogunmodede et al. (2020) found that years of agribusiness experience are a very important aspect when choosing self-employment through agribusinesses, and Fasakin et al. (2022) found that with more experience, youth decided to intensify their agricultural participation. This result shows the importance of exposure towards the agricultural sector, not only primary but also in activities among the value chain. When youth are exposed to the agricultural sector to gain some experience, it could lead to further involvement in future. Programmes and initiatives could thus be developed to expose inexperienced individuals to the agricultural sector, which could teach and show the impact the sector could have on households' livelihoods.

Agricultural training was also found to be significant (5%) for individuals who are involved in agricultural cooperatives. This indicates that such individuals are more interested in

either having access to or receiving and attending agricultural training sessions, compared with youth respondents not currently involved in the sector. These results are in line with findings by Coleman (1988) and Pyysiainen et al. (2006), who stated that knowledge and skills acquired from agricultural training increase and improve agricultural participation, which ultimately leads to efficiency and productivity. Possible explanations could be that the youth involved in the sector are more inclined to participate because of their focus on the agricultural sector, while those who are not involved are unaware of the fact that they can also join this training and that it is not only for current participants. Agricultural training and workshops provided by government and private institutions equip youth to improve their production methods and ultimately yield better produce. Not only could training assist the youth who are already involved in the sector, but focus could also be on how to engage those who are not currently involved. These programmes could provide specific focus on why they should choose the agricultural sector and the advantages of the sector, while (importantly) providing assistance and training on how youth could possibly enter the sector. In cases where human resources are improved through agricultural training, youth are then empowered to build a more competitive and resilient agricultural sector.

Youth who are part of a *government support programme* are more likely to participate full-time in agriculture as individuals (10%) or as part of family businesses (5%), rather than not participating in agriculture or related economic activity. This is in line with the hypothesis that government support programmes have a role to play in attracting youth to participate in agriculture. Baloyi (2010) found that extension support and government support programmes increase the likelihood of individuals becoming involved in agriculture.

Access to extension services such as training and support programmes, resources and linkages to financial and other services play an important role in farm businesses (Wale et al. 2021) and could thus play a very important role for enhanced participation of youth in the primary agricultural sector. The necessary time and resources should thus be allocated to these aspects to understand why youth are not participating or gaining the envisioned advantage from these programmes and training. Extension officers fulfil the role of relaying the concerns of commercial and small-scale farmers to government. Previous research has already found that extension services in South Africa are not always seen in a positive light, while youth have also not always been beneficiaries (Masango 2015). Wale et al. (2021) mentioned that the provision of agricultural extension services is important in promoting entrepreneurship in smallholder farming, showing the importance of access to these services. *Extension contact* was expected to have a positive influence on getting youth to participate in agriculture. The coefficient shows that youth respondents who indicated that they were in contact with extension services were more likely (1%) to participate in agricultural activities in all three options

included in the research. This is in line with the findings from Baloyi (2010) and Wale et al. (2021), where it was indicated that extension support services increase agricultural participation. A matter of concern, however, could be that only around 30% of the respondents indicated being in contact with extension services. This shows that although contact is limited, it does make a difference in terms of participation in the sector. The result may not be surprising, as extension services are aimed at assisting and providing information to individuals who are involved in the sector, although activities such as information and demonstration days could be open to all – including those not involved in the sector. Activities such as these should perhaps be aimed at individuals who are not involved to increase awareness and opportunities in the agricultural sector.

Wale et al. (2021) mentioned that land tenure security is a critical component in on-farm entrepreneurial development, meaning that ownership or even access to land is very important to enhance entrepreneurship in specifically primary agriculture. The authors explain that ownership of land provides a certainty in long-term decision-making, as opposed to decisions which are made in situations of uncertainty such as with unsecure tenure (e.g. noncompliance with contractual agreements). Unsurprisingly, *access to land* was also found to be significant (1%), indicating the importance of access to land and participation in the agricultural sector. Youth who have access to land were more likely to be engaged in all three the forms of involvement in the agriculture and related economic activities compared with those who are not currently involved in the sector. This result confirms what has been reported for years and is in line with the findings of Groenewald (1993), Cousins (2007), Wale et al. (2021) and Fasakin et al. (2022). Access to land gives youth the opportunity to exploit natural resources, which can provide dividends in the form of employment and income. With most respondents practising homestead gardening, stable lives can be established when land is productively utilised. Land enables people to create stable and positive lives, when one has access to land (Muchara et al. 2014), while lack of land tenure makes smallholder farmers subsistence orientated (Wale et al. 2021). Wale et al. (2021) also cautioned that access to land is not the only factor or resource in attracting on-farm entrepreneurship; they state that having access to land without access to other resources could demotivate individuals towards on-farm entrepreneurship. Consequently, providing youth with secure access to land in combination to other agricultural resources could enhance youth agricultural participation.

Livestock contributes towards improving livelihoods of rural people in South Africa, providing food and income potential (Myeki & Bahta 2021). Youth respondents who have access to *livestock* are more likely (1%) to engage the agricultural sector as an individual and as part of a family business as opposed to not being engaged in farming or related economic activities. Bienabe et al. (2004) found that people who own livestock are involved in agriculture and are thus enabled to engage in agricultural markets or related economic activities.

This relates to Myeki and Bahta (2021) stating that livestock or livestock production contributes to the livelihoods of people in rural areas, especially to the livelihoods of rural poor of South Africa. In some cases, livestock production is only for household consumption (Myeki & Bahta 2021), showing the importance of livestock production in the daily livelihoods of rural populations and participation in the agricultural sector. Owning livestock for survival or marketing purposes allows the youth to be involved in agriculture through cooperatives. When farming as part of a cooperative, having more numbers of livestock makes it possible for youth members to produce better as part of a group. Rearing livestock as part of a cooperative allows more individuals to gain skills in that regard, which eventually improves the livelihoods of all cooperative members and the situations of their household members are enhanced. Another advantage of livestock is for the assistance it can provide for expansion aspirations, the sale of livestock can provide valuable additional income, which can be used for investing in expansion activities (Chipfupa 2017).

Access to credit has been used regularly in research and found to have an impact on involvement in the agricultural sector (i.e. Ng'atigwa et al. 2020). However, our finding did not indicate that credit had an impact on participation, perhaps because of the low levels of access to credit (Table 1) indicated by the respondents. Instead, the financial variable *social grants usage to buy inputs* was positively significant (1%) when youth involved as individuals and as part of family business were considered. The result indicated the importance of social grants as a source of household income and how they are used to further the farming or agricultural related business. Youth respondents who were in a family where social grants were received as part of the household income were more likely to participate in farming or related economic activities as individuals and family businesses compared with the reference category. Most of the respondents' households did receive social grants, which were used to improve their socio-economic statuses. The usage of social grants for agricultural purposes has also been previously reported in research by Sinyolo, Mudhara and Wale (2017) and Wale and Chipfupa (2018). Lack of financial resources is mentioned by Kew et al. (2015) as a major disincentive for young people to start or grow a business. The authors also state that the entrepreneurs who participated in their research raised their capital through family or their own savings, which relates to the finding of this research that respondents' own capital, in this case social grants, was used for activities rather than institutions.

Kaki et al. (2022) reported the importance of having an entrepreneurial friend as a role model, which has a positive influence on students to start their own agribusinesses after they have graduated. The result by Kaki et al. shows the importance of networks and the potential influence they have on individuals. Groups also have an important role to play in the agricultural sector, and Fasakin et al. (2022) call on agencies within the agricultural sector to enhance efforts

to from social groups between stakeholders and youth in agriculture. Being involved in social groups and social media groups were included to determine whether these could have any potential influence on participation in the agricultural sector similar to the reported findings. Wale and Chipfupa (2018) mentioned that social groups, especially the usage of communication technology or social media, remain unclear in terms of rural youth. The authors also mention that extension seemed to focus more on providing information to farmers who are involved in cooperatives and less on individual farmers. Through all these mediums, information can be shared.

Understandably, there are youth who are full-time involved through agricultural cooperatives in the agricultural sector, that being one of the dependant variables. However, youth who are involved in the sector through other means (mostly either individually or family) could also be part of or involved in agricultural cooperatives, albeit through lesser means, as cooperatives have been found to be less common among youth participants (Mmbengwa et al. 2021). This was determined in the research, and it was found that youth who are involved as individuals are also more likely to be involved in agricultural cooperatives (10%) compared with the youth who are not involved in the sector. The results show that cooperatives could have a valuable role to play in attracting youth to the agricultural sector. This could even be just to introduce individuals to the sector and provide the opportunity to learn and develop skills, which could perhaps lead to developing, growing or establishing their own agricultural businesses. This is a clear indication that cooperative farming enables youth to become involved in farming by being part of agricultural cooperatives. According to Holloway et al. (2000) and Ortmann and King (2007), agricultural cooperatives stimulate agricultural participation.

Research by Wale and Chipfupa (2018) has shown that networks or information-sharing are very popular by means of social connections; these include farmer-to-farmer information sharing. It is envisioned in the research that being part of a group, including a normal youth group or even social media groups, could have an influence on agricultural participation. This was also found to be true in terms of *Youth club* membership, where it was found that youth involved in the sector through family businesses were more likely to be involved in youth clubs (5%). The descriptive statistics have shown that just more than half of the respondents were part of social media groups. The usage of social media could be a double-edged sword; on one side, it could have a positive impact on the agricultural sector with access to (and spreading) information, while on the other, it could also distract and draw individuals away from the sector. The information that could be spread through social media could not only be both positive and constructive but also negative. The results indicated that youth who were involved as individuals were less likely to be members of a social media group (1%) compared with the ones who were not currently engaged in agricultural activities. Kaki et al. (2022) concluded that the establishment

of entrepreneurship clubs – students within the agricultural fields – is a good option to enhance entrepreneurial intention, and one can argue that a similar result can be achieved among a group (Fasakin et al. 2022) of friends or community members in an area.

Conclusion

This research set out to explore the influence of access to livelihood assets in combination with entrepreneurial dimensions on youth participation in the agricultural sector. Like previous research, attention was given to access factors within the SLF and their influence on participation in the sector. However, this research contributes by including endogenous factors associated with entrepreneurial dimensions of youth, which have received limited attention in research to date in the agricultural sector. The results confirm that endogenous factors associated with entrepreneurial dimensions (goal-orientated, pull entrepreneurship, self-belief and determination) do indeed have an influence on youth participation in the agricultural sector. The results show that endogenous factors should be considered when deciding how to attract youth to participate in the agricultural sector. Furthermore, the results confirm the suggestion by Iwara et al. (2021) that more attention should be given to endogenous factors as the case is with exogenous factors.

The research proves the heterogeneity of youth in terms of their access to exogenous resources and endogenous factors (entrepreneurial dimensions). The implications are that innovative policies are required to accommodate the heterogeneity of youth to enhance their participation in the sector. Government policies that seek to involve youth in agriculture should focus on providing creative platforms which would expose individuals from an early age to farming and related economic activities. Agricultural projects can be implemented and will give youth greater exposure to farming from a young age. Greater exposure leads to greater experience in farming and related economic activities. Farming experience or experience within the agricultural sector will enable the youth to continuously participate in agriculture, which could eventually lead to better livelihoods and socio-economic statuses.

Access to or ownership of land in relation to agricultural participation in any shape or form has once again been proved to be important. As backyard farming is the most practised production method in these areas, microprojects and development incentives should be initiated in these rural areas. Homestead gardening projects can be aimed at stimulating youth participation in agriculture, which could ultimately lead to better livelihoods and economic growth. These projects could be used as an indicator showing that the individual is interested to participate in the agricultural sector and progress towards growing a small agricultural business to assist in the land distribution question of South Africa or any other resource distributions. Not only could these projects assist with resource distribution, but they could also be a means of entrepreneurial training and development. This

requires a combination of endogenous and exogenous resources which capacitate the youth not only by providing resources but also by developing their endogenous skills such as entrepreneurship and business management. Once entrepreneurial skills and competencies are encouraged, various agricultural business ventures can be exploited in rural areas. Small markets can be introduced by youth entrepreneurs, where produce is sold from and to the community. This raises awareness that agriculture offers entrepreneurial and income opportunities can not only be means of primary agriculture but also in value-adding activities.

The research has shown that not only do differences in access to resources associated with the SLF have an impact on participation, but differences between entrepreneurial dimensions were also found to have an influence. Research by Chipfupa and Wale (2018) found that psychological capital should be included in the development of farmer typologies, especially smallholder farmers. This research confirms their findings, suggesting that entrepreneurial dimensions of youth should also be considered when typologies are considered for the development of policies and other means of support to increase the participation of youth in the sector. Future considerations for involving youth should thus ensure that youth have access to resources, as already stipulated in literature. However, the results from the research show that focus should not only be on exogenous or external resources, but youth should also be provided with opportunities through which they can enhance their skills and entrepreneurial abilities as part of internal or endogenous factors. Future considerations in terms of policies, programmes and investments towards youth in agriculture should thus consider a complete package of resources and not only individual or single resources, for example, land or finance.

The research was focused on an area within the Free State province of South Africa, and it will be important to confirm these research findings in other areas or determine the differences between areas, which would be important to consider for policy and programme development in other countries. This would also potentially further show the heterogeneity of youth between different regions, which should be considered in attracting youth towards participating in the agricultural sector. Future research should also focus on how entrepreneurial dimensions and other endogenous factors of youth could be included in developing specific youth typologies that could inform government and other role-players in getting youth involved in the agricultural sector, including agricultural value-chain activities.

Acknowledgements

The authors wish to thank the WRC and DALRRD (the former DAFF) who co-funded by the research project (K5/2789//4) entitled, 'Entrepreneurial development for establishing small farming businesses and employment by youth in rain-fed crop farming'. The research team wish to

acknowledge the assistance received from the youth, extension officers and officials and youth centres.

Competing interests

The authors declare that they have no financial or personal relationships that may have inappropriately influenced them in writing this article.

Authors' contributions

J.I.F.H. and B.D.J. were involved in conceptualisation, methodology, formal analysis, writing of the original draft and review and editing of the manuscript. J.I.F.H. was involved in project administration and supervision. H.J. was responsible for conceptualisation, writing (review and editing) and supervision.

Funding information

The research is co-funded by the WRC and DALRRD (the former DAFF) under grant (K5/2789 / /4).

Data availability

The data of this study can be made available from the corresponding author, J.I.F.H., upon reasonable request.

Disclaimer

The views and opinions expressed in this article are those of the authors and do not necessarily reflect the official policy or position of any affiliated agency of the authors.

References

- Agri SA, 2017, *Land audit: A transactions approach*, Land Centre of Excellence, viewed 30 July 2022, from https://cispc.cachefly.net/assets/articles/attachments/71719_agrisa_land-audit_november-2017.pdf.
- Adeyanju, D., Mburu, J. & Mignouna, D., 2021, 'Youth agricultural entrepreneurship: Assessing the impact of agricultural training programmes on performance', *Sustainability* 13(4), 1697. <https://doi.org/10.3390/su13041697>
- Ahmad, M.H., Adnan, R. & Adnan, N., 2006, 'A comparative study on some methods for handling multicollinearity problems', *Malaysian Journal of Industrial and Applied Mathematics* 22, 109–119.
- Ama, N.O. & Okurut, F.N., 2013, 'Assessing factors that affect women and youth micro-entrepreneurs in Botswana', *International Journal of Academic Research in Economics and Management Sciences* 1(2), 306–332.
- Baloyi, J.K., 2010, 'An analysis of constraints facing smallholder farmers in the Agribusiness value chain: A case study of farmers in the Limpopo Province', MSc dissertation, University of Pretoria.
- Bandura, A., 1997, 'Self-efficacy: Toward a unifying theory of behavioural change', *Psychological Review* 84(2), 191–215. <https://doi.org/10.1037/0033-295X.84.2.191>
- Berner, E., Gomez, G. & Knorrings, P., 2012, "'Helping a large number of people become a little less poor": The logic of survival entrepreneurs', *The European Journal of Development Research* 24(3), 382–396. <https://doi.org/10.1057/ejdr.2011.61>
- Bienabe, E.C., Le Coq, C., Liagre, J. & Sanz, L., 2004, *Linking small holder farmers to markets: Lessons learned from literature review and analytical review of selected projects*, CIRAD TERA TA 60/15 73, The World Bank, Breton.
- Birdthistle, N., Costin, Y. & Hynes, B., 2016, 'Engendering entrepreneurial competencies in the youth of today: A teacher's perspective', *Journal for Education and Training* 8(58), 766–782. <https://doi.org/10.1108/ET-02-2016-0031>
- Bureau for Food and Agricultural Policy (BFAP), 2013, 'Land reform in the Free State, the land audit, and the way forward to 2030', *BFAP Reports* 279771, *Bureau for Food and Agricultural Policy (BFAP)*, *BFAP Reports*. <https://doi.org/10.22004/ag.econ.279771>
- Burchell, B.J. & Coutts, A.P., 2019, 'The experience of self-employment among young people: An exploratory analysis of 28 low-to middle-income countries', *American Behavioral Scientist* 63(2), 147–165. <https://doi.org/10.1177/0002764218794240>
- Cele, L. & Wale, E., 2020, 'Determinants of smallholders' entrepreneurial drive, willingness and ability to expand farming operations in KwaZulu-Natal', *Development in Practice* 30(8), 1028–1042. <https://doi.org/10.1080/09614524.2020.1764501>
- Chindoga, L. & Fatoki, O., 2011, 'An investigation into the obstacles to Youth Entrepreneurship in South Africa', *International Business Research* 2(4), 161–169. <https://doi.org/10.5539/ibr.v4n2p161>
- Chipfupa, U., 2017, 'Entrepreneurial development pathways for smallholder irrigation farming in KwaZulu-Natal: Typologies, aspirations and preferences', PhD thesis, University of KwaZulu Natal.
- Chipfupa, U. & Tagwi, A., 2021, 'Youth's participation in agriculture: A fallacy or achievable possibility? Evidence from rural South Africa', *South African Journal of Economic and Management Sciences* 24(1), a4004. <https://doi.org/10.4102/sajems.v24i1.4004>
- Chipfupa, U. & Wale, E., 2018, 'Farmer typology formulation accounting for psychological capital: Implications for on-farm entrepreneurial development', *Development in Practice* 28(5), 600–614. <https://doi.org/10.1080/09614524.2018.1467377>
- Coleman, J.S., 1988, 'Social capital in the creation of human capital', *The American Journal of Sociology* 94, 95–120. <https://doi.org/10.1086/228943>
- Corrigan, T., 2009, 'Socio economic problems facing Africa: Insights from six APRM country review reports', *SALIA Occasional Paper* 34, 4–54.
- Cousins, B., 2007, 'Agrarian reform and the two economies: Transforming South Africa's countryside', in L. Ntsebeza & R. Hall (eds.), *The land question in South Africa: The challenge of transformation and redistribution*, pp. 220–245, Human Sciences Research Council Press, Pretoria.
- Dossou, S.A.R., Adeoti, R., Aoudji, A.K.N. & Djana, M., 2021, 'Effect of entrepreneurial orientation on business performance of young women agribusiness owners in Benin: Do social and business environments matter?', *African Journal of Science, Technology, Innovation and Development*, 1–17. <https://doi.org/10.1080/20421338.2021.2003510>
- Elias, M., Mudege, N.N., Lopez, D.E., Najjar, D., Kandiwa, V., Luis, J.S. et al., 2018, 'Gendered aspirations and occupations among rural youth, in agriculture and beyond: A cross-regional perspective', *Journal of Gender, Agriculture and Food Security*, 3(1), 82–107.
- Fasakin, I.J., Ogunniyi, A.I., Bello, L.O., Mignouna, D., Adeoti, R., Bamba, Z. et al., 2022, 'Impact of intensive youth participation in agriculture on rural households' revenue: Evidence from rice farming households in Nigeria', *Agriculture* 12(5), 584. <https://doi.org/10.3390/agriculture12050584>
- Free State Department of Agriculture and Rural development (FSDARD), 2018, *Workshop during May 2018 between UFS research team and representatives from Free State Department of Agricultural and Rural Development*, Thaba Nchu.
- Gandure, S., Walker, S. & Botha, J.J., 2013, 'Farmers' perceptions of adaptation to climate change and water stress in a South African rural community', *Environmental Development* 5, 39–53. <https://doi.org/10.1016/j.envdev.2012.11.004>
- Glover, D. & Sumberg, J., 2020, 'Youth and food systems transformation', *Frontiers in Sustainable Food Systems* 4, 101. <https://doi.org/10.3389/fsufs.2020.00101>
- Groenewald, J.A., 1993, 'Resource use entitlement, finance and entrepreneurship in sub-Saharan Smallholder agriculture', *Agrekon* 32(3), 122–128. <https://doi.org/10.1080/03031853.1993.9524733>
- Hadebe, N., 2016, 'The impact of capital endowment on smallholder farmers' entrepreneurial drive in taking advantage of small-scale irrigation schemes: Case studies from Makhathini and Nduomo B irrigation schemes in KwaZulu-Natal, South Africa', MSc dissertation, University of KwaZulu-Natal, Pietermaritzburg.
- Henning, J.I.F., Matthews, N., August, M. & Madende, P., 2022, 'Youths' perceptions and aspiration towards participating in the agricultural sector: A South African case study', *Social Sciences* 11(5), 215. <https://doi.org/10.3390/socsci11050215>
- Holloway, G., Nicholson, C., Delgado, C., Staal, S. & Ehui, S., 2000, 'Agroindustrialization through institutional innovation: Transaction costs, cooperatives and milk-market development in the east-African highlands', *Agricultural Economics* 23(3), 279–288. <https://doi.org/10.1111/j.1574-0862.2000.tb00279.x>
- Iwara, I.O., Kilonzo, B.M., Zuwarimwe, J. & Netshandama, V.O., 2021, 'Entrepreneurs' endogenous attributes necessary for small enterprise success in Vhembe rural areas, South Africa', *Southern African Journal of Entrepreneurship and Small Business Management* 13(1), a331. <https://doi.org/10.4102/sajesbm.v13i1.331>
- Kaki, R.S., Mignouna, D.B., Aoudji, A.K. & Adéoti, R., 2022, 'Entrepreneurial intention among undergraduate agricultural students in the Republic of Benin', *Journal of African Business*, 1–18. <https://doi.org/10.1080/15228916.2022.2031584>
- Kew, J., Namatovu, R., Aderinto, R. & Chigunta, F., 2015, *Africa's young entrepreneurs: Unlocking the potential for a brighter future*, Development Unit for New Enterprise, University of Cape Town, Rondebosch.
- Lans, T., Versteegen, J. & Mulder, M., 2011, 'Analysing, pursuing and networking: Towards a validated three-factor framework for entrepreneurial competence from a small firm perspective', *International Small Business Journal* 29(6), 695–713. <https://doi.org/10.1177/0266242610369737>
- LaRue, K., Daum, T., Mausch, K. & Harris, D., 2021, 'Who wants to farm? Answers depend on how you ask: A case study on youth aspirations in Kenya', *The European Journal of Development Research* 33(4), 885–909. <https://doi.org/10.1057/s41287-020-00352-2>
- Lebusa, M.J., 2011, 'Does entrepreneurial education enhance under-graduate students' entrepreneurial self-efficacy? A case at one university of technology in South Africa', *Business Review* 1(10), 53–64.
- Maconachie, R., Binns, T. & Tengbe, P., 2011, 'Urban farming associations, youth and food security in post-war Freetown, Sierra Leone', *International Journal of Urban Policy and Planning* 29(3), 192–200. <https://doi.org/10.1016/j.cities.2011.09.001>

- Magagula, B. & Tsvakirai, C.Z., 2020, 'Youth perceptions of agriculture: Influence of cognitive processes on participation in agripreneurship', *Development in Practice* 30(2), 234–243. <https://doi.org/10.1080/09614524.2019.1670138>
- Maluti a Phofung Local Economic Development Strategy (MAPLEDS), 2015, *Maluti-a-Phofung Local Economic Development Strategy 2015–2020*, viewed 02 January 2020, from <http://map.gov.za/documents/LocalEconomicDevelopment/MAP%20LED%20Strategy%20-%20Final%20Draft.pdf>.
- Man, T.W.Y., Lau, T. & Chan, K.F., 2002, 'The competitiveness of small and medium enterprises: A conceptualization with focus on entrepreneurial competencies', *Journal of Business Venturing* 17(2), 123–142. [https://doi.org/10.1016/S0883-9026\(00\)00058-6](https://doi.org/10.1016/S0883-9026(00)00058-6)
- Masango, R., 2015, 'Smallholder farmer cooperatives', MSc dissertation, University of the Free State, Bloemfontein.
- McElwee, G. & Bosworth, G., 2010, 'Exploring the strategic skills of farmers across a typology of farm diversification approaches', *Journal of Farm Management* 13(12), 819–838.
- Metelerkamp, L., Drimie, S. & Biggs, R., 2019, 'We're ready, the system's not—youth perspectives on agricultural careers in South Africa', *Agrekon* 58(2), 154–179. <https://doi.org/10.1080/03031853.2018.1564680>
- Mitchelmore, S. & Rowley, J., 2010, 'Entrepreneurial competencies: A literature review and development agenda', *International Journal of Entrepreneurial Behaviour and Research* 16(2), 32–111. <https://doi.org/10.1108/13552551011026995>
- Mmbengwa, V.M., Qin, X. & Nkobi, V., 2021, 'Determinants of youth entrepreneurial success in agribusiness sector: The case of Vhembe district municipality of South Africa', *Cogent Social Sciences* 7(1), 1982235. <https://doi.org/10.1080/23311886.2021.1982235>
- Muchara, B., Ortmann, G., Wale, E. & Mudhara, E., 2014, 'Collective action and participation in irrigation water management: A case study of Mooi River Irrigation Scheme in KwaZulu-Natal Province, South Africa', *African Journal Online* 40(4), 699–708. <https://doi.org/10.4314/wsa.v40i4.15>
- Mueller, V., Doss, C. & Quisumbing, A., 2018, 'Youth migration and labour constraints in African agrarian households', *The Journal of Development Studies* 54(5), 875–894. <https://doi.org/10.1080/00220388.2018.1430770>
- Mukwedeyá, B.T., 2018, 'The role of rural youth in the smallholder farming sector: Challenges and opportunities in Okhahlamba Local Municipality, South Africa', Master dissertation, University of KwaZulu Natal, Pietermaritzburg.
- Municipalities SA, 2016, *Free State Municipalities*, viewed 07 June 2019, from <https://municipalities.co.za/provinces/view/2/free-state>.
- Myeki, V.A. & Bahta, Y.T., 2021, 'Determinants of smallholder livestock farmers' household resilience to food insecurity in South Africa', *Climate* 9(7), 117. <https://doi.org/10.3390/cli9070117>
- Ng'atigwa, A.A., Hepelwa, A., Yami, M. & Manyong, V., 2020, 'Assessment of factors influencing youth involvement in horticulture agribusiness in Tanzania: A case study of Njombe Region', *Agriculture* 10(7), 287. <https://doi.org/10.3390/agriculture10070287>
- Nieuwoudt, S., Henning, J.I.F. & Jordaan, H., 2017, 'Entrepreneurial competencies and financial performance of farmers in South Africa', *South African Journal of Economic and Management Sciences* 20(1), 1640. <https://doi.org/10.4102/sajems.v20i1.1640>
- Nwibo, S.U., Mbam, B.N. & Biam, C.K., 2016, 'Determinants of agripreneurship among the rural households of Ishielu local government area of Ebonyi state', *Journal of Biology, Agriculture and Healthcare* 6(13), 3–10.
- Obayelu, O., Adepoju, A. & Omirin, O., 2019, 'Does human capital explain food insecurity status of rural households or vice-versa?', *Review of Agricultural and Applied Economics (RAAE)* 22(1), 91–97. <https://doi.org/10.15414/raae.2019.22.01.91-97>
- Ogunmodede, A.M., Ogunsanwo, M.O. & Manyong, V., 2020, 'Unlocking the potential of agribusiness in Africa through youth participation: An impact evaluation of N-Power Agro Empowerment Program in Nigeria', *Sustainability* 12(14), 5737. <https://doi.org/10.3390/su12145737>
- Ortmann, G.F. & King, R.P., 2007, 'Agricultural Cooperative II. Can they facilitate access of small-scale farmers in South Africa to input and product markets?', *Agrekon* 46(2), 219–244. <https://doi.org/10.1080/03031853.2007.9523769>
- Oseifuah, E.K., 2010, 'Financial literacy and youth entrepreneurship in South Africa', *African Journal of Economic and Management Studies* 1(2), 164–182.
- Ouko, K.O., Ogola, J.R.O., Ng'on'ga, C.A. & Wairimu, J.R., 2022, 'Youth involvement in agripreneurship as Nexus for poverty reduction and rural employment in Kenya', *Cogent Social Sciences* 8(1), 2078527. <https://doi.org/10.1080/23311886.2022.2078527>
- Piaza-Georgi, B., 2000, 'The role of human and social assets in growth: Extending our understanding', *Cambridge Journal of Economics* 16, 461–479. <https://doi.org/10.1093/cje/26.4.461>
- Pyysiäinen, J., Anderson, A., McElwee, G. & Vesala, K., 2006, 'Developing the entrepreneurial skills of farmers: Some myths explored', *International Journal of Entrepreneurial Behaviour and Research* 1(12), 21–39. <https://doi.org/10.1108/13552550610644463>
- Rigby, D., Young, T. & Burton, M., 2001, 'The development of and prospects for organic farming in the UK', *Food Policy* 26(6), 599–613. [https://doi.org/10.1016/S0306-9192\(01\)00023-9](https://doi.org/10.1016/S0306-9192(01)00023-9)
- Singh, A., 2013, 'Factors influencing entrepreneurship among farming community in Uttar Pradesh', *Indian Journal of Commerce and Management Studies* 4(3), 13–18.
- Sinyolo, S. & Mudhara, M., 2018, 'The impact of entrepreneurial competencies on household food security among smallholder farmers in KwaZulu Natal, South Africa', *Ecology of Food and Nutrition* 57(2), 1–22. <https://doi.org/10.1080/03670244.2017.1416361>
- Sinyolo, S., Mudhara, M. & Wale, E., 2017, 'The impact of social grant-dependency on agricultural entrepreneurship among rural households in KwaZulu-Natal, South Africa', *The Journal of Developing Areas* 51(3), 63–76. <https://doi.org/10.1353/jda.2017.0061>
- Steenkamp, A.G., 2013, 'An assessment of the impact of entrepreneurship training on the youth in South Africa', Unpublished PhD thesis, North-West University.
- Sumberg, J. & Hunt, S., 2019, 'Are African rural youth innovative? Claims, evidence and implications', *Journal of Rural Studies* 69, 130–136. <https://doi.org/10.1016/j.jrurstud.2019.05.004>
- Sumberg, J., Yeboah, T., Flynn, J. & Ynyidoho, N.A., 2017, 'Young people's perspectives on farming in Ghana: A Q study', *Food Security* 9, 151–161. <https://doi.org/10.1007/s12571-016-0646-y>
- Svotwa, T.D., Jaiyeoba, O., Roberts-Lombard, M. & Makanyeza, C., 2022, 'Perceived access to finance, entrepreneurial self-efficacy, attitude toward entrepreneurship, entrepreneurial ability, and entrepreneurial intentions: A Botswana youth perspective', *SAGE Open* 12(2), 21582440221096437. <https://doi.org/10.1177/21582440221096437>
- Tolamo, T.J., 2012, 'Mobilising youth participation in agriculture using participatory extension approach: A case of Ga-Mothiba village', Mini dissertation, University of Limpopo, Limpopo.
- Townsend, R., Benfica, R., Prasann, A. & Lee, M., 2017, *Future of food: Shaping the food system to deliver jobs*, The World Bank, Washington, DC, viewed 23 June 2022, from <chrome-extension://efaidnbnmnbbpcajpcglclefindmkaj/https://openknowledge.worldbank.org/bitstream/handle/10986/26506/114394-WP-PUBLIC-18-4-2017-10-56-45-ShapingtheFoodSystemtoDeliverJobs.pdf?sequence=1&isAllowed=y>.
- Turolla, M., Swedlund, H.J., Schut, M. & Muchunguzi, P., 2022, "'Stop calling me a youth!": Understanding and analysing heterogeneity among Ugandan youth Agripreneurs', *Africa Spectrum* 57(2), 178–203. <https://doi.org/10.1177/00020397221105292>
- Turton, N. & Herrington, M., 2013, *Global entrepreneurship monitor: South Africa report*, University of Cape Town, Cape Town.
- Viljoen, M.F., Kundhlande, G., Baiphethi, M.N., Esterhuysen, P., Botha, J.J., Anderson, J.J. et al., 2012, *An assessment of the social and economic acceptability of rainwater harvesting and conservation practices in selected peri-urban and rural communities* 57(2), 178–203. WRC Report No 1648/1/12, Water Research Commission, Pretoria.
- Vogel, P., 2017, 'From venture idea to venture opportunity', *Entrepreneurship Theory and Practice* 6(41), 943–941. <https://doi.org/10.1111/etap.12234>
- Wale, E. & Chipfupa, U., 2018, *Appropriate entrepreneurial development paths for homestead food gardening and smallholder irrigation crop farming in KwaZulu-Natal Province*, WRC Report No. 2278/1/18, Water Research Commission, Pretoria.
- Wale, E., Chipfupa, U. & Hadebe, N., 2021, 'Towards identifying enablers and inhibitors to on-farm entrepreneurship: Evidence from smallholders in KwaZulu-Natal, South Africa', *Heliyon* 7(2021), e05660. <https://doi.org/10.1016/j.heliyon.2020.e05660>
- Williams, B., Onsmann, A. & Brown, T., 2010, 'Exploratory factor analysis: A five-step guide for novices', *Australasian Journal of Paramedicine* 8(3). <https://doi.org/10.33151/ajp.8.3.93>
- Wickramaratne, A., Kiminami, A. & Yagi, H., 2014, 'Entrepreneurial competencies and entrepreneurial orientation of tea manufacturing firms in Sri Lanka', *Asian Social Science* 18(10), 50–62. <https://doi.org/10.5539/ass.v10n18p50>
- Yeboah, T., Sumberg, J., Flynn, J. & Anyidoho, N.A., 2017, 'Perspectives on desirable work: Findings from a Q study with students and parents in rural Ghana', *The European Journal of Development Research* 29(2), 423–440. <https://doi.org/10.1057/s41287-016-0006-y>