

Article

Accounting for Heterogeneity among Youth: A Missing Link in Enhancing Youth Participation in Agriculture—A South African Case Study

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Abstract: Youth participation in the agricultural sector remains key to addressing youth unemployment. Young people represent a heterogeneous social group with markedly diverse social and economic needs that require tailor-made support interventions to enhance their participation in agricultural activities. The main objective of this article was to develop distinct youth typologies informed by diverse endowment of livelihood assets, including the psychological assets and entrepreneurial characteristics that shape young people's career and livelihood choices, including participation in agriculture. A two-stage multivariate analytical approach was applied using principal component analysis (PCA) and cluster analysis (CA) to formulate youth typologies. Seven clusters were identified. The seven distinct clusters representing youth typologies were named “*Training beneficiaries with access to extension*”, “*Job secure*”, “*Females endowed with negative psychological capital*”, “*Opportunist and determined livestock farmers*”, “*Social grant reliant*”, “*Resource poor traditional livestock farmers*” and “*Non-farming income with access to credit*”. The results confirm that young people are indeed a heterogeneous group with diverse support needs. Unpacking the interrelated and multidimensional complexities among the youth is a vital take-off point to inform effective policy and tailor-made support interventions and effectively foster active youth participation in agriculture and related activities. We argue that support initiatives should not only address access to physical resources, but should also foster the development of soft skills such as entrepreneurial skills and boosting the psychological capital of young people while addressing gender inequalities.

Keywords: youth unemployment; heterogeneity; youth typologies; participation in agriculture; entrepreneurial characteristics; livelihood assets



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1. Introduction

Youth (There is no consensus on the definition of youth as highlighted by varying age brackets in literature. The South African Youth Commission Act of 1996 and the African Youth Charter defines youth as persons between the ages of 18 and 35 years. The United Nations (UN) defines the youth as people between the ages of 15 and 24, while the African Youth Commission regards youth as persons in the age group of 15–35. The RSA National Youth Policy (NYP) applies the age bracket of 14 and 35 years while the commonwealth uses the 15–29 years bracket. Statistics South Africa (Stats SA) defines youth as young people typically between the ages of 14 and 25 or 35) unemployment is considered a global crisis with crippling economic, social, political, and psychological consequences [1–3]. The complex and multi-dimensional youth unemployment problem is more pronounced in sub-Saharan Africa (SSA) owing to rapid population growth and underdevelopment [4,5]. In South Africa (RSA), the unemployment burden persists among youth, with an unemployment (Unemployment refers to persons who are actively looking for work/start a business, were available to work/start a business) rate of 63.9% and 42.1% for youth aged between 15 to 24 and 25 to 34, respectively, which remain higher than the

national unemployment rate in the country standing at 32.9% during the third quarter of 2022 [6].

Effective engagement of youth in agriculture is considered key to addressing youth unemployment and enhancing the sustainability of the sector as the farming community ages, food demand rises and technology advances [7–9]. However, the participation of youth in the sector is constrained and consequently low [10]. Participation of youth in farming and agricultural-related activities is considered to be mainly hindered by constrained access to livelihood assets. Djurfeldt et al. [11] and Juma [12] consider access to resources (assets) as key for one to successfully engage in agricultural activities. In addition, several engagement barriers have been highlighted in the literature. These include, but are not limited to low aspirations, lack of entrepreneurial and market skills, low interest, inadequate infrastructure, poor communication systems, social isolation, and negative perceptions [13–17].

In efforts to address engagement barriers and stimulate an inclusive, effective, and progressive development of the agricultural sector through active youth involvement, several support programmes, policies and strategies have been identified and implemented by the government and other support stakeholders [16,18,19]. The literature highlights that support initiatives motivate and empower youth to actively participate in agricultural activities [20–22]. Nevertheless, one of the key obstacles to sustainable youth engagement in agriculture is the orthodox assumption that generalises the youth as a social group in terms of their access to livelihood assets and support needs, which has resulted in one-size-fits-all support initiatives [23]. While the age range presents one of the common characteristics young people share, they are not a homogeneous group [24,25]. Rather, youth represent a heterogeneous social group with markedly diverse social and economic needs that require tailor-made support interventions to improve their livelihoods. The Food and Agriculture Organisation (FAO) [24] refers to internal and external factors such as access to livelihood assets, gender, aspirations, concerns and needs of youth as key indicators of heterogeneity among youth. Moreover, the opportunity spaces of youth differ as they are shaped by diverse dimensions such as family status, religion, gender and wealth [25]. These diverse factors shape young people's career and livelihood choices, which include participation in agriculture. Treating youth as a homogenous group is too strong an assumption that has resulted in simplistic, one-size-fits-all interventions and strategies that have ineffectively address the real hurdles impeding youth participation in agriculture and related activities [25].

While recognizing the heterogeneity of youth is key to guide support strategies and interventions that match young people's needs, it is not possible to develop and implement these interventions on an individual basis due to transactional costs constraints. In efforts to lower transactional costs of interventions, formulating typologies has been considered in agriculture to inform the design or redesign of support interventions and policies that are tailored to the specificities of different and distinct key characteristics. The typology formulation approach has been applied in several agricultural studies to capture and understand the heterogeneity among farms, farming systems and farmers [26–31]. Typologies allow the grouping of heterogeneous farmers, farms and farming systems into groups considering identified key success factors, for instance, to adopt a technology, innovativeness or expand business ventures. The classification of youth into typologies is crucial to identify specific support strategies that can be implemented to effectively address participation constraints that limit their engagement in agriculture. Knowledge of haves and have-nots of different young people can facilitate the implementation of tailor-made support initiatives, which can effectively influence the participation of youth in agricultural activities [32].

Though typology development is a well-established approach, its application to research investigating youth participation in agricultural activities is limited. For example, Chipfupa and Tagwi [33] applied the typology formulation approach to assess the potential for rural youth to participate in agriculture, considering key success characteristics such as access to livelihood assets, managerial skills, agricultural perceptions, and psychological

capital (PsyCap). McKillop, Heanue and Kinsella [26] profiled young farmers on dairy and dry stock farms according to the differences in their innovativeness, while Armon-Armah et al. [34] considered attitudes, motivations, and aspirations to formulate typologies of youth in cocoa farmers. However, in the typology formulation, PsyCap was used as a proxy to capture the dynamics of soft skills such as entrepreneurship, that are considered key in enhancing youth participation in agriculture. Agricultural value chains can potentially attract youth through various entrepreneurial opportunities [35]. Though subsistence agriculture is common among African youth, Turolla et al. [36] highlights that support initiatives from the government and other development partners often give priority to youth interested not only in cultivating beyond household consumption but to also earn an income, which contributes to the broader goal of rural development and economic growth. Jolex and Tufa [9] posit that the benefits of entrepreneurship can align marginalised youth within the mainstream of the economy, for instance, through participation in profitable enterprises and value chains. Ignoring entrepreneurial characteristics of young people in characterising them means support interventions can overlook strategies that can facilitate engaging in agricultural activities as business ventures which leads to misrepresenting and narrowing the actual impediments of active engagement of youth in agriculture. McKillop et al. [26] and Armon-Armah et al. [34] only considered youth in specific enterprises in the typology formulation, which can limit the applicability of the typologies to all youth at different participation levels.

The aim of this research is to develop representative youth typologies that capture their heterogeneity informed by the diverse endowment of livelihood assets, including their psychological assets and entrepreneurial characteristics that shape young people's career and livelihood choices, including participation in agriculture. This research contributes to knowledge by, firstly, extending the applicability of the typology framework by including entrepreneurial characteristics to capture the heterogeneity of youth that contextually varies by virtue of demographic location. Understanding such characteristics of youth is relevant to match the capabilities of young people and opportunities to enhance their participation in agriculture and agricultural businesses. In addition, the analysis does not consider predefined groups of youth by not only including established young farmers for specific enterprises; rather, efforts were made to contextualise and define typologies that could provide insights on possible key focus areas to attract, support and/or retain youth in agriculture. In doing so, a more detailed picture of youth's haves and have-nots can be presented at different participation levels.

The paper is structured as follows: The next section outlines the methodology, which includes the study area, data, and empirical model. The following section then presents the results and provides a detailed discussion. Lastly, conclusions are drawn, and implications of the findings in relation to policy recommendations to support the effective engagement of youth in the agricultural sector are presented.

2. Materials and Methods

2.1. Study Area

The research was conducted in two areas located in the Free State Province of South Africa, namely Thaba Nchu and QwaQwa. Thaba Nchu is located within the Mangaung Metropolitan Municipality (MMM) and QwaQwa is located in the Maluti-a-Phofong local municipality of the Thabo Mofutsanyana district, as indicated in Figure 1. The study areas were selected according to prior determined factors such as proximity to the research team, prevalence of youth unemployment in the relevant areas and agricultural potential. The agricultural sector constitutes one of the main primary activities that contribute to the livelihoods of the population in the province and is characterised by large-scale and small-scale commercial agriculture as well as subsistence agriculture. Crop production dominates agricultural activities, with approximately 90% of the province under cultivation.

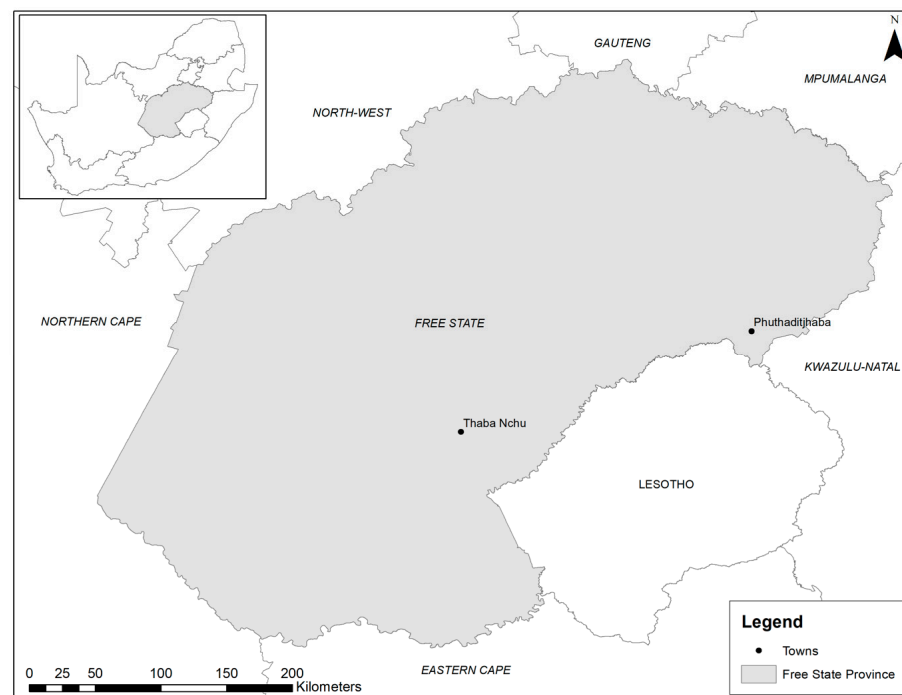


Figure 1. Free State Province map indicating the study areas: Thaba Nchu and QwaQwa (also officially known as Phuthaditjhaba).

2.2. Data

The data were collected using a random and convenient sampling method considering individuals between the age of 18 and 36. A total of 500 questionnaires were completed by youth respondents during the period of 2018 to 2021. Of the 500, only 492 respondents were used for the analysis, as 8 of the respondents did not meet the age criteria specified for the research. Youth who are currently participating in farming or agricultural-related activities and those not currently participating were targeted for this research. A pre-tested questionnaire was used to collect primary data from the youth who were willing to partake at free will. Though the questionnaire was provided in English, a provision was made to explain and elaborate to the respondents in their first languages, mainly Sesotho and Setswana, where necessary. Face-to-face meetings were arranged with youth through government extension officers in each study area, where a group of young people would gather at a central point in the village in which they reside. Young people attended the meetings of their own will depending on the convenience of the meeting times and location. The research team explained the purpose of the research to all youth and that their participation was voluntary before the questionnaire was distributed and respondents could withdraw anytime during the interview.

Following Chipfupa and Wale [27] and Chipfupa and Tagwi [33], the study adopts the modified sustainable Livelihood Framework (MSLF), which takes into cognisance the five sustainable livelihood framework (SLF) capitals (financial, social, natural, physical, and human) and psychological capital (PsyCap). Besides the six capitals, the study considers the entrepreneurial characteristics of youth as key determinants of livelihood strategies or choices by youth. Entrepreneurial characteristics indicate the ability of an individual to successfully complete a role or a job. Data on social, financial, human, physical, natural capital, PsyCap and entrepreneurial characteristics of youth respondents were hence obtained and captured in Microsoft Excel. Availability of resources such as land and credit are considered to influence the choice of agriculture as a career by youth [37,38]. Human capital and demographic factors such as age, skills, experiences, gender, marital status, household size and education also influence the decisions of young people to participate in agricultural activities [39–42]. The positive influence of social factors such as exposure to mass media,

membership in social organisations, access to extension agencies and information and communication technologies (ICTs) on youth engagement in agricultural activities has also been highlighted in the literature [40,43–45].

Table 1 depicts the descriptive statistics (means and standard deviations) of variables used for the analysis. For the purpose of this study, analysis is presented for the combined data collected from the two study areas.

Table 1. Descriptive statistics of variables used in the formation of youth typologies.

	Mean	Std. Dev
Human Capital		
Participation in Agric (% yes)	0.56	0.50
Age (years)	26.03	4.78
Household Size (family members)	4.31	2.09
Gender (% male)	0.57	0.50
Marital Status (% Single)	0.85	0.35
Education (At least matriculation completed)	0.61	0.49
Farming Experience (years)	2.75	4.54
Farming or agriculture business-related short-term training (% yes)	0.15	0.35
Support programme beneficiary (% yes)	0.06	0.24
Natural Capital		
Access to land (% yes)	0.57	0.50
Land size (Ha)	4.45	41.29
Physical Capital		
Access or control over any livestock (% yes)	0.34	0.47
Livestock Value (ZAR)	7592.30	33,286.26
Access or control to production assets (% yes)	0.29	0.46
Production assets value (ZAR)	30,284.78	184,085.04
Financial Capital		
Nonfarming Income (ZAR)	8675.53	26,352.29
Crop Income (ZAR)	2363.40	15,079.45
Livestock Income (ZAR)	3416.59	16,571.55
Social Grant (ZAR)	3393.19	6794.95
Credit (ZAR)	920.73	13,945.00
Social Capital		
Access to extension services (% yes)	1.67	1.25
Cooperative membership (% yes)	0.16	0.36
Youth club membership (% yes)	0.10	0.30
Access to social media (FB, WhatsApp, Instagram) (% yes)	0.75	0.43
Psychological Capital		
Hope		
Engage your family so that they parcel out to you a piece of land (S1)	3.81	1.17
Talk to traditional leaders to check for the possibility of acquiring land (S1)	3.52	1.28
Do nothing and hope that they will be available land soon (S1)	2.13	1.3
There is no possibility of resolving these constraints (S2)	2.63	1.4
You still have the potential to work through the challenges and turn things around (S2)	3.92	1.16
The government can address the issues (S2)	3.67	1.21
Resilience		
Give up and forget about the business (S1)	1.80	1.05
Consult your peers already in business to find out how they managed to obtain funding (S1)	3.95	1.15
Send your application to a different financial institution (S1)	3.97	1.19
Give up and forget about the business (S2)	1.84	1.13
Continue with the business and consult a business advisor/peer (S2)	3.93	1.22
Continue with the business and change the way you run your business activities (S2)	4.02	1.17

Table 1. Cont.

	Mean	Std. Dev
Human Capital		
Self-Efficacy/Self-Confidence		
Accept the deal (S1)	4.1	1.17
Ask them to find someone else (S1)	2.13	1.28
Ask them to wait because you still want to think about it (S1)	2.36	1.34
Optimism		
Continue with the business and see these failures and setbacks as temporary (S1)	3.81	1.24
Invest less of your time on your business and seek other opportunities (S1)	2.44	1.32
Quit the business and find something else to do (S1)	1.99	1.21
Sell the business (S2)	2.15	1.35
Sell a part of the business (S2)	2.64	1.40
Refuse to sell and continue with the business (S2)	3.49	1.39
Entrepreneurial characteristics		
Choose an investment with 50% chance of losing everything and a 50% chance that your money will be doubled.	2.74	1.47
choose an investment with 100% guarantee that your money will generate a 15% return on investment.	3.76	1.31
Quit the job and pursue the business opportunity.	2.38	1.39
Continue with your job and ignore the opportunity	2.38	1.39
Partner with people and utilize the opportunity while working	3.62	1.30
Source finance from other formal organisations that offer financial support	3.50	1.37
Source finances from informal organisations like community cooperatives, stokvels and loan sharks	2.44	1.37
Source out money from family and friends.	3.36	1.31
Work longer hours than usual including weekends or hire someone	3.98	1.18
Do nothing—opt out of business	1.91	1.21
Cancel some contracts to minimize workload	2.19	1.23
Contract neighbour businesses to make up quantity.	3.12	1.38
Look for piece work/informal work and earn some money for yourself	4.15	1.02
Ask your family to give you money	3.28	1.41
Rebrand your products, give them a fresh and new look	4.06	1.07
Adopt the new technology and retrench most of your workers	3.08	1.47
Continue being labour intensive and forego the potential profits	3.24	1.40
Switch to modern technology	3.76	1.33
Continue with the traditional methods	2.71	1.47
Successfully initiate and run the business with less assistance/mentorship	2.96	1.48
Need close assistance and mentorship from government and other stakeholders	3.82	1.29
Do business planning for your farming	4.06	1.25
Farm without a business plan	1.99	1.26

Note: Each psychological capital component was represented by two scenarios indicated as S1 and S2.

About 56% of the respondents participated in agricultural activities. Participation levels were specified as; (1) full-time farming or related economic activities as an individual, (2) full-time farming or related economic activities as part of a cooperative, (3) partially in farming or related economic activities through family/business and (4) not currently engaged in farming or related economic activities. Approximately 62% of the respondents that participated in agricultural activities were involved partially through family businesses. This is a reflection that, for most, their participation does not necessarily mean that they have made a livelihood choice; rather, they reside within agricultural households [33]. The average number of individuals residing in a household is approximately four, with an average age of around 26 years of age. In terms of gender, there is a slight skew of the distribution in favour of males (57%). Of the 56% of the respondents that participated in agricultural activities, 64% were males.

Concerning the level of education, most of the respondents have matriculated as the highest level of education attained. Chipfupa and Tagwi [33] also found the same

regarding the education level attained by youth in their study. The notably low averages of access to training (15%) and other support (6%) are also consistent with literature that highlights low access of youth to training and support initiatives, though they are considered key to enhancing youth participation in agriculture [16,33]. More than half (57%) of the respondents had access to land. Importantly, limited access to productive assets (29%) and credit (R920.73 on average) by the respondents is also evident, and these challenges have been highlighted among factors impeding the active engagement of youth in agriculture. Regarding income sources, more than half (55%) of the respondents have access to social grants as a source of income compared to the approximately 38% that earn nonfarming income. Social grants are considered an important source of income for rural communities [46].

Regarding PsyCap and the entrepreneurial characteristics of youth, variables were measured according to 5-point Likert scales (1 = strongly disagree to 5 = strongly agree and 1 = very unlikely to 5 = very likely, respectively). Different scenarios were used as an indirect approach to measure entrepreneurial characteristics and PsyCap to avoid a bias of using self-reported scores. The Likert scale measured the responses to the scenarios presented. A behavioural approach that includes scales for hope, resilience, self-efficacy, and optimism was adapted to measure PsyCap [46]. Scenarios related to entrepreneurial characteristics expressed as scales of risk taking, efficiency and profitability and embracing change, opportunity taking, determination, proactiveness, independence, innovation and creativity, locus of control and goal orientation were used. Negative statements included in the questionnaire were excluded from the analysis as these responses are also captured by the scale of the positive statement. The approach used in this study to describe the means of the Likert scale data follows work by Pimentel [47]. For this 5-point Likert scale, means intervals are described as follows; 1.00–1.79 denotes strongly disagree or very unlikely, 1.80–2.59 denotes disagree or unlikely, 2.60–3.39 denotes neutral, 3.40–4.19 denotes agree or likely and 4.20–5.00 denotes strongly agree or very likely. The means for PsyCap and entrepreneurial characteristics highlighted in Table 1 show general positive entrepreneurial characteristics as indicated by means (>3.39) that show determination and persistence, a strong drive to achieve, independence, innovation, and being visionary and goal oriented. However, the respondents indicated a low internal locus of control. Participants are characterised by high hope and resilience but low self-efficacy and optimism.

2.3. Empirical Models

A two-stage multivariate analytical approach was employed to develop youth typologies using Principal Component Analysis (PCA) and cluster analysis (CA) using the Statistical Package for Social Sciences (IBM SPSS version 28). Stage one included 3 steps and stage two included 2 steps. During the first stage, PCA was used to reduce the dimension of variables. Within stage 2, the indexes generated with PCA were used as variables in CA to group youths with more similar asset endowment to one another to construct youth typologies. CA is a recognized statistical classification tool designed to classify the dataset into clusters with members that show similar characteristics to one another compared to members of other clusters [48–50]. The multivariate analytic approach was applicable following its use in typology development studies in agriculture to characterise farms, farming systems and farmers [26,29,31,33].

2.3.1. Stage 1: Reduction of Variables Dimension

PCA was conducted in three steps. Firstly, a PCA was conducted to reduce dimensionality of variables representing psychological capital; then, a second PCA was conducted on entrepreneurial characteristics. The last PCA included the Sustainable Livelihood Framework (SLF) variables combined with the indexes of psychological and entrepreneurial dimensions derived from the first two PCAs. For each PCA, a number of rules were considered to successfully complete the analysis. Firstly, the generated correlation matrix should have a minimum of three variables that have correlation coefficients greater than 0.5 for

the procedure to continue. Then, the generated correlation coefficients on the anti-image matrices should be greater than 0.5. Factors that do not meet the criteria are excluded from the analysis [51]. The appropriateness of the analysis was determined by means of the Kaiser–Maier–Olkin (KMO) test, with a result greater than 0.5, and a statistically significant Bartlett’s Test of Sphericity [52,53]. Following the communalities criteria, factors with communalities of less than 0.5 were excluded from the analysis. Communalities represent the proportion of the variance in the original variables that is accounted for by the factor solution. Each factor should explain at least 50% of the variance in each component included. The varimax method was used to rotate the factors to check for complexity within structures or loadings of each component. Following the Kaiser rule, all principal components (PCs) with an eigenvalue greater than one were retained. Factor loadings greater than 0.4 (absolute value) were considered to have strong factor loading and were used to interpret each component [27,31,33,54].

2.3.2. Stage 2: Typology Formulation

The reduction of number of variables was essential in cluster analysis to retain stable and non-overlapping clusters which presents the second step of typology formulation [37,55]. The factors retained in the third PCA represented variables that were subjected to a CA which resulted in clusters representing youth typologies. Following the guidance of Musafiri et al. [29], Upadhaya et al. [30] and Twumasi et al. [38], the CA followed a two-step clustering procedure where factors were first subjected to Ward’s hierarchical clustering within the first step and then K-means clustering during the second step to ensure stable clusters. Hierarchical clustering is useful to determine the optimal number of clusters and also results in clusters with a good distribution of number of variables per cluster while K-means clustering classifies or groups variables into interpretable clusters. Using the clustering used by Ward [56], the distance between every pair of clusters is computed, and the two closest clusters are merged into a single cluster at each iteration [52]. The optimal number of clusters (k) retained from Ward’s method were used as a starting point for K-means clustering to obtain a desired number of un-nested clusters. Marzban and Sandgate [49] explain that the Ward’s method performs best among hierarchical methods.

3. Results and Discussion

3.1. Reducing Dimension of Variables

3.1.1. Psychological Capital Indexes

A total of 16 statements measuring PsyCap were initially included in the first PCA. Four of the statements were excluded as the variables did not meet the communalities criteria. The 12 statements that were included in the first PCA yielded five components. The factor loadings of the respective variables are provided in Table 2. The components included explained about 66% of the total variability in the data set. Each component was evaluated and labelled according to variables with the strongest loading within each component as presented in Table 2. Factor loadings greater than 0.4 are highlighted in bold font for ease of interpretation as recommended by [57].

The first component (PC1) had strong positive loadings on variables that relate to youth who do not easily give up in the face of adversity; hence, it was named resilience. These youth were willing to persist to secure funding even in a scenario of multiple rejections by funding agencies, and were also persistent in scenarios of the business making a loss. According to Luthans et al. [58], setbacks are inevitable within entrepreneurial ventures and the ability to be resilient and continue even during setbacks is a key success factor in a business. Chipfupa and Tagwi [33] also found youth to be resilient and hope for positive outcomes. The component represents youth who are willing to persist and see alternative options to succeed in business.

Table 2. Psychological capital components.

Variable (Statement)	Component				
	PC1	PC2	PC3	PC4	PC5
Continue with the business and consult a business advisor/peer	0.88	−0.02	−0.11	0.03	0.01
Continue with the business and change the way you run your daily business activities?	0.81	−1.4	−0.6	−0.4	−0.8
Consult your peers already in business to find out how they managed to obtain funding	0.66	0.10	−0.06	0.33	−0.05
Refuse to sell and continue with the business.	0.05	−0.80	0.03	0.15	0.10
Sell the business	−0.13	0.78	0.06	0.03	−0.05
Sell a part of the business	0.13	0.66	0.01	0.07	0.31
Ask them to wait because you still want to think about it?	−0.11	0.00	0.87	0.01	−0.08
Ask them to find someone else?	−0.08	0.03	0.82	−0.03	0.18
The government can address the issues.	0.04	−0.03	−0.04	0.81	−0.07
You still have the potential to work through the challenges and turn things around.	0.11	−0.03	0.02	0.77	0.02
Invest less of your time on your business and seek other opportunities	0.10	0.02	0.25	0.02	0.78
Talk to traditional leaders to check for the possibility of acquiring land	0.32	−0.01	0.18	0.11	−0.64
Eigenvalues	2.39	1.68	1.52	1.21	1.09
% of variance explained	19.90	14.03	12.65	10.12	9.06

Notes: KMO = 0.61; Bartlett's Test of Sphericity < 0.001; Total cumulative variance = 65.73%.

The second component (PC2) shows strong loadings on factors describing respondents who are discouraged about struggles in their farming business operations and who are willing to give up on a business if it is not financially rewarding and sell the business and move on, or sell part of the business. This component is labelled pessimistic. Individuals with higher levels of optimism consider unfavourable situations as only being temporary and make positive attribution to success, always looking on the bright side of situations, while pessimistic individuals consider setbacks as being permanent and quit easily [47].

Principal component three (PC3) presents youth who do not believe in their ability to achieve specific performance attainment. PC3 is named low self-confidence. Self-confidence represents the overall value that one places on oneself as a person and their ability to cope and perform in a given task [55]. Individuals who show low conviction of their abilities to mobilise courses of action (decisions) needed to successfully execute a specific task within a given context are considered to have low self-confidence [59]. The component characterises respondents that do not believe in their abilities to lead even when resources are available.

Principal component four (PC4) showed strong loadings on factors representing hope regardless of the various socio-economic challenges youth are faced with, and hence it is named hopeful. Schneider [60] describes hopeful individuals as those that have a positive motivational state oriented on successful outcomes to events and also see many ways to tackle a challenge. Respondents in this component acknowledge the role of the government to address challenges such as unemployment, lack of access to capital and information, and poverty. The fifth component (PC5) describes respondents who do not have the ability to envisage alternative ways through which they can overcome challenges, thus increasing the chances of being overwhelmed and quitting. The component is named hopelessness as it characterises youth who do not see a way of overcoming challenges such as constrained access to productive resources they are currently facing. Lack of hope can inevitably result in individuals losing their willingness to explore alternative ways to succeed in a given situation, but seeking alternative opportunities instead.

The extracted PsyCap indexes indicate that respondents were characterised by both positive and negative PsyCap. While some are willing to persist in accessing resources such as finances and seek alternative strategies to improve the profitability of the business, others are hopeless, pessimistic and ready to sell the business and seek alternative opportunities. Some youth respondents are characterised by the hope that challenges such as access to land, unemployment and poverty can be addressed through government support, while others lack the self-confidence to lead such support initiatives such as cooperatives. The next section presents the extracted indexes for entrepreneurial characteristics in step two.

3.1.2. Entrepreneurial Indexes

In compiling entrepreneurial indexes in the second PCA, a total of 16 statements were initially included in the analysis. Three of the statements were removed during the procedure as they did not meet the communalities criteria. Table 3 provides the factor loading of variables for the six components that were retained, and they explained about 64% of the total variation in the data.

Table 3. Entrepreneurial characteristics components.

Variable (Statement)	Component					
	PC1	PC2	PC3	PC4	PC5	PC6
Need close assistance and mentorship from government and other stakeholders to successfully run the business	0.83	0.02	0.00	0.04	0.15	0.05
Successfully initiate and run the business with less assistance/mentorship	− 0.83	0.11	−0.07	0.02	0.13	0.02
Look for piece work/ informal work and earn some money for yourself	−0.03	0.71	0.13	−0.11	0.21	−0.06
Work longer hours than usual including weekends or hire someone to get the job done?	−0.10	0.70	0.09	0.22	−0.06	0.18
Adopt the new technology and retrench most of your workers?	0.01	0.04	0.85	0.05	0.03	−0.18
Switch to modern technology?	0.06	0.17	0.72	0.05	0.01	0.29
Ask your family to give you money	0.03	0.06	0.10	0.74	0.06	−0.10
Source out money from family and friends.	0.02	0.04	−0.01	0.71	0.16	0.13
Do business planning for your farming?	0.21	0.32	0.32	− 0.39	0.32	0.13
Contract neighbour businesses to make up quantity.	0.02	−0.09	0.03	0.26	0.77	−0.03
Rebrand your products, give them a fresh and new look?	−0.01	0.14	0.02	0.01	0.67	0.05
Source finance from other formal organizations	0.17	0.29	−0.03	0.10	−0.11	0.74
Quit the job and pursue the business opportunity.	−0.26	−0.34	0.15	−0.16	0.26	0.62
Eigenvalues	2.12	1.53	1.40	1.08	1.07	1.04
% of variance explained	16.80	11.77	10.73	8.30	8.22	7.99

Notes: KMO = 0.62; Bartlett's Test of Sphericity < 0.001; Total cumulative variance = 63.79%.

The first component (PC1) had strong loading on factors relating to low self-reliance, characterising youth who have low internal entrepreneurial drive and do not believe in themselves to succeed on their own without support regardless of availability of other resources. The second component (PC2) was strongly loaded on variables that show a strong drive to achieve one's goals. Respondents represented in this component are committed to pursuing opportunities they have identified before asking for external assistance. This component was named proactive and independent. PC3 had high factor loadings on variables characterising youth that are willing to switch to modern methods of operating businesses and was named embrace change.

Component four (PC4) was named problem-solving attitude, but this attitude lacks vision given the positive loadings on variables that represent respondents who do not hesitate to search for assistance to overcome a challenge or constraint but would also rather farm without a business plan. The preference to source financial assistance from family members may characterise youth who are also not strongly committed to business initiatives. The fifth component (PC5) had strong loadings on variables related to youth who have a strong drive to achieve and are innovative. The last component (PC6) characterises youth who are opportunists and determined to access resources to succeed in their entrepreneurial ventures. PC6 represents respondents who reflect entrepreneurial opportunistic behaviour as they are willing to pursue a business opportunity regardless of having a stable job.

The results from the PCA on entrepreneurial characteristics show that respondents are characterised by positive entrepreneurial characteristics such as being proactive, skilled in problem solving, having a strong drive to achieve and being innovative. These characteristics have been highlighted to position youth as pivotal role players in the transformation and repositioning of the agricultural sector, restoring its image and replacing the ageing farming population [61,62]. The next section presents indexes extracted in step three where SLF variables combined with the indexes of psychological and entrepreneurial indexes derived from the first two stages are reduced.

3.1.3. Sustainable Livelihood Assets, Psychological Capital and Entrepreneurial Indexes

For the third PCA, a total of 32 variables were included in the analysis, with 21 of the variables represented selected variables representing the six livelihood capitals indicated in the MSLF as guided by the literature, while the other 11 were indexes extracted from the first two PCAs in step one and two. The analysis yielded eleven principal components, which explained about 62% of the variation within the data. Table 4 represents the factor loadings in each component.

PC1 has strong positive loading on factors related to participation in agricultural activities, being endowed with land and having farming experience. The component was named 'experienced participants with access to land'. The second factor (PC2) has high loadings on factors related to respondents who are members of cooperatives and youth clubs and are beneficiaries of government support programmes such as financial support, support with inputs or training. The component was named 'support beneficiaries and social network membership'. PC3 characterises respondents who rely on non-farming income as main source of income and have access to credit. The component was named 'job security'. Component 4 (PC4) emphasizes the role of access to extension to access training, with strong positive loadings on both variables. The component was named 'training beneficiaries with access to extension'. PC5 has high loadings on factors related to marital status, which indicated single marital status.

Component 6 (PC6) has positive loadings on factors related to respondents that own or have control over livestock and mainly source their income from livestock sales. The respondents in this component are also opportunistic and determined, so the component was named 'opportunistic and determined livestock farmers'. The seventh component (PC7) has high loadings on factors relating to resilient, proactive, and independent respondents. The eighth component (PC8) was named 'educated with access to social media', given the strong positive loadings on education level completed and access to social media. Component 9 (PC9) characterises respondents who come from larger households that rely on social grants as the main source of income and was named 'social grant-reliant households'. Component 10 (PC10) shows high loadings on factors that represent youth who are hopeful and have access to production assets, and was named 'hopeful with access to production assets'.

Principal component eleven (PC11) has high loadings on variables relating to gender and low self-confidence and was named 'females with low self-confidence'. Though both females and males are involved in agricultural activities, societal ideologies consider activities such as agriculture mainly suitable for males, resulting in females not believing in their abilities to contribute significantly to the sector [63]. Component twelve (PC12) has high loadings on variables representing negative PsyCap and positive entrepreneurial characteristics. The component characterises youth that are hopeless but have a strong drive to achieve and are innovative (positive entrepreneurial drive). Component 13 (PC13) has strong loadings on embracing change. The component characterises traditional farmers. The strong loadings on the last component (PC14) were on variables relating to respondents who have a problem-solving attitude but are pessimistic and lack vision in business ventures.

Indexes extracted in step three highlight the different access to livelihood capital among respondents. While others have access to land and secure income, some have access to social capital and rely on income received through social means. While some respondents show positive PsyCap, others are strongly entrepreneurially inclined. The next section presents stage two of the analysis, where typologies were formulated.

Table 4. Components of variables used in typology formulation.

Variable (Statement)	Component													
	PC ₁	PC ₂	PC ₃	PC ₄	PC ₅	PC ₆	PC ₇	PC ₈	PC ₉	PC ₁₀	PC ₁₁	PC ₁₂	PC ₁₃	PC ₁₄
Access to land	0.79	0.13	−0.05	0.08	−0.03	0.00	−0.05	0.03	0.02	0.03	0.13	0.02	0.05	0.01
Participation in Agric	0.78	0.18	0.01	0.13	−0.01	0.18	−0.03	−0.02	−0.03	0.02	0.05	0.04	0.07	−0.03
Farming Experience	0.70	−0.06	0.09	0.04	−0.11	0.05	0.12	−0.05	0.02	−0.04	−0.14	−0.05	−0.07	−0.09
Low self-reliance	−0.33	−0.12	−0.06	0.19	0.19	0.18	0.12	0.16	−0.06	0.02	−0.14	−0.06	0.31	−0.11
Youth club membership	0.05	0.79	0.02	−0.02	−0.03	0.08	−0.01	0.08	−0.02	0.00	−0.17	0.08	0.04	0.01
Cooperative membership	0.14	0.68	−0.07	0.27	−0.08	0.08	0.03	0.07	−0.03	0.03	0.13	−0.14	−0.07	0.07
Support Programme beneficiary	0.18	0.48	−0.08	0.10	0.13	−0.02	0.26	−0.09	−0.07	0.08	0.24	−0.08	−0.03	−0.09
Nonfarming Income (R)	0.02	0.02	0.84	0.02	−0.08	−0.01	0.01	0.05	0.01	0.06	−0.05	0.02	0.01	0.02
Credit (R)	0.02	−0.07	0.77	0.06	0.03	0.02	0.08	0.04	−0.04	−0.06	0.07	−0.06	0.01	−0.01
Crop Income (R)	0.02	0.09	0.12	0.78	0.06	0.06	−0.09	0.05	0.04	0.11	−0.03	−0.04	0.01	0.00
Farming or agriculture business-related short-term training	0.20	0.16	−0.02	0.56	−0.08	−0.01	0.29	−0.16	0.01	−0.07	−0.08	0.08	−0.15	−0.06
Access to extension services (How Often)	0.24	0.12	−0.05	0.43	−0.25	0.12	0.12	0.06	−0.27	0.04	0.23	−0.17	0.14	−0.09
Marital Status (Single/otherwise)	0.01	−0.03	−0.08	0.07	0.79	−0.09	0.05	0.03	−0.04	−0.10	0.00	0.00	−0.08	−0.01
Age	0.27	−0.02	−0.05	0.17	−0.67	−0.02	0.14	−0.17	−0.15	−0.05	−0.05	0.01	−0.02	−0.12
Livestock Income (R)	0.01	0.12	−0.05	0.14	−0.15	0.75	−0.05	0.13	0.03	−0.07	−0.02	−0.05	0.01	0.00
Access to livestock seizing opportunities and determined	0.38	0.06	0.04	−0.15	0.10	0.64	0.11	−0.04	−0.18	0.05	−0.05	0.00	0.03	−0.10
Resilient	−0.01	−0.06	0.13	0.12	0.02	0.43	0.31	−0.19	0.13	0.36	0.10	0.04	−0.21	0.18
Proactive and independent	0.05	0.01	0.02	0.14	0.00	0.12	0.72	0.12	−0.02	−0.02	0.02	0.12	0.06	0.09
Access to social media	−0.10	0.14	0.13	−0.14	−0.09	−0.15	0.61	0.07	0.07	0.09	−0.06	−0.28	−0.04	−0.19
Education	−0.13	0.00	0.03	−0.04	0.09	0.07	0.01	0.70	0.06	0.12	0.12	−0.11	−0.19	−0.10
Household Size	0.05	0.22	0.20	0.00	0.10	0.03	0.23	0.49	−0.02	−0.07	−0.20	0.04	0.06	0.02
Income Social Grant (R)	0.02	−0.02	0.00	0.00	0.03	0.01	0.00	−0.04	0.84	0.03	0.01	−0.05	0.04	0.02
Hopeful	0.06	−0.06	−0.10	0.02	0.08	−0.08	0.08	0.25	0.47	−0.07	−0.11	−0.08	0.51	−0.06
Hopeless	−0.01	0.02	−0.05	0.04	−0.07	−0.05	0.06	0.08	−0.04	0.82	−0.02	0.02	0.02	0.00
Access to production assets	−0.01	0.02	−0.05	0.04	−0.07	−0.05	0.06	0.08	−0.04	0.82	−0.02	0.02	0.02	0.00
Low self-confidence	0.05	0.32	0.14	0.09	0.02	0.32	−0.17	0.04	0.15	0.41	−0.03	0.16	−0.05	−0.15
Gender	0.05	0.02	0.05	−0.03	0.04	−0.01	−0.02	−0.02	−0.02	−0.01	0.84	0.02	0.08	−0.01
Strong drive to achieve and innovative	0.22	0.12	0.16	−0.02	0.32	0.11	−0.05	−0.26	−0.36	0.28	−0.39	−0.07	0.13	−0.04
Embraces change	−0.01	−0.04	−0.02	−0.07	0.02	−0.04	−0.05	−0.06	−0.02	0.05	0.02	0.80	−0.08	−0.06
Pessimistic	0.12	0.03	−0.10	0.19	−0.10	−0.03	0.24	0.40	−0.20	0.08	−0.04	0.44	0.22	0.22
Problem-solving attitude but lacks vision	−0.02	−0.01	−0.08	0.07	0.12	0.00	0.02	0.23	−0.01	−0.02	−0.15	0.01	−0.76	0.00
Eigenvalues	−0.14	0.04	0.02	−0.06	0.03	0.00	0.03	−0.11	0.03	−0.07	0.00	0.02	−0.03	0.84
% of variance explained	0.12	−0.08	−0.01	−0.01	0.12	−0.13	−0.13	0.29	−0.02	0.28	−0.05	−0.35	0.00	0.47
	3.45	1.95	1.56	1.53	1.42	1.27	1.23	1.17	1.11	1.07	1.06	1.03	1.02	1
	10.79	6.10	4.87	4.79	4.44	3.98	3.83	3.65	3.47	3.35	3.33	3.23	3.18	3.13

Notes: KMO = 0.68; Bartlett's Test of Sphericity < 0.001; Total cumulative variance = 62.13%.

3.2. Youth Typology Identification and Characterisation

The fourteen factors retained in the final PCA were subjected to a CA to typify youth. The first step of the CA (hierarchical CA) resulted in seven cluster groups. The cluster solution was obtained by cutting the cluster tree at a linkage distance of 14 that indicated

stable number of clusters on the dendrogram (Figure 2). The dendrogram was cut at 14 (bold orange line) using subjective inspection relating to the objective of the research to identify smaller homogeneous groups (typologies) [52]. Cutting the dendrogram at a lower distance at 12 (black dotted line) or higher distances at 15 and 18 (blue and red dotted lines), resulted in non-significant between group differences for some variables for the successive k-means clusters.

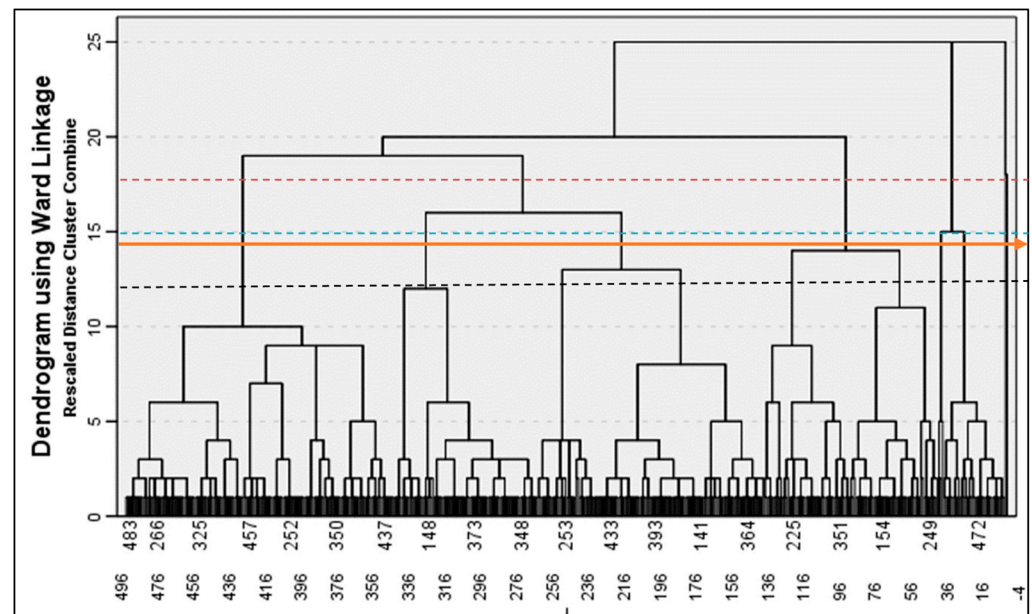


Figure 2. Dendrogram representing the hierarchical cluster analysis solution.

The starting point of the second CA step (K-means) was the seven clusters retained from the first step. A seven-cluster solution resulted in step two, as presented in Figure 3. The resulting clusters represent the seven youth typologies. The final cluster centres represent the mean values of all variables in the cluster. The higher the mean, the higher the contribution of the variable to cluster solution and the more discriminating that variable is within that cluster.

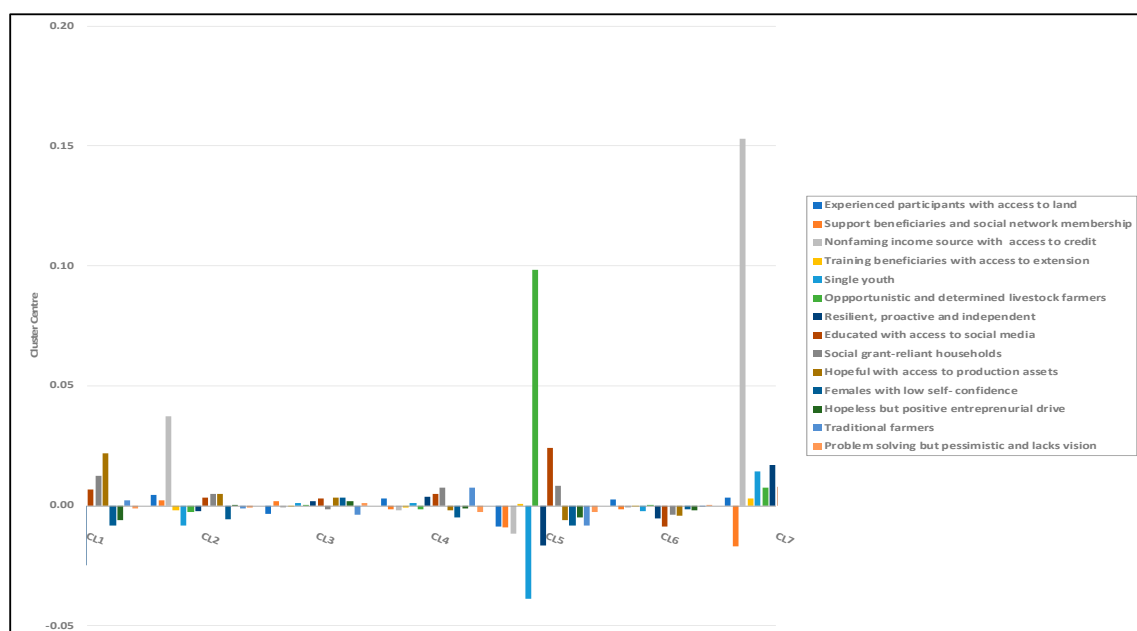


Figure 3. Final cluster centres for the factors included in the cluster analysis.

Although the final cluster centres provided the empirically identified defining attributes within each cluster and its naming, exploring the average values and proportions of main characteristics within each factor (Table 5) was also useful to illuminate characteristics of each typology. The clusters were named according to defining attributes, as highlighted by the more pronounced graph bars representing final cluster centres in Figure 3.

Table 5. Characteristics of youth typologies.

	CL1	CL2	CL3	CL4	CL5	CL6	CL7	<i>p</i>
	(n = 1)	(n = 9)	(n = 221)	(n = 110)	(n = 1)	(n = 149)	(n = 1)	
Human Capital								
Participation (% yes)	100	77.78	42.99	63.64	100	66.44	100	*
Age	25	27.56	24.83	25.92	34	27.81	20	*
Household Size	6	4.78	4.02	5.64	4	3.71	5	*
Gender (% male)	100	88.89	47.06	54.55	0	70.47	100	*
Marital Status (%Single)	100	55.56	88.69	90.00	0	79.19	100	*
Education (At least matric)	100	100	67.42	80.91	100	34.90	100	*
Farming experience (years)	4	4.22	1.50	3.52	2	3.91	10	*
Farming/Agriculture related training (% yes)	100	22.22	15.38	12.73	0	14.09	0	0.32
Natural Capital								
Access to land (% Yes)	100	77.78	47.96	65.45	100	62.42	0	*
Land size (Ha)	50	3.06	5.19	1.05	600	1.69	0	*
Physical Capital								
Access to livestock (% yes)	0	33.33	31.22	30	100	39.6	100	0.24
Livestock Value (Rand)	0	2388.89	9311.02	2773.27	7500	6977.30		*
Access to production assets (% yes)	100	66.67	36.65	25.55	100	19.46	0	*
Production assets value (Rand)	1,450,000	137,511.11	44,512.99	6390.45	260,000	11,260.88	0	*
Financial Capital (Rand Value)								
Non-Farming Income	56,000	150,666.67	6257.60	4442.36	0	5336.72	189,600	*
Crop Income	300,000	4277.78	2184.25	1587.93	0	1120.13	0	*
Livestock Income	0	1555.56	3326.47	2645.27	240,000	2596.17	304,000	*
Social Grant	0	3386.67	1212.83	10,922.83	0	1137.05	0	*
Credit	11,000	9388.89	238.46	44.55	0	19.46	297,000	*
Social Capital (% yes)								
Access to extension	100	88.89	92.76	89.09	100	93.29	100	0.23
Cooperative membership	100	11.11	22.17	8.18	0	11.41	0	*
Youth Club membership	0	11.11	13.57	10.00	0	5.37	0	0.33
Access to social media	100	88.89	92.31	83.64	100	41.61	100	*
Beneficiary of support programmes	0	0.00	10.41	3.64	0	2.68	0	0.07
Psychological Dimensions								
Resilient	88.76	65.46	70.93	74.31	4.80	57.95	91.8	*
Pessimistic	29.39	32.94	41.40	32.51	11.59	40.60	29.02	*
Low self-confidence	26.02	34.58	42.95	29.65	14.56	36.40	55.44	*
Hopeful	85.92	62.08	69.23	60.61	80.70	54.95	68.11	*
Hopeless	31.78	35.92	48.02	40.85	38.32	44.19	21.45	*
Entrepreneurial dimension								
Low self-reliance	80.73	53.27	65.40	69.96	78.67	59.48	82.57	*
Proactive and independent	74.04	72.11	63.79	68.48	56.75	56.59	96.7	*
Embraces change	2.33	57.98	65.80	52.48	78.17	56.96	42.21	*
Problem solving attitude but lacks vision	60.17	51.81	52.31	51.96	45.32	47.76	55.72	0.44
Strong drive to achieve and innovative	79.87	56.77	61.48	61.89	68.26	50.74	47.14	*
Seizing opportunities and determined	62.90	58.45	52.76	43.23	91.64	43.27	66.36	*

Note: All values are means or proportions (representing yes and positive). Means have been used rather than medians to better illustrate differences between youth typologies. * $p < 0.05$.

An ANOVA variance test was carried out for continuous variables, while a chi-Square test was performed for categorical variables to ensure that variables within clusters were

statistically different from each other using a threshold of $p < 0.05$. Most of the variables were statistically significant ($p < 0.05$), reflecting differences among clusters as indicated in Table 5. However, variables such as farming or agriculture-related training, youth club membership and beneficiary of support programmes were not significant as access is low across all typologies. There are also no statistical differences in access to livestock among respondents, though the income received from livestock sales is significant. This can highlight the different purposes of keeping livestock within households. Access to extension was also not significantly different among respondents, as most of them highlighted access to extension. Nevertheless, the frequency of access was different. The resulting F-values for most variables indicated a good and strong contribution of the specific variable to cluster separation, indicating stable clusters. Means of PsyCap and entrepreneurial characteristics variables indicated in Table 5 were calculated using standardised scores (z-scores) between 0–100 calculated from indexes generated during the PCA procedure (stage one).

3.2.1. Training Beneficiaries with Access to Extension

Cluster one (CL1) was represented by one respondent who sourced income from non-farming and farming activities. CL1 is associated with the second highest access to land (50 Ha) and the highest average crop income (R300,000) relative to all clusters. The respondent in this cluster is involved in farming activities full time, operating within a cooperative. According to Zantsi et al. [31], cooperatives have been identified as a viable solution for addressing youth unemployment. Regardless of the respondent sourcing income from permanent employment, participation in agricultural activities through a cooperative has also resulted in additional income that can improve the livelihood of the youth. Characterised with positive PsyCap and positive entrepreneurial characteristics, young people represented by CL1 can be considered to be already engaging actively in agricultural activities.

3.2.2. Job Secure

Cluster two (CL2) is defined by the highest mean non-farming income, indicating job security. Approximately 2% of the total respondents are included in this cluster, with an average income of R150,666.67 sourced from non-farming activities. The youth are also characterised by the highest access to credit, which is expected given that job security is one of the major factors considered when it comes to credit access and repayment ability. This finding is consistent with Twumasi et al. [38], who also found that income-secure young farmers are considered creditworthy by lenders and are hence considered credit unconstrained. Youth in this cluster participate (78%) in agricultural activities through crop farming, as indicated by the highest average crop income and the second highest average farming experience regardless of job security. Access to productive assets such as land and credit encourages youth to participate in agricultural activities [35,64]. Furthermore, the second-highest mean access to farming or agriculture-related training indicates an interest in building skills and knowledge in agricultural activities.

The dominant PsyCap attributes include resilience and hopefulness, which reflect positive PsyCap. The cluster is also characterised by positive entrepreneurial characteristics (proactive and independent, with a strong drive to achieve and innovative, seizing opportunities and determined), indicating that the youth can take advantage of agricultural entrepreneurial activities along the value chain given that most of them are job secure. The characteristics of this cluster may reflect youth that farm as part of diversification strategies, as found by Rietveld [25]. Though youth were participating in agricultural activities, they are also engaged in nonfarming activities for their livelihood. The constraints facing this group include limited to no access to government support and limited involvement in social networks, which may have an influence in further shifting their livelihood away from agricultural activities.

Given this profile of youth, market or business-oriented support and development initiatives would be more suitable if improved networks and government support are

prioritised to enhance their participation in agricultural entrepreneurial ventures. The entrepreneurial mindset of youth in this cluster offers a vital characteristic that can be explored to enhance youth involvement in agriculture and related activities through entrepreneurial initiatives. This entails improved access not only to extrinsic resources such as capital but also to entrepreneurial characteristics and psychological capital. Access to social networks and extension highlighted in this cluster can enhance the potential of youth to maximise the utility of assets they already have, such as access to credit. According to Mayanja et al. [65], social capital can enhance access to support initiatives from government and non-government institutions such as group marketing. Tailor-made social assets will benefit the active engagement of youth represented in this cluster. In addition, access to production assets and credit highlighted in the cluster can drive participation in business through high-value-added economic activities [33,35].

3.2.3. Gender Sensitive with Negative PsyCap

Cluster three (CL3) constitutes the highest proportion of respondents, with approximately 45% of the total respondents. CL3 is the only cluster that includes more females than males. The cluster characterises single respondents with the least participation in agricultural activities (43%) and sourcing most of their income from non-farming activities. Quisumbing and Doss [63] highlighted that constrained access to productive resources such as land, financial services, assets, technology, and opportunities limit the active participation of females in agricultural activities. The least participation in agricultural activities may thus be attributed to the cluster constituting more females than males.

CL3 is characterised by the lowest access to land, which is mainly attributed to higher vulnerabilities to tenure insecurity among female youth. Zulu et al. [23] and Rietveld et al. [25] also highlighted the constrained access to land by female youth. The respondents in this cluster have a relatively higher social capital endowment compared to other clusters as indicated by highest cooperative and youth club membership and access to social media. Low access to social capital has however been indicated in previous studies [11,60]. The participation of females in social networks in this case may thus be attributed to efforts to access resources.

Notably, CL3 is characterised by youth endowed with negative psychological capital as the cluster is associated with factors that show low self-confidence, pessimism and hopelessness, which could be potentially attributed to constrained access to livelihood assets. The deeply rooted sociocultural beliefs and norms on gender roles contribute to prevalence of negative PsyCap [11,25]. Though the role of females in agriculture has been increasingly acknowledged both as labourers and farm business owners and managers, gender gaps are still evident in the agricultural sector [66,67]. The group, however, shows some positive entrepreneurial characteristics such as being strongly driven to achieve, innovative, seizing opportunities, determined, and embracing change. Rural females are involved in petty trading activities of agricultural output such as fruits and vegetables [42,68]. The relatively positive entrepreneurial characteristics are considered to root from the need to supplement their diet and make an income while having flexible schedules to make room for household chores and family time. The current involvement of youth in social networks in this cluster can be used as platforms for training, to access information and to develop entrepreneurial skills so they can also participate in and grow their own entrepreneurial ventures.

3.2.4. Social Grant Reliant Households

Cluster four (CL4) is defined with the highest average household size (6) and highest average income sourced from social grants. The youth in this cluster constitute about 22% of the total respondents. The cluster represents single dependent youth that still reside with their financially burdened families. Social grants are considered an important income source for most underprivileged households in RSA [69], including for youth in this cluster. Chipfupa and Wale [70] and Sinyolo, Mudhara and Wale [71] also highlighted the reliance on social grants as a source of unearned income for smallholder farmers. Though

participation in farming and agricultural activities is fair (64%), the group has participated the least in farming or agriculture-related training and has access to the smallest average land size of about 1 hectare. Of youth participating in agricultural activities in this cluster, 62% indicated that they participate partially through family businesses or activities. This reflects that these youth participate in agricultural activities as part of family chores, not because they are interested. Djurfeldt et al. [11] identified a similar typology of youth who farm together with their families and labour is provided as part of household requirements. The least access to land can be attributed to poor access to land through inheritance and poor succession and land transfer plans [72].

With social grants constituting the main source of average household income, only 6% of respondents in this cluster that have access to social grants highlighted that they utilise some of the income for procurement of agricultural production input. The respondents in CL4 are also endowed with the least physical capital. Furthermore, the relatively low support received through government support programmes can also limit participation due to the aforementioned lack of productive resources. These youth might be discouraged to participate in agricultural activities if succession delays and other potential income earning opportunities come their way. Furthermore, given that preference is given to married youth during land allocations [73], the single youth in this cluster may be disadvantaged. The cluster is characterised by positive PsyCap indicated by high resilience, self-confidence and optimism which can be key attributes that can enhance the participation of youth if challenges such as limited access to credit and limited social networks are addressed. The cluster characteristics compare well with Juma [12], who found an economically burdened typology of farmers with positive PsyCap but characterised by negative entrepreneurial characteristics such as low self-reliance, least ability to embrace change and low determination and ability to seize opportunities. Constrained access to finance presents a barrier to entrepreneurship.

Poor access to government support and the least membership in cooperatives is also an evident constraint within this cluster. Social networks are considered crucial platforms to enhance resource access, for instance through collective action initiatives to access land and credit. Networking and membership also provide a platform for information sharing (market information, production techniques, technology adoption) and skills development through learning from each other [74]. For these youth, participation in activities such as marketing and trading that require limited access to scarce resources such as land and physical resources can also be pivotal to transforming the agricultural sector [10]. Compared to other groups, youth in this cluster can benefit from enhanced social capital through affiliation in youth social groups, associations, and cooperatives. Building social capital for these youth can play a key role for youth to access productive resources. Intervention of extension is key to encourage youth to be more solution-oriented than problem-oriented. For instance, youth can be proactive and use their own savings to start small business ventures.

3.2.5. Opportunist and Determined Livestock Farmers

Cluster five (CL5) includes one respondent who participates full-time in agricultural activities as an individual through livestock production. One of the main distinguishing characteristics for the participant with other clusters is the highest land size (600 Ha) through Permission to Occupy (PTO) rights (A PTO is a personal user right that allows use or occupation of un-surveyed rural land without transferring ownership of land to the occupant). Livestock income was indicated as the only source of income for the respondent and was ranked as a very important source of income. Full-time farming as a business was indicated as the current occupation for the respondent. Considering the strong entrepreneurial characteristics such as the ability to seize opportunities, determination, innovativeness, a strong drive to achieve, and access to productive assets and land, youth represented by this cluster can successfully pursue agricultural businesses. Support initiatives that can enhance access to credit, training and participation in social networks are, however, key for

effective engagement for youth with related characteristics. The respondent indicated the difficulties faced in making long-term decisions due to the land ownership rights currently through PTO. Support for youth education on their rights under PTO land ownership will be key in this instance to enhance active participation.

3.2.6. Resource-Poor Traditional Livestock Farmers

The cluster constitutes about 30% of the total respondents included in the study. Cluster six (CL6) has the highest average age of respondents and also the lowest average household size. The respondents in this cluster have attained the least education level compared to other clusters. The group is dominated by livestock farmers, with the second-highest participation in agricultural activities (66%) and an average of about four years of farming experience. Respondents in this cluster have the highest average access to extension services. Notably, CL6 is characterised by poor asset endowment. Compared to other clusters, CL6 has the least access to credit, production assets, social networks access and membership and benefits the least from support programmes. It is thus expected that their main source of livelihood is derived from non-farming activities. Lower income levels mainly sourced from part-time, informal, and insecure employment mean they are less able to invest in resources and inputs for their productive activities and less attractive for credit offers. The latter may also indicate that youth are not involved in the sector envisioning growth; rather, they are involved as a way of life or waiting for better opportunities. Rietveld et al. [25] found such characteristics to describe reluctant farmers whose interest and actual engagement contrast. Furthermore, youth in this cluster are endowed with negative PsyCap and negative entrepreneurial characteristics. Low self-reliance, low proactivity and independence, low problem-solving ability and innovativeness and low determination or ability to seize opportunities represent the negative entrepreneurial characteristics associated with CL6. The youth in this cluster have the least resilience and hope in the face of adversity, which may indicate low motivation to thrive in farming and agriculture-related activities. For youth in this cluster, participation in agriculture is more for self-fulfilment with limited effort rather than a chosen livelihood strategy.

3.2.7. Non-Farming Income with Access to Credit

The cluster (CL7) is represented by one respondent mainly characterised by the highest average non-farming income sourced from permanent employment, highest livestock average income and highest access to credit. Credit accessed is, however, not for agricultural purposes. Income from permanent employment was ranked as the most important source of income. Participation in agriculture was indicated to be partially through family activities, as also indicated by the highest average farming experience (10 years). The respondent is also importantly characterised by having no access to land and production assets. Besides farming experience gained through indigenous knowledge, access to training and social networks is key for effective participation in agricultural activities. The respondent represents financially secure youth who participate in agricultural activities as a way of life while pursuing opportunities outside of agriculture. Youth represented by this cluster may be inclined to search for livelihood opportunities outside of agriculture.

4. Conclusions

While recognising that youth are a heterogeneous group whose support needs cannot be addressed with one-size-fits-all solutions, intervention strategies to support the active engagement of youth in agriculture cannot be tailor-made on an individual basis considering the associated transactional costs. As such, it is necessary to group youth into groups that reflect their heterogeneity as a social group but also recognise the similarities within the smaller groups. The main aim of the research was to develop youth typologies informed by the endowment of livelihood capitals, including psychological capital and entrepreneurial characteristics. Typologies allowed the grouping of youth into smaller homogeneous groups considering key characteristics that influence their decision making,

including participation in agricultural activities and guiding the necessary interventions to support them. The results confirmed that youth are, indeed, a heterogeneous social group. Without considering pre-defined groups, seven typologies were developed based on young people's capital endowment and entrepreneurial characteristics to inform key intervention strategies considering their haves and have-nots to enhance participation in different agricultural activities. While livelihood capital, including financial, natural, social, and psychological capital, distinguished some typologies, the results highlighted that entrepreneurial characteristics (high or low) were also different within typologies. Considering soft skills such as entrepreneurial characteristics thus contributes to understanding the heterogeneity among youth and should be included in characterising social groups such as youth to guide specific support interventions.

The research concludes that:

- Youth are a heterogeneous group with different haves and have-nots.
- While youth are heterogeneous, it is possible to group them into smaller homogeneous groups based on their livelihood assets, psychological capital, and entrepreneurial characteristics.
- Not considering predefined groups of youth already participating in specific enterprises enhances the applicability of the typology approach to inform intervention strategies to attract or enhance the participation of youth in different agricultural activities.
- Characterising youth should emphasise more on the resources youth have instead of the often overemphasis on the have-nots.

From a policy perspective, a need exists to understand the characteristics of youth beneficiaries before implementing one-size-fits-all solutions. Effective intervention strategies need to be tailor-made for the smaller homogeneous groups to manage transactions while still recognising the heterogeneous nature of youth. Support strategies should be diversified to focus not only on enhanced access to physical resources such as land and credit but also on developing soft skills such as entrepreneurial skills and influencing decision making and behaviour (Psychological capital) inclined towards participation in agricultural activities as a livelihood choice. In addition, strategies to enhance youth engagement in agricultural activities should place more emphasis on supporting youth based on what they have, instead of what they do not have, while addressing biases such as gender inequalities that restrict participation of female youth.

Further research could explore how typologies can be used as a take-off point to inform intervention strategies coordinated in development pathways based on specific support strategies that should be prioritised for specific youth groups to enhance their active engagement in agricultural activities. Implementation of development strategies through coordinated and tailor-made policies and interventions could be more effective in supporting, attracting and retaining youth in agriculture compared to a one-size-fits-all approach.

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