

Inaugural lecture of Professor Sanlie Middelberg

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Title: Feeding the multitude: a management accountant's perspective

1 INTRODUCTION

In 2017 almost 10% of the world population – 770 million people – experienced severe food insecurity as measured by the Food Insecurity Experience Scale (FIES) (FAO *et al.*, 2018). This tool estimates people's ability to access food (FAO *et al.*, 2017). Severe food insecurity is described as someone going "for entire days without eating due to lack of money or other resources" (FAO *et al.*, 2017). Of these 770 million, 375 million – nearly half – live in Africa, representing fully three out of every 10 people on the continent (FAO *et al.*, 2018). Put another way, this number is equivalent to six and a half times the South African population of 58 million going hungry every day in Africa – children, men and women. Alternatively, if you realize that the NWU auditorium seats 957 people (NWU, 2019), the food-insecure people in Africa – who go without food for days on end – would fill the auditorium almost 390 000 times. With such food deprivation on such a large scale, there is clearly an urgent need to know how to feed this hungry multitude.

Let me bring it closer to home – during December last year, as our family was driving to the Drakensberg, my husband and I were looking at, and comparing, the state of the maize fields next to the road. We were quite shocked to notice that the usually waving seas of maize instead supported only short – barely visible – plants. It made us think what the result of a smaller harvest – today and in the future – would have not only on the farmers and employment, but also on us the consumers who take the farmers' bounty for granted.

Now, picture the following – you walk into your local grocery store and all the shelves which once were piled high with fresh fruit and vegetables are empty. As you round the corner of an aisle, you notice that there is also no bread on racks and milk in the fridge. You then go to my brothers' butchery next door, but there is a notice on display saying TEMPORARILY CLOSED. You gaze through the

window and see more empty shelves. As you contemplate the reason for this, it hits you – there has been an on-going drought, which did not really register before because water always came out of the taps at home. But in the countryside, the farmers failed to plant through lack of rain, the cattle did not have feed, cows could not produce milk. There was limited food to feed the growing nation.

By show of hands, who has family or friends working in the agricultural supply chain? [PAUSE] We can therefore agree that agriculture plays a crucial role in our daily lives and furthermore that this sector has to feed the multitude. Indeed, it is vital to the well-being of our modern society – on a par with the provision of secure and healthy places to live and rewarding employment for those who seek it. Hunger and global warming are two of the greatest threats facing mankind.

Deputy Vice-Chancellor: Teaching and Learning, Professor Robert Balfour; Executive Dean: Faculty of Economic and Management Sciences, Professor Sonia Swanepoel; Deputy Dean: Research and Innovation, Professor Babs Surujlal; Deputy Dean: Teaching and Learning, Professor Herman van der Merwe; Professor Susan Visser; Deputy Director of the School of Accounting Sciences, Professor Jan van Romburgh; friends and family,

When pondering the start of a new year, the word FRESH comes to mind. Maybe you started a new job, or your children started a new grade or, in our case, our eldest made a FRESH start as a grade 8 pupil in a new school. The word FRESH also reminds me of agriculture – small plants progressing to full-grown maize; calves maturing into cows and bulls; fresh produce being prepared for market – and all the while the agricultural sector feeds the multitude and creates employment. Today, I am going to use the word FRESH as an acronym to direct my lecture:

- F – from where?
- R – road
- E – establishing my research field
- S – so what?
- H – what is on the horizon.

I am sure you are wondering why a management accountant is talking about agriculture. I used to ask myself the same question. I therefore invite you on a journey through my career so that you can share my view that research is not merely interesting and useful but necessary and can be FRESH. Especially research in agriculture.

1.1 From where?

I completed my Bachelor of Commerce honours degree in Financial Accounting in 1997 in the former Potchefstroom University for Christian Higher Education. I spent two years working abroad in London in the United Kingdom as a corporate actions clerk, first at Citibank and then at HSBC. During the second half of 1999, I moved back to this country and started working at Total South Africa, first as a Refining Accountant and then as a Senior Internal Auditor. I spent five years employed at Total. I then met my husband in 2003, got married in 2004 and moved to Ireland – all in the space of a year. We were planning to work and travel abroad; however, I unexpectedly fell pregnant in the second month of our stay in Ireland and moved back to South Africa at the end of 2004. During our stay in the Emerald Isle, I enrolled with the Chartered Institute of Management Accountants (CIMA) and completed three modules in the course of achieving the professional qualification of Associate Chartered Management Accountant (ACMA). My husband was offered employment in Potchefstroom and this is where we have been living ever since.

1.2 Road

Staying at home with the baby, I soon realized that I would need something else to keep my mind occupied. I therefore contacted the university to enquire about the possibility of externally marking examination scripts. During this conversation, Professor Susan Visser informed me about the master's degree in management accounting offered by the School of Accounting Sciences. During my studies for the degree, I was approached by Professor Visser to temporarily fill-in for a staff member going on maternity leave. For two years I filled part-time positions until I applied for, and was offered, a permanent position in the management accounting department of the School of Accounting Sciences starting on 1 July 2007.

By this time, you may have wondered about the difference between a management accountant and any other kind of accountant.

The Chartered Institute of Management Accountants distinguishes between a financial accountant and a management accountant, as follows (CIMA, 2019):

A financial accountant will typically prepare reports based on historical performance, while a management accountant will use historical reports to make decisions for a company going forward.

The management accountant will therefore combine both financial and non-financial information to drive the success of a business.

I obtained a Master of Commerce degree in management accounting during the May 2007 graduation, with the topic of my research entitled: *The application of management accounting principles in the bread industry: a case study*. My first academic paper was on management accounting techniques to determine the financial viability of the delivery routes in the bread industry, co-authored with Surika van Rooyen and Appie Pienaar (Middelberg *et al.*, 2009).

Along the way I obtained the award for the top South African student in the final CIMA case study exam and was granted membership as an ACMA in 2008.

My initial topic for a PhD was to investigate the wheat-to-bread value chain in South Africa, to follow on the subject of my master's. The National Agricultural Marketing Council had, however, already conducted such a study. Through a master's student working at Free State Maize – an agribusiness – I was told that there was a need to investigate and how to account for commodity derivatives in the agricultural sector. What does that mean? Derivatives are financial instruments representing a contract between two parties. The value of the derivative is derived from an underlying asset such as maize, shares, or gold. In South Africa, derivatives are mostly traded on the JSE derivatives market (JSE, 2019). My study focused on maize, understandably because it is the main agricultural crop grown in this region.

Now, opinions differ about the value of derivatives.

Who of you are familiar with the legendary investor Warren Buffett? [PAUSE] Well, in the 2002 annual report of Berkshire Hathaway Inc. – the incredibly successful company he founded and of which he is still the chairman – he made the following comment: “In our view, however, derivatives are financial weapons of mass destruction...” (Berkshire Hathaway, 2002:15). Derivatives can be used to protect – also referred to as “hedge” – a producer against price risk. Many grain farmers however steer away from using derivatives (or hedging tools), but rather sell their produce to their local agribusiness at a price lower than what it is ultimately sold for. Dr Koos Coetzee, an agricultural economist at the Milk Producers Organisation, fittingly summarises it: “Grain prices are highly volatile. Those who ignore the hedging tools available to them do so at their own peril” (Coetzee, 2014).

Agribusinesses, previously operated as agricultural cooperatives, offer production finance to farmers with the aim to obtain their grain. The traders in the agribusinesses use derivatives, such as futures and options, to protect the business against the grain price moving against them. Futures are a contract between two parties agreeing to buy or sell an asset at a future date at a price agreed today (Chance & Brooks, 2008). Options, on the other hand, are a contractual agreement between two parties that gives the buyer or seller the right, but not the obligation, to buy or sell an asset in the future at a price agreed today (Chance & Brooks, 2008). The difference between futures and options is that the holder of an option does not have to exercise the right to buy or sell an asset, whereas the holder of a futures contract is committed to buying or selling the asset at the agreed price (Chance & Brooks, 2008). As part of my research, I identified through interviews with various agribusinesses, nine different kinds of transactions they use to offer farmers credit and how they account for the various derivatives in their financial statements. I developed a standard interpretation and methodology on the accounting treatment of these derivatives that could serve as a benchmark to investors and analysts when comparing the financial performance of agribusinesses.

Three publications came from my PhD (Middelberg *et al.*, 2011; Middelberg *et al.*, 2012; Middelberg & Buys, 2012). They were co-authored with my promoter,

Professor Pieter Buys, also a management accountant, and my co-supervisor, Professor Paul Styger, an agricultural economist.

1.3 Establishing my research field

It will be clear to everyone that securing an adequate supply of food is essential to the stability and well-being of all life. An important element of this objective is the huge commercial businesses, both global and regional, that have been established, which are served by international and national agencies such as the Food and Agriculture Organization of the UN, the International Food Policy Research Institute, the Organisation for Economic Co-operation and Development, etcetera – and all universities worthy of the name have research and teaching programmes devoted to providing advice, training and new knowledge to serve the interests of their local communities as well as globally.

To complement these activities there is a huge and growing academic literature in the many disciplines that serve agriculture – including the fields of economics and management as well as the biological, agricultural and animal sciences, and sustainable development. Some of the leading protagonists have achieved international renown, such as the Indian-born Nobel laureate Amartya Sen, now a professor at Harvard, and Jeffrey Sachs of Columbia University in New York, one of the leading experts on economic development and the fight against poverty. Here, at the southern end of the hungry continent of Africa, we have no shortage of research challenges to face – and, because of our proximity, better opportunities to tackle them in a practical way than those eminent academics in the northern hemisphere! This is what I realised early on and which has motivated my research career — which I turn to now.

In the course of completing my PhD, I realised that I thoroughly enjoyed conducting research focused on the agricultural sector. Although I was not raised on a farm, I enjoy interacting with the agricultural business community. I furthermore realised that I had a unique set of skills – what the academic community would refer to as an interdisciplinary approach to a study – a combination based on the disciplines of business and agriculture. A classic

example of a topic demanding interdisciplinary research is the problem of food insecurity – which is where we started, you will remember.

As I was reviewing the literature for my PhD studies, I became especially aware of the heavy cost of food insecurity not only in Africa, but globally (Grochowska, 2014). Some of the key statistics that highlight the problem of food insecurity on our continent are the following: According to the revised 2017 United Nations World Population Prospects document, of the global population of nearly 7.6 billion people, 17 percent (1.3 billion) live in Africa (UN, 2017:1). What's more, in 2017 for every 100 females there were 102 males – so to concerned parents, you can rest assured, your daughters will all find husbands. The global population is predicted to increase to almost 9.8 billion in 2050 – an increase of 2.2 billion from 2017 – of which 1.3 billion (57%) is expected to occur in Africa (UN, 2017:4) (Table 1.1). Several African countries are projected to triple in size between 2017 and 2100 – and astonishingly, Zambia, Angola, Burundi, Nigeria, Somalia and Tanzania are expected to grow by a factor of five (UN, 2017:5). The most populous of these countries, Nigeria, is now predicted to outnumber the entire population of Europe by the end of the century (Sailer, 2017).

Table 1-1: Population of the world and Africa, 2017, 2030, 2050 and 2100

	<i>Population (millions)</i>			
<i>Region</i>	<i>2017</i>	<i>2030</i>	<i>2050</i>	<i>2100</i>
World	7 550	8 551	9 772	11 184
Africa	1 256	1 704	2 528	4 468

Source: UN (2017)

Sub-Saharan Africa (SSA) has the youngest population in the world – 62% is below the age of 25 (Yeboah & Jayne, 2017). Moreover, the region's population is expected to double over the next 35 years – with an additional 17 million youths annually entering working age until 2035 (Losch, 2016). It is therefore evident that the agricultural sector has a pivotal role to play both in providing food security and creating employment.

These statistics on the role that the agricultural sector has to play, and their implications for the future, enticed me further into this research field. In 2013, therefore, I published a paper which identified and elaborated on the key challenges facing the South African agricultural sector. Amongst others, these included: 1) food security; 2) addressing climate change by adapting agricultural practices; 3) becoming a potential competitor for agricultural land in terms of growing crops for biofuels; and 4) land redistribution (Middelberg, 2013a). Further challenges have emerged since then, which I will elaborate on later in this address.

On the sometimes contentious subject of land ownership and the role it plays in agricultural credit, I interviewed several commercial banks offering finance for agricultural production. The following are key findings (Middelberg, 2013b):

- the main agricultural financing model used to provide production credit to commercial producers, was the balance sheet method – using agricultural land as collateral;
- with the possible change of land ownership, land could fall away as collateral – alternative financing methods are required;
- grain contract financing was identified as an alternative financing method as it utilises both the expected grain harvest and crop insurance as collateral.

I presented this paper at an international conference on agricultural risk, finance and insurance held in China, where I met the editor of the *Agricultural Finance Review* – a journal housed at Cornell University, one of America's top tertiary education institutions. He was fascinated that the value of a production loan in many instances exceeded the value of agricultural land, due to rising input costs. This was unheard of in the United States as the US government, similar to the regimes of other developed countries, subsidise the agricultural sector. These subsidies protect producers against price, revenue, and yield fluctuations. Additionally, producers receive subsidies for conservation attempts, insurance premiums, marketing, exports and conducting research. These subsidies are more than \$20 billion a year (Edwards, 2018). South African producers on the other

hand, do not receive subsidies but have to compete against their subsidised counterparts.

The comment about the value of land led me to investigate which methods banks use to value agricultural land used as collateral (Middelberg, 2014). Over that period, I started engaging with AgriSA, an agricultural non-profit industry association, representing a membership of agricultural producers. I was invited on a trip to Mozambique for the annual general meeting of AgriSAMoz – an affiliate of AgriSA in our neighbouring country. South African farmers in Mozambique complained that they are unsure how commercial banks evaluate credit applications. Upon my return, this became my next research project (Middelberg *et al.*, 2014). In addition, I had a master's student who completed a comparative study of agricultural wages in Mozambique and South Africa and their influence on production cost and mechanisation (Saayman & Middelberg, 2014). The main finding of the research indicated that although cheap, unskilled labour is available in Mozambique, the cost of lower productivity has to be compared with the cost saving due to cheaper labour.

During 2014 I also met Johann Kotzé, the Head of Agriculture overseeing Africa, at one of the main commercial banks in South Africa and the rest of Africa. Through Johann, I obtained access to practice enabling me to conduct relevant research. He has a passion for Africa and a love for people. Although a busy man, he nevertheless made time for interviews and through him I have built a research network. He also introduced me to the concept of value chain financing (VCF) and suggested that Zambia is the ideal country to document its practical application – partly because English is the language of instruction. In April 2015 I accompanied Johann to Zambia and was introduced to and interviewed a number of agribusinesses and financiers. I also experienced first-hand the role smallholder farmers play in the agricultural sector. Their influence is huge – they represent approximately 80% of all farms in sub-Saharan Africa and directly employ about 175 million people (AGRA, 2014), apart from the crucial part they play in food production.

All land in Zambia is government-owned and most smallholder farmers therefore do not have title deeds to use as collateral for financing. Value chain financing

thus serves as an alternative (Middelberg, 2017). One example is the case of the Conservation Farming Unit (CFU) – a non-governmental organisation created and supported by the French government with the aim of promoting conservation farming practices in Africa. The directors of the CFU realised that productivity amongst small farmers is low due to a lack of equipment. A commercial bank agreed to provide funding to the CFU for a tractor and a ripper to eligible smallholder farmers on a three- to four-year lease basis. The farmer is required to pay a deposit of 20% on the value of the equipment. As part of the purchase agreement, the tractor provider has to offer an after-sales service and the farmer is furthermore required to take out insurance on the equipment. This scheme was structured so that the equipment serves as collateral. As these farmers generally practised traditional farming methods in the past, the CFU in addition offers training in conservation farming (CF) practices to farmers. Due to the strength of the value chain, this financing scheme works as the farmers obtain access to equipment to increase their productivity resulting in higher profits. In turn, the bank receives loan instalments from the farmers and manages their risk as the loan is secured through using the tractor as collateral.

Another research project of mine resulting from the Zambian network is focused on the attractiveness of Zambian farm blocks for investment. I conducted this project with my colleague, Professor Pieter van der Zwan, a tax specialist. This project was funded by CIMA and will be published later this year. The main conclusions of this research are that the Zambian Farm Block Development Programme (FBDP) is an effective way to attract investment as it provides investors with access to land. However, there are structural issues nothing to do with the FBDP that require attention before it can really be successful, including a lack of proper export markets and policy uncertainty.

An interdisciplinary study combining management accounting principles and the agricultural sector was conducted by a master's student and former colleague, Alick Burger. He evaluated the use of global management accounting principles (GMAPs) in a mechanised piggery and found that, without pre-knowledge, the farmer applied the concepts and principles of GMAPs in the operation of the piggery. The recommendation from this research is that all commercial farming

operations should consider GMAPs as a tool to establish best practice in the support of decision-making. I co-authored a paper from this research (Burger & Middelberg, 2018).

Another particularly interesting research project was conducted by one of my master's students and colleague, Liesel Botha. She completed her postgraduate degree through the investigation of corporate political activity as part of enterprise strategy by agribusinesses. She conducted interviews with senior representatives of large agribusinesses to determine what strategy they followed to interact with the government in order to influence agricultural policy. It is especially important to understand the interaction with government in today's uncertain political climate. She found that the selected agribusinesses experienced significant regulatory uncertainty regarding the general direction and implementation of future agricultural legislation. She recommended that agribusinesses continue to engage with government as a strategic priority. On the other hand, it was recommended that government should seek policy consistency and be open to improved access by agribusinesses.

1.4 So what?

We can all agree that the agricultural environment is uncertain. We are confronted daily with media headlines about land ownership, drought, crime, and even (especially) increasing food prices. All these elements increase the risk not only to agricultural producers, but also to financiers providing funding for agriculture. In addition, they indicate that traditional lending practices have become insufficient.

I therefore argue that research in agricultural finance is essential – especially in a South African/SSA context. This is the research gap I have intended to fill, both in the past and in the future.

1.5 Horizon

So what fresh research ideas lie on the horizon?

Through Johann Kotzé, I was introduced to Professor Cobus Oberholster, another person for whom I have the utmost respect and from whom I have learnt, and will

still learn, a great deal. Cobus has two doctoral degrees – one on the topic of VCF and the other on the future of agricultural finance in sub-Saharan Africa – while holding a full-time position as an executive director at a well-known agribusiness. We are working on a project to develop a resilience framework to facilitate and guide the integration of small-scale livestock farmers in South Africa into the regional and global red-meat value chain. This will be a two-year project. Two professors from Business Economics at Wageningen University in the Netherlands have expressed interest in collaborating on this project. They are fascinated with the various challenges faced by the agricultural sector in South Africa.

Furthermore, I have a PhD student and colleague, Martin Botha, developing a water disclosure index for the food, beverage and tobacco industry. During his research, he concluded that agriculture is one of the most water-intensive sectors (Ernst & Young, 2012:1). Furthermore, a master's student, Sicelo Masuku, is developing a business proposal template in support of the establishment of a livestock farm in South Africa.

As you will have noticed, therefore, there is much research to be done. I hope that you now have a FRESH perspective on agricultural research, especially from the perspective of a management accountant.

I want to close with a quote from Kofi Annan, the late former Secretary-General of the United Nations and a fellow African:

“If we get agriculture right in Africa, where most of the people now are working in that sector, not only would it help boost development but we will be secure in terms of food and nutrition and then be able to move on to other areas” (Russell, 2011).

Making provision for food supply to feed the multitude in the face of climate change is not new to Africa. When Joseph was made vizier under pharaoh in Egypt, it was his management of the corn stocks during the seven years of plenty that allowed Egypt, and its neighbours, to endure the seven years of famine.

REFERENCE LIST

AGRA (Alliance for a Green Revolution in Africa). 2014. Africa agriculture status report: climate change and smallholder agriculture in sub-Saharan Africa. <https://agra.org/wp-content/uploads/2017/09/Final-AASR-2017-Aug-28.pdf> Date of access: 17 Jan. 2019.

Berkshire Hathaway Inc. 2002. 2002 Annual Report. <http://www.berkshirehathaway.com/2002ar/2002ar.pdf> Date of access: 17 Jan. 2019.

Burger, A.B. & Middelberg, S.L. 2018. An evaluation of Global Management Accounting Principles in the sustainability of a South African mechanised piggery. *Journal of Economic and Financial Sciences*, 11(1):a154.

Chance, D.M. & Brooks, R. 2008. An introduction to derivatives and risk management. 7th ed. Australia: Thomson.

CIMA (Chartered Institute of Management Accountants). 2019. Your career. <https://www.cimaglobal.com/Starting-CIMA/Your-Career/> Date of access: 14 Jan. 2019.

Coetzee, K. 2014. Safex – ignore at your peril! *Farmers Weekly*, 5 Sept.

Edwards, C. 2018. Agricultural subsidies. <https://www.downsizinggovernment.org/agriculture/subsidies> Date of access: 12 Feb. 2019.

Ernst & Young. 2012. Preparing for water scarcity: raising business awareness on water issues. [https://www.ey.com/Publication/vwLUAssets/Preparing_for_water_scarcity_Raising_business_awareness_on_water_issues/\\$FILE/EY_Preparing_for_water_scarcity.pdf](https://www.ey.com/Publication/vwLUAssets/Preparing_for_water_scarcity_Raising_business_awareness_on_water_issues/$FILE/EY_Preparing_for_water_scarcity.pdf) Date of access: 28 Jan. 2019.

FAO, IFAD, UNICEF, WFP & WHO. 2017. The state of food security and nutrition in the world 2017: Building resilience for peace and food security. www.fao.org/3/a-l7695e.pdf Date of access: 18 Dec. 2018.

FAO, IFAD, UNICEF, WFP & WHO. 2018. The state of food security and nutrition in the world 2018: Building climate resilience for food security and nutrition. <http://www.fao.org/3/I9553EN/i9553en.pdf> Date of access: 18 Dec. 2018.

Grochowska, R. 2014. Specificity of food security concept as a wicked problem. *Journal of agricultural science and technology*, 4(2014):823–231.

JSE. 2019. Derivatives market. <https://www.jse.co.za/trade/derivative-market> Date of access: 7 Febr. 2019.

Losch, B. 2016. Structural transformation to boost youth labour demand in sub-Saharan Africa: The role of agriculture, rural areas and territorial development. https://www.ilo.org/wcmsp5/groups/public/---ed_emp/documents/publication/wcms_533993.pdf Date of access: 7 Febr. 2019.

Middelberg, S.L., Van Rooyen, S. & Pienaar, A.J. 2009. The application of management accounting techniques to determine the financial viability of delivery routes in the bread industry: a case study. *Meditari Accountancy Research*, 17(1):33–47.

Middelberg, S.L., Styger, P. & Buys, P.W. 2011. The case of accounting treatment of options in the South African agricultural sector. *Oeconomica*, 56(2):40–50.

Middelberg, S.L., Buys, P.W. & Styger, P. 2012. The accountancy implications of commodity derivatives: A South African agricultural sector case study. *Agrekon*, 51(3):97–116.

Middelberg, S.L. & Buys, P.W. 2012. Commodity derivative transaction comparability: Evidence from South Africa. *Journal of Applied Business Research*, 28(3): 441–448.

Middelberg, S.L. 2013a. Sustainable agriculture: A review of challenges facing the South African agricultural sector. *Journal of Human Ecology*, 42(2):163–169.

Middelberg, S.L. 2013b. Evaluating grain producers' production financing alternatives: Evidence from South Africa. *Agricultural Finance Review*, 73(2):272–289.

Middelberg, S.L. 2014. Agricultural land valuation methods used by financiers: The case of South Africa. *Agrekon*, 53(3):101–115.

Middelberg, S.L., Buys, P.W. & Oberholzer, M. 2014. Evaluating the credit assessment criteria used by financiers to assess credit applications in Mozambique. *Bank and Bank Systems*, 9(3):82–89.

Middelberg, S.L. 2017. Value chain financing: evidence from Zambia on smallholder access to finance for mechanization. *Enterprise Development and Microfinance*, 28(1–2):112–129.

NWU (North-West University). 2019. The Sanlam Auditorium (F14). <http://services.nwu.ac.za/puk-arts/sanlam-auditorium-f14> Date of access: 6 Febr. 2019.

Russell, A. 2011. Kofi Annan interview: the full transcript. <https://www.ft.com/content/c2d31f14-7caa-11e0-b9e3-00144feabdc0> Date of access: 7 Febr. 2019.

Saayman, M.J.M. & Middelberg, S.L. 2014. The effect of higher wages on production cost and mechanization: A South African maize sector study. *Journal of Applied Business Research*, 30(2):341–352.

Sailer, S. 2017. U.N. "World Population Prospects 2017:" the Coming Sub-Saharan Tsunami. <http://www.unz.com/isteve/u-n-world-population-prospects-2017-the-coming-sub-saharan-tsunami/> Date of access: 23 Jan. 2019.

UN (United Nations). 2017. World population prospects: the 2017 revision, key findings and advance tables. <https://www.un.org/development/desa/publications/world-population-prospects-the-2017-revision.html> Date of access: 23 Jan. 2019.

Yeboah, F.K. & Jayne, T.S. 2017. Africa's evolving employment trends: implications for economic transformation. *Africa growth agenda journal*, 14(1):18–22.