DST-NRF
Centre of Excellence
in Food Security

2015 ANNUAL REPORT

Contents

Executive Summary

The DST-NRF Centre of Excellence in Food Security (CoE-FS), hosted by the University of the Western Cape (UWC) and co-hosted by the University of Pretoria (UP), was launched on 15th April, 2014. Transdisciplinary research, capacity development, knowledge sharing and engagement activities are underway to fill strategy and policy knowledge gaps and to realise food security for poor, vulnerable and marginal populations. This is in line with our goal to become the leading hub of knowledge production on food security and nutrition in Africa.

Putting funding to work

Of the R25 million funding received from the NRF for the year under review, approximately R21 million was spent on research (running costs as well as student bursaries) and on the Centre's administration. The remainder (approximately R4 million) has been rolled forward to fund projects committed to in 2015 but which will be implemented in 2016. In total, 37 research projects were funded, 33 of which started during the reporting period. A Centre Manager, Communications Officer, and two administrative support staff were appointed in 2015 to administer these funds.

In addition to the resources received from the NRF, the Centre received matching grants of R2.7 million from participating universities. Furthermore, the CoE-FS received over R7.7 million in external grants and research contracts from the Programme to Support Pro-poor Policy Development in the Office of the Presidency, the Global Alliance for Improved Nutrition (GAIN), the University of Missouri and the Office of the Premier, Western Cape Government. The CoE-FS has also expanded to include an R8 million research programme on the Humanities and Food Insecurity, funded by the Mellon Foundation. Finally, Dr Stephen Devereaux, was appointed as the UK-SA Bilateral South African Research Chair in Social Protection for Food Security, and will assume his position at UWC in 2016.

Developing capacity in food security

Beyond financial security for CoE-FS researchers, leveraged funding offer the chance to widen the CoE-FS network and create new linkages to expand the Centre's reach. Formal Collaborative Agreements established in 2015 ensured that academics across 11 South African and two international institutions worked together on Food Security issues in 2015. To date, the CoE-FS has provided bursaries to 62 students, 20 of whom are black South Africans, and 30 are women. We have also made a concerted effort to include women in our research teams: 49% of our project leadership team were women in 2015. Several projects also focus on women, as women are typically the food security and nutrition guardians in households.

Although it is early to comment on the impact of the research in terms of the scientific and knowledge generation, some achievements are worth highlighting. Thirty-one research articles and three book chapters have been published across the various programmes. A special edition of Food Research International was produced in 2015 that examined the theme of the inaugural presentation at the launch of the CoE-FS: "Can science and good governance deliver dinner?" Due to the success of this edition, the publisher, Elsevier, is interested in funding the CoE-FS's mid-term conference in 2019. Added to this, researchers affiliated with the Centre have delivered 64 presentations this year: keynote addresses, presentations at international and local conferences, and presentations at government events including the Minister of Science and Technology's Budget Speech of 2015, as well as several workshops and seminars.

Improving food policy and access

Finally, in the policy and rights component of our work addressing the question "What policies, technologies, interventions and products enable access to affordable and nutritious and safe food in ecological, economic, social and politically sustainable ways?" our studies found that there are many policies, strategies and programmes related to food security in South Africa.

The Constitution sets out clear rights and responsibilities for government and civil society. However, there is no legislative framework governing food security and nutrition and ensuring the right to food for all, and particularly the right to good nutrition in children. In addition, the multiple, overlapping and duplicated programmes are not coordinated at all, and no national food security information system exists to inform the policy cycle.

Despite a tradition of evidence-based policy-making for food security in South Africa, there is no formal system to monitor and evaluate the implementation and impact of multiple programmes. While national surveys do inform policy-making, the results from a large body of sub-national studies do not seem to feed into food security and nutrition policy-making cycles in South Africa.

In terms of technologies and products, one study is developing insects as an alternative protein sources for pigs, poultry and fish. Researchers showed that insect-based feeds produced comparable results to conventional feeds, offering the opportunity to use waste as a substrate to produce quality feed protein.

A project studying biochars (charcoal used as a soil amendment and in filtration) established that more readily available eucalyptus biochar performs better in general than pine. In the field of smallholder farming, it was found that food waste at farm level and along the food chain is still a problem in South Africa and that small-scale farmers lack resources such as refrigeration and general hygiene to minimise food waste. Researchers identified that processing agricultural produce into shelf-stable produce is a viable way to prevent food waste that should be pursued further. Another study found that foods based on indigenous crops can provide adequate nutrition to combat diet-related non-communicable diseases.

Spreading the word

The Centre's leadership and researchers have engaged with external researchers, public institutions and other interested parties, sharing knowledge and contributing to information gathering and reporting. The launch of the 2015 Global Nutrition Report, hosted by the CoE-FS in South Africa, is a good example of how dissemination strengthens relations with our local and international partners.

Dissemination also includes input on policies, debates and discussions, as well as expert input into policy and programme review and design through contract research. Several CoE-FS researchers are also involved with confidential policy assignments with national government, or provide services and expertise to local organisations, industry and institutions of learning to ensure that the knowledge produced at the Centre contributes to policy and translates into public knowledge.

Storming the frontlines

Recognising the progress outlined above, the Steering Committee meeting in November 2015 recommended that the CoE-FS move out of the Forming Stage to Stage 2: the Storming Stage.

The CoE-FS is now well positioned to expand its envisioned role as an African hub for food security and nutrition research, knowledge and policy expertise.

Professor Julian May
Director (UWC)

Professor Sheryl Hendriks
Co-Director (UP)

The Centre of Excellence at a glance...

Director: **Professor Julian May**
Co-Director: **Professor Sheryl Hendriks**

The DST-NRF Centre of Excellence in Food Security was launched in April 2014 and is hosted by the **University of the Western Cape** and the **University of Pretoria**, with participants from **9 other research institutions**.

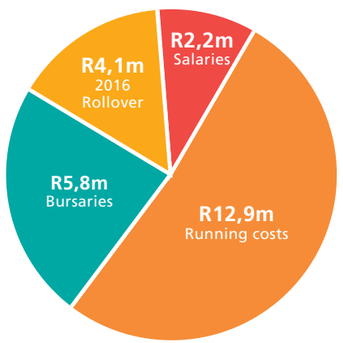
The CoE-FS aims to:

understand the **SCALE**, **NATURE**, **CAUSES** and **CONSEQUENCES** of **FOOD INSECURITY** in South Africa and Africa.

investigate products, technologies, processes and policies that can **REDUCE FOOD INSECURITY** and improve lives.

conduct research, build capacity and disseminate findings that will **PROMOTE A SUSTAINABLE FOOD SYSTEM** in South Africa.

The CoE-FS is funded by the National Research Foundation (NRF), which provided **R25 million** in funding for 2015.



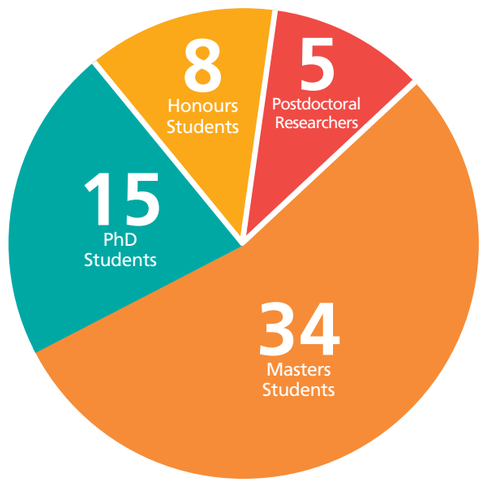
Other sources of funding:

R2.7 million
in matched grants from allied research institutions

R7.8 million
in external funding sources

R8 million
grant from the Mellon Foundation for Humanities-based food security research

The CoE-FS funded **62 students** in 2014/2015



60% non-white (both SA and non-SA)

48% women

39% South African women

7 MASTERS STUDENTS and **7 HONOURS STUDENTS** graduated in 2015

Funds were split between **37 RESEARCH PROJECTS**, 33 of which started work in 2015. From this research, the CoE-FS has produced:

31 journal articles

64 conference presentations

30 popular articles (print and online)

3 book chapters

7 keynote addresses

22 radio/TV interviews

To access detailed info about outputs go to: https://goo.Gl/Yu0kp0

Research themes at the Centre of Excellence

Research at the CoE-FS covers five broad themes, with each theme subdivided into two programmes. The research programmes are led by Programme Principal Investigators (PPI) who are senior researchers drawn from the Hosts and consortium partners.

Food Creation

Food Production

This programme focuses on diverse food production systems used by small and medium farmers, particularly in former homelands. Researchers hope to identify opportunities to reduce loss and waste, and uncover new ways to achieve sustainable and safe food production by increasing crop and animal diversity.

Food Processing and Preservation

This programme looks at how agro-processing can add commercial and health value to indigenous South African crop production, and help tackle food insecurity in rural areas.

Food Distribution

Value Chains

This programme is trying to understand how corporate food distribution and retail systems affect the way that food-insecure people in South Africa make food choices.

Markets and Livelihoods

This programme studies how international and local markets influence the cost and nutritional value of a typical South Africa diet.

Food Consumption

Health and Nutrition

This programme aims to provide a comprehensive overview of the South African diet in different sectors of the South African population, focusing in particular on different forms of malnutrition.

Consumer Choice and Behaviour

This programme seeks to provide resources to advise about the food environment, understand how aspects of the food environment shape food choices, and to explore how government shapes food choices through employment, training, policy and legislation.

Food Governance

Control and Safety

This programme studies rural and urban supply chains to identify key food safety challenges and understand the underlying regulatory framework, with a view to identifying knowledge gaps and securing trade.

Policy and Rights

This programme aims to monitor the global and national food security policy debates and developments, and identify and evaluate alternative policy options for South Africa.

Food Contestation

Ethics and Values

This programme investigates ethical, religious and spiritual challenges relating to food security in South Africa.

Food Politics and Cultures

This programme looks at sociocultural issues in the arena of food security, as well as studying activism and consumer rights.

Special projects and contract research

Beyond these five themes, the CoE-FS conducts contract research for various South African and international organisations.

Food Production

PPI : Professor Kennedy Dzama, University of Stellenbosch

Insects hold the key to sustainable animal feed

Researchers at the CoE-FS in food security have found that they can safely produce insect larvae for animal feed using human and animal waste as a food source. This is one of the major findings made by Dr. Elsje Pieterse and her team at Stellenbosch University, in collaboration with colleagues from University of Pretoria.

The demand for animal protein is increasing globally as populations grow and developing economies become wealthier. This has placed enormous pressure on animal and animal feed production systems. Farmers currently use unsustainable fish and soya meal as the major source of protein for raising animals.

To find a sustainable alternative, Pieterse and colleagues looked to insects as a source of protein. The project's main aim was to identify suitable insects for animal feed, develop suitable rearing methods, and ultimately create actual animal feed products from these edible insects.

Researchers investigated the nutritional value of the black soldier fly in feed for young animals. They found that suckling pigs show similar or better production and stronger immune systems when raised on this diet compared to counterparts that were fed soya instead.

The team also evaluated the nutritional composition of nine different potential insect species, and tested two of them for their value as feed for egg-laying poultry.

The project developed several new products, and tested them to make sure the food was healthy and safe. The researchers also created recipes for using insects in value-added meat products.

In another part of the study, they investigated how four species of fly larvae can break down different types of waste. These species can be used to break down manure from intensive animal production systems as well as abattoir waste and turn it into high quality animal protein sources suitable for animal feeding. Pieterse's team also assessed how viable it is to use insects grown on human faecal matter for egg and meat production.

In both studies the researchers found similar or better production in animals when fed these insect meals, with no food safety or food quality issues identified.

Food security research often overlooks the pressure that producing animal feed places on agricultural production systems and the environment in general. This research paves the way for a safe and sustainable alternative to fish and soya meal for feeding animals, while turning the massive volumes of animal and human waste produced every year into a valuable resource.

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Turning smallholder cattle farming into a business

The majority of South Africa's livestock is found in Limpopo and the Eastern Cape. Yet, more people in these provinces than anywhere else in South Africa go hungry and cannot afford basic life necessities. When Stellenbosch University's Dr Cletos Mapiye and collaborators from University of Fort Hare, University of Limpopo and University of Pretoria sought to find out why, they discovered that most smallholder livestock farmers earn on average just R1000 per month from selling cattle. A minority, however, earn enough to make a living, indicating that smallholder beef production systems can be improved.

Project researchers came up with three main areas that could improve the value of smallholder livestock:

- produce greater amounts of better-quality meat by feeding cattle more nutritious food
- sell more cattle by accessing high-value markets
- brand their meat products to appeal to consumers

While these seem like sound recommendations, the reality of rural communal farming makes them difficult to enforce. In the Eastern Cape, for example, the majority of livestock farmers sell their cattle privately rather than through formal markets like auctions or abattoirs. Poor diets, badly organised marketing groups, and an inconsistent supply of high-quality cattle for formal markets remain major obstacles to selling cattle commercially.

Similarly, smallholder farmers are unlikely to consistently produce cattle that conform to the stringent requirements for becoming a beef brand. However, the fact that they graze on natural pastures could be a selling point for consumers. Characterising beef as pasture-fed could therefore be a powerful marketing strategy without having to legally register a beef brand. Communal feedlots are probably the simplest way to make smallholder cattle profitable, as they can double as central markets for local sales. To improve these feedlots, the researchers have compiled a database of feeds commonly used in the surveyed areas, and have formulated low-cost, balanced diets. They are currently looking at the success of these diets for crossbred and Nguni cattle.

Increasing food access and income for the resource-poor smallholder farmers of South Africa will in turn make beef production systems economically sustainable. The role of women in different communities will likely have a big influence on this, something that Mapiye is now looking into.

"Importantly for drought-prone areas like Mpumalanga, North West, Limpopo and the Free State, the organically-treated soils held more moisture after a three-week dry spell than did chemically-treated soils."

Preventing hunger organically

Although South Africa produces enough food to feed its 53 million citizens, 14 million South Africans do not have access to regular food supply, with seven million being chronically hungry. Producing crop yields that can sustain a family or provide an income, requires fertile soils containing plenty of minerals and water. While commercial farmers use chemical fertilisers to add nutrients to soil, small-scale farmers cannot afford them.

Organic matter such as compost, manure, and bone meal can be a cheaper source of both nutrients and carbon, which improves the soil's ability to hold precious water. To see whether smallholders could use organic practices to improve yield and nutritional quality of their crops, Professor Raymond Auerbach of Nelson Mandela Metropolitan University along with collaborators from Stellenbosch University and the University of Limpopo compared crops grown using organic and chemical fertilisers.

While chemical fertilisers increased the amount of phosphorus that could be taken up by plants, they did not increase one of the most essential nutrients for plant growth: potassium. Organic treatments, meanwhile, increased both phosphorus and potassium. These findings suggest that less acidity and greater organic matter in the organically-treated soils made more potassium available to the plants.

Importantly for drought-prone areas like Mpumalanga, North West, Limpopo and the Free State, the organically-treated soils held more moisture after a three-week dry spell than did chemically-treated soils.

Although there are clear benefits to organic farming, low returns pose a major hurdle for organic farmers. Putting grain or vegetables on the table or the market is ultimately all that matters to the farmer. Yet, organically treated crops provided 20-40% less yield than their chemically treated counterparts.

If organic farming methods are to improve the wellbeing of South Africa's poorest communities, the yield-gap between organic and chemical treatments will have to be closed. This is a priority for future research.

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Organic crops provided **20-40%** less yield than their chemically-treated counterparts.

Cleaning up South Africa's water

Many rural communities in South Africa are drinking water contaminated with organic pollutants from industry and agriculture. Part of the problem is that pollutants like pesticides and fertilisers are difficult to remove from industrial wastewater.

Stellenbosch University's Dr Gunnar Sigge and collaborators from the Universities of Venda and Pretoria wanted to develop a low-cost, low-tech water purification system. They used "biochar", a type of charcoal made from renewable organic material that removes organic compounds from wastewater.

Biochar filters water by first soaking up organic matter and then holding on to it like glue. Sigge and colleagues tested different types of biochar made from pine and eucalyptus to see whether they could maximise the amount of organic pollutants removed from water.They found that treating the biochar with hot water did not improve its filtration ability. Of the two tree species tested, they found that eucalyptus provided the best biochar.

Eucalyptus biochar could therefore be used to remove organic pollutants from wastewaters produced by wineries and food industries. Since the organic compounds remain attached to the biochar, they could be recycled to create new organic products. Importantly, not only is biochar filtration a low-cost, low-tech way to remove organic pollutants from water, but it is also wastewater treatment that is both renewable and sustainable.

Farm waste turned to food for plants and fish

In South Africa today, there is a need to make agriculture more sustainable. High-quality products need to be produced in a way that protects and improves the environment, benefits farmers, their employees and local communities, and safeguards the health and welfare of all farmed species.

One of the biggest obstacles to sustainable agriculture is the large amount of organic waste produced by farms. Re-using this carbon- and nutrient-rich waste to benefit plants and animals instead of polluting rivers, could contribute to efforts to make agriculture sustainable.

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Dr. Elmi Lotze of Stellenbosch University and collaborators from Nelson Mandela Metropolitan University and University of Limpopo tested different ways to turn farm waste into a compost that fertilises soils and helps them to retain water.

To process organic materials from different sources like cow manure or fruit waste, the researchers used a similar fermentation method to the one that produces beer and cheese. In this case, microbes within airtight reactors break down solid organic matter in the waste. The resulting sludge, a mixture of solids and liquids, needs further processing before it is safe enough to be used on soils.

Project researchers tested both liquid and solid components of the sludge for beneficial nutrients; bacteria that could be harmful to humans and animals; and anything else that could be toxic to seeds and plants. They then used the liquid portion to provide nutrients for growing plants and fish together, in a soil-less system known as aquaponics.

The researchers intended to use the solid portion as compost to fortify soil. However, they could not obtain enough to test it on farms and are therefore developing ways to increase volumes.

Once developed on a larger scale, this renewable, recyclable waste system will benefit the environment by reducing farm waste. It will also help small-scale farmers remain sustainable by lowering input production costs and increasing income earned from farmed products.

Food Processing and Preservation

PPI: Professor Naushad Emmambux, University of Pretoria

Developing renewable and recyclable waste system can benefit the environment by reducing farm waste and could lower production costs of small-scale farmers thereby increasing their income.

Processing African grains for economic and physical health

Indigenous grains like sorghum and millets hold the potential to improve South African diets and help develop small businesses at the same time. That's according to Prof Gyebi Duodu of the University of Pretoria's Department of Food Science, who creates and tests healthy foods made from indigenous grains.

"Rapid urbanisation in Africa has adversely affected people's dietary choices; we are not eating that healthily any more," says Duodu, who forms part of the CoE-FS's programme on Food Processing. "In the interest of convenience, people are eating less indigenous whole grains and more highly refined or energy-dense foods, which has brought about an increase in diet-related chronic disease, things like diabetes, cancer and so on."

Africa boasts a wide variety of indigenous grains and other crops, which if consumed as whole grains could offer a healthier alternative to high-energy, high-glycaemic index (GI) foods made from highly refined wheat and maize. Examples of indigenous grains include sorghum, millets, and teff; other crops that Duodu is interested in include the legumes cowpea and bambara groundnut, and orange-fleshed sweet potato.

Along with colleagues at Tshwane University of Technology, University of Limpopo and the North West University, Duodu is using these crops as ingredients for porridges, biscuits, beverages and other processed foods. After these foods have been developed, he and his colleagues test the foods for flavour and other quality parameters, and also measure the health-promoting properties. They are also working with the Agricultural Resarch Council (ARC), who provide the orange-fleshed sweet potato, and the Council for Scientific and Industrial Research (CSIR) who assist with analysis.

"We've done a lot of the basic research, and the data indicates that these foods have very good potential health promoting properties - we have a proof-of concept," he says. The nutritional benefits he is interested in are things like low GI, antioxidant activity, and nutrients like iron, zinc and vitamin A which are commonly deficient in South African populations.

"We are trying to draw people's attention back to the positive aspects of our indigenous grains."

Now, he hopes to take the research forward into the next phase - testing the health-promoting effects of these foods in animals and eventually, humans. This type of research is more difficult, more time-consuming and more expensive, but Duodu foresees that it will have major benefits for South Africa, and not just in terms of health.

He believes that these products provide a great opportunity for small businesses looking for an innovative product that is proudly South African. He hopes that potential entrepreneurs will buy into the concept and foresees that teaching these businesses how to process the grains into different forms will introduce new skills into the sector and even generate employment opportunities.

> "We are trying to draw people's attention back to the positive aspects of our indigenous grains."

Another sector that could benefit is the small-scale crop producers that are already producing sorghum and other crops in South Africa, both independently and for larger food manufacturing companies.

"We see this as an opportunity to boost production of these grains - if we can show they are health-promoting, it seeps back to farmers and boosts production of those crops."

Thus, through his research into food processing for better health, Duodu hopes to not only improve the health of many marginalised South Africans, but stimulate the economy across the agro-food value chain.

Food losses should be prevented along the entire food supply chain

Ensuring that the world has enough to eat is not simply a case of producing more food - reducing food losses and waste can contribute just as much to alleviating world hunger.

Food is lost at each step of the "food supply chain". This is a chain of events in which food is produced, harvested, handled, stored, processed, distributed and finally, consumed.

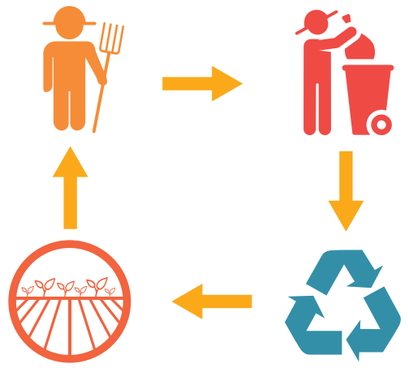
The University of Pretoria's Professor Elna Buys and collaborators from Stellenbosch University identified key areas of the global food supply chain where high losses occur, particularly in developing countries. They then applied this information to South Africa's informal food sector - a thriving but unregulated food chain that includes small-scale farmers and processors, as well as countless informal street traders.

Their researchers found that while first-world consumers waste food by, for example, discarding food when it reaches its "sell-by" date, in developing countries, food is lost across the entire food chain. Reasons include outdated harvesting techniques, poor storage and cooling facilities, limited infrastructure, and inadequate packaging and marketing systems.

As a developed country with huge socio-economic problems, South Africa loses food in both first- and third-world ways. For instance, Professor Buys discovered that many ready-to-eat meals on supermarket shelves were still perfectly safe to eat after the "sell-by" or "use-by" dates listed on the packaging. Worryingly, however, some foods that were still within their stipulated shelf lives had high levels of bacteria that can cause food poisoning. This may point to problems with the cold storage or packaging aspects of the food supply chain. For both the formal and informal food sectors, packaging systems that extend the shelf life of fresh foods would help to make food safer and reduce waste.

Since many low-income or unemployed South African consumers rely on the informal food sector to supply their food, helping small-scale farmers and traders to reduce losses will ultimately benefit both suppliers and consumers. Professor Buys is looking into traditional plant crops grown by small-scale farmers but not included in commercial food supply chains. Basing food-processing industries on some of these neglected crops could create jobs while developing safe, marketable, affordable and nutritious food products.

Food supply relies on a complex chain of producers, suppliers and retailers. Understanding the food supply chain in developing countries will help farmers to reduce losses during production.



Preventing food losses from harvest to home

From the time that a farmer harvests grain, milks a cow or slaughters a chicken to the time it ends up in a bowl or on a dinner plate, losses may occur.

Grain, for example, may be eaten by insect pests while it is being stored. Fruit, vegetables and meat, meanwhile, may spoil if they are not kept cold enough during transport. This is a problem particularly for small-scale farmers without access to good storage, transport and processing facilities.

> "For resource-poor farmers, the simplest way to prevent food losses due to spoilage is to dry fruit and vegetables (either in the sun or using homemade solar dryers), can them, or use them to make jam or juice."

Dr Elke Crouch of Stellenbosch University brought together food specialists from Universities of Pretoria and Fort Hare to explore potential solutions to minimise these losses. Rather than repeat work that has already been done, they gleaned useful information from numerous global food studies.

The food experts' literature search revealed that certain packaging systems can extend the shelf life of fruit, vegetables, meat, and dairy products. They also found that mobile abattoirs and appropriate cooling systems will help to preserve meat products.

For resource-poor farmers, the simplest way to prevent food losses due to spoilage is to dry fruit and vegetables (either in the sun or using homemade solar dryers), can them, or use them to make jam or juice.

Results from this review will help policy-makers decide on investments in future technologies and products that prevent food wastage. This will allow small-scale enterprises to help to alleviate hunger and malnutrition in South Africa's poorest regions.

Value Chains

PPI: Professor Andries du Toit, University of the Western Cape

Processing local crops for health and prosperity

Researchers at the University of Pretoria and the University of the Western Cape have teamed up with local food processing companies to find ways that small-scale South African farmers can reduce waste and grow their income.

In partnership with food scientists, engineers, economists, a financial analyst and private sector companies Delphius and CFAM Technologies, Professor Emmambux is studying ways to process local crops into nutritious foods and food ingredients. The idea is that food processing holds the potential to save waste on the farm and also provide income to farmers and entrepreneurs while providing healthy new foods for the South African consumer.

Thus far the project has produced several porridges from cassava, soy, teff and bambara groundnut. These are easily digestible, have a lower glycemic index than maize meal, and often provide more accessible nutrients than the South African staple diet.

Emmambux and his team are looking at a number of different processing technologies, namely extrusion cooking, fermentation, solar drying, microwave and micronisation. They hope that this research project will lead to potential new products that can be commercialised.

Teff

Soy

Cassava Root

Asking the right questions about South Africa's food system

The food system in South Africa is heavily influenced by the poorest social classes and the choices they make, despite much of the power in the South African food environment being held by large corporations. This is one of the findings from the Agro-food value chain, regulation, and formal and informal livelihoods project, coordinated by Dr Shane Godfrey and Dr Gareth Haysom, both at the University of Cape Town.

Their network of researchers also showed that South Africa suffers from fragmented and incoherent policy in the areas of agriculture and food security. This is particularly true of the informal food economy, which has been effectively ignored by policy-makers despite playing a huge part in ensuring poor South Africans can eat.

These findings are the outcome of an 18-month review process to try and understand the complex and tangled relationships between producers, suppliers and consumers of food, through a process known as value chain analysis.

"We came up with this notion of a state-of-knowledge review," says Godfrey. "The idea was to lay a solid platform to plan a medium-to-long term research programme, rather than everybody doing their own thing."

This project has brought together almost 20 researchers to discuss and study various aspects of food value chains in South Africa. They looked at social, legal, corporate and governance aspects in order to better understand the complex systems that govern access to and distribution of food.

The outcome was 16 working papers available online via both the Centre of Excellence in Food Security and the Institute for Poverty, Land and Agrarian Studies website).

The papers t cover such diverse topics as 'Corporate power in the agrofood system' and 'Labour regulation and the economy'. Godfrey says that despite the diverse research topics, their review process has generated interesting connections, and it has highlighted important questions to start asking – like who holds the power in food value chains, and how this affects changes in food prices.

"We're starting to better understand what we need to do to answer these questions," he says. "But we're barely scraping the surface in terms of how connections within the value chain work."

What exactly is a value chain, though? The idea originally comes from research in the automotive industry, and basically refers to the chain of production from raw materials to consumer product (and beyond to include waste management and recycling). Value chain analysis

An enumerator conducting research into the informal food economy at a shop in Kisumu, Kenya. Image credit Gareth Haysom.

tries to understand all the different players, or nodes, in that chain, and looks at relationships between the different nodes. Godfrey says, "What makes a value chain different from a supply chain is the notion of power in those relationships." In every value chain, certain players have more power and others have less; this affects how value is distributed within the chain.

> The informal food economy has been ignored by policy-makers despite playing a huge part in ensuring poor South Africans can eat.

This power disparity leads to very complex and dynamic systems that are very hard to study. "Value chains are usually too big and too complex to practically study as a whole, so very often people just take a segment of the value chain and study that while recognising that it just one part," says Godfrey. The complexity of the problem is evident from the working papers produced during this project. They raise issues with food access, employment and labour practice, nutrition and food safety, consumer vs corporate power, and the overlap between formal and informal food markets.

A good example of how these issues can intersect is that of Margereet Visser's research into the conditions of farm workers in the Western Cape. After apartheid, labour laws were changed to protect the rights of farm labourers by taking power away from the fruit and wine producers in the Western Cape. However, this has led to retailers exerting their power over producers and resulted in little meaningful change in working conditions for the labourers.

Across the spectrum, there is evidence that the South African government's focus on promoting rural production as a path to national food security has not acknowledged or supported the key role of the informal sector in promoting access to food. In general, the lack of appropriate policy on food security has undermined food security in South Africa.This research has clearly demonstrated some of the problems with SA's food value chains. Now, Godfrey, Haysom and their network will start to look for solutions; for practical ways to address the failings they have found in the food system.

"If you are going to improve livelihoods in the value chain, what does that mean for food prices?" Godfrey asks. "And by implication, what does that mean for food security more broadly in society?"

Kenya enumerators after a day of field work gathering data on informal food systems. Image credit Gareth Haysom.

Corporate control of South Africa's food

Food production and supply in South Africa is dominated by large companies, many of them multinational. By the time food ends up on a supermarket shelf or in a consumer's shopping bag, it has gone through multiple levels of production and processing known as a "value chain" or "value web" .

Professor Ben Cousins of the University of the Western Cape collaborated with researchers at the Universities of Cape Town and Pretoria to understand who controls South Africa's food value chain, and how this affects the consumer.

The researchers discovered that the entire process, from providing seed and fertiliser to selling the food produced, is mostly in private hands. **For example:**

- Big companies like Pioneer HiBred and Monsanto control seed production, while others like Sasol and Barloworld supply the bulk of fertilisers and machinery. These are collectively known as farm inputs.
- 90% of South Africa's food is produced by large commercial farms.
- This food is processed by big brands like Tiger Brands, Nestle and Pioneer Foods.
- Foods destined for the domestic consumer market are distributed by wholesalers and bulk markets, which supply them to retailers like Shoprite, Pick n Pay, Spar and Woolworths. However, these also include thousands of small, informal and independent retailers, particularly in poor or rural areas.
- The consumer buys food from these retailers.

Because of this food supply structure, the researchers found that corporations have immense power over what the consumer buys. Instead of consumers driving demand, producers are creating demand. By having considerable input on anything from dietary guidelines to advertising, they can even influence consumer perceptions of food quality and health.

Where does this leave South Africa's millions of small-scale farmers, informal traders and poorest consumers? According to Professor Cousins, this corporate dominance reduces formal employment, especially in primary agriculture and in food manufacturing. This suggests that efforts need to focus more on creating livelihoods in the agri-food sector, and less on expanding already powerful corporate activities.

Professor Ben Cousins of PLAAS

Schematic overview of the South African agro-food system structure:

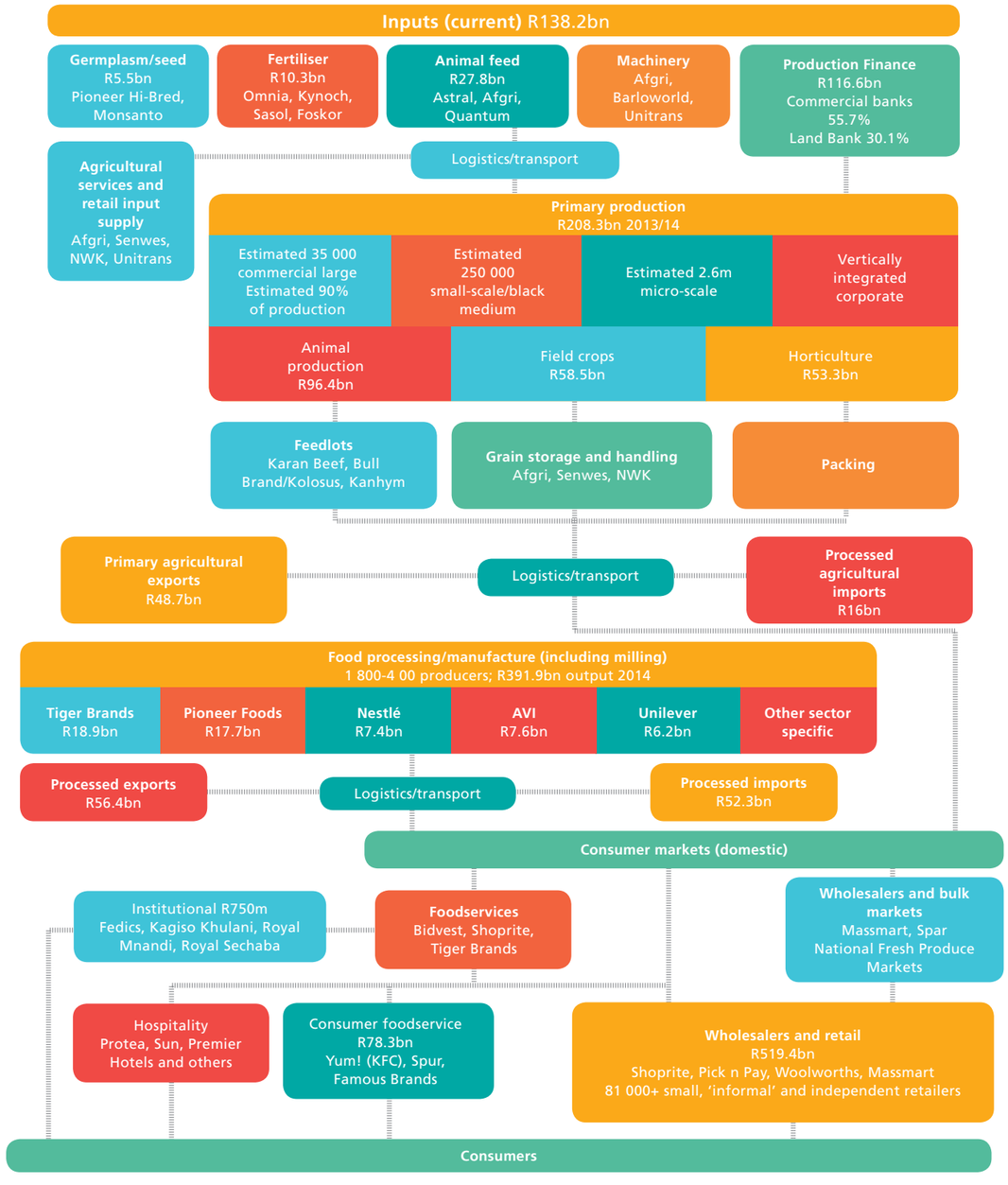
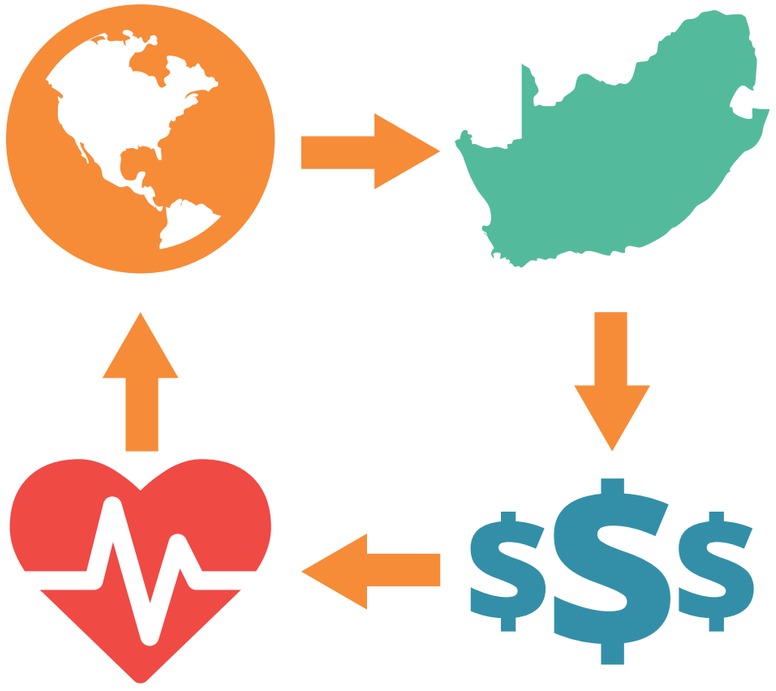


Image credit: Stephen Greenberg.

Value chains in the South African food system are heavily influenced by global events, multinationals and local corporations.



The corporate dominance of food production and supply in South Africa also has health and financial implications for the consumer.

Markets and Livelihoods

PPI: Professor Johann Kirsten,University of Pretoria

Drought and the rising cost of maize production

During the recent drought, the cost of white maize increased by 80%, and the cost of maize meal grew by 40% in response. Marlene Louw, a PhD student in the CoE-FS's Markets and Livelihoods research programme, is trying to understand how consumer food prices are affected by factors changing commodity prices.

The early 2000s saw similar rapid inflation in food prices in South Africa; food security, particularly for poor households, was badly affected. This prompted researchers at the Department of Agricultural Economics, University of Pretoria (UP) to put more effort into understanding food prices in SA.

Enter Marlene Louw, who is looking to incorporate this research into her own work at the Bureau for Food and Agricultural Policy (BFAP), a non-profit housed at UP that provides market-based research to inform decision-making in the agro-food and beverage industries.

Louw's PhD research, which was funded by the CoE-FS, looked at how changes in underlying commodity prices manifest in final retail food prices. Using a "time-series econometric method" to find out how commodity price shocks show up in supermarket prices, Louw analysed whether there was a long-term relationship between commodity prices and final food retail prices.

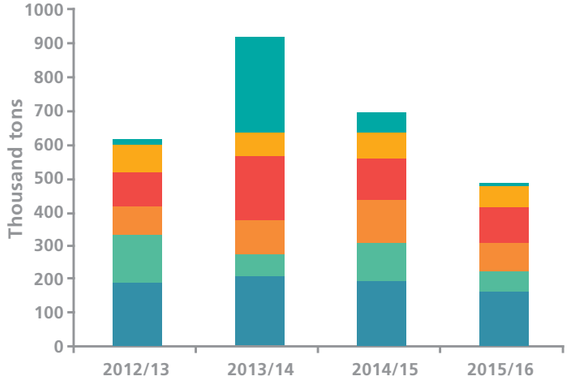
Her research focussed on two value chains: the wheat-to-bread and the maize-to-maize meal value chains. These two value chains provide important staple foods to South Africa's poorest people; thus they are closely tied to food security. They were also the food products hit hardest by the latest drought.

The research was not straightforward - value chains are complex systems with multiple influences that need to be taken into consideration when analysing inflation. For instance, there have been significant tariff increases, a dry season in the past year, and a slump in world prices for the past several months. All of these factors influence inflation.

> "In March 2016 we found that the cost of the average staple-foods food basket had increased by almost 19% year-on-year due to the drought."

In addition, the wheat-to-bread value chain saw what is known as a commodity super-cycle between 2005 and 2008, an event that caused a significant increase in commodity prices. Companies in both value chains are also thought to engage in uncompetitive behaviour, as would be expected in these industries dominated by a few large firms.

South African grain exports have decreased dramatically in the last two growing seasons:



Only includes the first 31 weeks of the 2015/16 season.
Image credit BFAP Drought Policy Brief.

To Louw's surprise, her preliminary results disputed the existence of such uncompetitive activity within these value chains; prices have moved as expected in a competitive market. Louw says there are only a handful of these firms because "the margins in these value chains are so small that there is only room for a few large companies." The effects of the drought on these value chains and other staple foods are reflected in the 2016 BFAP Drought Policy Brief, available on their website.

"In March 2016 we found that the cost of the average staple-foods food basket had increased by almost 19% year-on-year due to the drought," says Louw. She says that this was also influenced by the weak Rand in recent months, but that we could hope for lower inflation in coming next year.

The Drought Policy Brief suggests that the cost of the food basket in the coming season may decrease by 10% to 16% if production conditions improve. This would depend on better rainfall and low global commodity prices, but offers some hope for South Africa's food-insecure communities.

There is a lot of scope to build on the research from a food security point of view, says Louw.

"There is also room to look at it from a macroeconomic perspective, to ask what the implications of a drought on food security are in more general terms."

The drought in summer 2015/2016 devastated farms across South Africa and contributed to the increasing cost of maize.:

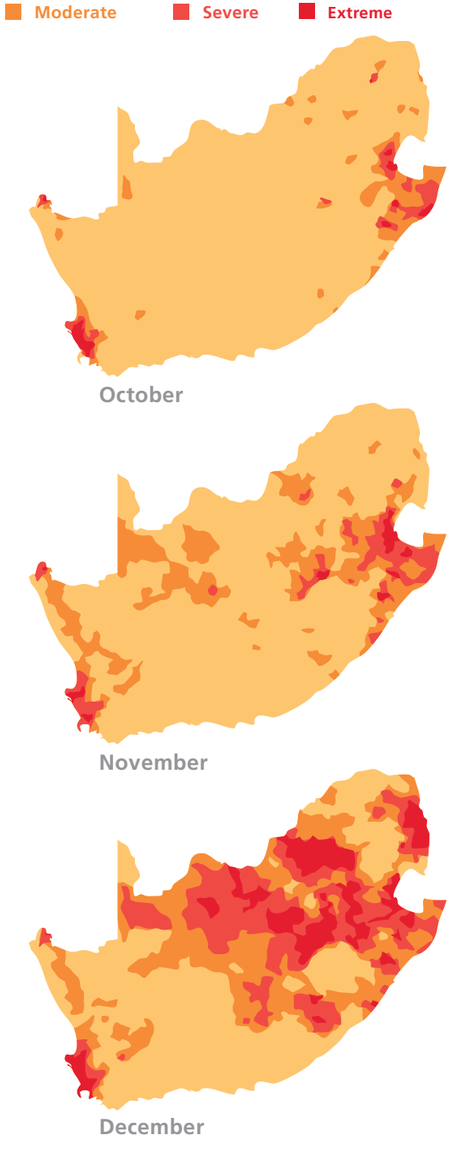


Image credit BFAP Drought Policy Brief.

Nearly half of South Africans are food insecure; many severely undernourished

When people cannot get enough nutritious food to grow and develop normally, or to lead an active and healthy life, they are generally considered "food insecure". This definition, however, oversimplifies a multidimensional problem faced by almost half of South Africa's population. Consequently, the University of Cape Town's Professor Murray Liebbrandt set out to more accurately measure poverty and food insecurity in South Africa. He created a Multidimensional Food Insecurity Index (MFII), which he based on an already-developed South African Multidimensional Poverty Index (SAMPI). Indices like these are used to classify regions or populations as food secure or insecure according to their "score" for poverty and how easily they can access nutritious food.

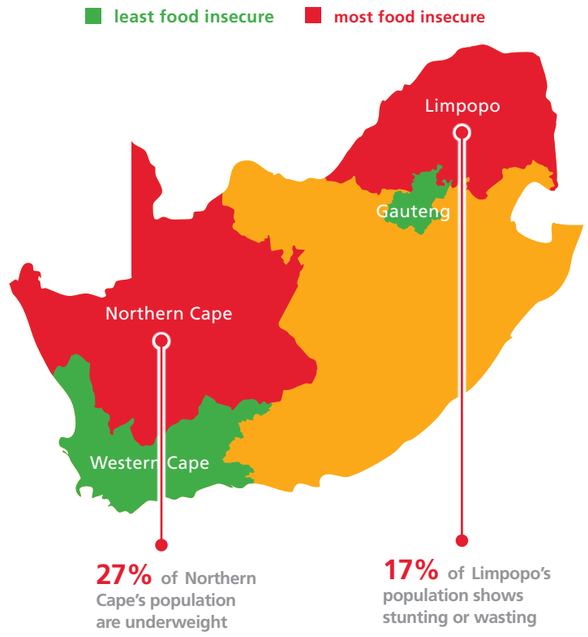
Unlike previous poverty indicators, SAMPI considers poverty in more ways than simply how much money someone has to live on. This index also uses health, education, living standards and unemployment to describe different poverty levels.

Similarly, Professor Liebbrandt included multiple factors in his index to describe food insecurity in South Africa. These can be considered as a whole or broken down into different subgroups to create individual or household profiles.

Professor Liebbrandt's index revealed that nearly half of South Africa's population is in some way food insecure. One of the main reasons for this was not enough variety in the diet. If most of a person's nutrition comes from grains and carbohydrates, and they are eating very few protein-rich foods, for example, they will be considered undernourished. Other, less easily quantified factors, included an individual's perception of whether they were getting enough food, determined by how hungry they felt.

Overall, Professor Liebbrandt found that the most food-insecure people live in Limpopo and KwaZulu Natal, while the Western Cape and Gauteng enjoy the lowest levels of multidimensional food insecurity. Worryingly, 17% of Limpopo's population experienced stunting or wasting, while 27% of the Northern Cape's population were underweight.

These results indicate that many South Africans are severely undernourished, with important social and economic consequences. Identifying exactly what makes people food insecure will help policy-makers to focus on those areas that will best alleviate poverty and hunger.



Hunger affected by food quantity and quality

The poor in South Africa face a number of challenges, but none more so than keeping themselves adequately fed amid widely fluctuating food prices. Maintaining a diet that supplies all the nutrition and energy required to lead a healthy and active life depends on both quality and quantity of the food consumed. These two dietary factors in turn depend on how affordable the food is.

Using data from the National Income Dynamics Study [NIDS] - a survey of thousands of South African households to track and understand the shifting face of poverty - University of Cape Town's Professor Murray Leibbrandt looked at how much households spend on food to get an idea of the quantity of food they are consuming. For quality, he looked at whether they are getting their nutrition from a wide enough variety of foods.

Professor Leibbrandt then used statistical tests to determine if food quantity correlates with hunger, and if food quality correlates with good nutrition. For nutrition, he looked at the body mass index (BMI) of adults, which is calculated from the weight and height of an individual. This value can be used to determine if someone is underweight and therefore undernourished. To determine hunger, he simply looked at whether households reported being hungry. He found that whether a household goes hungry depends on both food quantity and quality, but quantity plays a bigger role. The contributions of both dietary factors to adults' BMI values, however, differed according to sex. While either dietary diversity or food expenditure can be used to explain male BMI values, both factors contribute to whether a female is underweight, overweight or has an ideal BMI.

These results show that the variety of foods that households put into their food baskets influences whether they go hungry and receive enough nutrition. This is an important consideration for government recommendations on what should constitute affordable food baskets.

Government interventions needed to make healthy food affordable

For South Africa's urban and rural poor, price fluctuations in food can be the difference between going to bed fed or hungry. The affordability of food can be tracked by looking at family "food baskets": these list the type and quantity of food items most commonly purchased by households with different income levels.

To measure food affordability, University of Pretoria's Professor Hettie Schönfeldt used household surveys, questionnaires and published data to work out the contents of food baskets from different socio-economic and cultural groups. She then calculated how much it would cost to buy food that provides all the nutrition and energy needed to stay healthy.

Taking into account individual or family incomes, Schönfeldt compiled food baskets describing the quantity (and purchase units) of foods that provide a nutritious diet for individuals in various age, gender, socio-economic and cultural sub-groups. She also developed 14-day sample menus for four population age-groups to inform which foods should be included in recommended National Nutritious Food Baskets.

Overall, the project found that a healthy diet is unaffordable for most South Africans. Attaining healthy food baskets for all will most likely require multiple government interventions such as educating the public on healthy (but affordable) food choices, tax deductions, social grants and subsidies. Healthier diets will benefit South Africa long-term by improving the population's physical and mental performance and reducing illnesses and disease.

Image credit: Institute for Food Nutrition and Well-being, University of Pretoria

Health and Nutrition

PPI: Professor Rina Swart, University of the Western Cape

The secret economy of waste

Research from the CoE-FS has revealed a hidden economy thriving on our landfill sites. All over South Africa, small communities of 'waste pickers' have created livelihoods by scavenging recyclables, food and potentially useful items off of rubbish dumps. Professor Rinie Schenck, Professor Rina Swart and their research team at the UWC's Department of Social Work has studied these marginalised communities to better understand this informal economy.

Waste picking is a common but essentially undocumented way for South Africa's poorest and least-privileged individuals to survive. On landfills all over South Africa, the waste pickers crowd around new waste deliveries to parse the useful waste from each consignment. Mostly, they are looking for recyclable goods - paper, plastic, glass and metal are all valuable to informal buyback centres, who sell the goods on to the larger recycling companies.

"Waste pickers save South African municipalities an estimated R700 million every year," says Schenck. "They are essentially offering a free service to remove recyclable items from the landfill sites. This saves money in terms of landfill space, as well as the indirect costs of recycling and waste management."

> **Waste pickers save South African municipalities an estimated R700 million every year.**

Researchers interview a waste picker at Botshubelo Landfill in Mpumalanga. Image credit Rina Swart.

Despite this service, waste picking is not covered by any type of legislation or policy - waste management policies in South Africa cover only the formal waste sector. This means that conditions are not always good for the pickers, as different municipalities have different ways of dealing with them.

In some cases, the pickers are chased off the landfill sites. In others, they are left to do their work in unhealthy and unpleasant conditions. In a rare few, they are looked after and supported in the work they do. For example, the Graaff-Reinet municipality has built a transfer station for the pickers to work at to support waste pickers. "In Graaff-Reniet, they built a transfer station - an open structure with a roof where people can sort the waste and the pickers can take out what they want," says Schenck. "Having a transfer station provides shade, ensures that the waste is still clean, and streamlines the process."

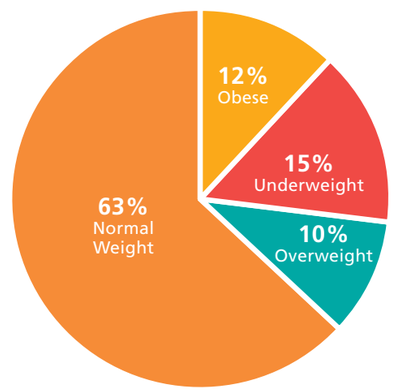
While collecting recyclables, many of the waste pickers collect food as well. In some cases the food is brought to the dump in containers - as it is well-known that the waste pickers will eat it. In other cases, the food is buried in line with regulations for disposing food past its sell-by date, or mixed with other waste. The pickers (don't often get sick from eating the food, however, and) say they can tell when food is fine to eat by smell, taste and touch.
It remains a difficult existence - the researchers found that on average pickers made about R770 on a good week and about R290 on a bad week. Just over half of waste pickers collect food as well, and it seems as though the diet foraged this way can often be quite diverse.

Part of this study looked at obesity, and in women, obesity is lower amongst waste pickers than the general population (40% as opposed to 60%) but still surprisingly high. In the general population, this may be due to a diet that consist principally of starchy staples such as maize meal or bread. The diversity of food for waste pickers very much depends on the presence of industries and restaurants in the area of the landfill site, however. In some cases, there simply isn't food enough to scavenge.
Despite the difficulties inherent in this kind of work, the researchers found a pervasive sense of pride and independence in the waste pickers that they spoke to. Schenck hopes that by making municipalities aware of the waste pickers' plight, they can help to protect the livelihoods of this marginalised group.

"Waste pickers are the most important part of this informal waste value chain, but their contribution is unrecognised," she says. "We don't want to do anything to take their livelihoods away from them."

In a given week, waste pickers earn between R300 and R800 from what they collect:

A large proportion of waste pickers tested were within normal weight limits:



The South African diet is high-energy but nutrient-poor

The World Health Organisation (WHO) continuously uses new research into human nutrition to provide dietary guidelines for populations across the world. According to WHO, essential nutrients for humans include protein, carbohydrates, fats and lipids, a range of vitamins, and a host of minerals and trace elements.

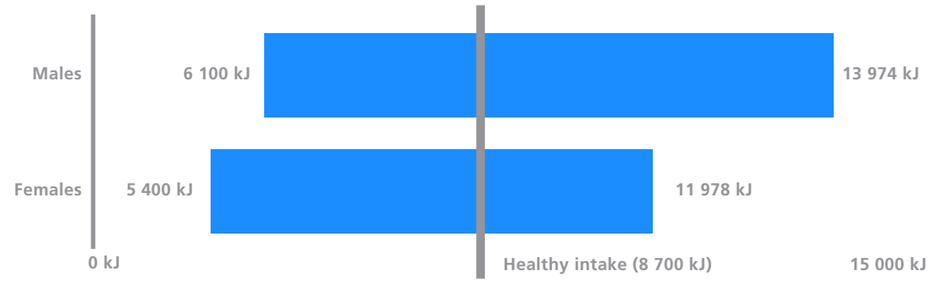
Many countries use this information to develop national dietary allowances or recommendations, South Africa included. However, the reality in South Africa is that most people cannot afford to eat according to WHO standards. Professor Hettie Schönfeldt of University of Pretoria worked with colleagues from University of Cape Town and the Human Sciences Research Council to find out what South Africans are eating. Using data available online and from libraries, they reviewed the diets of adults and children between 2000 and 2014.

What they found was worrying:

- While the WHO-recommended average energy intake for adults to lead a healthy and active lifestyle is 8 700 kilojoules (kJ), males were consuming anything between 6 100kJ to 13 974kJ, and females between 5 400kJ and 11 978kJ. This indicates that many South Africans are either underweight or overweight, both of which have serious health implications.
- To provide this energy intake, people consumed too much sugar and carbohydrates, and too little protein. This indicates that even overweight people are undernourished.
- While fat intake was within WHO recommendations, the type of fat consumed was a concern.
- The amounts of essential micronutrients like vitamins and minerals in people's diets varied greatly, and people from rural and urban populations consumed vastly different amounts of food.
- Most South Africans eat refined and higher-value food: Refined food is food that has been processed to look and taste different than in its original state. For example, many white breads have had the nutrient-rich bran and germ removed from the grain, leaving the bread with very little nutritional value. Higher-value foods like milk and cheese may still be processed, but have more nutritional value. Unprocessed high-value foods include fruit and vegetables.

This study shows that adult diets are changing, even in rural, traditionally subsistence-based communities, to energy-rich but nutrient-poor foods. As these diets can lead to obesity and type 2 diabetes, more education on the value of healthy but affordable foods is urgently needed.

Daily calorie intake in South Africa shows a broad distribution, with men getting more calories in general than women. South Africa faces challenges of both under- and over-nutrition, based on WHO recommendations:



Tracking South African eating habits to inform dietary guidelines

Keeping track of what South Africans eat is important for the welfare of the country. Partly due to rapid urbanisation, South African diets appear to be increasingly reliant on sugar-laden, highly refined foods. This trend is associated with health problems like obesity, diabetes, heart disease and some cancers.

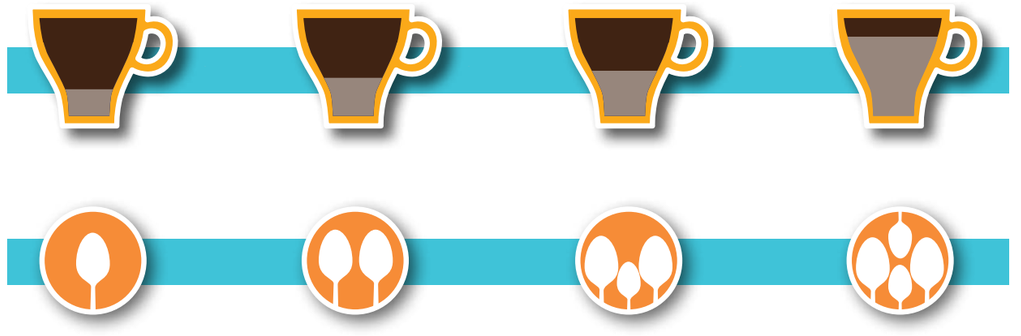
Dr Mieke Faber of the Medical Research Council is developing "tools" to help nutritionists assess South African diets. These tools consist mainly of questionnaires documenting both household and individual food intake using, for example, household inventories.

Faber is also developing a manual for a "24-hour dietary recall" assessment. With this technique, nutritionists interview household members and ask them to recall what they ate in the past 24 hours. The advantage of this is that interviewees do not need to fill in questionnaires themselves (meaning they do not need to be literate), and the short recall time frame makes their food listing more accurate.

A draft of this manual, which includes a questionnaire and protocols for interviewers to follow, was used in a survey looking at fortified foods. These are foods low in essential nutrients, like bread and maize meal, which have had nutrients added to them.

Dietary and lifestyle guidelines based on information gathered from assessment tools like Faber's will help to reduce the disease burden on the country. Knowing which foods people eat the most will also help government to decide which foods to add nutrients to, in addition to already-fortified wheat flour and maize meal.

South African diets appear to be increasingly reliant on sugar-laden, highly refined foods.



Using data to improve health in rural and urban populations

A broad study of food choices in urban and rural areas has revealed that an alarming number of South Africans are overweight, and identified some of the factors associated with excessive body fat.

The PURE-SA (Prospective Urban and Rural Epidemiological Study South Africa) research programme aimed to empower community health workers to help South Africans make better food choices. Led by Professor Puoane at the University of the Western Cape, the has study collected data from more than 1200 participants thus far, three quarters of which were women.

Based on three accepted indicators of excessive body fat, the study found that 82-96% of women tested were overweight, while 26-62% of men were considered to be overweight using the same indicators.

Factors associated with excess body fat included being over 50, education below tertiary level in men, and tobacco smoking in women.

Researchers are now looking to develop an intervention that community health workers can use to improve diet choices in rural and urban areas. Once this intervention is in place, it will be monitored to see whether it is having the intended effect.

Professor Thandi Puoane speaking at the two day "Food politics and Cultures Symposium" at UWC in July 2015

Consumer Choice and Behaviour

PPI: Professor David Sanders

Eliminating nutrient deficiencies in South Africa's poor

Fortification of staple foods has shown some success in South Africa, but there is more work needed in order to eradicate malnutrition in South Africa's poor communities. This is the finding of a recent survey for the Global Alliance for Improved Nutrition (GAIN); the survey was run by Professor Rina Swart of the University of the Western Cape's Department of Dietetics and Nutrition.

This research forms part of a global review of mandatory food fortification by GAIN, but it also fits into Swart's mandate as programme leader for the CoE-FS's Health and Nutrition research programme. Swart and her team adapted GAIN's research methods for South African conditions, and are now using the data to better understand what is and isn't working in South Africa's national fortification programme.

"When we started the CoE-FS we asked, what are the nutrition gaps in the country? What are the nutrients that people are deficient in, which food groups, and why?"

In South Africa, foods like bread, flour and maize meal have been fortified for several years in an attempt to reduce common nutritional deficiencies in South Africa. Since 2003, a multivitamin mix has been added to these staple foods to increase the levels of vitamin A, iron and zinc (along with another 5 vitamins) in South African diets. Swart was involved in the original National Consumption Survey in 1999 to understand SA's nutrition needs, and contributed to the policy that led to mandatory fortification of foods. There have been several national surveys since then (in 2005 and 2012). Now, she is following up to understand whether the fortification is adequate and doing its job.

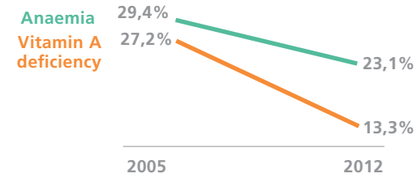
The results of previous surveys showed that fortification is working, to a point. Anaemia in women is reduced by around 50%, sub-clinical vitamin A deficiency (deficiency without obvious symptoms) is reduced in children, and neural tube defects in newborn babies (a symptom of folic acid/vitamin B deficiency) have been reduced significantly.

However, nutrient deficiencies are far from eradicated and continue to impact South Africans' health and productivity.

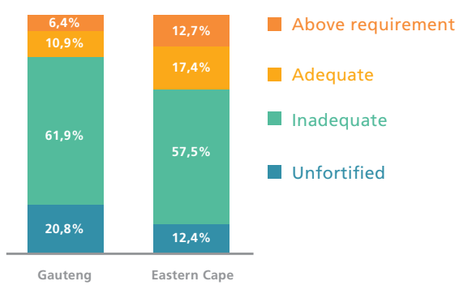
The GAIN survey focussed on consumption to check whether consumers were getting enough of the fortified foods to meet their nutritional needs, and to see whether there were other foods that could be fortified.

"We took food samples and analysed iron levels because it is the most stable of the fortificants in the multinutrient mix," says Swart. "We analysed dietary intake of women in detail, and we had a battery of questions on consumption."

Mandatory fortification has had a positive effect on nutrition deficiencies in South Africa:



Maize meal is seldom adequately fortified, despite regulations that have governed fortification of staple foods like maize meal since 2002:



> When we started the CoE-FS we asked, what are the nutrition gaps in the country? What are the nutrients that people are deficient in, which food groups, and why?

The other consideration for researchers was whether they have been fortifying the correct foods.

Swart explains: "We looked at different vehicles for fortification, not just currently fortified vehicles. That includes oil and cake flour, because cake flour is not currently fortified, only bread flour."

As it turns out, South Africans do not use bread flour, even when baking bread. They predominantly use cake flour, thus reducing their nutrient intake. There is now legislation in progress to make fortification of cake flour mandatory in order to address this.

In general, foods like wheat bread flour and maize meal are not fortified to the extent required by law; in some cases, these vehicles have not been fortified at all. This has prompted changes in the way that the Department of Health monitors fortification, with more focus now placed on monitoring at the mill, and plans to improve monitoring practices in general. Swart says that there are also plans to change the form of iron used in the multivitamin mix in order to make it easier for the body to absorb (known as bioavailability).

Armed with survey data and sound nutrition guidelines, Swart and her team are working closely with the Department of Health towards zero nutritional deficiencies in South Africa.

Do child support grants benefit children's diets?

Children are especially vulnerable to the effects of poor diets and malnutrition. Even if they are not starving, eating calorie-rich but nutrient-poor diets can lead to stunted growth and lower IQ.

Unfortunately, energy-dense maize meal porridge and white bread are cheaper than more nutritious foods and make children feel full. They do not, however, provide nearly enough nutrition to meet a growing child's needs. The government introduced a Child Support Grant (CSG) in 1998, but evidence of its effectiveness is limited. Some surveys maintain that children receiving CSGs are less stunted and hungry, while others report that there is little difference between recipients and non-recipients of the grant.

Dr Tanya Doherty and colleagues from the Medical Research Council wanted to better understand how the CSG affects diets and nutrition among children in poor households. They started by interviewing 40 mothers of children under five in Mount Frere in the Eastern Cape and Langa in the Western Cape, as well as local shop owners.

Although results are preliminary, Dr Doherty's study garnered some interesting insights. For example:· Caregivers have a deep-seated belief that their babies do not get full from breast milk alone, and spend their grants on expensive baby foods in the first six months of a child's life.

- To earn extra money for baby foods, caregivers will som times leave their babies alone in order to do casual work (for example, washing for other community members). This illustrates how important they consider baby food to be, and is one area where education on the value of breast milk could save households money and leave caregivers free to look after their children.
- Caregivers saw weight gain as a healthy sign that the child is growing well,with repercussions for childhood obesity.
- The CSG is not enough to pay for both schooling and food. Therefore, once children are old enough to eat the same food as other household members, they are given cheap starchy foods with little variety to save money on food.

A more in-depth survey currently underway in Langa should shed more light on the effects of CSGs on child nutrition, including the difference, if any, in growth of children receiving and not receiving grants.

Better food environments can prevent obesity

Nearly two-thirds of South African women and one-third of men are overweight or obese. The rapid rise in obesity in South Africa and worldwide suggests that food environments have changed, particularly regarding the type of food that is easily accessible and cheap. An increasing reliance on starchy, refined food that is filling but has little nutritional value may partly explain why many South African households are both overweight and malnourished.

Professor Vicky Lambert of University of Cape Town and collaborators from University of the Western Cape, Wits University and Colombia's Universidad de Antioquia seek to find out why people choose to buy and eat certain foods. They will compare the variety, quality and price of food purchased by people from high-income and low-income backgrounds, as well as what influences their choice of shop or supermarket.

To do this, the team developed a questionnaire to give to people leaving selected supermarkets and spaza shops. In what is known as an intercept survey, they will list the food items in shoppers' bags and the amount paid for them. They will also record how far people travelled from home to shop for food, and how they got there. The answers will tell Lambert a great deal about the food environments of low- and high-income areas.

Lambert's team also devised an interview for supermarket chains to see what kind of food they stock and how their prices differ according to the socio-economic status of the area they are in. By looking at the variety and quality of foods that shoppers can choose from, they will get an idea of how easily people from high- and low-income areas can access healthy foods.

When completed, this study will for the first time reveal factors influencing food choice and consumption in both high- and low-income communities. This information may be used by policy-makers to deliver health messages or to devise ways to give South Africa's poorest communities better access to quality food.

Healthy citizens make a healthy nation

Food systems have changed dramatically in the past few decades from community-supported agriculture, farmers' markets and home gardening to reliance on supermarket-bought convenience food. As the demand for calorie-rich, cheap food grew, so nutrition declined and lifestyle-related diseases like heart disease and diabetes climbed. This has placed a massive disease burden on both developed and developing countries.

South Africa is in the unique but unenviable position of having a twin dietary problem: much of the country's population is either underweight due to not getting enough food, or overweight due to eating an unhealthy, starch-laden diet. Whether underweight or overweight, South Africa's people are malnourished.

Realising that government policy can make South Africans healthier, research by Professor David Sanders of University of the Western Cape monitors public sector policies and actions impacting food environments in South Africa. With help from the CoE-FS in Food Security and the International Network for Food and Obesity/Non-communicable Diseases Research, Monitoring and Action Support (INFORMAS), he is developing a benchmark for good policy against which government actions can be compared.

For example, agriculture and food policies could better support health policies, which are currently treated separately. Likewise, economic decisions that affect food prices should consider their impact on the health of the poor.

Using international practices as examples, Dr Sanders developed a scoring system to rate the South African government's actions and interventions to reduce obesity and associated diseases. He will eventually create a policy index which can be used by policy-makers to improve their actions, and as a baseline against which to measure progress in implementing such policies.

By setting nutrition goals for policies and interventions in agriculture, the food industry and other relevant sectors, the South African food environment can be significantly improved. This makes sound economic sense, as healthy citizens translate to a healthy, productive nation.

Control and Safety

PPI: Professor Lise Korsten, University of Pretoria

Food safety on the streets

Fresh vegetables sold on the street in South Africa carry no more or less food-borne pathogens than fresh produce bought from shops and formal markets. Professor Lise Korsten, who supervised the research at the Plant Pathology Division at the University of Pretoria, says that it's likely due to shorter supply chains and environmental conditions in the informal food sector.

"In the formal food sector, fresh produce can be in the supply chain for an extended period, with multiple transfers and intermittent periods of storage," says Korsten. "That's where we think the contamination problems likely come in."

This finding was part of a survey looking at foodborne pathogens on fresh produce sold in the informal sector - that's all the fruit and veggies sold on the street, off the back of bakkies or in trolleys within informal settlements. In South Africa there are regulations around food safety in the formal sector, but almost no attention has been paid to the informal sector. This is a problem, as increasing numbers of South Africans get their food outside of the formal food system.

"Up until now food safety legislation and regulations in South Africa have very much focussed on the formal sector; in the informal sector, there's just a void," she says.

For this reason, Korsten and colleagues wanted to better understand "how safe is the food on the plates of the poor and marginalised in South Africa?"

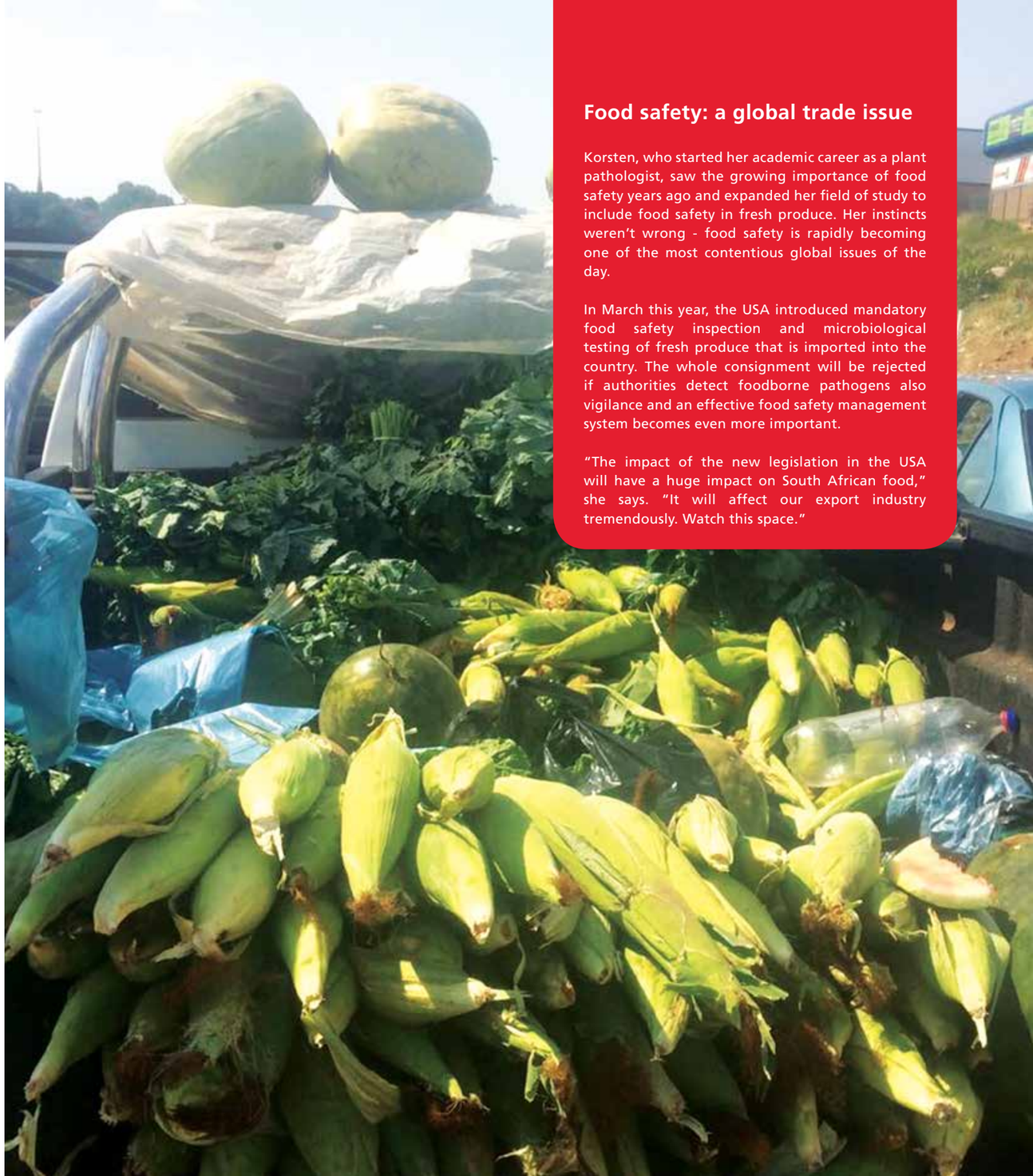
Perhaps surprisingly, it seems that the answer thus far is "pretty safe". The research sampled cabbage, carrots, tomatoes, apples and spinach at various informal fresh produce stalls around Tembisa, an informal settlement in Ekurhuleni. They identified fresh produce sellers around Tembisa by using a food access map produced by another CoE-FS researcher, Leif Petersen from Sustainable Livelihoods Foundation.

The researchers were looking specifically for foodborne pathogens on the foods; while some foodborne pathogens were found, they were within Department of Health guidelines. Levels of organisms that the researchers looked for were similar to that found on fresh produce purchased from the formal sector. The only potential food safety issues were the site that fresh produce was sold at, as well as the water which was used to keep produce clean and fresh, which did not seem to be of drinking water standard.

The researchers have not finished looking at the results of their sampling - they want to look at potential chemical contamination next. In the long run, Korsten hopes that this research could lead to improved standards for food safety in South Africa, as well as science-based guidance documents for informal sector food safety policy.

"We'd like to provide enough scientific data for government to actually address the gaps in the legislation regarding detecting foodborne pathogens," she says. "We are working to develop a highly sensitive and accurate diagnostic method for South Africa, and get this technology to the point where it is making a difference in the life of the man in the street."

"Up until now food safety legislation and regulations in South Africa have very much focussed on the formal sector; in the informal sector, there's just a void."



Food safety: a global trade issue

Korsten, who started her academic career as a plant pathologist, saw the growing importance of food safety years ago and expanded her field of study to include food safety in fresh produce. Her instincts weren't wrong - food safety is rapidly becoming one of the most contentious global issues of the day.

In March this year, the USA introduced mandatory food safety inspection and microbiological testing of fresh produce that is imported into the country. The whole consignment will be rejected if authorities detect foodborne pathogens also vigilance and an effective food safety management system becomes even more important.

"The impact of the new legislation in the USA will have a huge impact on South African food," she says. "It will affect our export industry tremendously. Watch this space."

Health and safety of meat suppliers in question

Most South African consumers in poor communities get their protein from eggs, chicken, offal and, to a lesser extent, from sausage and beef. They tend to obtain these animal food products from the largely unregulated informal food sector (for example, street vendors). Uncontrolled slaughter of farmed beef and uninspected meat on the market puts consumers at risk from food-borne diseases and toxins.

The University of Fort Hare's meat expert, Professor Voster Muchenje, suggests that integrating informal meat sellers into the formal meat supply chain would subject them to stricter regulations and therefore improve their safety. To see how this can be done, he first looked at the quality of animal products sold on the informal market, and established whether consumers were aware of the health risks posed from eating such products.

With Professor Elna Buys and Professor Hettie Schönfeldt of the University of Pretoria and other collaborators from Stellenbosch University and Tshwane University of Technology, Muchenje investigated the practices of abattoirs/ slaughterhouses and milking parlours in rural areas.

The team found that whereas in the formal sector carcasses are stored under sanitary, refrigerated conditions, the informal sector does not follow safety regulations and meat is heavily exposed to bacterial contamination. Despite this, consumers are more concerned about the quality and price of the product than about safety risks. They do, however, take note of the meat's expiry date.

Although formal-sector consumers show confidence in the safety and quality of meat purchased from retailers and butchers, it appears that even this sector is not risk-free. When Muchenje's team looked at the amount of bacterial contamination in meat from South African abattoirs and retail shops, they found that levels were higher than is considered acceptable by European safety standards.

Clearly, more effective meat safety regulations are needed for both formal and informal meat sectors in South Africa. Upgrading the standard of our meat supply chain will result in fewer meat imports, increased income for small-scale farmers and, importantly, safe but affordable meat for poor and marginalised communities.

Professor Elna Buys with postgraduate students funded by the CoE studying at the Unviersity of Pretoria

Professor Voster Muchenje (UFH) speaking on the Role of Meat in Food Security at the 2015 World Food Day panel discussion organised by the CoE-FS and PLAAS

Better cooperative governance will help feed South Africa

A country is considered "food secure" when all people at all times have access to safe and nutritious food that meets their dietary requirements for a healthy and active life. Despite being an upper-middle income country, South Africa falls far short of these requirements.

Research by Professor Jaap de Visser of University of the Western Cape looks at how the South African government can more effectively address food security through better planning, regulation, budgeting and decision making.

The problem is that government currently regulates food on multiple levels, with little coordination between national, provincial, district and local government. Professor de Visser set out to determine who does what at each level of government, and how this process can be improved.

The role and power of different governmental authorities needs to be made clearer, and there needs to be better collaboration on issues concerning food safety. Local governments in particular should play an important part of regulating food, land and agriculture. Such regulation should take into account the essential role that informal trading plays in providing food for poor communities.

For example, municipalities could use their constitutional powers to enhance the potential of local fresh produce markets. They could place markets strategically in urban development plans, provide adequate infrastructure to make them more accessible, regulate trade practices, and police them better to minimise criminal activities.

At a national level, government needs to work with civil society and the private sector, both at home and globally. A better understanding of government's current capability to address food security challenges will help to ensure that all South Africans have access to healthy food in future.

Policy and Rights

PPI: Professor Sheryl Hendriks, University of Pretoria

Fight for your right to food

South Africans are guaranteed a right to food by our Constitution as well as several international treaties and agreements. But according to Professor Ebenezer Durojaye of the Dullah Omar Institute at the University of the Western Cape, the government is failing its citizens, and civil society needs to step up to fight for better access to food.

The fundamental question that Durojaye and colleagues wanted to answer was this: "Given that South Africa's Constitution explicitly protects the right to food, why are we not seeing litigation challenging government on its failure to achieve access to food for all?"

Funded by the CoE-FS under the Policy and Rights programme, the researchers reviewed broad swathes of literature, legal documents and international agreements to better understand how the right to food is protected in South Africa, and what government and civil society organisations are doing (or not doing) to ensure that nutritious food is available to all. This process also involved a comparison with India, where civil society organisations have successfully held the Indian government accountable to guarantee the right to food for all citizens.

"We looked at the Constitution and other national policies relating to the right to food," says Durojaye, "as well as South African commitments to international and regional human rights law, like UN treaties and human rights instruments, and other regional human rights instruments related to the right to food."

The UN's Special Rapporteur on the right to food visited South Africa in 2011, and many of his comments and recommendations are in line with Durojaye's findings. The laws, policies and programmes to ensure access to food are all in place, but poor implementation has stopped these interventions from being effective. The Special Rapporteur also found that a lack of coordination between government departments was holding back access to food for all.

Overall, the research team found that very little is being done by civil society to hold government accountable for these failures. Durojaye cites the example of the Treatment Action Campaign as a successful civil society movement that forced real change in protecting citizen's constitutional rights – in that case, the right to health. In the case of the right to food, there is no such coordinated campaign yet.

"Most organisations in South Africa don't have a clear understanding of what the right to food means," says Durojaye. "You don't have to die of hunger before you know the right to food has been violated."

He hopes that this work will encourage civil society organisations to step up and begin fighting for the right to food, while acknowledging that his research group also needs to provide support to this sort of campaign.

"One of the mandates of the CoE-FS is advocating for human rights issues, especially the right to food. No-one is questioning our government's performance in achieving universal access to food. We need to do more to hold them accountable."

Organisations such as the Studies in Poverty and Inequality Institute (SPII) and Black Sash along with several community organisations have started to advocate for a right to food campaign, and Durojaye hopes that his research group can be involved.

"We would be really interested in being part of that movement so that we can contribute our expertise and knowledge," he says. "We will also continue to work with government and the Chapter 9 institutions - specifically the Human Rights Commission - to see how we can help realise the right to food."

This research sets the tone for that conversation by identifying what is limiting access to food in South Africa and providing suggestions for how to go about changing the status quo.

Finding answers to food insecurity

What does it mean to be food insecure in South Africa? How does it feel to not be guaranteed a good meal every day? What stops people from being able to buy, grow or eat nutritious food? And how does this relate to the current obesity epidemic playing out in South Africa right now?

The answers to these questions lie in many studies and reports published since 1994 on individual, household and community food insecurity in South Africa. However, the widely varying aims and techniques employed by these studies make any straightforward conclusions nearly impossible.

Professor Sheryl Hendriks of the vUniversity of Pretoria teamed up with Dr Alison Misselhorn, an independent consultant, to make sense of all the data.

Based on certain criteria, they selected 169 studies available online. To extract useful information from the studies, they used a computer programme that analyses text for keywords and phrases. The programme, called Atlas.ti, also provided tools that allowed the team to uncover meanings and relationships hidden within the studies' often complex findings.

This is what they found:

- Being described as food-secure or insecure is not a simple thing: the studies employed at least 27 different tools or methods to gauge food security status.
- It's not just the measurement strategies that differ: each of the studies focussed on different geographic environments and interpreted their results within unique socio-economic contexts.
- Over 100 of the 169 studies focussed on rural communities. Even within these areas, there exists an enormous diversity of study outcomes.
- The authors' stated reasons and aims for their studies were just as diverse, with at least 18 different categories of objectives. This means that their findingsemphasise widely varying issues related to foodsecurity.

While it may seem that this diversity complicates their analyses, Hendriks and Misselhorn maintain that it also offers unique insights. To gain any meaningful perspectives on food security in South Africa, such diverse focus points and opinions are needed.

Although they are still busy analysing the data, their findings are already proving useful as a baseline against which to measure the current and future status of food security in South Africa. It also highlights the array of challenges to food security in this country.

Four pillars of a well-fed society

Government policies can help to shape food environments, particularly by providing information and incentives to consumers, farmers and businesses. This means that politics plays a large role in creating a food-secure society.

The Western Cape provincial government is developing a provincial food security and nutrition strategy to ensure its citizens have better access to nutritious food. The Office of the Premier contracted Professor Julian May and other researchers at the Universities of Cape Town, Pretoria and Stellenbosch, as well as the private sector research company, SADC Research, to develop the strategy document.

After preparing discussion documents, organising consultations between government, civil society and the private sector, and interviewing relevant people in each of these sectors, the team wrote a draft strategy. This document recommended four pillars through which government intervention can improve South African diets:

- Food assistance; food awareness and safety: Offering coupons for healthy food; education on healthy food and the consequences of eating an unhealthy diet; better packaging and transport systems to keep food fresh
- Food-sensitive planning: Creating places in urban plans that make it easy for people to access healthy food
- Food resource management for the future: Making farming more sustainable by providing incentives, e.g. fertiliser subsidies for smallholders; grants for farmers using sustainable, environmentally friendly practices; investing in research that provides alternatives to fertilisers and pesticides
- Establishing an inclusive food economy: Investing in food security and agriculture by including agricultural activities in business decisions; basing those decisions on sustainability, safety and quality rather than merely profit.

Having accepted this document, the Office of the Premier is now consulting with provincial and municipal government to finalise the strategy and implement it. This could ensure that the Western Cape is the best-fed province in the country.

Four pillars through which goverment intervention can improve South African diets:

Ineffective food security policy threatens South Africa's food security

Policy decisions by government executives can have far-reaching impacts on ordinary citizens. However, policy decisions are not always sound, nor do they always have the desired effect.

Examples of policies adopted to help alleviate hunger and malnutrition in sub-Saharan Africa include introducing fertiliser subsidies for small-scale farmers, and fortifying foods with essential nutrients. Many sub-Saharan African countries are also involved in a global movement to end malnutrition, known as the "Scaling Up Nutrition" (SUN) Programme.

SUN brings together civil society, donors, UN agencies and the private sector to support country-led, multi-sectoral strategies to combat undernutrition. South Africa, however, has resisted taking part in the programme despite international pressure.

What evidence led South African politicians to reject a programme that has been adopted by countries across the globe?

In partnership with the International Food Policy Research Institute (IFPRI) and Michigan State University, and funded by USAID's Feed the Future Innovation Lab on Food Security Policy, Professor Sheryl Hendriks and colleagues from University of Pretoria used a model for food security policy to explore South Africa's policy decisions. Known as the kaleidoscope model, it analyses drivers of change in the food security arena, with a specific emphasis on agriculture and nutrition policies. By focussing on five key elements of thae policy cycle - agenda setting, design, adoption, implementation, and evaluation and reform - the model identifies what conditions are required for policy change to occur.

The team used the case of the SUN programme to compare policies adopted by South Africa with those of Malawi and Zambia, both of which opted to take part in SUN. They found that while South Africa has an established policy-making process that is informed by evidence (for example, from national surveys), the government does not implement them effectively.

Hendriks concluded that the biggest threat to implementing food security policies is a lack of coordination across sectors. For instance, results from numerous sub-national nutrition studies are not being fed into food security and nutrition policy-making cycles in South Africa.

Understanding whether, why, and how specific agriculture and nutrition policies are implemented should help to ensure that future policies have a greater impact on food insecurity in South Africa.

The five key elements of the policy cycle should guide policy-makers in the South African food security space:

Regulating food policy will improve food access

The South African Bill of Rights states that every citizen has the right to enough food and water to meet their needs. Despite this, many South Africans are still going to bed hungry or undernourished.

The South African government has a number of different strategies and programmes in place to give the country's citizens better access to nutritious food. While these are regulated by various policies and legislation, there is little coordination between programmes.

To streamline existing regulations, North-West University's Professor Nic Olivier and Dr Anel Gildenhuis established a database collating national, international and regional data on strategies and policies relating to food and nutrition.

To build the database, Professor Olivier and Dr Gildenhuis collected information from recent Strategic Plans, Annual Performance Plans and Annual Reports from national and provincial government departments

Having integrated documents from each department or entity in one place, the researchers will provide an overview of the wealth of policies, strategies and programmes contained within them. This will also allow them to develop proposals to amend and improve existing policies and legislation.

To keep the database up-to-date, they will summarise all new developments and changes in a freely available monthly newsletter. This information, written in plain and concise language, will help public and private sectors, civil society, and the South African government to work together towards making food accessible to all.

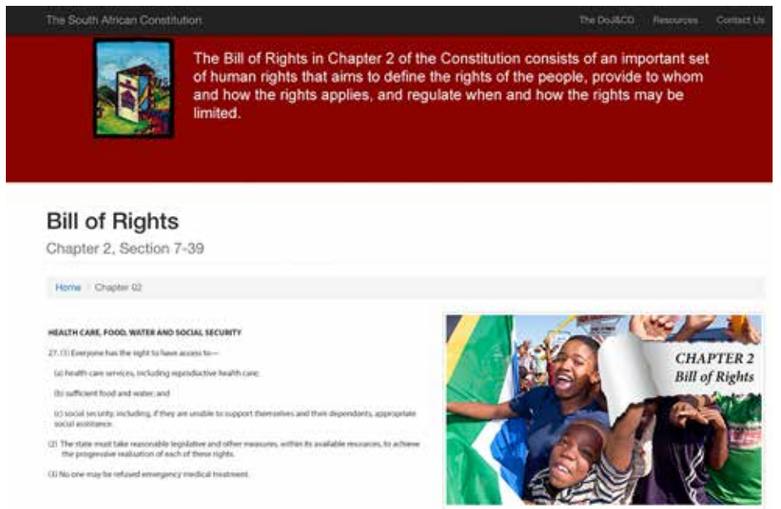


Image credit: http://www.justice.gov.za/legislation/constitution/chp02.html

Real-time information on food security in Tshwane

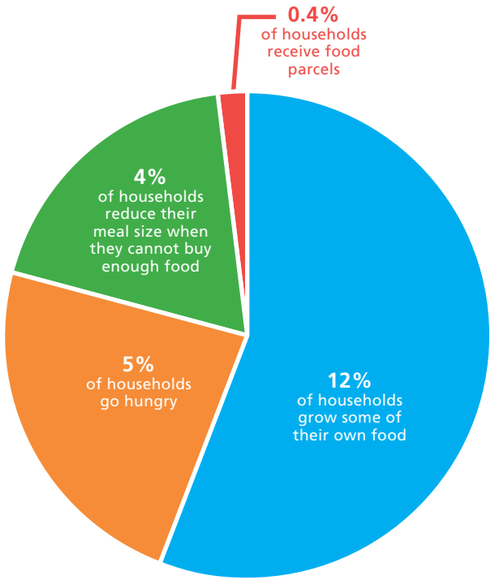
Researchers at the University of Pretoria have used established research partnerships with the City of Tshwane to better understand the causes, context and consequences of food security in various parts of Tshwane Municipality. This research forms part of a larger initiative referred to as Community Oriented Primary Care (COPC), which combines research and community engagement to identify practical solutions to real health challenges.

Professors Jannie Hugo and Tessa Marcus of the University of Pretoria used the smartphone-based data collection platform developed for the COPC initiative to research food choices in eight Tshwane districts. The study looked at cooking methods, hunger coping strategies, purchasing patterns and meal choices.

They found that in these urban areas, 12% of households grow some of their own food, 5% go hungry, 4% reduce their meal size when they cannot buy enough food, but only 0.4% receive food parcels.

Most adults and children surveyed eat two meals per day; these meals are made up mostly of maize meal and supplemented with an average of R12 worth of fish, beans, tomato and onion, or bread.

This real-time information about food security in urban Tshwane will provide information on which to base rational policy decisions. In addition, the data collected here allows researchers to develop interventions that can be easily tested through the COPC system.



Professor Jannie Hugo explaining the Community Oriented Primary Care initiative. Mologadi Makwela

Ethics and Values

PPI: Professor Ernst Conradie, University of the Western Cape

Food security and the moral compass

"What do we do when we eat?"

It may sound a simple question: chew, swallow, digest, repeat until satisfied. But its simplicity belies the importance and value that we as a species attach to eating. There are social and cultural biases, religious prohibitions around certain foods, and ethical concerns that go to the core of what it means to be alive.

Any discussion of food security would be incomplete without considering these aspects. Hence the programme on "Food ethics and Values" under the leadership of Professor Ernst Conradie, of UWC's Department of Religion and Theology, investigates the oft-overlooked symbolism in food production and consumption.

"Professor Julian May, Director of the CoE-FS in Food Security raised the concern that food researchers and scientists may miss something or take things for granted," says Conradie. In particular, the concern is that a focus on only the scientific and economic aspects of food security might produce solutions that overlook important considerations from an ethical perspective.

Thus, Prof Conradie sought and secured funding from the Mellon Foundation to support research projects in this area. So far, the programme has funded two Master's and two post-doctoral research projects.

Two of these projects focus on Muslim social welfare organisations and their use of *zakat*. *Zakat* is a type of religious tax on the current wealth of Muslims which is used in part to support the poor (not just Muslims), usually via a Muslim welfare organisation.

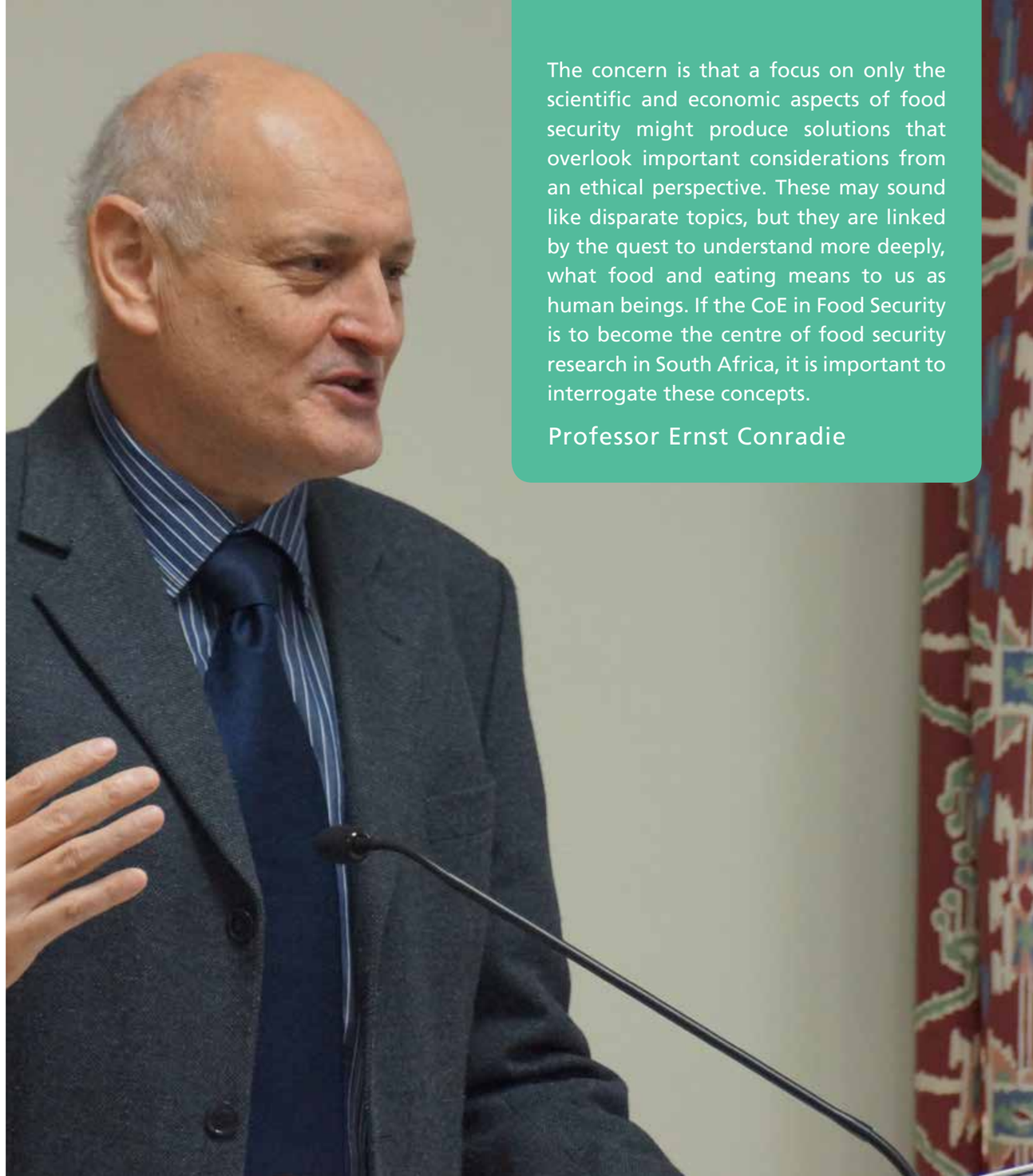
The first project looks at whether *zakat* and the organisations that distribute it are helping to provide food security for the poor that they are ostensibly helping, or merely providing sustenance. The project questions the appropriate use of *zakat* if it is not contributing to sustainable food security.

The second project investigates the nutritional aspect of this welfare system. There are several Muslim laws governing the nutritional value of food provided by *zakat*; the research explores whether these laws are being followed, and whether the food given by these organisations is aligned with modern concepts of a nutritious diet.

The other two projects overseen by Prof Conradie are interested in Christian aspects of food security. One looks at cultural and religious symbolism associated with certain food types – usually negative or positive attitudes towards certain types of foods – as addressed in Roman Catholic welfare organisations in South Africa. This project has shown that these attitudes contribute to food insecurity in South Africa.

Conradie envisions that his research group can provide a forum for conversations about food security and contestation, and how discussions about food are also linked issues of ethics, values and religion. For example, a post-doctoral researcher is investigating how concepts of sin in Christian ethics relates to the debate around genetically modified organisms (GMOs). This work considers and contrasts the sins of pride ("Creating GMO's is like playing God") and sloth ("It is our responsibility to work to feed the hungry") within the context of the ethics of GMO's.

"These may sound like disparate topics, but they are linked by the quest to understand more deeply, what food and eating means to us as human beings. If the CoE-FS in Food Security is to become the centre of food security research in South Africa, it is important to interrogate these concepts," says Conradie.



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Professor Ernst Conradie

Food Politics and Cultures

PPI: Professor Desiree Lewis, University of the Western Cape

> The laws, policies and programmes to ensure access to food are all in place, but poor implementation has stopped these interventions from being effective.

In search of new perspectives on food security

Food security is a complex and multidimensional issue, which requires research into various aspects from researchers with a range of perspectives and areas of expertise. Professor Desiree Lewis and her team from the Department of Women and Gender Studies is looking at social aspects of food security such as food branding, food activism networks and changing indigenous knowledge around food.

Food security research in South Africa has, for many years, focussed mainly on the hard science of food – topics like nutritional value, fortification and the socioeconomics of food access – while essentially disregarding the important role that humanities-based food studies can play in this complex field.

To address this, Lewis is heading up the CoE-FS's Food Politics and Cultures programme, which seeks to encourage and build a burgeoning research community in this area by supporting young researchers and driving specific research topics.

Lewis and her team are involved in five research areas under the umbrella term 'humanities-based food studies'. These are food branding, the contradictions between mind and body in food, alternative approaches to food studies, indigenous food knowledge, and food activism.

Food branding research is focussing on the impact that packaging and advertising imagery has on eating patterns. In our modern consumer-driven society, food is strongly associated with identity and ideology. It is important to understand how iconic fast food brands influence eating habits and how consumers respond to the lifestyles being sold by these brands.

The disagreement between mind and body, which Lewis calls "the rational mind and the irresponsible body" is something that almost everyone has experienced before. Understanding this disconnect is important in food security; conventional food security recommendations have focussed more on rational interventions.

Researchers are interested in food security beyond satisfying basic nutritional needs, and they will study this by working with organisations in Khayelitsha maintaining food gardens and cooking or selling food.

To find alternative approaches to studies of food security, researchers are looking at how alternative mediums like puppet theatre, film or imagery can represent moods, feelings and sensations linked to food that are otherwise difficult to express.

Another researcher within the programme is working with women's food sovereignty organisations in Cape Town (see sidebar) to understand how indigenous knowledge can be reshaped or adapted to different environments. Preliminary evidence shows that these systems are resilient and adaptable to challenges posed by food costs, food safety, or nutritional requirements.

Researchers are working with similar food sovereignty and slow food organisations in Cape Town to understand the landscape of food activism in South Africa. While in other countries this type of movement is associated primarily with the privileged youth, in SA there is a strong movement among poor, young and black individuals as evidenced by the local chapter of the Slow Food Youth Network and Khayelitsha's Impilo Market.

While still in its early stages, research at the Food Politics and Cultures programme is aiming to address areas of food security in South Africa that have been ignored until now.

The broad aims of the Food Politics programme are to build and strengthen an interdisciplinary research community committed to the relatively new field of humanities-based food studies, and to mentor postgraduates and new researchers within this community.

Professor Desiree Lewis, Programme Principale Investigator for the Food Politics programme

Masters students Thembelihle Bongwana (left) and Rudo Chikara(right)

What is Food Sovereignty?

Food sovereignty is a relatively recent concept, which essentially places people and the environment before profits in the arena of food access. In short, food sovereignty means that the people who produce, distribute and consume food should control the mechanisms and policies of food production and distribution, and that this production should not be harmful to the environment.

It is generally seen as a response to the increasingly corporate and industrial nature of food systems in the 21st century. Proponents of food sovereignty (a loose global movement of farmers, growers, consumers and activists) support local and sustainable production of food for the community, and fight for the rights of those doing the producing.

> “The CoE-FS’s Food Politics and Cultures programme seeks to encourage and build a humanities-based food research community by supporting young researchers and driving specific research topics.”

Audience attending the two day Food Politics and Cultures Colloquium in 2015 to launch the Food Politics research programme

Special projects
(externally funded and contract research)

Applying health research in schools for learners' well-being

An international collaboration between Professor Peet du Toit and Professor Ronel Ferreira of the University of Pretoria, Professor Sanford Rikoon of the University of Missouri and researchers at Fordham University in New York has created an intervention strategy to help improve the diet and lifestyle of schoolchildren in South Africa.

Referred to as TEARS (theory, education, application, research, satisfactory outputs), the principle aims to instill good lifestyle and eating habits into school learners to address the growing crisis of lifestyle disease in South Africa.

School children in informal settlements and rural areas are negatively affected by high levels of poverty, where poor healthcare coverage and maintaining healthy lifestyles are common challenges. While children in these communities have faced problems of undernutrition and malnutrition for many years, lifestyle diseases like diabetes and obesity are more recently causing major health concerns in South Africa.

"In schools in the rural areas we found that the physical activity of the children and the nutrition available is substandard. We need to change it; there are a lot of opportunities to help these children," says du Toit.

These very serious issues cannot be dealt with in isolation, as they can affect teaching and learning in these communities by impacting the learners' physical activity, nutrition and social well-being. Du Toit and his team of researchers believe in addressing these components to facilitate a better learning and teaching environment.

"We created a platform for schools to empower the children and support their well-being and promote health interventions," du Toit explains. "

At the same time, university students can use the platform to further their careers, increase their research output and present at conferences."

To do so, they are applying the TEARS education framework in a few rural schools. The team conducted this research project at three township schools (grades 4 to 6) in the Bronkhorstspruit area, and two schools (grades 1 to 3) in the Pretoria region. Breaking down the TEARS model into its component parts shows how du Toit and team went about their research intervention.

The '**T**' stands for Theory which is the driving force behind the idea to empower children at these rural schools to help drive social change in their communities. '**E**' stands for the Education that du Toit and team have provided to increase the children's physical activity. The '**A**' represents Application of the aforementioned education, which was achieved through testing and evaluation days in the schools. The "**R**" represents the Research that was conducted using data collected at schools; this was applied to develop a suitable intervention plan that would support positive change in these communities.

The final letter, '**S**' represents the Satisfactory output in the form of a multidisciplinary health promotion intervention called WinLife (Wellness in Lifestyle Intake Fitness and Environment). WinLife focussed on the nutrition, physical fitness and emotional function of the children in the programme.

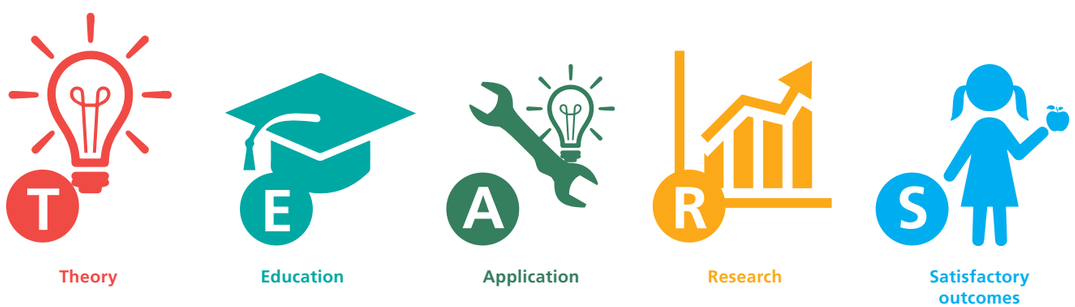
Du Toit and his team learned that previous similar research projects left after conducting their research, with no intervention afterwards. They did things differently by following up on their findings with the WinLife intervention. The researchers also applied the same principles in New York schools, and du Toit hopes to compare SA and US data on school interventions.

"We can compare our combined data and then go to the Department of Basic Education in South Africa as well as in the US and show them the difference that we have made with our pre- and post- test research approach, as well as with the intervention," he says.

The WinLife intervention plan spanned six weeks when they would go back to the schools to give the children advice on nutrition, social well-being, and physical activity. The researchers formed groups with the children to show them how they could do the exercises at home as well.

Prof du Toit and the team noticed a big difference in the children's knowledge about nutrition, physical activity, and social well-being. The researchers plan to return to the schools later to introduce the children to more physical activities and more in-depth knowledge on nutrition.

The project has been such a success that the parents of learners involved in the research specifically requested more sessions of this nature in 2016. This sentiment was shared by the teachers and the principals of the participating schools.



Low-cost ways to improve crop yields

Commercial maize farmers keep their yields high by using fertilisers to add nutrients to the soil, pesticides to prevent damage and disease, and irrigation to supply plenty of water. However, Small-scale, resource-poor farmers generally cannot afford these expensive inputs.

Fortunately there are other, less costly ways to improve yields. Growing maize with another crop such as cowpea can improve the soil's ability to hold water, make it more fertile and help to control weeds. Also, rain-fed farms can be planted with maize varieties that don't need as much water to grow as do those in irrigated areas.

Professor Peter Motavalli of University of Missouri and Professor Joseph Asiwe of University of Limpopo were contracted by the CoE-FS to see whether intercropping drought-tolerant maize varieties with cowpea would help smallholder farmers to overcome drought conditions in Limpopo.

During 2015 and 2016, they planted trial fields in Limpopo with maize and cowpea to identify which traits allow them to grow in drought-prone areas. They also looked at how phosphorus fertilisation could improve drought tolerance.

By comparing parameters like plant height, fodder yields for cowpea and cob yields for maize, the researchers hope to convince smallholders to adopt drought-tolerant intercropping systems and practises that conserve soil moisture.

How does food production and processing affect food price?

When you buy a box of milk from your local shop, you are but the final link in a long chain of transactions known as the "value chain".

Food producers, food processors and retailers are key links in the value chain: transactions between producers and processors determine price, as do transactions further down the chain between processors and retailers. Professor Ferdi Meyer of the University of Pretoria wanted to understand how exactly the food value chain affects food prices in South Africa.

He found that early in the value chain, producers generally trade goods that have little or no competitive advantage over similar goods provided by other producers. For example, wheat grain produced by one farmer is hard to differentiate from wheat grain produced by another farmer. This results in a transaction known as an "arm's length transaction" where the producers and processors are each acting in their own interests, which results in the goods being sold at market value.

For chicken and milk value chains, however, transactions between producers and processors are based on relational contracting which stipulates price, quantity and quality. In these cases, the buyer and seller have a relationship based on trust, and the effect of these contracts on price is less clear.

Further down the value chain, when processors sell to retailers, goods are clearly different from competitors' goods and they are also typically more perishable. This makes making transactions between processors and retailers riskier.

At this stage of the value chain, contracts are mostly relational rather than arm's length, and their effect on price is largely unknown. Further research on this is needed in order to understand how fluctuations in food prices affect millions of South Africans living in poverty.

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