



DST-NRF
Centre of Excellence
in Food Security

2016

ANNUAL
REPORT





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Cover image by: Sustainable Livelihoods Foundation and Justin Patrick (photographer)



As might be anticipated, research at the Centre of Excellence in Food Security (CoE) in 2016 has generated a plethora of results at different levels of detail, innovation and impact. This information is provided in the body of the report and in the publications listed in the appendices. A number of key findings are especially noteworthy.

Conceptualising the South African food system

We find that conceptual and research-driven binaries sometimes used in the analysis of food security are unhelpful and do not reflect the functioning of the food system in South Africa. As examples, formal and informal sectors operate effectively as one sector, and while food production is a rural activity, food insecurity manifests in both urban and rural areas. Our desktop work reveals that deagrarianisation and informalisation are themes of many studies of food insecurity and the South African food system is similar in both rural and urban areas. Arguably, South Africa has a predominantly urban-type food system, reinforced by the functioning of the agri-food value chains. Although context does matter, South Africa's agri-food value chains span scales, economies and policies, and thus the CoE's research agenda should encompass the regional and international context of the food system. We suspect that similar transitions are occurring in other African economies.

Formality and informality

While the highly concentrated nature of the South African food system is well-documented, our mapping of the changing food system has revealed a more nuanced picture. Local food systems exist in which formal and informal enterprises both co-operate and compete. Some of the activities involve producing raw food or the preparation of cooked food, but many are based on the informal distribution of products that have been processed and packaged in the formal economy.



Julian May
Director



Lise Korsten
Co-Director

There are also strong linkages between formal food producers, processors and distributors, and informal enterprises. Many of the linkages operate without regulation, contracting or record, and some may be illegal.

Potentially facilitating, or being facilitated by this interface between formal and informal enterprises is the existence of a wide 'periphery' with large numbers of economic participants. These are located particularly in primary agricultural production, manufacturing, distribution and retail. These are the largest nodes by financial value in the agri-food system and constitute good starting points for looking more in-depth at livelihood opportunities in the agri-food system, the potential for innovation, and the need for regulation.

Our concern for the changing food environment is heightened by our investigations into consumer perceptions. Despite recognising the food safety risks associated with meat consumption (especially for chicken but also for red meat), consumers are not 'spontaneously' concerned about meat safety. When purchasing meat, consumers focus mainly on other aspects such as expiry date, price and organoleptic aspects (e.g. taste, tenderness

“ South Africa's agri-food value chains span scales, economies and policies, and thus the CoE's research agenda should encompass the regional and international context of the food system. ”

and appearance). Consumers' confidence in meat purchase outlets from a safety perspective is focussed mainly on formal retailers and known local butcheries. Very poor consumers resort to 'smelling food' as a safety assessment and to cutting off suspected parts and then preparing the remaining product. Consumers in South Africa have little knowledge (formal sector) or totally lack information (informal sector) on the importance of food safety of fresh produce and dried products.

Governing the food economy

Despite the existing legislative framework on the rights to food in South Africa, including ratification of international and regional human rights instruments, the realisation of the right to food remains a challenge. And despite pervasive violations of the right to food, few attempts have been made to hold the government accountable through litigation. Drawing experience from other jurisdictions we suggest that the government, Chapter Nine institutions and civil society groups could do more in ensuring accountability of role players in the supply chain in the realisation of the right to safe food. We also believe that the CoE needs to further engage with policy-makers at national, provincial and municipal level, and that knowledge brokerage should become both a Key Performance Area and a research theme of the Centre.

We propose developing a 'food access continuum' that could be better used to inform food-sensitive policies in both urban and rural areas. This continuum needs to be viewed against the backdrop of a food system that is

largely dominated by large multinational companies who have significant power to shape the quality and safety of food, as well as the food choices of consumers, potentially with negative impacts on their health outcomes.

This corporate concentration is associated with a sustained decline in formal employment in the agri-food system, except perhaps wholesale and retail and consumer food services. Jobs have become more precarious, characterised by casualisation and, in certain unregulated or not self-regulated cases, poor working conditions.

“ We propose developing a 'food access continuum' that could be better used to inform food-sensitive policies in both urban and rural areas. ”

Our study of waste pickers, as an example of highly vulnerable groups, established that their livelihood activity is critical to their food security. However, the existence of the waste pickers is not acknowledged in any policy and there are no suggestions or recommendations to municipalities on how to manage, or include waste pickers in the waste management system. We suspect that other highly vulnerable groups fall between policy gaps as well.

We have mapped out a complex 'Big Food' landscape with seed, grain storage and handling, feedlots, commodity-specific manufacturing e.g. sugar, baking, fish, consumer food services (including fast food), and wholesale and retail. In addition to the power of corporations already discussed, we have observed that they exert significant influence in discourses about food quality and safety, and shape the agendas of public-private nutrition and scientific bodies. To some extent this influence is tempered



by the rapid increase in the availability of cheaper imported products in the South African market, some of which appear to move through unregulated channels. At the same time, South African corporations play a similar role in other African countries as the multi-nationalisation of South African agri-food capital has developed.

Finally, we have found that the governance of the food system will need to recognise poor people themselves, especially women, who demonstrate agency in their use of the food system. This means that transitions in the food system are shaped, not only by corporate power, but also by demand-side drivers emerging from the 'foodways' of the poor. An important caveat is that our work in the Prospective Urban and Rural Epidemiological (PURE) sites showed a lack of knowledge about risk factors for noncommunicable diseases. As such, demand-side drivers also play a role in unhealthy food choices.

Our outreach work in George with the Kos en Fynbos organisation provides an example. The movement has grown from strength to strength and we find benefits in terms of dietary diversity for the vegetable gardeners involved in the movement, as well as an emerging sense of food sovereignty and of claiming back the city through cultivation. However, the gardeners require further training in both the production and processing of the food that they grow, while the municipal authorities require new capabilities for working with such groups.

Not enough nourishment on the plate

With South Africa facing challenges of both under- and over-nutrition, our research on food baskets showed that most South Africans couldn't afford a healthy diet. This may explain the paradox of child malnutrition in South Africa, which is unchanged since the 1990s, despite the dramatic expansion in social grants. Examining the

different food types consumed by different income strata revealed different patterns of consumption.

A desktop survey finds a large variation in energy and macronutrient intake reported in published studies. Energy intake varies from 6 100kJ to 13 974kJ in males and 5 400kJ to 11 978kJ in females, compared to the 8700kJ average adult consumption that is often given as being appropriate for a healthy and active lifestyle. The mean added sugar intake of all the participants in the reviewed studies is greater than the 25g or the 10% of energy recommended by the World Health Organisation (WHO). Data analysis of official statistics shows that the shares of total food expenditure generally trend towards more refined and higher-value food items.

Alarming, our work in the Western Cape PURE urban site found proportions with obesity and overweight based on body mass index (BMI) and waist circumference (WC) estimated at 81.6% and 86.1% for women respectively, and an equivalent of 36.0% and 25.9% for men. The prevalence of hypertension and diabetes was also found to be high particularly in women compared to men.

There are opportunities for innovation

In an attempt to move beyond diagnosis of the food security problem, the CoE is seeking opportunities to demonstrate how innovation and technology can contribute towards the provision of safe, nourishing and affordable food to poor



In an attempt to move beyond diagnosis of the food security problem, the CoE is seeking opportunities to demonstrate how innovation and technology can contribute towards the provision of safe, nourishing and affordable food to poor and marginalized groups.



and marginalized groups. Our focus in this regard is on two areas: innovation for environmental change-resilient agriculture, and the creation and processing of 'SMART' (Safe, Marketable, Affordable, Ready-to-eat (Convenience) and Trend-setting) foods and food ingredients that have been enriched to combat malnutrition and diet-related noncommunicable diseases.

Our work at the Nelson Mandela University experimental farm in the George area of the Western Cape has shown that it is possible to further close the yield gap between conventional and organic horticulture through careful management of soil health and improving water retention of soils.

The research team at Stellenbosch University has established that various insect species can be reared for food or feed on different waste sources or balanced feeds, and can successfully be used for animal feeds. The production potential of these systems far outstrips that of current agricultural practices while efficiencies are also substantially higher. Nutrient and water circulation is possible and the end products are valuable for either animal feed or human food.

At the University of Pretoria, we have found several opportunities to improve the nutritional value of processed and indigenous foods. For example, we have established that the fat-soluble vitamin C is encapsulated by forming starch-lipid complexes during pasting. Sorghum-based beverages exhibit higher phenolic content and antioxidant properties than the maize-based beverages and commercially available magueu. Cassava-soy extruded porridge with added bran reduced the estimated glycaemic index. It was also found that extrusion cooking reduced the particle size of the bran particles and increased the solubility of the fibre.

These physical changes increase the viscosity of extrudates and thus reduce the starch digestibility.

Challenges

Resources at the CoE are being spread across a wide range of topics and at different levels of analysis. This is partly due to the following:

- The complex nature of the food system;
- The many issues requiring investigation;
- The transdisciplinary nature of the work;
- The nature of research that includes all levels of post-graduate students; and
- The structure of the CoE that brought together two research teams comprising a wide spread of expertise and interest, each with their own collaborating institutions.

There has been improvement in the focus of the CoE on a core set of research questions, better articulation across projects in the Business Plan, and a clear target group (the poor and the marginalised) that has been identified as the core focus of all the research programmes.

The CoE continues to seek opportunities to expand its activities into other African countries, and several proposals have been submitted to funders for this purpose, including for the UNESCO/UNITWIN Chair in the African Food System. The World Public Health Nutrition Association's Annual Congress held in 2016, and the upcoming World Food Security Conference in 2017 facilitate this ambition and have attracted significant numbers of African researchers to South Africa, and will continue do so in the near future. This broadens and deepens our existing networks, thereby increasing our capacity to work beyond South Africa.

The Centre of Excellence at a glance



Director: **Professor Julian May**
Co-Director: **Lise Korsten**



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**.



The CoE aims to:



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

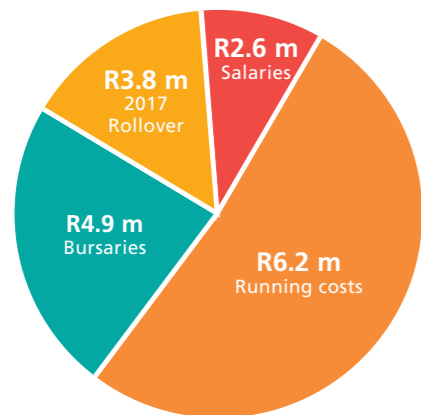


investigate products, technologies, processes and policies that can **REDUCE FOOD INSECURITY** and improve lives.



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

The CoE is funded by the National Research Foundation (NRF), which provided **R17.5 million** in funding for 2016.



Other sources of funding:



R2.7 million in matched grants from allied research institutions

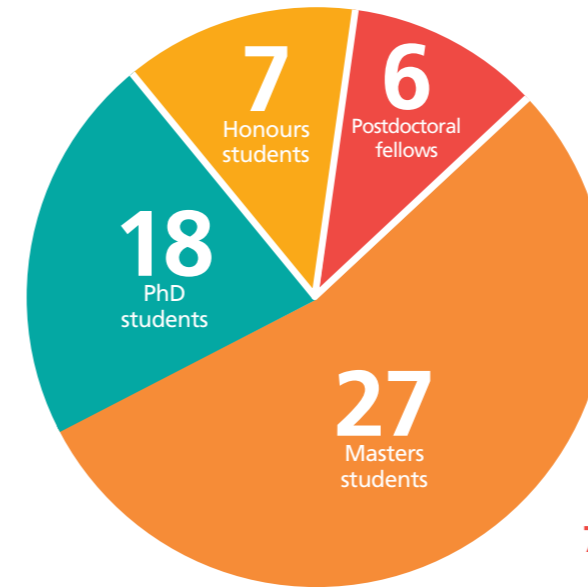


R7.8 million in external funding sources



R2.7 million grant from the Mellon Foundation for Humanities-based food security research

The CoE funded **58 students** in 2016



75% South African women

71% black students (both SA and non-SA)

58% females overall

1 PhD, 5 MASTERS and **7 HONOURS STUDENTS** graduated in 2016



Funds were split between **46 RESEARCH PROJECTS**, 20 of which started in 2016, and another 26 continued from 2014/2015.



39 journal articles



55 conference presentations



45 popular articles



1 book chapter



4 conferences organised



4200 website views

To access detailed info about outputs go to: <https://goo.gl/7h9F3M>

The Centre of Excellence collaborates with local and international organisations



Tshwane University of Technology



UNIVERSITY OF JOHANNESBURG



UNIVERSITY OF LIMPOPO



University of Cape Town
iYunivesithi yaseKapa • Universiteit van Kaapstad



NORTH-WEST UNIVERSITY
YUNIBESITHI YA BOKONE-BOPHIRIMA
NOORDWES-UNIVERSITEIT

**DST-NRF
Centre of Excellence
in Food Security**



DST-NRF Centre of Excellence in Human Development



HSRC
Human Sciences Research Council



ARC • LNR
Excellence in Agricultural Research and Development



ASSAf
ACADEMY OF SCIENCE OF SOUTH AFRICA



UNIVERSITY of the WESTERN CAPE



UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA



University of Missouri



UNIVERSITEIT STELLENBOSCH
UNIVERSITY



University of Fort Hare
Together in Excellence



IDS Institute of Development Studies



cirad
AGRICULTURAL RESEARCH FOR DEVELOPMENT



MRC Medical Research Council



Research at the Centre of Excellence in Food Security

In 2014, the CoE adopted an approach of targeted food security research to address key constraints to South African development. Between 2015 and 2016 we developed an integrated research framework, moulding the initial identified key focus areas into more focussed, prioritised programmes. We continue to focus on the causes (determinants), context (status quo, situation and experience of people) and consequences (impact) of food security for poor and vulnerable populations in a changing food system, and in the face of malnutrition, poverty, inequality and unemployment.

To address these issues, our research is organised through integrated Programmes that can vary in scope and complexity. In addition to the six Programmes that are directly funded by the NRF, our research also includes two Programmes on Humanities and Food Insecurity funded by the Mellon Foundation (Symbols and Politics), and a South Africa/United Kingdom Bilateral Research Chair in Social Protection for Food Security funded by the Newton Fund and the NRF (SARChI). Our Programmes are headed by Principal Investigators who are leading scholars in their field of study. The PPIs are drawn from the host and collaborative institutions.

The areas of research informing the focus of our work are:



Systems Understanding the National and Global Food System

What are the structures and dynamics of, and influences on, the South African food system and how is it changing?

Government, farms, and businesses all interact in complex ways to determine the shape of a country's food systems. Understanding the structure and changes in these systems is important in improving access to healthy and nutritious food for all.



Innovation Innovation and Technology for Enterprise Development

What technological and enterprise innovations will build livelihoods and food security in the food system?

Researchers from various disciplines are working together to promote innovations in food and nutrition for South Africa. In particular they are focusing on food production and processing using locally-available ingredients.



Plates Shelves, Baskets and Plates

What food is on the plates of South African consumers and what pathways were followed to bring this food to the plate?

In this programme, researchers are trying to understand what influences the food intake and food choices of South African citizens. Understanding the current situation and trends will guide strategies and interventions to improve South African diets and eating habits.



Safety Food Safety Hazards That Affect Food Security

What food safety hazards exist that affect food security and how can these be best managed?

In a developing country like South Africa, food safety is an important way to improve nutrition and ensure that everyone has access to enough food. Researchers are looking at every stage of food production to make sure it is safe to eat and to minimise losses between the farm and the plate.



Children Persistence of Child Malnutrition in South Africa

Why has child malnutrition persisted in South Africa?

While some nutrient deficiencies in South African children have improved, others have persisted, and obesity and related diseases are on the rise. Finding solutions for this challenge is critical to ensure that South Africa's children grow into thriving and successful adults.



Policy Food Governance and Policy Reform

What governance and policy reform is necessary to ensure sustainable food security and nutrition?

For food security research to have an effect, it is important that there is some transfer of knowledge into policy. This programme ensures that the research from the CoE informs policy-making and has an impact on South Africa's food security status.



Symbols The Symbolic Construction of Food Consumption in the Context of Food Insecurity

How do cultural and religious symbols construct and distort the ways in which food is selected, prepared and consumed?

This programme tries to understand the social, cultural and religious contexts that influence food intake and food security.



Politics Food Politics and Cultures: Humanities Approaches to Food

How do human relationships to food and the meanings that food acquire in particular cultural and social contexts affect the power dynamics around food production and access?

This programme currently focuses on building a research community to better understand the political and cultural dynamics of food access in South Africa.



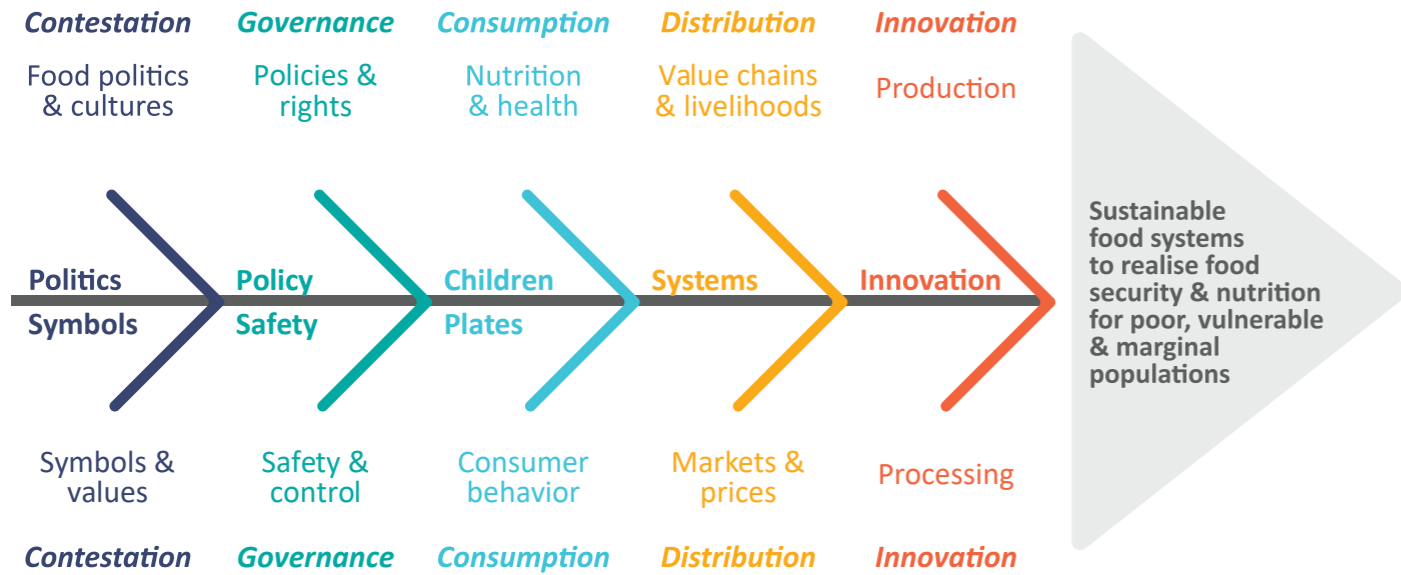
SARChI Social Protection for Food Security

Why is South Africa's comprehensive social protection system not making a much more significant contribution to the eradication of food insecurity and hunger, and how can this contribution be enhanced?

Food insecurity remains a massive challenge in South Africa despite comprehensive social protection programmes designed to address the problem. Researchers are trying to understand why social protection has not improved the food insecurity situation after 20 years of democracy.

The CoE's research programmes can be mapped onto an analytical framework, which shows how they relate to the CoE's founding research domains. This framework depicts disciplinary work being undertaken as projects within multi-disciplinary programmes, and synthesised at the core through trans-disciplinary analysis.

The SARChI currently spans several of the domains including Contestation, Governance, Consumption and Distribution.



External Research

Along with projects and activities initiated or led by CoE affiliated researchers, the Centre also sponsored a number of smaller projects and events that were aligned to specific and broader goals of the Centre, and funded using unallocated or returned funds.

Systems

What are the structure, dynamics and influences on the South African food system and how is this changing?

Principal Investigators: Professor Andries du Toit and Professor Frans Swanepoel





Trade, food security and consequences for our society

A series of working papers from [Professor Andries du Toit](#), of the [Institute for Poverty, Land and Agrarian Studies \(PLAAS\)](#) has looked at different aspects of the agri-food system in southern Africa, identifying trends and potential problems at this nexus of food, economics and politics.

The agri-food system is comprised of all the institutions and arrangements - from those pertaining directly to farming and food distribution to the underlying ecological and social systems. The design and functioning of this system has important consequences for many aspects of life in South Africa - not only food security but also employment and livelihoods, and the impacts on the ecosystems on which life and society depend.

Du Toit managed a team of researchers who tackled different aspects of the agri-food system in South Africa. The research was published as working papers in October 2017 on the [PLAAS website](#).

A project led by [Stephen Greenberg](#) of the [University of the Western Cape](#) (UWC) looked at the role of trade in nutrition and food security in South Africa. The working paper notes that South Africans experience high levels of food and nutrition insecurity, which in turn exacerbates food-related diseases like obesity and diabetes. The researchers looked at availability, access and nutrition as three dimensions of food security and how they combine to affect the food basket of poor South African households.

Greenberg and his team considered case studies in the sugar and poultry industries to gauge their impact on the lives of poor South Africans. They found that cheap imports generate immediate, current 'benefits' for resource-poor households in the form of cheaper carbohydrates and protein, but pointed out that these are short-term,

unsustainable benefits that may have negative health consequences in the long-term.

The researchers argue that food security should be looked at as being more than formal jobs and cheap food, and that policies should address inequality and past injustices.

[Professor Mafaniso Hara](#) at UWC led a team that studied the intra-regional trade and investment in fish in the the [Southern African Development Community \(SADC\)](#) region. Through interviews with key members of the food industry in South Africa and African regional economic bodies, researchers looked to understand this industry's impact on food security in the region.

“...investors find it more profitable to export local products to more lucrative export markets and then import cheaper products for the local market. This has worrying consequences for southern African food security.”

His [working paper](#) considered how international trade is driven by import substitution, shortfalls in local production, and the quality of food demanded by consumers. The study found that large volumes of imported sardines are an important source of raw material for South Africa's canning industry, which in turn creates jobs and a stable supply of valuable fish protein.

Hara says that investors find it more profitable to export local products to more lucrative export markets and then import cheaper products for the local market. This has worrying consequences for southern African food security.



How do big food corporations affect the South African poor?

This project, led by Professor Ben Cousins from PLAAS at UWC, set out to lay the foundation for a longer-term investigation into the key system dynamics influencing the nature, cost and quality of food available in poor consumer environments in South Africa.

Cousins studied the many parts of this system including value chains and trends, and looked to set out a new research agenda for the CoE using this information. He found that one of the outcomes of the agri-food system patterns in SA is reduced formal employment, and that this should be countered with job creation in primary agriculture and in food manufacturing.

The research also confirmed the domination of the food system by large corporations, particularly in seed, grain storage and handling, feedlots, commodity-specific manufacturing sugar, baking, fish, consumer food service (including fast food) and wholesale and retail. The findings highlighted some of the key implications of this, among which is that corporations exert significant influence in conversation around food quality and safety, and shape the agendas of public and private nutrition and scientific bodies (for example through membership, sponsorship and decision-making power in the South African Association for Food Science and Technology (SAAFoST), International Life Sciences Institute (ILSI), the Association of Dieticians of South Africa (ADSA) and the Nutrition Society of South Africa (NSSA), as well as government food safety and standards committees, such as the Food Legislation Advisory Group (FLAG) in the Department of Health.



A lack of policy direction is undermining South African food security



A multi-year review of South African agri-food value chains has revealed challenges for food security in production, retail and distribution, as well as in the policy-making arena. The research has also highlighted the importance of the informal food market for food security, food access and employment.

Led by Dr Shane Godfrey at the University of Cape Town, the study was aimed at identifying knowledge gaps, in order to understand the effects of policies and programmes on SA food security, and understand how value chains affect consumers' food security and livelihoods.

In a series of 15 published papers, the researchers showed that informal food distribution, though large and



...food policy is incoherent and ineffective in South Africa, and is non-existent in the informal sector despite how important the sector is for many citizens' food and financial security.



important, is an overlooked sector of the value chain. Another major finding was that food policy is incoherent and ineffective in South Africa, and is non-existent in the informal sector despite how important the sector is for many citizens' food and financial security. Godfrey says this lack of policy direction is undermining food security in South Africa.

Designing nutritious meals on a budget



Researchers at the University of Pretoria have designed a menu for various socioeconomic groups that provides the best nutrition possible, based on the amount of money spent monthly on food. To achieve this, they looked into what makes up an average South African food basket.

Led by Professor Hettie Schönfeldt, the researchers soon realised that no single food basket could represent all of South Africa. So for different socioeconomic categories, they identified the food items that made up 50% of food costs every month. Then from this information they built two weeks of ideal menus for each category.



Image by: Sustainable Livelihoods Foundation and Justin Patrick (photographer)

Innovation

What technological and enterprise innovations will build livelihoods and food security in the food system?

Principal Investigators: Professor Ndiko Ludidi and Professor Naushad Emmambux



Healthier foods that hit the high notes



A Caesar salad of lettuce, croutons and cheese can be deceptively unhealthy, depending on how much fat is in the mayonnaise dressing going on top. Dollops of this popular condiment can contain up to 75% fat.

Is it possible to produce a healthier yet still tasty mayonnaise? Consider using teff, a grain originating from Ethiopia, where it is used in flatbreads. At the University of Pretoria's (UP's) [Department of Food Science, Welday Teklehaimanot](#) replaced some of the oil in a mayonnaise formulation with a teff and maize starch paste. The low-calorie sauce he made had the familiar tang of mayonnaise and smeared like the classic version, but contained only 20% oil.

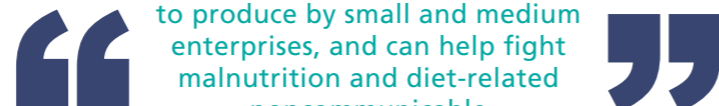
PhD student [Joyce Agyei-Amponsah](#) is now testing its sensory properties. So far, her investigations into its taste, smell and texture show that the product holds promise. The studies, led by [Professor Naushad Emmambux](#) of UP, research leader for the Innovation programme at the CoE, are however about much more than the development of mayonnaise for the health-conscious.

This food scientist's vision is clear: "We want to develop low-GI foods that are less energy-dense, that are cost-effective to produce by small and medium enterprises, and can help fight malnutrition and diet-related non-communicable diseases such as diabetes and obesity."

Together with his colleagues, Emmambux is working through a venerable book of ideas.

Processing methods, such as extrusion cooking or microwave technology to produce convenience foods, are being tested. In one project, an agricultural engineer is designing a small-scale solar dryer to dry out the flesh of moringa and sweet potatoes, while another is building a small but energy-efficient hybrid oven.

We want to develop low GI foods that are less energy-dense, that are cost effective to produce by small and medium enterprises, and can help fight malnutrition and diet-related noncommunicable diseases such as diabetes and obesity.



Climate-smart indigenous African agricultural crops such as cowpea, sorghum and Bambara groundnuts are being investigated, to find out if products made from them could be a saving grace to people experiencing food insecurity. Most of these legumes and cereals are naturally loaded with nutrients and biologically active compounds called phytochemicals. Many contain starches that take time to digest. These starches are low GI and therefore help keep blood sugar levels stable and hunger pangs at bay. Some contain plant-based phenols and phytochemicals that could possibly ward off cancer and inflammation.

"We hope to produce so-called SMART foods with extra



health benefits that are safe, marketable, affordable, ready to eat and trendsetting," says Emmambux.

Sorghum porridge with a high antioxidant content, double cream yoghurt with half the fat, and nutrient-rich baby foods have already been developed.

Investigations into starchy foodstuffs such as maize are high on the agenda, because such calorie-rich products form the bulk of many African diets. "Starch can be modified in many ways using chemicals, but nowadays consumers prefer so-called 'clean labelling' and don't want to eat starches that were modified using synthetic chemicals," explains Emmambux.

In one such investigation, a lower GI maize starch was developed using heat moisture treatment and added lipids. It can also be used as a 'clean label' starch to thicken acidic foods.

The dream is to one day have such convenient snacks and porridges in stores. However, Emmambux notes that their focus is on developing healthy concepts backed by science.

Production needs to be stepped up and market surveys done to gauge consumers' preferences. Then it's up to the market and product developers to get these food inspirations onto consumers' plates.



Growing the impact of organic farming



Research at the Nelson Mandela University (NMU) is promoting small-scale organic farming as an answer to SA's food insecurity woes. CoE researchers are conducting field trials to improve yields and reduce water use of organic farms while improving soil fertility, as well as supporting community organisation through training partnerships.

Three years of long-term organic farming field trials by Professor Raymond Auerbach at Nelson Mandela University has improved soil potassium and phosphorus available to crops, as well as improving the quantity of soil organic matter (SOM). Techniques that have had a strong positive impact are crop rotation, mulching, cover crops and using rock phosphate as a fertiliser.

The researchers hope to show in future trials that increased SOM leads to increased potassium and phosphorus available to the plants, with subsequent improvements in yield. This would address a major criticism of organic farming – yields remain at least 20% lower than that of conventional farms.

This project is also improving gardening and farming skills through training partnerships with groups like Kos en Fynbos, as well as the Western Cape Department of Agriculture, Forestry and Fisheries. The project has also trained 100 trainers for the planned Environmental Education Centre at the Garden Route Botanical Garden.

Comparing drought tolerance of African crops



Professor Ndiko Ludidi of the University of the Western Cape is comparing the drought resistance of maize, sorghum, soybean and cowpea crops - all important staples in South Africa.



This research is focused on the seedling stages of these grains, where they are most vulnerable to a lack of rain and high salt levels in soil. The stage is so crucial that it can lead to complete crop failures and not just yield shortages.



New innovative food processing technology

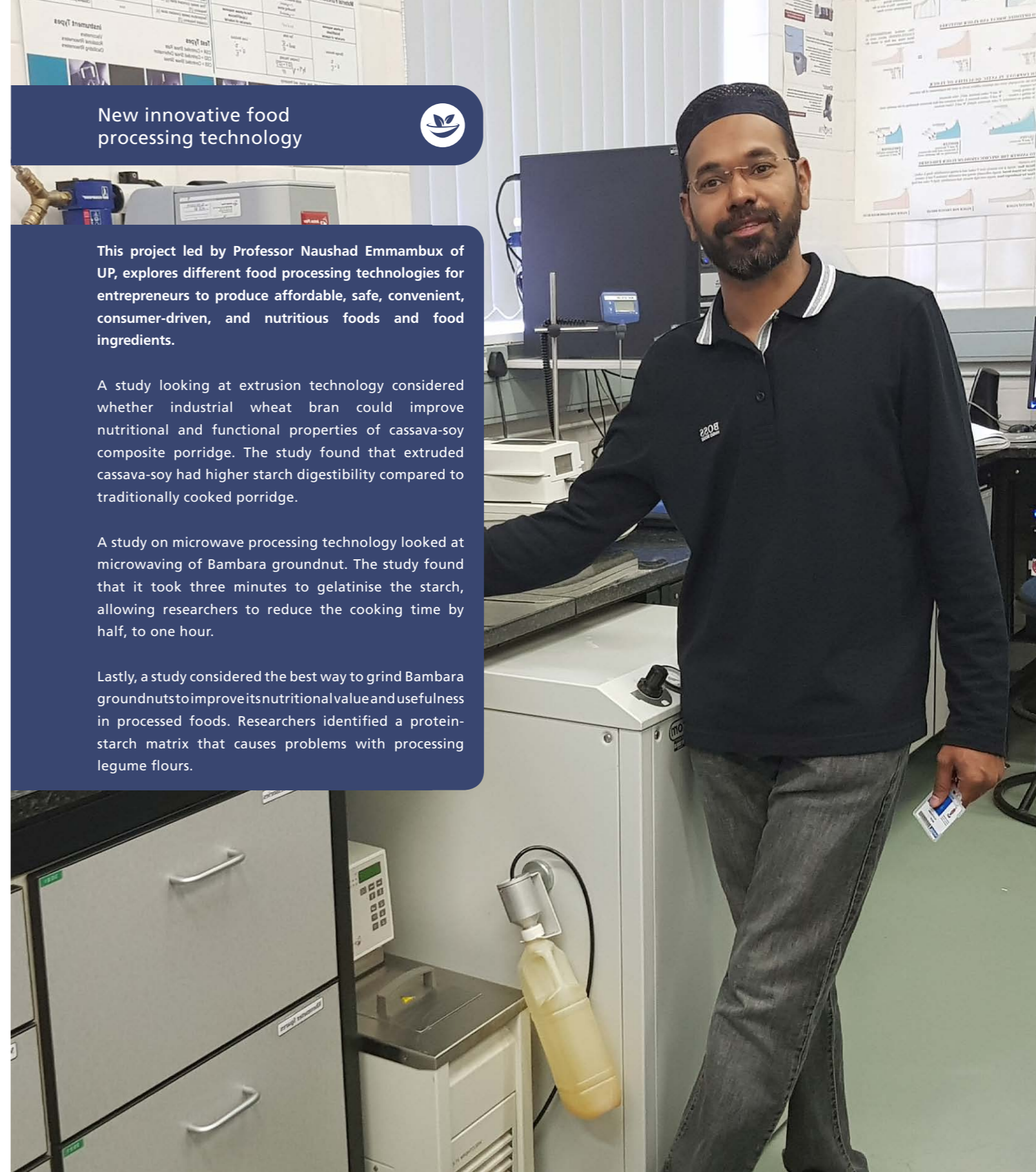


This project led by Professor Naushad Emmambux of UP, explores different food processing technologies for entrepreneurs to produce affordable, safe, convenient, consumer-driven, and nutritious foods and food ingredients.

A study looking at extrusion technology considered whether industrial wheat bran could improve nutritional and functional properties of cassava-soy composite porridge. The study found that extruded cassava-soy had higher starch digestibility compared to traditionally cooked porridge.

A study on microwave processing technology looked at microwaving of Bambara groundnut. The study found that it took three minutes to gelatinise the starch, allowing researchers to reduce the cooking time by half, to one hour.

Lastly, a study considered the best way to grind Bambara groundnut to improve its nutritional value and usefulness in processed foods. Researchers identified a protein-starch matrix that causes problems with processing legume flours.



Indigenous African crops hold promise to beat malnutrition



CoE researchers at UP have used local ingredients to create porridges and other processed foods with enhanced nutrition or health-improving properties. Led by Professor Gyebe Duodu, these researchers are using African crops like orange-fleshed sweet potato, cowpea and Bambara groundnut to make foods that can combat malnutrition in South Africa.

A major breakthrough for this project was a way to decrease the GI of dietary staples like starch, by modifying the chemical structure or processing the foodstuffs using heat or chemical treatments. This will help address obesity and other metabolic diseases.

Researchers also showed that some of these African crops have health-promoting properties or can contribute to beating vitamin A deficiency, which is common in South Africa.

“ Researchers also showed that some of these African crops have health-promoting properties or can contribute to beating vitamin A deficiency, which is common in South Africa. ”

Using insect larvae for sustainable animal feeds



This research, led by Dr Elsje Pieterse of Stellenbosch University SU, studied how insects could be used for feeding animals and processing waste. The project found that in general, raising insects on waste to feed animals (and humans) is a sustainable, safe and cost-effective approach that has the potential to outstrip the production of current agricultural practices.

Researchers studied the larvae of nine different insect species for their nutritional content, and measured the effects of two of these species on production when fed to egg-laying poultry, pigs, or fish grown in aquaculture

systems. Another part of this project evaluated insect larvae grown on human fecal matter. In all cases, animal production was as good or better when fed with insect-based foods compared to their normal soya- or fish-based diet, and in all cases there were no food safety or quality issues found.

Another part of the study looked at how four species of fly could be used to break down different types of waste, such as abattoir waste or cattle manure. These waste streams could be turned into nutrients and water for animals within two weeks.

Plates

What food is on the plates of South African consumers and what pathways were followed to bring this food to the plate.

Principal Investigator: Professor Rina Swart





Child Support Grant failing South Africa's children

The current child Support Grant in itself is “just not enough” to secure food security for children in low-income households. That’s according to [Dr Wanga Zembe-Mkabile](#), a specialist scientist at the Medical Research Council’s Medical System Research Unit. Her work looks at how cash transfer programs can improve child nutrition and food security in low- and middle-income countries.

The social grant scheme is SA’s major poverty alleviation strategy, yet this research shows that its value doesn’t meet the basic needs of children in the face of extreme poverty, rising food prices, and subsequent food insecurity.

Zembe-Mkabile’s qualitative study focused on the effects of this modest grant (currently R380 per child per month) on children’s diets. She conducted forty in-depth interviews with mothers of children under five years old in Mount Frere (Eastern Cape) and Langa (Cape Town). Zembe-Mkabile also facilitated focus group discussions and interviewed local shop owners.

Currently, the child Support Grant is a vital and often sole source of income for most of the poor households studied. Her research shows a huge disparity between these grants and the money required to meet children’s nutritional

children’s dietary needs, especially given that it is spread amongst many users in chronically poor households.”

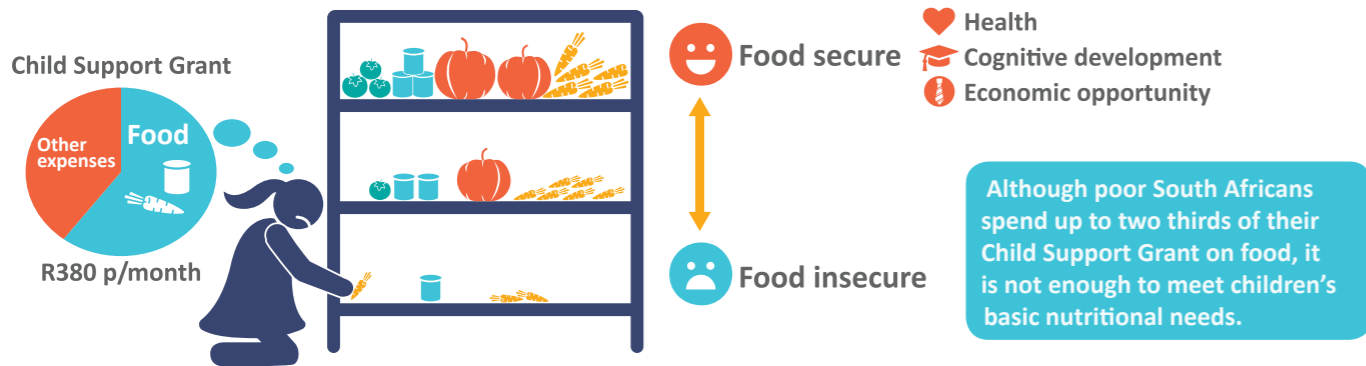
Further exacerbating the problem, cash grants alone do not resolve issues of malnutrition in poorer communities. “The grant should be seen as part of a broader package of services to poor households, including support for early childhood development with a nutritional component.

In the households she studied, the child support grants had a useful effect where they were combined with other bigger grants, for instance, an old age pension received by another member of the same household. “All these”

strategies and social services need to work together to ensure children’s well-being,” she says.

“We need to follow a multi-sectoral approach. The grant is only one aspect of it, albeit an important one. We need a broader, more effective basket of poverty alleviation strategies.”

This work is being followed up with a quantitative birth cohort study. Researchers will recruit pregnant mothers and follow the development of their children from birth to the age of two.



needs. “The current grant alone does not match the high levels of food insecurity and rising food prices, which is affecting the health of children,” Zembe-Mkabile says.

Although the grant was designed to help meet children’s nutritional needs, it is also used for other purposes. “It helps households to deal with food inflation and to reduce hunger. Many households are running out of food before the end of the month. When used for food money, it is mostly used to buy staple foods. It is also used for school expenses, including transport.”

The reality is that many of the children who participated in this study consumed poor diets, and were likely undernourished. “This could have a ripple effect on their future health, economic opportunities and human capital development,” she said. “The cognitive development of children raised in chronic poverty is often stunted.”

Her research also suggests that the monetary value of the grant is too low for it to achieve its stated goal of meeting the basic nutritional needs of children. “It is just not enough”, she says. The grants are too small to support.

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



Professor Hettie Schönfeldt of the University of Pretoria worked with colleagues from the University of Cape Town and Stellenbosch University 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:

South African populations are either underweight or overweight, both of which have serious health implications.

People consume too much sugar and carbohydrates, and too little protein. This indicates that even overweight people are undernourished. In particular, South Africans eat too much processed food, which often has lower

nutritional value than unprocessed foods like fruit and vegetables.

The amounts of essential vitamins and minerals in people’s diets varied greatly, and people from rural and urban populations consumed vastly different amounts and types of food.

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 with subsequent associated diseases such as type 2 diabetes and hypertension, more education on the value of healthy but affordable foods is urgently needed.

Sample menus were compiled using typical foods, commonly consumed by and accessible to South Africans, and foods deemed to provide more nutritional 'value-for-money'. Standard portion sizes were used for each sub-group.

more expensive protein sources, for example chicken, were included on only four of the seven days and more affordable, but nutritionally adequate proteins, for example legumes and eggs, were used on the other three days.

A menu structure of three main meals with a morning and an afternoon snack was adopted. In a 7-day period,

Sample menus that promote healthy eating while remaining within South African budgets

Example with more expensive protein sources					Example with less expensive protein sources				
	Lactating female	2-5 yrs	6-9 yrs	Adult		Lactating female	2-5 yrs	6-9 yrs	Adult
Breakfast and/or snack					Breakfast and/or snack				
Maize porridge, cooked (g)	375	250	300	375	Maize porridge, cooked (g)	375	250	300	375
Low fat milk (ml)	250	125	125	250	Low fat milk (ml)	250	125	125	250
Margarine, med fat spread (g)	5	5	5	5	Margarine, med fat spread (g)	5	5	5	5
Bread, brown (g)	100	30	80	90	Bread, brown (g)	100	30	80	90
Margarine, med fat spread (g)	15	5	10	15	Margarine, med fat spread (g)	15	5	10	15
Tea (ml)	250	0	0	250	Tea (ml)	250	0	0	250
Low fat milk (ml)	75	125	125	75	Low fat milk (ml)	75	125	125	75
Lunch and/or snack					Lunch and/or snack				
Bread, brown (g)	130	60	100	120	Bread, brown (g)	130	60	100	120
Margarine, med fat spread (g)	20	10	15	20	Margarine, med fat spread (g)	20	10	15	20
Pilchards, canned (g)	90	45	60	90	Egg, boiled (g)	60	30	60	60
Tomato, sliced (g)	90	30	60	90	Tomato, slice (g)	90	30	60	90
Fruit, in season (g)	180	80	130	180	Fruit, in season (g)	180	80	130	180
Maas/Low fat milk (ml)	250	125	125	250	Mas/Low fat milk (ml)	250	125	125	250
Supper and/or snack					Supper and/or snack				
Rice, cooked (g)	195	90	150	195	Rice, cooked (g)	195	90	150	195
Beef, cooked (g)	90	50	60	90	Lentils, cooked (g)	160	80	90	160
Cabbage (g)	90	55	70	90	Peas, split (g)	85	35	70	85
Carrots (g)	80	40	60	80	Cauliflower (g)	80	40	60	80
Oil, sunflower (ml)	15	8	10	15	Oil, sunflower (ml)	15	8	10	15
Tea (ml)	250	0	0	250	Tea (ml)	250	0	0	250
Low fat milk (ml)	75	125	125	75	Low fat milk (ml)	75	125	125	75
Fruit, in season (g)	180	80	130	180	Fruit, in season (g)	180	80	130	180

Studying food choices from every angle



Researchers at the CoE have looked at food and lifestyle choices from several different angles. They are hoping to identify the causes of poor food choices and the consequences for health in South Africa.

Professor Thandi Puoane at the University of the Western Cape has found high levels of obesity, hypertension and diabetes in urban and rural areas, and she says that inactive lifestyles are to blame. This is according to South African arm of the global Prospective Urban and Rural Epidemiological (PURE) cohort study. The study aims to identify risk factors for chronic noncommunicable diseases in rural and urban settings, and potential social interventions to address them.

So far, researchers have found that a lack of knowledge about nutritious foods leads to poor food choices and unhealthy food intake in the study population. There is also a lack of knowledge about risk factors for noncommunicable diseases, and poor diagnosis and management of hypertension and diabetes mellitus. More than 80% of women and more than 25% of men are considered obese and overweight based on body mass index and waist circumference. These findings highlight the need for access to adequate, affordable healthcare, and have given rise to "SMART-2D", a diabetes multilevel

research and intervention project undertaken in six countries around the world.

In parallel, Professor Vicky Lambert of UCT led a team to find out why people choose to buy and eat certain foods. The researchers compared the variety, quality and price of food purchased by people from high-income and low-income backgrounds.

The team developed a questionnaire to give to people leaving selected supermarkets and spaza shops. The researchers 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.

On the policy level, Emeritus Professor David Sanders of UWC has monitored public-sector policies and actions that impact food environments in South Africa. He is developing a benchmark for good policy against which government actions can be compared. Professor Sanders developed a scoring system to rate the South African government's efforts to reduce obesity and associated diseases. The study compiled policies, identified gaps in the policies, and proposed actions in a single report on actions that should be prioritised.



The people that live on landfills



A study of 'waste pickers' in South Africa – people who live by sorting waste for valuable items – has highlighted the difficult lives led by the people at the bottom of the socioeconomic ladder. Headed by Professor Rinie Schenck of UWC, the research has found that despite this practice occurring all over South Africa, there is no national, provincial or municipal policy in place to govern the practice and legality of waste picking.

Schenck says that the waste pickers make a living by collecting recyclable materials from landfill sites and

selling them to recycling companies. They supplement this income by finding clothes, appliances and furniture that have been thrown away. There is also some evidence that they get food from this work, but as the risk of disease is very high, it cannot be thought to improve food security.

On average, a waste picker is supporting at least four other people, and they usually have no formal education or prospects of formal employment.



Can South Africa manage disasters to ensure food security?



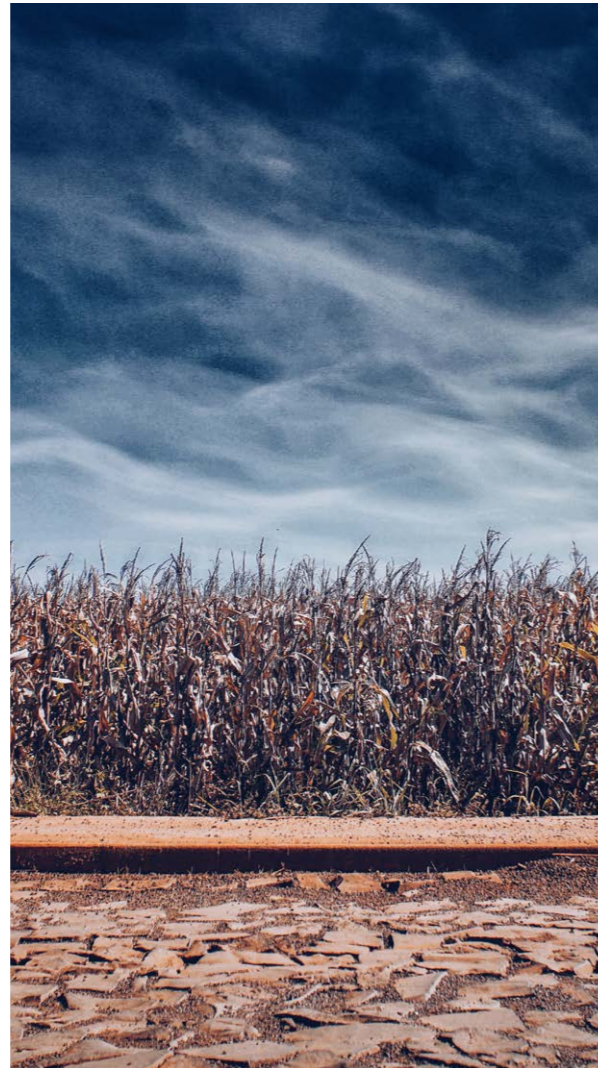
Professor Dawid van Niekerk of North West University (NWU) is investigating disaster risk policies related to food security, such as climate change adaptation strategies, to determine how a sustainable food system can be achieved in South Africa in a changing world.

He will essentially determine if South Africa's policies are achieving food security for poor, vulnerable and marginal populations. His approach includes reviewing legislation, budgets, governance frameworks and regulations related to food security across different sectors.

New projects were started under this research programme in 2016 and the work is ongoing.



Will South Africa's climate & disaster policies protect food security?



Safety

What food safety hazards exist that affect food security and how can these be best managed?

Principal Investigator: Professor Lise Korsten





Better governance can improve food security

Food security does not yet feature strongly in the laws, policies, and programmes of most municipalities in South Africa.

“Where it does,” says [Professor Jaap de Visser](#), Director of the [Dullah Omar Institute](#) at the University of the Western Cape, “it is mostly concentrated on food production, rather than facilitating access to food.”

De Visser is examining how improving governance across the three spheres of government can facilitate greater food security in South Africa. He has been looking at who does what at each level of government, and how these processes can be improved.

Land use and food security

Essentially, land use governance deals with what construction and activity are permitted where. “This is a critical lever for food security,” he says. “It is essential to protecting agricultural land, and also connects farmers, producers, retailers, and consumers.” This can be done, for example by planning for smarter transport infrastructure, more progressive arrangements for informal retailers and by controlling the impact of big retail with smart conditions to their land use approvals.

Local governments are under pressure to keep their books clean and not veer off their constitutional mandates, he points out. These mandates are also very often interpreted narrowly not to risk trouble or overexpose the municipal coffers. “There is a barrier to innovation and progressive policies.”

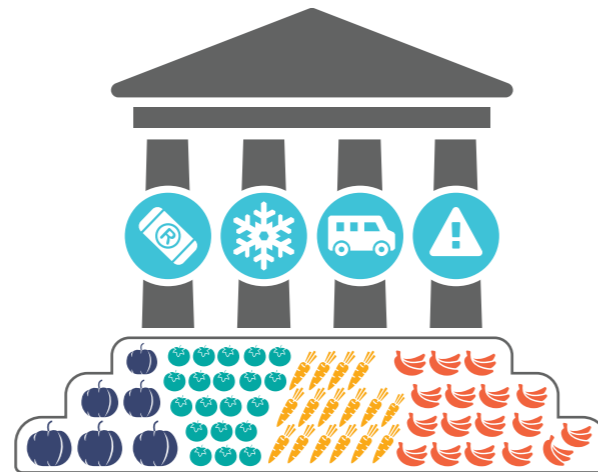
De Visser has built up comprehensive experience in research, teaching and consulting in multi-level governance. Some of his work has examined the various

levers for planning, regulation, budgeting, and decision-making regarding food security, with a specific focus on the informal market.

Making space for informal food retailers

Municipalities can do more to facilitate, as opposed to just control, informal food retailers, he says. “For example, fresh produce markets are a key constitutional power of municipalities. Municipalities can ensure safety at the market, assist with cold storage, regulate market behaviour and ensure adequate public transport connections.”

De Visser’s work will now focus in more depth on the recently adopted Spatial Planning and Land Use Management Act of 2013 and how it can be used for “food-sensitive planning”. De Visser also supervises several masters and Ph.D. students in this field.



Municipalities can assist informal markets with market behaviour, cold storage, public transport and safety.

“We will continue engaging with specific projects and campaigns such as the Philippi Horticultural Area (in Cape Town) as well as with government, for example concerning the [Department of Agriculture, Forestry and Fisheries’ \(DAFF’s\)](#) efforts to revamp the Agricultural Subdivision Act of 1970.”

New land use policy needs intergovernmental collaboration

Mechanisms to protect farm size in South Africa are deeply embedded in a complicated and entrenched system of agricultural land use control. However, the rapid transformation of the land use planning and management system that commenced in 2010 and which is still unfolding, is disrupting this. This threatens the old-school agricultural bureaucracy that protects farm sizes in the country.

With both DAFF and municipalities exercising land use management responsibilities on agricultural land, the need for intergovernmental collaboration is even more urgent; the new legal framework offers new opportunities in that regard.

By understanding and working with different levels and spheres of government on land use and other food security issues, de Visser hopes to promote a more inclusive and just food security system in South Africa





Food safety regulation lacking in SA



There is an urgent need for a food safety authority in South Africa, to help protect citizens' health and food security. This is the message of co-director of the CoE, Professor Lise Korsten. Her research team at the University of Pretoria is trying to understand food safety challenges in the informal fresh produce sector, hoping that knowledge of the problem will help researchers inform government of the changes needed in South Africa's informal food system.

Their research has revealed that fresh produce like apples, spinach and carrots sold by both street vendors and formal retailers can carry unacceptably high levels of bacteria like *Escherichia coli*, *Salmonella* and *Listeria*. Another alarming discovery is that many of these fresh fruits and vegetables carried multidrug-resistant bacteria.

Future research will study these bacteria in more detail, and look for recommendations and solutions that can be delivered to government to inform policy.



A food safety authority is needed to regulate bacterial levels on fresh produce in South Africa



Researchers develop a rapid food safety testing system



Food safety researchers led by Professor Lise Korsten at UP have laid the groundwork for a food safety diagnosis and traceability system for fresh produce in South Africa. This involved collecting and optimising techniques and strategies for sampling, testing and data management. Along the way, they tested fresh produce for contaminating bacteria in shops, on commercial farms, on small-scale farms and even in home vegetable gardens.

The methods they developed allow the researchers to rapidly identify the species and quantity of bacteria present on fresh produce, regardless of the source. They are currently expanding the number of organisms that can be identified using this system.

Putting the identification system into practice, they tested fresh produce from commercial and small-scale farms, identifying environmental *Escherichia coli* on many of the farms, and *Listeria monocytogenes* in a few cases. In general, small-scale farms had higher quantities of contaminating bacteria. When testing the system on food from retailers, they found that all shops were below the legal limit for coliform bacteria.

“The methods they developed allow the researchers to rapidly identify the species and quantity of bacteria present on fresh produce, regardless of the source.”

Health and safety of rural meat suppliers in question



The University of Fort Hare’s meat safety expert, Professor Voster Muchenje, investigated the safety practices of abattoirs and milking parlours in rural areas. He led a research team that found that the informal sector does not follow safety regulations and meat is heavily exposed to bacterial contamination.

The researchers found that consumers are more concerned about the quality and price of the product than about

safety risks. The study found that the levels of bacterial contamination in South African abattoirs and retail shops were higher than is considered acceptable by European safety standards.

The study also found that the *Bacillus sporothermodurans* bacteria is capable of producing highly resistant spores under unfavourable conditions, which has implications on the quality of UHT milk and other milk products.

“...consumers are more concerned about the quality and price of the product than about safety risks.”

Children

Why has child malnutrition persisted in South Africa?

Principal Investigator: Professor Julian May





How to make community gardens work in South Africa

[Khayelitsha's 'guerilla gardeners'](#) and [celebrity chef Justin Bonello](#) may seem worlds apart, but they share a passion for fresh produce grown by the community, for the community.

Grace Nkomo, a PhD student under the supervision of CoE Director, [Prof Julian May](#), has identified these two case studies as potential models of how community gardens could thrive in South Africa.

She says that a common perception at the moment is that gardens are not feasible because a massive financial input, and passionate leaders are often needed to establish and maintain them. By looking at how viable gardens really are, based on successful case studies, Nkomo's doctoral study may well challenge this perception.

Nkomo explains that while Bonello's project hopes to establish at least three school gardens by the end of 2017, unused public spaces have already been claimed, cleaned up and converted into public gardens by so-called guerilla gardeners.



“These gardens are funded by the gardeners themselves, and there are no fences, no security. So the food is free to the community...”

She thus has a unique opportunity to follow Bonello's efforts for the duration of her PhD. She wants to understand his motivation and his approach, and how the community responds.

“He aims to secure funding for up to 17 schools in his own community, the southern peninsula (in Cape Town). These schools are very different socio-economically - some are under-resourced in the Cape Flats; others are suburban.

“We will find out how open these schools are to an outsider coming in, and if they will buy into the project,” she says. She will also establish whether the community benefits from Bonello's idea to sustain the gardens by selling the produce to the community.

At the same time, she hopes to get consent from the guerilla gardeners of Khayelitsha to explore their approach: public gardens as a protest against capitalism and rising food prices.

“These gardens are funded by the gardeners themselves, and there are no fences, no security. So the food is free to the community,” says Nkomo. She says the group believes that putting a price tag on food is deciding who can eat and who can't, and is therefore a form of oppression. This is known as food sovereignty: a community's right to its own affordable and sustainable food systems.

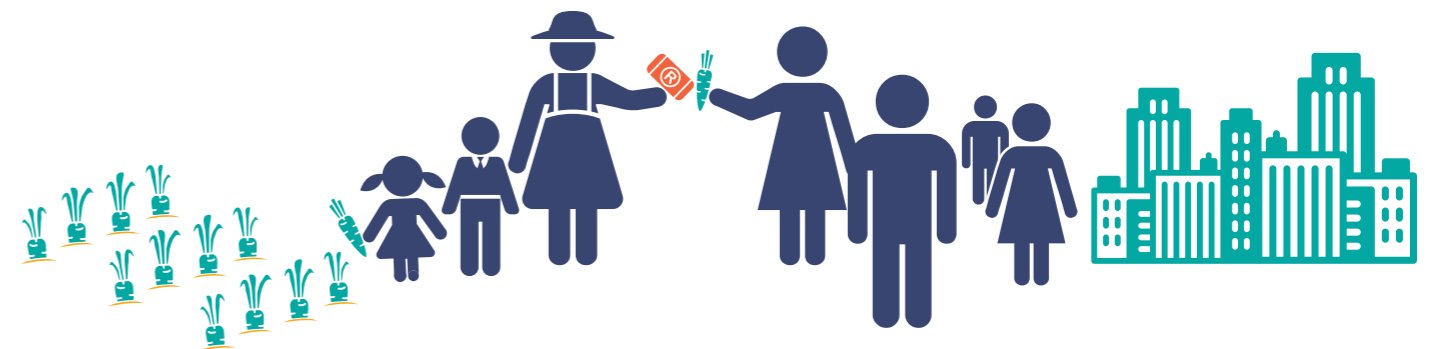
Their solution, in contrast to Bonello who will request 1500 m² for each of his gardens, is to take back small spaces of unused land, like dumping grounds, and convert them into gardens using their own resources.

Nkomo's study will evaluate the viability of these polar opposite projects, as well as other South African approaches, but what is already clear (from international research and the CoE's own findings) is that school gardens could offer many benefits.

Direct benefits to individuals include an increased intake of fruit and vegetables that promote health, and allowing access to nutritional foods that may otherwise be too costly to buy.

Gardens can also generate income for the community, and is one solution to accessing nutritional food locally in the face of rapid urbanisation.

Nkomo hopes that her study will pinpoint concrete solutions and guidelines for creating sustainable gardens that benefit communities, including schools. “If we can say, ‘they are possible, they are beneficial, and this is how we can get them going’, then we can look at updating policies so that additional resources might be made available.”



Community gardens can make fruit and vegetables accessible to urban populations while generating income.

Mining mother and child nutrition data



CoE Director, Professor Julian May and his team of researchers are comparing and analysing existing data sets on the nutrition and food security of mothers and children.

They are looking into breastfeeding and other feeding practices, maternal health and nutrition, malnutrition of infants and children, and what role the physical and socioeconomic environment plays.

Their aims are to understand why there are differences and similarities between the data sets, and to find new ways to pool and mine the data for insights into why malnutrition persists in South African children. Researchers will also determine if the measurement and analysis of childhood malnutrition can be improved.

Why child malnutrition persists in South Africa

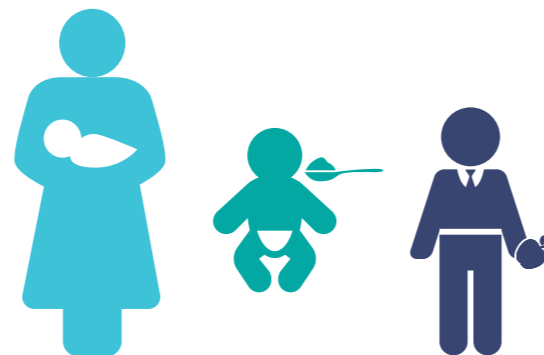


One way to answer the question of why child malnutrition is still such a problem in South Africa is to look at case studies around food intake and food preparation at different ages.

UWC's Professor Julian May leads efforts to better understand breastfeeding of infants under six months, as well as the transition from a milk diet to other foods.

He's also studying the role of the National School Nutrition Programme and school gardens on the eating patterns and food literacy of primary school children. This study is in collaboration with the SARChI Chair in Social Protection and Food Security, and it builds on research by the Medical Research Council and the Children's Institute at University of Cape Town.

Other case studies are revealing the impact of the Child Support Grant (CSG) on child malnutrition, and the role of food preparation practices in the context of poor water, sanitation and hygiene conditions.



From birth to primary school, how does food intake affect child malnutrition?



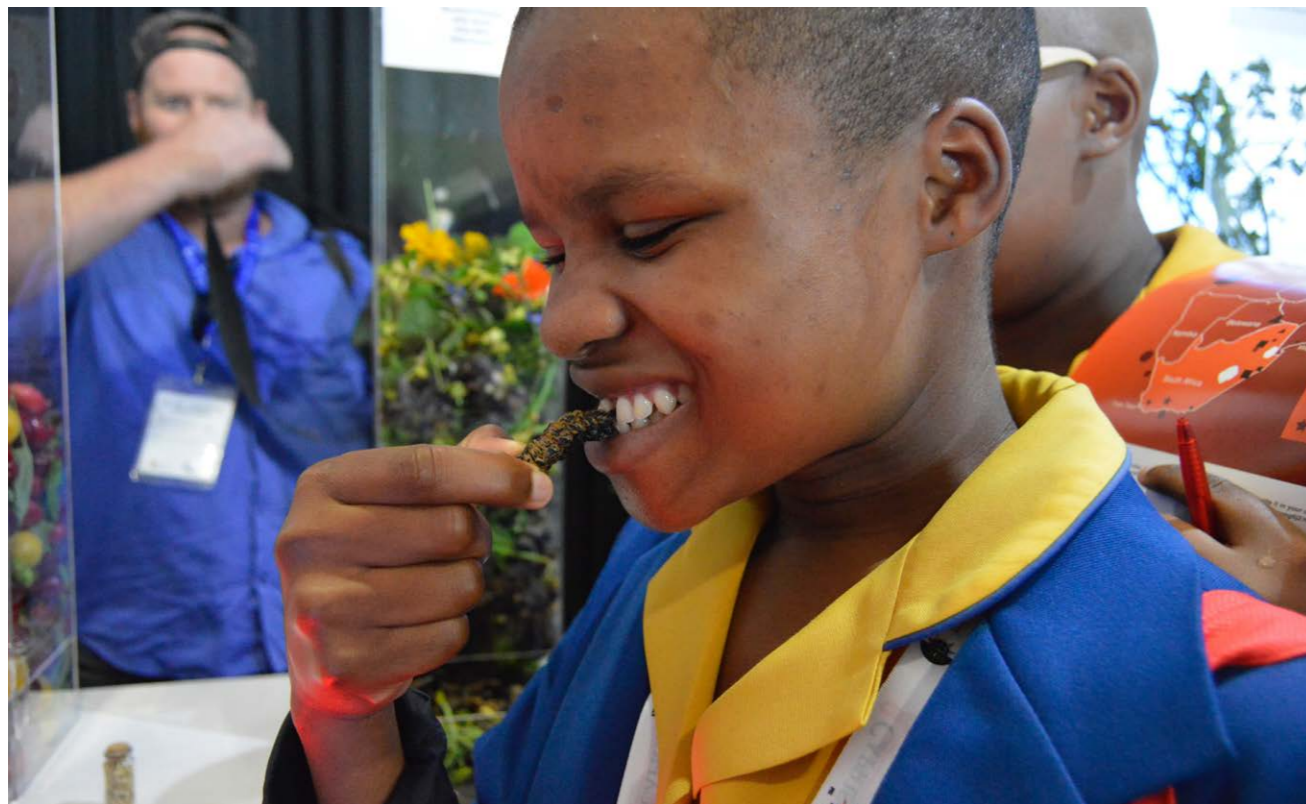


Laboratory research into child malnutrition, underway by UWC's Professor Julian May and colleagues, covers the development and safety of infant foods, as well as the safety of processed foods like polony for primary school children.

One study focuses on the development of nutritious foods for infants older than six months. These foods would be intended for complementary feeding and are based on indigenous grains.

Another is assessing the safety of foods commonly used for weaning in South Africa, such as 'mielie-melk' or 'pap-bottle', or formula.

Using next generation sequencing, researchers are also looking at the authenticity, safety and nutritional content of polony, the highly processed, ready-to-eat sausage commonly given to primary school children around South Africa.



Policy

What governance and policy reform is necessary to ensure sustainable food security and nutrition?

Principal Investigators: Professor Lorenzo Fioramonti and Dr Bruno Losch





Solving food insecurity will be no picnic

A 'useful understanding' of how food insecurity is experienced and how it can be addressed, is hampered by the large number of interpretations of how best to evaluate and measure it. This is according to a web-based systematic review, funded by the CoE and published by [PLOS ONE](#).

Reviewing a massive body of 169 sub-national food insecurity research studies conducted between 1994 and 2014 in South Africa, Dr Alison Misselhorn and [Professor Sheryl Hendriks](#) have found that most studies used one or more of 27 different measures of food insecurity.

"This has made it difficult to measure and provide an accurate analysis of the levels of food insecurity in the country," explains Dr Alison Misselhorn, an independent researcher associated with the [Institute of Food, Nutrition, and Well-Being at \(IFNuW\)](#) the University of Pretoria (UP). The review also confirmed that unaffordable diets remain the root cause of food insecurity. This was evident in the increasing consumption of cheaper, more available and preferred 'globalised' foods with high-energy content and low nutritional value that lead to overweight and obesity alongside child stunting. "Even in deep rural areas of South Africa these foods are increasingly available and are often more affordable and more available than nutrient rich foods," Hendriks explains.

“Unaffordable diets remain the root cause of food insecurity, evidenced by increasing consumption of foods with high-energy content and low nutritional value that lead to overweight, obesity, and child stunting.”

This has implications for the rise in chronic diseases and ever increasing rates of obesity in the country and, importantly, among the poor and marginalised.

The study also confirmed that women in South Africa play a central role in the pursuit of food and nutrition security for their families. Moreover, household food availability from agricultural production is often driven by women. "Yet women are severely hampered by poor decision-making power, exclusionary socio-economic institutions, and a lack of access to - and control over - both farm and non-farm assets," Misselhorn said.

Despite various policies and programmes put in place by government to alleviate the problem, including social grants, about 68% of participants in the review studies reported experiencing difficulties in securing a dependable supply of food. The studies also show that poverty remains the most common denominator of food insecurity, cited as a driver in 51% of the studies.

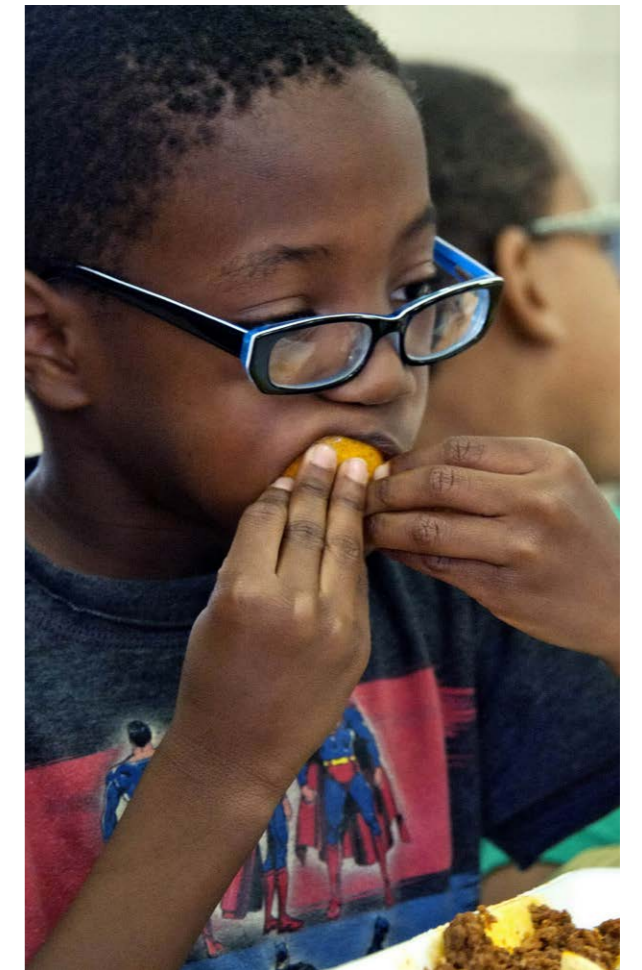


Food insecurity is driven by multiple factors and has multiple dimensions, and accordingly is studied from multiple perspectives and disciplines. "This could be one factor influencing the concerning reluctance of authors to lay out specific policy or programming recommendations from their work, with nearly half (47%) of the studies making no specific recommendations at all," says Dr Misselhorn.

"Although South Africa has a tradition of evidence-based decision making, grounded in the findings of national surveys, the rich insights from sub-national surveys (many of them Masters and PhD work) remain a largely untapped resource for understanding the contextual experience of food insecurity," adds Professor Hendriks.



Policy makers should be engaging with researchers to learn from these studies, while researchers need to share this wealth of sub-national study findings with government to strengthen food security planning, monitoring, and evaluation at all levels.



The right to food in South Africa



Professor Ebenezer Durojaye of the University of the Western Cape studied the right to food in South Africa, by reviewing laws, policies and international agreements in place. The research looked at two aspects of the right to food: first, the role of Chapter Nine organisations and civil society groups in ensuring this right, and secondly the legislation in place protecting consumers against mislabelling of foods.

Durojaye and colleagues compared South Africa to India and concluded that litigation should be used more in this country to hold government accountable to its commitments on the right to food for all citizens, which are enshrined in the Constitution. Evidence from both South Africa and India shows that activism from civil society organisations can be an effective way to influence law and policy and compel government to fulfill its commitments in terms of the right to food.

Next, the researchers reviewed legislation around food labelling. They found that there are laws and policies in place to protect consumers, but that this relies on effective testing and monitoring of food manufacturers and retailers by government. They concluded that the government, Chapter Nine organisations and civil society needed to do more to ensure that manufacturers are held accountable.

“...activism from civil society organisations can be an effective way to influence law and policy and compel government to fulfill its commitments in terms of the right to food.”

Regulating food policy will improve food access



Professor Nic Olivier and Dr Anel Gildenhuis of North West University established a database of national, international and regional data on strategies and policies relating to food and nutrition. The researchers collected information from recent Strategic Plans, Annual Performance Plans and Annual Reports from national and provincial government departments.

The researchers reviewed the legislative, policy and institutional frameworks relevant to food security in South Africa. The study made seven overview reports on the role of key national departments in matters pertaining to the Global Forum on Food Security and Nutrition.



Reviewing food security in Tshwane



An assessment of household food security and food-related activities in Tshwane has shown a wide variation within and between communities. Professors Jannie Hugo and Tessa Marcus at UP have assessed food security as part of a broader public health intervention in some of Tshwane's poorest communities.

They showed that food insecurity varied from below 1% of households up to 11% of households, depending on the district. Likewise, the number of households growing their own food varied from 3% up to more than 20% depending on district.

“...interventions in food security in these communities needs to be intensive and involve participants from various organisations and sectors of society to be effective.”

Finally, their work with government, community organisations and individuals in the community has shown that any interventions in food security in these communities needs to be intensive and involve participants from various organisations and sectors of society to be effective.



Symbols

How do cultural and religious symbols construct and distort the ways in which food is selected, prepared and consumed?

Principal Investigator: Professor Ernst Conradie





Beyond the numbers: Exploring the ethics and values of food security

Food security research focusses heavy on facts and figures - what percentage of the population is food insecure? What are the major nutrient deficiencies in South Africa? But there is another aspect that is much harder to quantify. Food and food security is a fundamentally human issue, meaning that our human values, morals and ethical decisions all play an important and often overlooked role in food security discussions.

For this reason, [Professor Ernst Conradie](#), of the University of the Western Cape's Department of Religion and Theology, heads up the programme on Symbols, to investigate symbolism and value systems in food production and consumption.

"Professor Julian May, Director of the CoE 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. The programme currently supports five Masters students (three newly registered in 2016) and one post-doctoral researcher.

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.

A recently established project is asking leaders of faith-based organisations around Cape Town why people are food insecure, trying to identify underlying causes rather than 'symptoms' such as unemployment.



If the CoE in Food Security is to become the centre of food security research in South Africa, it is important to interrogate what food and eating means to us as human beings



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.

One project is studying the Old Testament to understand the connections between food security, ideology and social cohesion (good relationships within a society) in ancient Israel. Conradie hopes that the research will have lessons for modern societies dealing with food insecurity.

"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 in Food Security is to become the centre of food security research in South Africa, it is important to interrogate these concepts," says Conradie.

Politics

How do human relationships to food and the meanings that food acquire in particular cultural and social contexts affect the power dynamics around food production and access?

Principal Investigator: Professor Desiree Lewis





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](#) at the University of the Western Cape (UWC) 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 – without considering the role of humanities-based food studies.

To address this, Lewis is heading up the CoE's Food Politics 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.

In terms of food branding research, Professor Lewis and her team are 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. Therefore 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 on next page) 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 also 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 South Africa 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.

Lewis also organised two international meetings around food contestation in the last two years, which brought together academics, artists and activists and stimulated conversations around food in South Africa.

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

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.





SARChI

Why is South Africa's comprehensive social protection system not making a much more significant contribution to the eradication of food insecurity and hunger, and how can this contribution be enhanced?

Principal Investigator: Dr Stephen Devereux





Social grants alone can't stop malnutrition

In 1998 the South African government introduced the [Child Support Grant \(CSG\)](#), which now reaches over 11 million children and has improved food intake and dietary diversity in poor households. Despite this, a closer look at the data shows a troubling trend: child nutrition hasn't significantly improved since the inception of the CSG.

[Dr Stephen Devereux](#) has looked at food security and child nutrition trends in South Africa, and pieced together why nutrition outcomes lag behind in spite of the increased food security offered by the CSG. Devereux is the SARChI Chair in Social Protection for Food Security, affiliated with the [Centre of Excellence in Food Security \(CoE\)](#) and the [Institute for Social Development](#) at the University of the Western Cape.

Explaining in a [working paper](#) for the CoE, Dr Devereux and co-author [Jennifer Waidler](#) write about possible reasons behind the paradox of improved food security without decreasing malnutrition. They argue that inadequate transfers, dilution of and deductions from social grants, and the idea that food security needs more than just food, are all behind the imbalance between food security and nutrition in South Africa.

With inadequate transfers, they say that although South African social grants are generous compared to other countries, they fall short of meeting nutritional needs. In reality, these grants are made less effective as they are often 'diluted' among several family members.

Devereux found that poor South African families will spend between one-third and two-thirds of the Child Support Grant on food, which amounts to R130 to R224 of the R360 (as of January 2017) they get every month.

Devereux writes that giving bank accounts to beneficiaries, while improving financial inclusion in the economy, also made grant-holders vulnerable to unethical service providers that make unauthorised deductions from these bank accounts.

While it might seem counterintuitive, Devereux also suggests that food security needs more than food. He writes that since the early 1990s, it has been understood that poverty and food insecurity are not synonymous. According to UNICEF, there are three underlying causes of child malnutrition: inadequate access to food, inadequate care for children and women, and insufficient health services or an unhealthy environment.

Devereux writes that cash transfers such as the CSG are not enough to eradicate malnutrition, because the scope and scale of social grants are not enough to affect national nutrition statistics.

Looking to possible solutions, Devereux mentions a pilot project in Bangladesh that complemented cash transfers with nutrition training, which performed much better than just giving cash to the beneficiaries.

"Social grants are essential to finance food consumption and reduce hunger in poor households, but the determinants of nutrition status are more complex than food consumption," he writes.



Social grants are essential to finance food consumption and reduce hunger in poor households, but the determinants of nutrition status are more complex than food consumption,



External Projects

The Centre of Excellence has sponsored a number of smaller projects and national and international events that were aligned to specific and broader goals of the CoE.





CoE events move conversations about food security forward

The Centre of Excellence in Food Security is not just funding research; it's also bringing diverse individuals, groups and organisations together to form a vibrant and robust network to address all aspects of food insecurity in South Africa. That means part of its activities have been dedicated to several local and national events in the food security space.

These events ranged from academic conferences and workshops through to an International Food Fair that celebrated the culinary and cultural traditions of the countries represented.

Hosted at the University of the Western Cape, the **International Food Fair** (held on 13 September 2016) saw students and staff from various groups of the CoE set up stalls to exhibit food, drink, music and other cultural activities from their home countries. The event encouraged informal discussion of cultural differences and personal experiences of food insecurity. This is the third year the event was celebrated and it has grown every year.

CoE researchers also participated in the **Department of Science and Technology (DST)-National Research Foundation (NRF) CoE Director's Forum** (25 - 26 Aug 2016), which brought school learners and university students together to interact with cutting edge research from the 15 CoE's around South Africa.

The **World Food Day Dialogue**, which took place on the 18th October 2016 at the River Club in Observatory, Cape Town, discussed 'Food insecurity, the consumer food environment, formality and informality in the South African food system'. Researchers highlighted the role of 'Big Food' corporations that are profiting while poor South Africans struggle to put food on the table.

On the academic front, the CoE contributed to three academic meetings in 2016. The first was the **International**

Symposium on Food Studies: Transnational Conversations, which took place at the University of Pretoria, 22 and 23 July 2016. The event brought together academics, postgraduates and artists involved in humanities-oriented food studies from around South Africa, Africa and the rest of the world. Strong ties were formed between South African and American universities, and local visual and performing artists contributed to the conversation around food security.

World Nutrition Cape Town took place at the University of the Western Cape 30 August to 2 September 2016. The CoE sponsored 57 South African students (61% of whom were women) to attend this conference as well as helping to coordinate the prestigious conference. The students served as rapporteurs and facilitators at the conference, while being exposed to current global research on different aspects of public health, nutrition, and food systems.

Finally, the **Annual Meeting of African Science Academics** took place on 6 and 7 November 2016, hosted by the CoE in conjunction with the Academy of Science of South Africa ASSAf, the South African Department of Science and Technology (DST) and the Network of African Science Academies (NASAC). The theme was 'Poverty Reduction', which included food security and agriculture, social determinants of health, gender, water and energy. A policy booklet called 'Social Protection in Africa' was launched at the conference, presented by Dr Sophie Plageron of the University of Johannesburg, who co-authored the report with Prof Leila Patel.

The CoE in 2016 contributed financially and intellectually to a range of events, all aimed at promoting conversation around food insecurity within the wider landscape of social development in southern Africa.

Does smallholder avocado production improve livelihoods in Burundi?



Mr Cyriaque Hazikama, a researcher at Poverty, Land and Agrarian Studies (PLAAS), UWC, studied the impact of the avocado industry on the quality of life and livelihoods of poor households in the Giheta district of Burundi. The research showed that benefits from avocado production are distributed among the members of producing households, and identified those who bear the challenges and costs of this production within these households.

The study focused on the period following the construction of an avocado oil refinery in the study area. The findings go towards determining whether the avocado industry helps poor people in Giheta as a crop that has both subsistence and commercial potential.



Avocado product on benefits poor households in Burundi



Ways to improve the food security of smallholder farms



Dr Joseph Asiwe of the University of Limpopo screened drought-tolerant varieties of maize and cowpeas for their use in intercropping systems in rain-fed agriculture in the Limpopo Province of South Africa. The study, conducted in collaboration with the CoE and funded by the University of Missouri, discovered promising high-yielding cowpea varieties with a short growing season.

The study examined the interrelated effects of phosphorus fertilization on improving drought tolerance. Asiwe surveyed smallholder farming communities about adoption of drought-tolerant intercropping systems and soil moisture conservation practices. The results of the study will benefit the farming communities involved.



Applying the TEARS strategy for community development and food security



Professor Peet du Toit from the University of Pretoria worked to improve well-being among primary school children vulnerable to poverty and other development risk factors. The research empowered children to take responsibility for their own lifestyles and eating habits.

The study developed an intervention aimed to enrich the current school curricula of Grade 4, 5 and 6 for two subjects: Life Skills, and Natural Sciences and Technology.

The result of the study gave children and their communities practical skills and knowledge to enhance their health and well-being.



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For full details of articles published, students funded and conferences attended, go to <https://goo.gl/7h9F3M>



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