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Paper **35**

# Systematic review of the literature on ‘informal economy’ and ‘food security’

South Africa, 2009–2014

5 July 2016

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## PLAAS Working Paper 35: Systematic review of the literature on 'informal economy' and 'food security': South Africa, 2009–2014

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## ABSTRACT

Despite the importance of the informal food economy in fulfilling the daily and weekly food needs of a large proportion of South Africa's low-income population, it appears little research exists on the exact nature of the relationship between the informal food economy and food security. This paper performed the first qualitative systematic review of research from South Africa that addresses both these aspects. The methods used in the review are described in detail, to increase the readers' ability to assess the reliability of subsequent findings and analysis. Findings confirmed the low level of research focus on the informal food economy (and food security), in particular the stages of the value chain beyond the farm gate and before the consumer. Food safety research is common, although applied narrowly and with mixed findings. The conceptualisation of nutrition research is encouragingly wide, encompassing both over- and under-nutrition, but does not seem to consider the broader urban informal context in which consumers are embedded. Lastly, the research approaches used are predominately quantitative, and the voices of those who survive within the informal food economy are largely absent.

**Keywords:** food security, informal economy, informal sector, systematic review, South Africa

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## ACRONYMS

AFSUN	African Food Security Network
BoP	Base of the Pyramid Innovation Centre
ETD	e-theses and dissertations
FSTA	Food Science and Technology Abstracts
ICCO	Interchurch Organization for Development Cooperation
ISAP	Index to South African Periodicals
MA	Master of Arts
MDev	Master of Development Studies
MSc	Master of Science
MNutr	Master of Nutrition
MPhil	Master of Philosophy
MTech	Master of Technology
NWU	North-West University
PhD	Doctor of Philosophy
SA	South Africa
SNIP	Source Normalised Impact per Paper
SU	Stellenbosch University
SUN Search	Stellenbosch University Library and Information Service
UCT	University of Cape Town
UNDESA	United Nations Department of Economic and Social Affairs
UFS	University of the Free State
UJ	University of Johannesburg
UL	University of Limpopo
UKZN	University of KwaZulu-Natal
UP	University of Pretoria
UNISA	University of South Africa
UWC	University of the Western Cape

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## 1. INTRODUCTION

Recent research has revealed a high prevalence of food insecurity among residents of low-income urban areas across South Africa (Naicker et al. 2015<sup>\*</sup>; Crush and Caesar 2014; Shisana et al. 2013<sup>\*</sup>; Rudolph et al. 2012<sup>\*</sup>; Battersby 2011; Frayne et al. 2009<sup>\*</sup>; de Wet et al. 2008<sup>\*</sup>). Using a validated survey targeting poor neighbourhoods across three major South African cities (n=2612), Frayne et al. (2009<sup>\*</sup>) found that 70% of respondents were 'moderately' or 'severely' food insecure. While the correlation between poverty and food insecurity is firmly established, its increasingly urban manifestation remains novel (Crush&Frayne 2011a<sup>\*</sup>). With 64% of South Africa already urbanised, expected to reach 77% by 2050 (UNDESA 2014<sup>\*</sup>), this high prevalence of food insecurity is cause for immediate and future concern for food security and for socio-economic development.

From the little that is known about how the food insecure access food in South Africa's urban areas, it appears that, generally, bulk monthly food purchases are done at formal food retailers (primarily supermarkets), while weekly and daily needs are most likely satisfied via informal food retailers (including food markets, spaza shops, takeaways and street traders) (Crush&Frayne 2011b; Frayne et al. 2009<sup>\*</sup>). Despite this apparently high degree of reliance on the informal food economy for everyday food needs, very little research has been directed at understanding the intersections of this economy with food (in)security (Crush&Frayne 2011b). Furthermore, the research that does exist is fragmented and the substantial dietary contributions of this economy (for better or worse) to millions of South Africans (see Steyn&Labadarios 2011; Steyn et al. 2011; Feely et al. 2009) is not matched by research attention.

This paper thus describes the first attempt to systematically review existing literature about or from South Africa that links the informal economy to food security. The aim is to provide a baseline understanding of the current state of knowledge about these links and guide future research endeavours. After carefully explaining how we applied a systematic literature review methodology in a qualitative manner, and the limitations thereof, we proceed to describe the results obtained. Results are presented first via a broad overview that describes the body of literature that exists. Next, we highlight some of the key themes we have interpreted from the review, especially in terms of what is said about the links between the informal food economy and food security. Finally, we indicate what the implications of these findings are for future research in this area.

## 2. SYSTEMATIC LITERATURE REVIEW METHODOLOGY

### Overview of the methodology

A systematic review seeks to identify, appraise and synthesise all the available literature on a given topic, in this case, in the social sciences (Petticrew&Roberts 2008<sup>\*</sup>). Although better developed in fields such as evidence-based medicine, the application of systematic review techniques in the social sciences is gaining increasing research interest (Petticrew&Roberts 2008<sup>\*</sup>). A key benefit of this methodology lies in making visible the usually hidden process of data collection and analysis so that researcher bias can be limited and also directly evaluated by the reader on its merit (Candel 2014<sup>\*</sup>; Petticrew&Roberts 2008<sup>\*</sup>). Thus, drawing on Petticrew and Roberts (2008<sup>\*</sup>), a systematic review was undertaken to analyse, then thematically synthesise highly fragmented bodies of literature pertaining to the various connections between informal economic activities and food security 'outcomes'. The aim was to find all available literature on the topic using relevant electronic databases, following a clear step-by-step approach, stating each choice made in the process.

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<sup>1</sup> Note: references sourced outside of the results of this systematic review are marked with an asterisk (\*).

The systematic review methodology used is a fairly novel application in the social sciences and does not conform to the more common quantitative applications. Typically, systematic reviews are used as the gold standard in evidence-based medicine, statistically pooling and synthesising vast numbers of primary clinical trials to determine the best intervention for a given condition (for such an approach see Gough et al. 2012\*; Littell et al. 2008\*). For our research, a quantitative assessment alone would be imprudent, if not impossible. The ‘informal economy’ and ‘food security’ are complex theoretical constructs rather than distinct symptoms or interventions, with an absence of empirical data (the informal economy for instance is notoriously difficult to measure accurately<sup>2</sup> and a great deal of debate exists on how to measure food security<sup>3</sup>). Accordingly, we adopted a more conceptual and heuristic<sup>4</sup> approach to assembling all the available research (primary and secondary, qualitative and quantitative) on the topic. The findings are then presented quantitatively and qualitatively according to themes (see Thomas&Harden 2008\*). In other words, unlike quantitative systematic reviews, our approach used broad inclusion criteria that are *topic-* rather than *methodologically-*centric and all research designs and methodologies were eligible for inclusion.

## Data collection steps

This section offers an overview of the tools and methods used to gather as much of the research on the topic as possible. Prior to the systematic review process, a more traditional ‘narrative’ literature review (see Green et al. 2006\*), commissioned by the Africa Centre Food Lab Project, on “*Exploring issues around food security in informal urban communities*” in the global South and South Africa was conducted (Methvin 2015\*; Even-Zahav 2014 unpublished\*). The insights from this work offered sufficient orientation with the various literatures on the subject in the South African context to initiate this review.

In the first step, we developed keywords and synonyms drawing on the previous literature review. Following the ‘building blocks’ search technique (PubMed 2013a\*), these terms were tabled, starting with very broad terms, namely ‘food’ and ‘informal’, before moving to more specialised terms, i.e. ‘food security’ and ‘informal economy’ (see *Table 1* for a complete list of keywords, synonyms and the order in which they were searched). In consultation with a faculty librarian of Economics and Management Sciences at Stellenbosch University (Strydom to Even-Zahav 2014\*) and Mouton’s (2001\*) research guide for South African masters’ and doctoral researchers, three domestic and three international electronic databases were selected to cover as much of the literature as possible. To capture literature produced in South Africa, we searched Sabinet Reference (Journal Articles) and the Stellenbosch University search engine, SUN Search, which comprises a collection of ten key domestic and international databases.<sup>5</sup> To further cover domestic theses and dissertations, the South African National ETD (e-theses and dissertations) Portal was also selected. We chose two of the larger and more sophisticated international databases, Scopus and EBSCOhost, to scan the broader literature and enable more specific searches than the domestic databases permitted. Finally, Google Scholar was chosen because of its large size, in an effort to capture more results.

<sup>2</sup> See Ligthelm (2006\*).

<sup>3</sup> See Coates (2013\*) and Barrett (2010\*).

<sup>4</sup> Given the paucity of data, the broad range of disciplinary approaches and the absence of methodologies developed to study the intersection of food security and the informal economy, a ‘heuristic’ approach to categorising the literature was adopted. In other words, instead of superficially imposing cohesive but ill-fitting theoretical and methodological frameworks, a more exploratory and spontaneously adaptive approach was called for (see Maxwell 2012\*).

<sup>5</sup> SUN search included the following databases at the time of search: Academic OneFile; ArchiveGrid; ArticleFirst; Electronic Books; ERIC; JSTOR Current Scholarship Journals; Literature Resource Center; MEDLINE; OECD iLibrary; SA ePublications Journal Collection; ScienceDirect; WorldCat.



The second stage involved the Boolean search (PubMed 2013b\*), based on the building blocks table, to identify the level of detail that best balanced quantity of results with topic relevance. The use of multiple databases of varying sizes and levels of sophistication demanded an adaptive approach to this review. Thus, keywords and synonyms in *Table 1* were adjusted for each database in order to strike a balance between quantity and relevance of results (see *Table 2* for Boolean phrases used in each database as well as a breakdown of results by database). This stage was conducted between 24 and 31 October 2014 and yielded 558 results across all databases. Lists of all results were saved in MS Word and Excel.

The third step manually applied the first three technical inclusion and exclusion criteria (see *Table 3*), which some databases failed to eliminate, by looking through the records of the results as they appeared on the various databases. Here, the following were eliminated: duplicates, older material (pre-2009) and research not conducted on South Africa. This significantly reduced the results to 177.

The fourth step applied the primary keywords and their synonyms (see *Table 1*) to the titles and abstracts (as well as introductions and conclusions where some relevance was suspected) of the results following the first three steps. Results that were plainly irrelevant were eliminated<sup>6</sup> while those that suggested any relevance were maintained; 105 papers remained following this stage.

The fifth and final stage involved reading all remaining papers to establish ultimate relevance, usually the introduction and conclusion, and a scan of the document. During this stage, a further 13 papers were removed from the final database (see *Appendix 1* for a list of these). The inclusion criteria captured many papers conducted in informal settlements, as opposed to focussing specifically on the informal food economy. However, given the dominance of this economy in informal settlements (see Steyn and Labadarios 2011; Crush and Frayne 2011b; Feely et al. 2009,) these papers were retained. In the case of relevance (n=92), the full text of the papers was read and synthesised into dominant and emergent themes.

Table 1: Search terms and synonyms

Search Terms	OR	AND		
Primary		Food	Informal	South Africa
Secondary		Food Security	Informal Economy	Cape Town <sup>7</sup>
Tertiary		Food Access	Informal Sector	
Quaternary		Food System	Informal Market	

The complete Boolean phrase was as follows: (Food OR Food Security OR Food Access OR Food System) AND (Informal OR Informal Economy OR Informal Sector OR Informal Market) AND (South Africa OR Cape Town). This approach did not always work in every database due to formatting and other restrictions and needed to be adjusted and simplified (see *Table 2*).

<sup>6</sup> e.g. Wyma, R. 2012. *Birds of the riparian corridors of Potchefstroom, South Africa*. Masters' thesis. North West University.

<sup>7</sup> This search term was used as an 'AND' category only for Google Scholar given that, unlike the other academic search engines, it scans each item's full-text. This resulted in an unmanageable number of results, most of which were clearly irrelevant based on initial inspection. Thus, 'Cape Town' was used as an admittedly biased but necessary means to limit the results and obtain more relevant ones. Considering that in only a small portion (n=6) of the final results (n=92) were obtained from Google Scholar, this was not deemed a major bias concern.

Table 2: Results breakdown per electronic databases searched

Academic Search Engine	Search Date	Boolean/Phrase	Limiters	Results
EBSCOhost (incl. Academic Search Premier; Africa-Wide Information; Business Source Premier; CAB Abstracts; Econlit; FSTA; GreenFile; MasterFile Premier; MEDLINE)	24/10/2014	(food security) AND (informal) AND (south africa)	Date: 2009	99
Google Scholar	24/10/2014	"food security" AND "informal trade" AND "Cape Town"	Date: 2009	89
South African National ETD Portal	27/10/2014	food* AND informal*	None	110
Sabinet Reference (new platform: Journal articles incl. SA & African Electronic Journals (SA ePublications); African Journal Archive; Index to South African Periodicals (ISAP))	28/10/2014	("informal" AND (economy OR sector OR market)) AND ("South Africa" OR "Cape Town") AND ("food" AND (security OR access OR system))	Title: Urban	86
Scopus	29/10/2014	(TITLE-ABS-KEY ("Food") AND TITLE-ABS-KEY ("Informal")) AND PUBYEAR>2008 AND (LIMIT-TO (AFFILCOUNTRY, "South Africa"))	Date: 2009; Country: South Africa	57
SUN Search	31/10/2014	food AND informal AND South Africa	Date: 2009	117
TOTAL				558

## Data Analysis

Once all inclusion and exclusion criteria had been applied, a final database was created (n=92) in Excel containing summarised information of the readings. Various categories were selected about which to capture information from the papers. If one consults the list below, one can see that Categories 1–5 are more quantitative, involving little subjective interpretation. Categories 6–9, however, are more conceptual and were based on insights gleaned from the initial literature review (Methvin 2015\*; Even-Zahav 2014 unpublished\*). The remaining categories (10 and 11) entailed qualitative assessment of the quality of the items and their key findings.

Table 3: Inclusion and exclusion criteria

	Included if:	Excluded if:
Language	English	Not English
Research conducted on	South Africa	Not South Africa
Published between	1 January 2009–31 October 2014 <sup>8</sup>	Preceding 2009
Topic criteria	Food (and/or synonyms) AND Informal (and/or synonyms) in Title, Abstract, Introduction or Conclusion	Does not meet the topic criteria listed alongside
Further topic criteria		Scan of paper reveals NO connection to: some aspect of food security or similar concept (e.g. dietary diversity) AND informality (either as settlement pattern or socio-economic status) OR similar concept (e.g. marginality)

1. Basic 'biographical' information: authors, year, title, document type, publication name, institutional affiliation of main author, database source, subject areas of journal (if applicable), subject area of the paper

<sup>8</sup> Note that research preceding 2009 that appeared to be of relevance was noted and later referred to for insights, and while not appearing in this paper, will be expanded on in future work.

2. Geographical location/s of the study: suburb, city/town, metro/district municipality, province
3. Relevance: Legislation/Policy/ Programme.
4. Geographic scale (global, national, provincial, regional, city-scale, one settlement/area within a city)
5. Unit of analysis and sample size: e.g. number of participants/households included in the study, or dataset used
6. Design and methodology: quantitative/qualitative/mixed methods; surveys/interviews/experiments/observation/literature review/anthropometric measures etc.
7. Settlement pattern: urban/peri-urban/rural; formal/informal (we based this on self-reported patterns in the papers or else our heuristic interpretation – sometimes using observations of density of built environment on Google Earth website)
8. Food security pillar: i.e. availability, access, utilisation (utilisation was further broken down into food safety, nutrition and/or social value (see Ingram 2011\*)).
9. Food value chain stage: i.e. inputs, production, processing, distribution, retail, consumption, waste (and various combinations thereof)
10. Comment: heuristic evaluation of each research's quality; i.e. validity, reliability.
11. Findings of the study: noted were those findings relevant to our study (i.e. related to informal economy and food security)

The next section presents a description of the results from categories 1–5.

### 3. DESCRIPTION OF THE RESULTS FROM CATEGORIES 1–5

#### Types of publications

The results contained a balance of academic literature (n=53) and grey literature (n=39). In the academic literature, only one book chapter was captured and the rest were peer-reviewed journal articles. The grey literature was dominated by Masters' and PhD theses (n=34), with the remainder (n=5) a mix of conference papers, corporate reports and newsletters. The omission of popular literature was deliberate and a consequence of the electronic databases chosen, not an indication of a lack thereof. The inclusion of the theses introduced both advantages and disadvantages; offering a great deal of disciplinary diversity and interesting angles on the topic but a myriad of research 'quality' issues. Overall, however, the grey literature greatly enriched the scope of this review.

#### Prominent authors

Many authors had two articles in the database, so *Table 4* below lists only those authors who had three or more publications<sup>9</sup>. Oldewage-Theron was the most prolific author in this review (n=5). The most significant finding was the focus on public health nutrition and food safety issues, respectively, among all these authors.

#### Prominent journals

The journals that featured most strongly in the database were: *South African Journal of Clinical Nutrition; Development Southern Africa; African Journal of Agricultural Research; Agrekon* and *Health SA Gesondheid*. *Table 5* below provides a summary of information about each of these journals. The most common peer-reviewed publishing destination was South Africa with one

<sup>9</sup> Note that the counting included authors irrespective of their placement in the list of authors. For instance, Labadarios is only the lead author of one paper in the review, but has co-authored two further publications with Steyn 2011 and Steyn and Nel, respectively.

other African journal from Nigeria. Two of the journals focus on public health (nutrition), two on agriculture (production), and one on development.

Comparison of journal impact factors between disciplines is normally difficult due to differing citation patterns between disciplines. Scopus has created a useful impact factor measure to try and deal with this, called the Source Normalised Impact per Paper (SNIP) (Stellenbosch University Library and Information Services, n.d.). This measure attempts to control for differences between subject fields, like the total number of citations in the field, how often authors in that field cite other papers and the extent to which the database that underlies the calculations covers that field (Stellenbosch University Library and Information Services, n.d.). It measures the total citations a journal receives in relation to the total citations in that field. Although Scopus did not contain any information for the *African Journal of Agricultural Research*, the graph in *Figure 1* shows that *Development Southern Africa* has a consistently high SNIP, while *Agrekon*'s impact seems to vary from year to year. *Health SA Gesondheid* seems to be steadily increasing off a low base. The *South African Journal of Clinical Nutrition*, while a popular destination for authors in our database, has had a fairly low SNIP in the past.

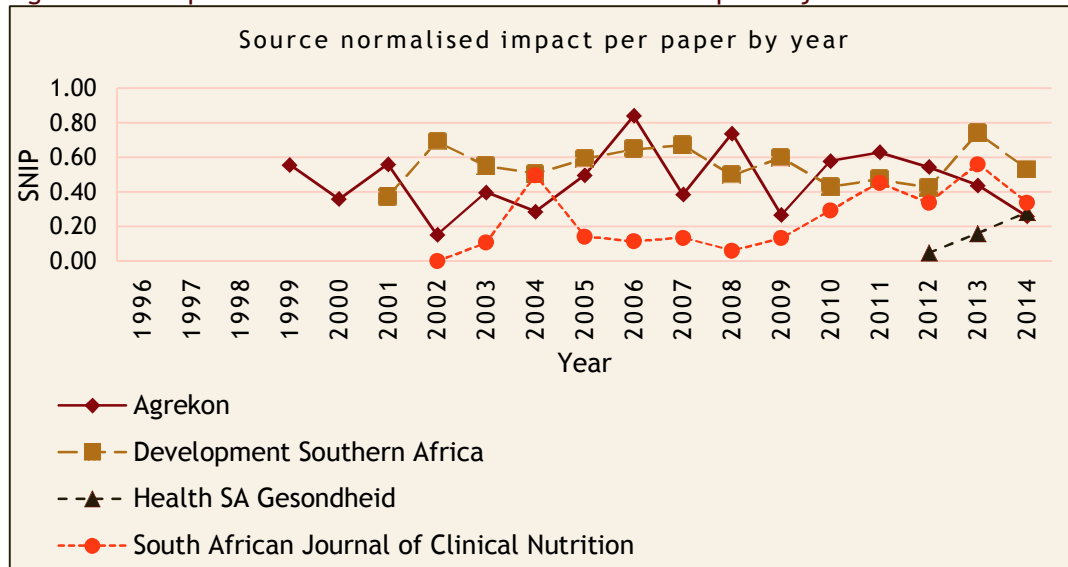
Table 4: Most prominent authors

Author	No. of Papers	Journals	Article subjects	University affiliation (from a Google search)
Oldewage-Theron, Wilhelmina H.	5	Health SA Gesondheid (2010; 2010; 2009); Nutrition (2011); South African Journal of Clinical Nutrition (2011)	Nutrition (4); Development Studies	2014–current: Professor of Nutrition, Department of Nutritional Sciences, Texas Tech University, USA; 2010–2014: Professor and Director: Centre of Sustainable Livelihoods, Vaal University of Technology, SA
Napier, C. E.	4	Health SA Gesondheid (2010; 2009); South African Journal of Child Health (2014); South African Journal of Clinical Nutrition (2011)	Nutrition (many co-authored with Oldewage-Theron)	Associate Professor: Department of Food and Nutrition Consumer Sciences, Durban University of Technology, SA
Lues, J.F.R.	4	Journal of Public Health Policy (2012); African Journal of Microbiology Research (2011); British Food Journal (2009); International Journal of Environmental Health Research (2009)	Pharmacology/ Toxicology (1); Public Health (3)	Professor: Department of Life Science, Central University of Technology, Free State, SA
Agenbag, M.H.A.	3	Journal of Public Health Policy (2012); British Food Journal (2009); International Journal of Environmental Health Research (2009)	Public Health (many co-authored with Lues)	Environmental Health Programme, Central University of Technology, Free State, SA
Steyn, N. P.	3	Nutrition Journal (2011); Ethnicity and Disease (2011); Nutrition Journal (2011)	Nutrition	Centre for the Study of Social and Environmental Determinants of Nutrition, Knowledge Systems: HSRC, SA
Drimie, S.	3	BMC Public Health (2013); Health and Place (2010); Agrekon (2009)	Public Health (Nutrition)	Interdisciplinary Health Sciences, Faculty of Medicine and Health Sciences, University of Stellenbosch, SA
Labadarios, D.	3	Nutrition Journal (2011 and 2011); Ethnicity and Disease (2011)	Nutrition (many co-authored with Steyn)	Centre for the Study of Social and Environmental Determinants of Nutrition, Knowledge Systems: Human Sciences Research Council, Cape Town, SA

Table 5: Top five journals from the database

Journal	No. of articles	Place of Publication	Publishing Frequency	Restricted/ Open Access	Focus of Journal (sourced from their own website)
South African Journal of Clinical Nutrition	4	South Africa	4 issues p.a.	Open	"all basic and applied areas of dietetics and human nutrition, including clinical nutrition, community nutrition, food science, food policy, food service management, nutrition policy and public health nutrition ... [the journal] recognizes that there are many factors that determine nutritional status and that need to be the subject of scientific investigation"
Development Southern Africa	4	London	6 issues p.a.	Restricted	"development policy and practice in the southern Africa region.... area-based scholarship in the social sciences ... policy solutions to local and regional socio-economic development challenges ... (economics, sociology, agricultural economics, development studies, political science, amongst others) ... include poverty, unemployment, tourism, agriculture, business development, infrastructure development and other related development themes"
African Journal of Agricultural Research	3	Nigeria	24 issues p.a.	Open since 2006	"covers all areas of agriculture such as: arid soil research ... agricultural genomics ... post-harvest biology and technology, seed science research, irrigation ... agronomy ... crop science ... horticulture ... agricultural economics and agribusiness"
Agrekon	3	South Africa	4 issues p.a.	Restricted	"research, debate, policy, and practice regarding agricultural economics in southern Africa ... solve agricultural, rural and relevant national problems in Southern Africa"
Health SA Gesondheid (Journal of Interdisciplinary Health Sciences)	3	South Africa	4 issues p.a.	Open	"aims to promote communication, collaboration and teamwork between professions and disciplines within the health sciences to address problems that cross and affect disciplinary boundaries ... issues related to public health, including implications for practical applications and service delivery that are of concern and relevance to Africa and other developing countries"

Figure 1: Comparison of SNIP values for four of the top five journals



Calculations updated on 13 June 2014.  
Source: Created by author using Scopus

## Student research

Theses made up a large proportion of research in the review results; almost 40% of the total number of papers (28 Masters' and 6 PhDs). They came from a wide array of disciplinary backgrounds, less expected ones including history, law, architecture, economics and biochemistry. The most common fields are described in *Table 6*.

Table 6: Most common thesis disciplines

Field of Study	Degree	No. of Theses	University
Development Studies	MA or MDev	4	University of South Africa (UNISA) (2 theses); University of Johannesburg (UJ); University of Limpopo (UL)
Agriculture	MSc	3	UNISA; University of Pretoria (UP); University of the Free State (UFS)
Nutrition	MNutr	2	Stellenbosch University (SU)
Environmental Management	MPhil	2	University of Cape Town (UCT)
Sustainable Development	MPhil	2	SU
Food Service Management	MTech	2	Vaal University of Technology

The most prolific universities for student output were: UP (6 theses); SU (5); UCT (5); North-West University (4); UNISA (3) and UKZN (3). Urban agriculture featured prominently as an area of focus for students.

## Geographical locations of the research

Since one of the key inclusion criteria for the database was that the paper must speak to research conducted in South Africa, all papers could be classified according to some level of geographic location.

Only three papers addressed issues both in South Africa and other countries: Alexander et al.'s (2011) comparison of the contribution of the formal and informal processed food sectors across several countries, Crush&Frayne's (2011b) study of food (in)security across 11 cities in 9 Southern African countries and Kamika et al.'s (2014) comparison of the levels of peanut contamination in Pretoria and Kinshasa.

Sixteen papers addressed issues on a national scale (with seven of these based largely on the same primary data sets). Research based on the StatisticsSA national household survey data comes from Aliber (2009); Labadarios et al. (2011); Steyn and Labadarios (2011); and Steyn et al. (2011). Two papers largely rely on the AFSUN data: Battersby and McLachlan (2013) and Crush and Frayne (2011b). All three papers by Agenbag and colleagues on food safety in the informal milk sector are also national in scope.

Provincially, Gauteng (n=27) and the Western Cape (n=22) are the most dominant locations in the country, unsurprising given their population sizes and the presence of excellent universities. KwaZulu-Natal (n=11), Limpopo (n=5) and Free State (n=4) are other provinces that receive some level of focus, with the less urbanised Eastern Cape (n=2) and Northern Cape (n=1) trailing behind. Mpumalanga is the focus of only one paper, along with villages in Limpopo and KwaZulu-Natal (in the fascinating study by Vorster et al. on the role of traditional leafy vegetables in the food security of rural households (2009)). The North-West province receives no focus, despite being home to North-West University, which produced a large number of theses included in the database (most of which conducted research in the Free State).

The scale of focus within the papers in Gauteng is mostly on a particular population within a single place, usually informal settlements. Most (n=17) focussed on just one informal settlement (e.g. Senoelo 2011; Samuel et al. 2010) or place (e.g. Kamika et al. 2014). Papers that looked across an entire municipal region were limited to the two from Qekwana (Qekwana 2012; Qekwana&Oguttu 2014) on traditional slaughterers in Tswhane and one from Warshawsky (2013) on the role of civil society in food security in greater Johannesburg. Only Taylor's desktop review of the Gauteng Provincial government's response to 2008 food price crisis covered issues at a provincial scale. Among papers that looked across a broader area, du Toit's (2013) thesis used already existing data from the Johannesburg Poverty and Livelihoods Study (De Wet et al. 2008\*). This dataset was based on 1408 respondents across the eight most deprived wards in Johannesburg Metropole (Du Toit 2013).

Du Toit (2013) found that food insecurity was one of the strongest predictors of poor mental health, particularly anxiety and depression. Duvenage's thesis (2010) surveyed over 500 low-income households (three informal settlements and one formal) to gauge which product attributes were most important to them; she concluded that satiety value, affordability and taste were the highest rated, but cautioned that nutritional value should be imposed anyway. Duvenage et al.'s (2010) paper was based on the thesis. Both the papers by Vearey et al. (2010) and Drimie et al. (2013) were based on the same (n=487) households, from the city centre of Johannesburg and a peripheral informal settlement, in order to compare factors like migration, HIV impacts, food security etc. Vearey et al. (2010) found higher food security among the mostly cross border migrants in the inner city, compared to internal migrants on the periphery. Drimie et al. (2013) found low dietary diversity overall, but slightly lower in the informal settlement.

The Western Cape is a much larger province than Gauteng, so it is unsurprising that there were no province-wide studies. Only three studies looked at city-wide issues: Thom and Conradie (2013) – who surveyed customers of three organic online delivery businesses; Chvatal (2010) – with a study of the solid waste policy of the City and its impact on informal salvagers; and Geyer et al. (2011) – who examined the use of land at the urban edge of the city. Only four studies looked at issues outside of Cape Town: five towns in the Breede River Municipality were the subject of an extensive Participatory Action Research project looking at land reform (Andrews et al. 2009); Enkanini informal settlement in Stellenbosch was researched by Mollatt (2014) and Von Der Heyde (2014) and Koornhof (2014) focussed on an informal and a formal low income area near Worcester in her analysis of child nutrition. Similarly to Vearey et al. (2010) in Gauteng, Koornhof (2014) concluded that nutrition and food security in the informal settlement was lower. Most of the rest of the papers focussed on one or two locations, mostly low-income areas of the city; the Cape Flats (mostly Khayelitsha and Phillipi) and Ocean View were the focus of more than one paper in this group.

Very few studies try to link different parts of the country. An exception is du Toit and Neves' (2014) account, based on over a decade of research, of the livelihood strategies of people who live between Alfred Nzo Municipality in the Eastern Cape and Khayelitsha in the Western Cape. This kind of in-depth study provides insights into the links between rural and urban, formal and informal.

## Research Designs

Quantitative designs and methods dominated (n=48), with surveys being one of the most common methods of data collection. Twenty-two papers self-identified as 'qualitative', although a large number of these should perhaps be classified as 'mixed methods', as there was a heavy reliance on quantitative methods of analysis. A few papers relied solely on literature (n=6), e.g. Cole and Bustan 2009; Taylor 2013, with a couple adding some interviews to their literature reviews (Leith 2012; Barlow&Van Dijk 2013).

Only a small selection of the papers in this review used qualitative methods to capture people's opinions and experiences around food and the informal economy. Köhly (2010) used interviews, observation and focus groups with teachers and children to understand how food growing relates to education and ecology. Gibbs et al. (2014) performed interviews and focus group discussions with participants and facilitators of a youth empowerment intervention to understand what challenges were faced during the implementation of the intervention (food featured as point of contention when female participants brought children to sessions and attempted to feed them from the food meant for participants). In a history study, Dunn (2010) used life history interviews to uncover urban farmers' perceptions of urban agriculture in the City of Cape Town, as well as add to the historical record of such activities. Tembo (2009) used interviews, focus groups and observation with 15 urban gardeners to understand their perceptions of the benefits and challenges of urban farming in Cape Town. In the field of psychology, Odendaal (2010) conducted an in-depth psychological analysis of one seven-year old child from an informal settlement in Gauteng; food, and its lack, emerged as the strongest theme from the analysis. In her M Nutrition thesis, Pereira (2014) used focus group discussions and interviews to reveal interesting findings about fruit and vegetable consumption practices and attitudes of Mitchells' Plain residents.

## 4. FINDINGS INTERPRETED FROM CATEGORIES 6–9

### Conceptual findings

As mentioned, categories were created based on the initial literature review, and a level of subjective interpretation was required in order to classify each paper within these categories. The discussion of the results of this categorisation are included here in a different section, in order to make it clear to the reader that they are now entering potentially more contestable terrain. First we present an overview of the different settlement patterns featured in the research sites. This is followed by a breakdown of which food security pillars have received the most research attention. Finally, we discuss the stages of the food value chain covered in the review.

It should be noted that overlaps exist in all conceptual categories, and this presented a significant challenge to us at times in our attempt to apply the categories. Several steps were taken to deal with this difficulty, including breaking down categories that contained divergent disciplinary designs (e.g. the addition of peri-urban to the urban/rural category); and combining sub-categories that spoke to more than one element (e.g. papers that spoke about both production and consumption). Despite these efforts, these conceptual findings still need to be treated not as definitive, but as general indications of present research orientation.



## Settlement patterns

Determining settlement patterns was one of the more challenging aspects of this endeavour given the lack of clarity about definitions and distinctions between urban and rural, and between formal and informal. This is especially difficult in South Africa given the plethora of idiosyncratic geopolitical jurisdictions and arrangements created by apartheid segregation and its meeting with post-apartheid developments and devolution of power: there are rural communal areas under traditional authorities, but these are not static entities; secondary cities and peri-urban towns are rapidly urbanising; formality exists amongst informality and vice versa. As Ndokweni (2012: 64) stated, '[i]n South Africa, there is no agreed definition of what is "urban" and what is "rural", as boundaries have shifted over time and rural areas have evolved into urban areas'. The situation is further complicated by wide-spread circular migration patterns and sustained ties between rural and urban areas, meaning boundaries are often temporal and porous (see du Toit&Neves 2014). To deal with these difficulties, results that failed to describe the areas of study adequately were heuristically evaluated using Google Earth (2015), based on observations of the form and structure of the built environment; looking at density, proximity to cities, infrastructure such as tarred roads, and housing structures.

In the final analysis of this category several papers were removed (national-scale (n=13) and one international-scale), as well as a paper about an urban conservancy (see Brill 2012) leaving (n=77) papers. Urban informal settlements featured most prominently (n=30), while rural informal (n=13) and peri-urban informal (n=13) were equally second. Few results were solely urban formal (n=3), peri-urban formal (n=1), and rural formal (n=1). Odendaal's (2010) psychological assessment of a child in Gauteng province did not reveal whether her location was rural or urban, only divulging that it was informal (n=1). Beyond that the remainder (n=18) had significant overlap between some or other variation of urban, peri-urban and rural, formal and informal. Most of these overlaps came from urban formal and informal (n=7) and urban and peri-urban, informal (n=3). On the face of this, most of the literature appears to focus on urban informality. Most of research results focussed on food security and informal settlements, rather than explicitly the informal economy. Such results were nonetheless retained if they bore relevance to the informal economy. Again, it is likely the case that the necessary use of the term 'informal' in the original search criteria inadvertently resulted in an 'urban' bias.

## Food security pillars

Within the urban food security literature there is a recurrent tendency to pit the two main pillars, 'availability' and 'access', against each other (see Crush&Caesar 2014; Battersby 2011; Crush&Frayne 2011b). There is also a common grievance from urban food security circles (Battersby&McLachlan 2013; Crush&Frayne 2011b; Battersby 2011) that availability gets too much attention, whereas access is neglected. While this criticism is perhaps more squared at policy, the literature in this review demonstrates a fair balance between the three main pillars: with (n=18) looking at 'availability', (n=25<sup>10</sup>) at 'access' and, to our surprise given the above debates, 'utilisation' at (n=20). Another category that was created was for papers that looked at more than one pillar (n=18), with the combination of both 'availability and access' (n=9) being the largest. These 'availability and access' papers tended to offer a more holistic view of food security in urban peripheries and peri-urban areas, and resulted in rich findings (see Faber et al. (2010) on African leafy vegetables; Oldewage-Theron&Slabbert's (2010) in-depth assessment of poverty; and Jackson's (2010) discussion on the role of soft vegetables in a local food system).

While the prominence of access over availability was somewhat unexpected, this cannot be generalised for the entirety of the food security literature in South Africa. As the use of the term

<sup>10</sup> Two of the 25 were based on the same research though (Duvenage's thesis (2010) was written into an article: Duvenage et al. (2010)).

'informal' in the original search terms seems to have skewed the results towards those in an urban setting, it is likely that the contention stated in the previous paragraph remains, and most of the literature are still more prone towards production and availability issues. Another factor that may mitigate our database's greater access than availability focus is related to the fact that categorising papers into the 'availability' category was fairly straightforward, as these papers spoke very clearly to the production stage of the value chain (e.g. urban agriculture). But the 'access' category was a less clear; while some papers dealt explicitly with access (Battersby 2011), others spoke to dietary diversity, for example, which is used as a proxy for nutrition and hence, utilisation. However, dietary diversity is also an indication of people's access to a variety of foods. These are therefore contestable classifications.

Another surprising finding was the predominance in this review of the 'utilisation' pillar. We found it useful to try and distinguish between the three main aspects of utilisation, using Ingram's (2011\*) approach:

1. 'food safety', from the biological sciences, assesses the risk of foodborne contamination and diseases microbiologically;
2. 'nutritional value', mostly from the field of public health, examines the various dietary requirements needed for physical health; and
3. 'social value', entailing social sciences and humanities' perspectives on choices, preferences, cultural and religious significance of food.

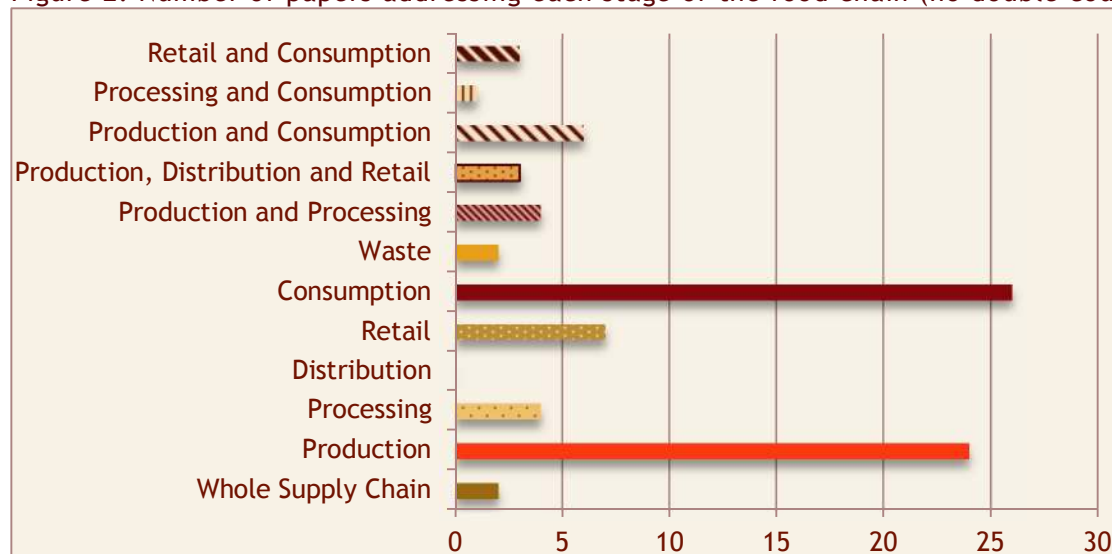
The most pronounced of these was food safety (n=12), while the remainder focussed on nutrition (n=8). None of the resultant papers discussed the social value inherent in utilisation. Perhaps this is to be expected, given that this review focuses on informal sector food security literature, where food safety and nutrition concerns are commonplace.

## 5. STAGE OF THE FOOD VALUE CHAIN

Each paper was assigned to one or more stages of the food value chain where possible (n=82). Only two papers could be classified as looking holistically across a whole value chain (Jackson 2010; Du Preez 2011). No papers looked exclusively at the inputs stage, although some discussions around inputs take place in some of the production-focussed articles. None of the papers had distribution as their main focus, although two papers addressed it along with the production and retail stages (McCrintle et al. 2013; Thom&Conradie 2013). When no papers are double-counted, *Figure 2* results. This shows papers purely focussed on Consumption (n=26) barely outweighing those purely focussed on Production (n=24). Of the 82 papers, 63 were focussed on only one stage of the value chain, 14 papers looked at two stages in combination and just three looked at three stages (Production, Distribution and Retail).

Given the dominance of nutrition among the top authors and journals, it is unsurprising that consumption, which is linked to both access and utilisation, features strongly. The strength of the production focus becomes clearer when one considers the focus on availability. Within the production-focussed papers, the urban agriculture focus among the student researchers is clear, as is a focus on production issues of small-scale farmers. The processing papers were almost exclusively related to food safety issues. The retail-focussed papers looked at livelihoods and food safety associated with informal food vending. The two papers on waste were related to each other: both Masters' theses worked on similar aspects of food waste in the Enkanini informal settlement in Stellenbosch (Von Der Heyde 2014; Mollatt 2014). Papers that dealt with both production and consumption were looking at the role of urban agriculture, small-scale fishers, home food production or indigenous crops on food security (e.g. Selepe&Hendricks 2014; Isaacs 2013; Alusala 2009).

Figure 2: Number of papers addressing each stage of the food chain (no double counting)



## 6. REFLECTIONS ON THE INFORMAL ECONOMY AND FOOD SECURITY

### Introduction

The aim of this section is further interpretation of the literature from the review, in order to reflect on what this body of research has to say about the role of the informal food economy on food security in South Africa. Since so few of the papers obtained from this systematic review design and methods focussed explicitly on the informal economy, there can be no claim to have comprehensively assessed the entire informal food economy in relation to all the dimensions of food security. Still, the results reveal various important insights about this economy, conceptually and materially. This section includes themes that emerged from the papers that did not fit neatly into the preceding categories.

### Defining the informal economy

Conceptually, du Toit and Neves (2014) made an important distinction between the informal *economy* and the informal *sector*; the key distinction being that the former captures the employment status of individual workers and the latter considers only the nature of a business. Under the former conception, nearly half of South Africans work under informal conditions and arrangements (du Toit&Neves 2014). Thus, while South Africa has a large, consolidated formal sector and a relatively small informal sector, based on the quantity and size of its businesses, the narrowness of this conception conceals many millions of vulnerable employees working informally in the ostensibly formal sector. Nevertheless, they argued that the romanticism that surrounds popular discourse about the potential of the informal sector as an engine for growth, employment and poverty alleviation, fails to consider the barriers presented by formal sector dominance.

### The nutrition transition

As shown, nutrition is a major focus of many of the papers and top authors and an overview of the literature's main points is warranted here. A key concern is the nutritional status of poor South Africans living in urban informal settlements, particularly children (e.g. Oldewage-Theron et al. 2011; Selepe&Hendricks 2014). Whereas traditionally the focus may have been on undernutrition, the collated results of this review present a more holistic view of malnutrition (see Faber&Wenhold 2007\*), which includes overnutrition as well: this amid mounting concerns of the impact of the 'nutrition transition' and associated rise in overweight and obesity prevalence in South Africa.

On the question of urban informal food environments, the nutrition transition and changing consumption patterns, several papers stood out. Feeley et al. (2009) found a very high consumption of fast foods from both formal and informal outlets, relative to other high-consumption, high-income population studies, among Sowetan youths involved in a longitudinal cohort study (n=1451). 30% of participants consumed fast foods 5–7 times per week, while a further 20% consumed such foods 2–4 times a week. Prepared meals from informal fast-food outlets were found to be a relatively cheap means of achieving satiety that poor people can generally afford. Steyn and Labadarios (2011) and Steyn et al. (2011), based on a nationally representative sample (n=3287), differentiated between fast foods and street foods. A large percentage of the South African population was found to consume street foods and fast foods, but twice the amount of street food than fast food, and with fruit the most commonly purchased street food item. They also found a high degree of heterogeneity in consumption patterns across socio-economic, geographic and ethnic lines. Employed, middle-income, black, urban informal populations were found to consume the most street-foods; indicating that it is likely not the poorest that frequently consume street foods.

Related to nutrition concerns, a global comparative study found that, on average, people consume more fruit and vegetables than packaged foods, at a ratio of 0.73 (Alexander et al. 2011). However, there is a marked difference across countries: while Indians consume over five times as much fruit and vegetables as packaged foods, people in the United States and United Kingdom consume 3.17 and 2.57 times more packaged foods than fruit and vegetables. As a developing country, South Africa has a surprisingly poor ratio of 1.9 times more packaged food consumed relative to fruits and vegetables (Alexander et al. 2011).

Alexander et al. (2011) also highlighted the importance of the informal food sector: it employs up to 60% of people in some African cities, makes a significant contribution to gross national income and food processing output, as well as a significant portion of total nutrient intake. The authors raised concern that the informal food sector does not meet health and safety standards, and may not be as healthy as formal food producers (and cites research by PepsiCo on snacks sold in South Africa, which found higher food colouring and sodium levels in unbranded foods) (Alexander et al. 2011). They recommend more research on small-and-medium size food enterprises and the informal food sector to better understand how to include them in health promotion efforts (Alexander et al. 2011).

Faber et al. (2010) examined 'African leafy greens' as potentially significant sources of micronutrients missing from many South African diets. They sampled respondents in rural and urban areas, finding that all these vegetables were commonly consumed in all areas, but more so in rural settings. However, production in rural areas was much higher, while in urban settings, it was primarily obtained from the informal market.

Roos et al. (2013) found that small general dealers, spaza shops and street vendors are the main source of food in a low-income community near Worcester in the Western Cape. Geographical access and poor availability of dietary variety were the main limiting factors for food security in their research, not food prices. Spazas offered limited supply of much needed fresh fruit and vegetables and meat but were more expensive than supermarkets in their study.

Dietary diversity, according to the findings in this review, is still a popular tool for assessing nutritional status (Drimie et al. 2013; Labadarios et al. 2011; Oldewage-Theron et al. 2011a; 2011b; Selepe 2010). The advantage of this approach lies in its simplicity. Yet dietary diversity can exist in the absence of nutritional security – i.e. a diverse diet of 'unhealthy' foods may result in a high score (Steyn et al. 2011); however, this was not the case in the papers in this review. Drimie et al. (2013) used the dietary diversity approach to assess the nutritional security of 487 households in Gauteng, and concluded that the nutrition transition is being shaped by the lower cost of many unhealthy

foods, and that the poor cannot afford more nutritious alternatives. Duvenage et al. (2010) also found that satiety and affordability ranked much higher as key factors that low-income consumers use when selecting what food to purchase.

'Dietary intake' evaluations (see Biró et al. 2002\*), which are more complex to administer but equally common, were also found in this review (Napier&Hlambelo 2014; Oldewage-Theron et al. 2011; Pretorius&Silwa 2011; Selepe 2010; Napier et al. 2009; Nyathela 2009). These tended to focus on children's diets, amid growing concern about the extant and shifting nutritional status of the most vulnerable demographic groups.

## Food safety

As already discussed, the number of papers focussed on food safety indicates a large interest in this aspect of the utilisation pillar of food security in the informal economy. Findings from these food safety papers were mixed though. Four papers conclude that food safety is a major issue in:

1. Informal goat slaughtering in Gauteng (based on lack of adherence to the law among the individuals interviewed) (Qekwana&Oguttu 2014; Qekwana 2012).
2. Informal home-based and commercial traditional beer-brewing in informal settlements in Kimberley (with only 30 respondents) (Lues et al. 2011).
3. Peanuts sold by informal traders in the Democratic Republic of Congo and Pretoria (found to have high levels of aflatoxin contamination) (Kamika et al. 2014).

Another five papers imply there may be issues with food safety and that further investigation is required. Three of these five are based on the same interviews with Municipal Health Services staff around the country, enquiring into their ability to adequately police informal milk production (Agenbag&Lues 2009; Agenbag et al. 2009; 2012). Although Agenbag and his co-authors strongly advocate for greater formalisation and regulation of the informal milk sector, warning of the health risks inherent therein, no evidence is provided on the extent of these issues, other than an unreferenced mention of "recent surveys" raising concerns (Agenbag et al. 2009:381). Rodda et al. (2011b) are positive about the potential of grey water re-use to boost home vegetable production in informal settlements, but caution that residents would require education on how to prevent grey water contamination.

Six<sup>11</sup> papers found positive results for food safety standards in the informal food sector, which seemed to surprise some authors. Dalvie et al. (2014) and Naidoo et al. (2013) started from the premise that treated wood used in open fires by street food vendors is a potential public health risk. They then downplayed their finding that there was no significant difference in the levels of exposure to chromium, copper and arsenic from treated wood among informal street food vendors versus non-vendors in Khayelitsha, despite the fact that the street food vendors were exposed for much longer periods of time each day than people cooking at home. McCrindle et al. (2013) were impressed that informal meat sellers in both Pretoria and Pongola were able to produce cooked meat that was safe to eat, despite their initial opinion that conditions at the street stalls were unhygienic. Lastly, in the biggest sample size used in any of the food safety studies, Campbell (2011) found that the 151 street food vendors interviewed in Johannesburg had good knowledge about food safety and hygiene (indeed, almost two-thirds had received some training, most likely from municipal officials).

What this diversity of results may indicate is divergence in food safety in different locations, food groups and economic sub-sectors; indeed, most of the problems seemed to come from the production and processing stages of the informal food chain. Notably this literature does not

<sup>11</sup> Two of the six are from the same set of data.

emerge from food security studies but from the fields of medicine and public health, particularly the microbiology and toxicology fields. Resultantly, its focus is highly specific and fairly narrow.

## What else is known about the informal food economy?

This section contains key points from the very few papers that looked specifically at the informal food economy (that are not already captured elsewhere).

Looking at the processing stage of the informal food economy, Aliber (2009) touched on the major scale of the informal slaughtering economy (processing an estimated 21% of all beef) as well as the scale of livestock distribution through the informal market in South Africa (45% of total livestock). Qekwana and Oguttu (2014) estimated that only 0.5% of the two million goats in South Africa are slaughtered at registered abattoirs, while the rest rely on 'informal' traditional slaughter.

Du Preez (2011) looked across the supply chain of a single commodity – potatoes; justified by potatoes being the most important tuber worldwide, third most consumed crop in the world, and the most important vegetable product in South Africa. In terms of distribution and retail, he noted that the informal sector is the second largest potato buyer (29%) and that it is rapidly growing. Moreover, over half of potatoes from Fresh Produce Markets, the largest buyers, are also purchased by informal traders.

From a livelihood perspective, Nishimwe-Niyimbanira (2013), looking at an informal rural setting in the Free State, found a patriarchal economy that leaves women vulnerable and food insecure, arguing that the informal economy offers a vital lifeline for 72% of the community studied, 55% of whom were female. Thus, '[w]omen's employment opportunities tend to be concentrated in the informal economy and in low value added activities. Policy-makers should acknowledge the importance of the informal sectors of the economy and contribute to improved productivity, working conditions and social protection, while easing and encouraging formalisation and reducing the risks in these sectors.' (Nishimwe-Niyimbanira 2013: 136).

Charman et al. (2012), while not offering a food security lens, looked specifically at the spaza sub-sector of the informal economy, arguing that there is an intra-sectoral consolidation or 'transformation' underway. This is ostensibly driven by 'entrepreneurial' foreigners, mainly from Somalia in their case, and is fast squeezing 'survivalist' South African spaza shops out of existence.

Though lacking an explicit food-focus, Leith (2012) examined the impact of planned versus emergent informal markets in transport interchanges, finding that local government interventions – for all their good will – failed to account for several crucial factors to secure informal livelihoods, chiefly by overlooking the importance of location for ensuring sufficient 'foot traffic'. Leith (2012) thus argued for the need to integrate informal markets into the 'urban fabric'.

## 7. DISCUSSION AND CONCLUSIONS

The key finding from this review is that there is a dearth of literature on the informal food economy in relation to food security. Instead, most of the research looks at food security among informal settlement populations (n=56), particularly those in urban areas (n=30). In terms of food security, most research evaluated issues of food access (n=25) and utilisation (n=20), followed closely by availability (n=18). The most studied stages of the food value chain were consumption (n=26) and production (n=24). Collectively, these foci reveal a (perhaps unsurprising) recognition by a small body of literature that there is a major food insecurity problem in urban informal settlements, primarily conceived as a food access (monetary and geographical) and utilisation (nutrition and food safety)

problem. While it is likely that a rural bias centred on food availability and production exists in the food security policy agenda as some suggest (see Crush&Frayne 2011a\*; Battersby 2012\*), the papers in this review do not support this impression. Again, this must be seen in perspective of this being a specific case, looking not specifically at policy but at literature, and not just at food security but also the informal economy.

The high level of focus on nutrition showed an encouraging recognition of the scourge of the 'nutrition transition', expanding the traditionally narrow notion of food security as undernutrition ('hunger'), towards malnutrition in all its dimensions – including micronutrient deficiencies ('hidden hunger') and overnutrition ('overweight and obesity').

Reliance on the informal economy in urban informal areas across South Africa is high (Steyn&Labadarios 2011). The informal food economy itself is mainly associated with access benefits (see Crush&Frayne 2011b; Battersby 2011) and utilisation (nutrition and safety) concerns (see Qekwana&Oguttu 2014; Kamika et al. 2014; Campbell 2011). Utilisation concerns dominate the literature on the informal economy's contribution to food security, with very little said about the access benefits provided.

However, there are too many gaps in knowledge to permit generalisations and we cannot claim to understand the full contribution of the informal economy to food security across the food value chain for more than a handful of commodities. In particular, while it is known that the informal economy is *de facto* being frequently used as a food access node, the exact nutritional contribution, particularly of prepared foods, and the contribution and risks to changing diets under conditions of a nutrition transition, is poorly understood.

Finally, while governing, managing, policing and controlling the informal food economy for better food security is one option, uncovering the underlying human, social and individual values, agencies, concerns and preferences from 'below' can enable a more constructive dialogue. Such dialogue, of engaging with the social value and preferences of people who provide the food in the informal economy, is almost entirely lacking. This is perhaps the most significant methodological gap found in this review.

## 8. AREAS FOR FURTHER RESEARCH

One of the main aims of this systematic review was to guide future research by uncovering the gaps in our knowledge on food security and the informal food economy. We provide our thoughts on these gaps here.

The findings of this review confirmed Vink's (2012: 167) view that food security research is focussed either on primary production or consumption (by the poor) and that there is a "missing middle" – i.e. a lack of research looking at the food economy beyond the farm and before the household. A typology of the informal food economy and its particular value chains would greatly assist in differentiating and enabling more nuanced understanding of its contributions, risks and opportunities.

The food safety studies were generally found to lack reflexivity regarding the degree to which compliance standards were constructed for the formal food economy, based on stringent food safety controls that are not possible nor, as some of the research showed, entirely necessary in the informal economy (see Maes&Verbist 2012\*). There was little questioning of the possibility of creating less stringent, more contextually viable food safety and hygiene standards. The hitherto narrow focus on 'food safety' presents a possible opportunity for integration and future collaboration between disciplines.

Most of the 'access' studies examined the nutritional status at individual and household scales, ignoring the urban food environment in which people and families are situated and which, arguably, enables the nutrition transition.

No papers explicitly focussed on the social value aspect of utilisation; that is, "the social, religious and cultural functions and benefits food provides" (Ingram 2011\*: 420). Instead, most results (n=46) across the entire review adopted techno-scientific, often quantitative approaches (see Alcock 2009\*). This entailed testing the food itself, conducting surveys, or testing the economic viability of informal businesses. Missing from the literature were human-centric food studies, that view human behaviour not only econometrically or biologically, but as driven by a complex set of heuristics and biases (see Tversky&Kahneman 1974\*), histories and cultures, dreams and aspirations.

Given the limits of the small sample size, it is impossible to generalise from these findings, yet these concerns should at least highlight the need to further investigate the experiences and wishes of traders and incorporate these into evaluations of the informal food economy as well as planned interventions by government and non-governmental sectors (rather than imposing top-down policies). Policies need to take account of the constraints and implications of intervening in this economy not only from an economic perspective, but also from the perspective of food security in its broadest sense, especially the social value dimensions. Conversely, the potentially serious implications for informal food economy livelihoods need to be clear when attempting to apply food safety standards. Participatory, immersive and ethnographic research designs can offer significant insights into these questions, which techno-scientific approaches, while valuable in their own way, cannot.

The review found that a significant knowledge gap exists on the pressing question of sustainability in the informal food economy. Sustainability assessments of various aspects of the informal economy would enable better support of this economy. Again, such assessments need to be done not in isolation from the constraints and desires of traders, but through a cautious and realistic evaluation of their socio-economic realities, against the backdrop of acute resource constraints and environmental degradation.

In an ideal situation, all informal economy research would entail interdisciplinary projects combining the human, natural and social sciences; evaluating the full food security contributions of street-food traders, and linking those with socio-economic and livelihood contributions (size, scope and aspirations). That said, so much about this economy is poorly conceived, assumed or simply unknown at this stage, that simply a greater scope of research approaches and foci would greatly benefit our understanding, whether material or conceptual.



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## APPENDIX A: PAPERS FOCUSED ON FOOD SAFETY ASPECTS OF INFORMAL FOOD

Authors	Year	Title	Publication type	Food safety findings related to informality
<b>PAPERS WITH FOOD SAFETY FOCUS</b>				
Agenbag M., Lues R. & Lues L.	2012	Exploring policy compliance of the South African informal milk-producing segment	Journal of Public Health Policy, 33(2): 230-243.	Seems to be based on same survey as the one below, but focuses here on explaining that milk producers should all have a certificate of compliance, and that selling raw milk is illegal unless the Municipality has special dispensation to allow it from Ministry of Health. This is only granted when the Municipality can show they can control the producers. Extent of raw milk produced and sold by informal sector is not known, but expected to be quite large. Again, no actual figures or descriptions of the hygiene and safety standards of SA's informal milk producers.
Agenbag, M. & Lues, J.F.	2009	Resource management and environmental health service delivery regarding milk hygiene: A South African perspective	British Food Journal, 111(6-7): 539-553.	Interviewed Municipal Health Service managers across the country and determined that they were not adequately performing inspections of informal milk-producers. No mention made that safety of milk from these informal producers has been found to be unsafe though, and no reference to the hygiene and safety standards of the producers.
Agenbag, M., Lues, L. & Lues, J.F.R.	2009	Compliance of local government towards controlling the informal milk-producing sector in South Africa	International Journal of Environmental Health Research, 19(5): 379-388.	Very similar to the above paper, based on same data. In this version, they mention "a number of surveys" that have raised concern about health and safety aspects of milk production in the country. However, no statistics given or further explanation on how the informal milk producers are actually unsafe.
Bauer R., Bekker J.P., Wyk N.v., du Toit C., Dicks L.M.T. & Kossmann J.	2009	Exopolysaccharide production by lactose-hydrolyzing bacteria isolated from traditionally fermented milk	International Journal of Food Microbiology, 131(Mar): 260-264.	No real comment on the safety (or not) of fermented milk from informal milk producers in Stellenbosch.
Dalvie M.A., Africa A. & Naidoo S.	2014	Relationship between firewood usage and urinary Cr, Cu and As in informal areas of Cape Town	South African Medical Journal, 104(1): 61-64.	Used same data as Naidoo et al. (2013). No significant difference between toxicity levels of informal street vendors and residents, despite street vendors' exposure to wood for longer periods of time each day.
Naidoo S., Africa A. & Dalvie M.A.	2013	Exposure to CCA-treated wood amongst food caterers and residents in informal areas of Cape Town	South African Journal of Science, 109(7-8): 1-7.	Used same data as Dalvie, Africa and Naidoo (2014). Findings essentially the same.
Qekwana N.D. & Oguttu J.W.	2014	Assessment of food safety risks associated with preslaughter activities during the traditional slaughter of goats in Gauteng, South Africa	Journal of Food Protection, 77(6): 1031-1037.	Despite finding preslaughter activities were fairly good, the paper focussed on the lack of scientific pre-purchase inspections, poor transport standards, and the lack of animal health certificates and awareness regarding importance thereof. For e.g. 70% of goats were traceable, 30% (mostly from speculators) untraceable. Suggests animal health certificates must be required by law and legislation to be reviewed to address issues raised in study.

Qekwana, D.N.,	2012	Occupational health and food safety risks associated with traditional slaughter practices of goats in Gauteng, South Africa	MMedVet (Hyg.)	Same data used as above, same findings.
Kamika I., Mngqawa P., Rheeder J.P., Teffo S.L. & Katerere D.R.	2014	Mycological and aflatoxin contamination of peanuts sold at markets in Kinshasa, Democratic Republic of Congo, and Pretoria, South Africa	Food Additives & Contaminants: Part B-Surveillance, 7(2): 120-126.	High levels of contamination in DRC and South Africa. Suggest better understanding of value chains key to identify best places to intervene as most peanuts in Pretoria came from Zimbabwe or Botswana. Storage at market may also be to blame.
Bester, L.A.	2013	Antibiotic resistance in the food chain: a case study of <i>Campylobacter</i> spp. in poultry	PhD (Medical biochemistry)	Found much lower antibiotic resistance in rurally (informal) raised chickens than in commercially reared layers and broilers.
McCrinkle, C. M. E., Siegmund-Schultze, M., Heeb, A. W., Zárate, A. V. & Ramrajh, S.	2013	Improving food security and safety through use of edible by-products from wild game	Environment, Development and Sustainability, 15(5): 1245-1257.	Studied formal game harvesting for export and found edible by-products were discarded in the field. Gave samples to street vendors in Pretoria and Pongola and found the vendors were able to produce safe food. In fact, despite hygiene standards for meat being poor at the vendors, none of their regular meat tested positive for any worrisome microbiological factors.
Lues, J.F.R., Ikalafeng, B.K., Maharaso, M., Shale, K., Malebo, N.J. & Pool, E.	2011	Staphylococci and other selected microbiota associated with indigenous traditional beer	African Journal of Microbiology Research, 5(13): 1691-1696.	Presence of certain microbiota near or above infective doses in majority of samples taken. Sampled from 30 informal brewers (home-based and commercial) in the informal settlements around Kimberley.
Campbell, P.T.	2011	Assessing the knowledge, attitudes and practices of street food vendors in the City of Johannesburg regarding food hygiene and safety.	M (Public Health)	Surveyed 151 informal street food vendors in Gauteng. Concluded they had adequate knowledge of how to handle and prepare food safely.
<b>PAPERS WITH INDIRECT FOOD SAFETY IMPLICATIONS</b>				
Vorster, H. J., Van Rensburg, W. S. J., Stevens, J. B., & Steyn, G.J.	2009	The role of traditional leafy vegetables in the food security of rural households in South Africa	Acta Hort. (ISHS) 806: 23-28. Arusha, Tanzania. 31 January.	Did not specifically look at safety issues, but suggested further investigation into storage and preservation methods for these crops as drying outside may expose them to contamination.
Rodda N., Salukazana L., Jackson S.A.F. & Smith M.T.	2011a	Use of domestic grey water for small-scale irrigation of food crops: Effects on plants and soil	Physics and Chemistry of the Earth, 36(14-15): 1051-1062.	Low levels of food safety issues if grey water is applied via bottle directly into soils. Some build-up of salts in soils over time; can be mitigated with rainwater watering periodically.
Rodda, N., Carden, K., Armitage, N. and Du Plessis, H. M.	2011b	Development of guidance for sustainable irrigation use of grey water in gardens and small-scale agriculture in South Africa	Water SA, 37(5), 727-737.	Advocates for grey water use in informal settlements to grow food, but cautions that education will be needed as grey water in informal settlements can co-mingle with other waste streams and present health hazard.