

# **SOUTH AFRICA FOOD AND NUTRITION SECURITY INFORMATION SYSTEMS REVIEW AND CAPACITY ASSESSMENT**

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*LITERATURE REVIEW REPORT FOR THE FAO/DAFF PROJECT  
TCP/SAF/3701 “Supporting the Development and Implementation of the  
Food Security and Nutrition Plan for South Africa”*

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**Prepared by the Human Sciences Research Council (HSRC)**

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## ACRONYMS AND ABBREVIATIONS

BFAP	Bureau for Food and Agricultural Policy
CoCa	Census of Commercial Agriculture
CPI	Consumer Price Index
CSAG	Climate Systems Analysis Group
CSIR	Council for Scientific and Industrial Research
CEC	Crop Estimates Committee
DAFF	Department of Agriculture, Forestry and Fisheries
DBE	Department of Basic Education
DEA	Department of Environmental Affairs
DED	Department of Economic Development
DHIS	District Health Information System
DoH	Department of Health
DSMIS	Drought Status and Management Information System
DSD	Department of Social Development
DST	Department of Science and Technology
DPME	Department of Planning, Monitoring and Evaluation
DWS	Department of Water and Sanitation
FAO	Food and Agriculture Organisation of the United Nations
FEWSNET	Famine Early Warning Systems Network
FNS	Food and Nutrition Security
FNSIMS	Food and Nutrition Security Information Management System
FNSIS	Food and Nutrition Security Information System
HFIAS	Household Food Insecurity Access Scale
ICT	Information, Communication and Technology
IFSS	Integrated Food Security Strategy
INP	Integrated Nutrition Programme
IS	Information Systems
NAMC	National Agricultural Marketing Council
NFNSP	National Food and Nutrition Security Plan
NIDS	National Income Dynamics Study
NIWIS	National Integrated Water Information System

NLiS	Nutrition Landscape Information System
NPFNS	National Policy on Food and Nutrition Security
NSNP	National School Nutrition Programme
PPI	Producer Price Index
RMAA	Red Meat Abattoir Association
RDP	Reconstruction and Development Programme
RRFCF	Regulations Relating to the Fortification of Certain Foodstuffs
SADC	Southern Africa Development Committee
SAGIS	South African Grain Information Services
SANHANES	South African National Health and Nutrition Examination Survey
SARVA	South African Risk and Vulnerability Atlas
SASSA	South Africa Social Security Agency
SASDE	Supply and Demand Estimates Committee
SAVAC	South Africa Vulnerability Assessment Committee
SAWS	South African Weather Services
STATS SA	Statistics South Africa
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
USDA	United States of America's Department of Agriculture
ZVRBF	Zero Vat Rating of Basic Foodstuffs

## EXECUTIVE SUMMARY

This literature review report has been prepared as part of the project commissioned by the Food and Agriculture Organisation of the United Nations (FAO) in collaboration with South Africa's Department of Agriculture, Forestry and Fisheries (DAFF), to define a Food and Nutrition Security information system (FNSIS) to be managed through a digital platform: the FAO/DAFF TCP/SAF/3701 Project "*Supporting the Development and Implementation of the Food Security and Nutrition Plan for South Africa*". The immediate objectives of this report are to analyse administrative information relevant to FNS across different stakeholders, review policy documents and characterise the existing national level FNS information systems. Using literature, the report broadly seeks to (a) explore capacity gaps, needs and capacity development options of FNS-related information systems in South Africa towards the creation of an efficient and effective synchronised multi-level FNSIS and (b) understand the nature and levels of coordination and networking among FNS institutions towards coming up with an institutional architecture that best anchors the planned synchronised multi-level FNSIS.

The main conclusions following from this literature review are as follows:

1. Incorporation of the conceptual principles, frameworks and methodologies from the broad Information Systems field into new advances in FNS metrics is highly uneven across countries, including the dimensions of food and nutrition security that different countries' FNS information systems prioritise
2. There are varied state and non-state actors collecting, analysing and disseminating FNS-related data and information at both the national and subnational levels in South Africa. This data/information, which addresses the four dimensions of food and nutrition security (i.e. availability, access, utilisation and stability) can largely be categorised into one or more of the following FNS-related information systems: agriculture information system, marketing information system, health and nutrition information system, vulnerability assessment information system, and meteorological and hydrological information system.
3. The FNS information/data/indicators being produced by the different actors are largely fit for the purposes of independently monitoring different FNS aspects, especially for the specific institutions. However, the different institutions appear to be working separately at both the national and subnational levels, without conscious data/information sharing and with very little coordination towards implementing FNS objectives. Even within government departments, there is limited sharing of information, resulting in duplication

of efforts. The different players operating within individual FNS-related information systems work in silos, resulting in a fragmented information system that makes it difficult to holistically contribute towards building a composite understanding and effective monitoring of FNS in the country.

4. There are a number of capacity gaps along the FNS information value chain in South Africa. These include lack of standardisation of data/information being collected by different institutions resulting in duplication, omissions and overlaps; different frequencies in similar data/information dissemination which then limits the impact of the information systems vis-à-vis various FNS objectives; data management and data analysis skills gaps in some information systems; and lack of maintenance of/updates on a number of digital platforms on which information is disseminated for most of the information systems.
5. The policy basis for intersectoral coordination among FNS stakeholders in South Africa appears to be strong on paper, with past and current FNS policy documents calling for improved coordination among FNS stakeholders at all levels. However, the implementation aspect of these policy calls has been weak. There have also been concerns around the lack of inclusivity of South Africa's FNS policy formulation process towards incorporating the views and input of non-state actors; as well as issues around rural-bias in the framing of the FNS problem.
6. Given the existence of varied FNS-related information systems and calls for intersectoral coordination among stakeholders in various FNS policy documents over the years, there is a fairly strong foundation for the development of a synchronised multi-level FNSIS anchored on well-coordinated FNS institutional structures in South Africa.

Subsequent recommendations following from the above conclusions towards developing capacities for efficient and effective FNS-related information systems as well the creation of a synchronised multi-level information system are as follows:

1. There should be the development of standardised FNS data/information collection, analysis and management guidelines, processes and/or methodologies across FNS-related information systems, or, at least, within individual information systems, to allow for data interoperability within and across individual information systems.
2. There is need to capacitate officials with information, communication and technology (ICT) skills, and/or hire personnel with ICT skills, to improve data analysis and data management in some FNS-related information systems. Furthermore, institutions should

take on board information users' views and concerns towards disseminating information that is not only specific to user needs but also accessible to targeted users at all levels.

3. There should be concerted efforts towards soliciting the buy in of stakeholders, and improving intersectoral coordination among stakeholders across all FNS-related activities at all administrative levels, as recommended in various past and current FNS policy documents. A starting point towards intersectoral coordination would be the establishment of the proposed national FNS coordinating body – the FNS Council chaired by the Deputy President, and associated committees and forums at the subnational level, as suggested in the 2017 National Food and Nutrition Security Plan.
4. A department with convening powers, which is also well-positioned to mobilise for adequate technical, human and financial resources should drive the FNS intersectoral coordination as well as oversee the envisaged synchronised multi-level FNSIS. This should ideally be the Presidency, or the Department of Planning, Monitoring and Evaluation (DPME), which currently sits in the Presidency.

## 1. INTRODUCTION AND BACKGROUND

This literature review report provides an assessment of the status and nature of food and nutrition security (FNS)-related information systems as well as the FNS institutional architecture in South Africa. The ultimate aim is to identify gaps, needs and capacity development options towards the creation of a synchronised FNS information system (FNSIS) that is supported by robust and well-coordinated multi-level FNS institutional structures<sup>1</sup>. FNS is widely defined as “a situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life” (FAO, 1996). Following the FAO definition, South Africa’s National FNS Policy (2013) defines FNS as "access to and control over the physical, social and economic means to ensure sufficient, safe and nutritious food at all times, for all South Africans, in order to meet the dietary requirements for a healthy life". These definitions indicate that FNS is multi-dimensional, and the four dimensions of FNS commonly identified are food availability, food access, food utilisation and stability. These dimensions are hierarchical, with availability necessary but not sufficient to ensure access, while access is, in turn, necessary but not sufficient for effective utilisation (Barrett, 2010).

The food availability dimension refers to the availability of sufficient quantities of food of appropriate quality, supplied through domestic production, imports or donations. Food access is about households or individuals having adequate resources to acquire, in a socially acceptable manner, appropriate foods for a nutritious diet. The food utilisation pillar speaks to the ability of households to select, store, prepare, distribute and eat food in ways that ensure adequate nutritional absorption for all members of a household. This dimension therefore focuses on how households use the food through adequate diets, clean water, sanitation and health care to reach a state of nutritional well-being where all members’ physiological needs are met. The food stability pillar points to the fact that to be food secure, a population, household or individual must have access to adequate food at all times. They should not risk losing access to food due to sudden shocks (e.g. an economic or climatic crisis) or cyclical events. Accordingly, the content of an effective FSIS should comprise four types of integrated data and information aimed at monitoring:

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<sup>1</sup> A FNSIS consists of people, equipment and procedures to gather, sort, analyse, evaluate, and distribute needed, timely and accurate information on FNS (Ntshepe, 2011).



- *Availability* of food by considering agricultural production, imports, exports and losses of staple foods and animal products
- *Access* to food by considering market information and social indicators such as poverty, food prices, income, unemployment and social protection.
- *Stability* of availability and access through vulnerability, meteorological and hydrological assessments which consider the status of infrastructure and stocks, climate change and extreme weather events
- *Utilization* of food by considering the health and nutrition status of the population

A country's well-functioning FSIS should effectively draw on the following five types of information monitoring systems that link with the four dimensions of food security described above: the agriculture information system; marketing information system; health and nutrition information system, meteorological and hydrological information system and vulnerability assessment information system (cf. Temel, 2011).

It is well documented that whilst South Africa is food secure at the national level, experiences of food and nutrition insecurity at the household and individual levels are immense (Boatema et al, 2018; Pereira and Drimie, 2016, John-Langba, 2015). Whilst the right to food is entrenched in Sections 27, 28 and 35 of the Constitution (Republic of South Africa, 1996), the country currently faces a number of challenges that may worsen its FNS situation. These challenges include population growth, impacts of HIV/AIDS, concerns around climate change and variability, rising poverty and unemployment levels and, subsequently, lack of purchasing power for many, and nutritional concerns stemming from the country's current 'nutrition transition' status whereby undernutrition – particularly stunting and micronutrient deficiencies, is co-existing with rising incidences of overweight and obesity, and the associated consequences such as hypertension, cardiovascular diseases and diabetes (DoH, 2013; Pereira and Drimie, 2016).

South Africa lacks adequate data on key FNS-related aspects which include indices such as changes in stunting prevalence over time and adolescent and adult anthropometry (GoSA, 2017). The country also does not have a synchronised mechanism to track FNS progress, highlight bottlenecks, raise the profile of issues and hold stakeholders to account (ibid). Furthermore, the country does not have a reliable and accurate system to analyse the conditions of the food and nutrition insecure, nor does it have a monitoring and evaluation framework and basis to determine the effect of FNS interventions (Hendricks et al, 2016). This makes the

identification of the causes, extent and cases of hunger and vulnerability, malnutrition and under-nourishment in the country particularly difficult. It also hinders the possibility of developing coherent FNS policy measures and proper evaluation of their results and impacts.

It is against this background that the role of functional FNS-related information systems as well as a robust integrated FNSIS hinged on well-coordinated institutional arrangements at all levels is critical. As FAO (2015) articulates, the scope of a synchronised framework of information for food and nutrition security encompasses the following three aspects:

- a) Ensuring that high quality data, statistics and information are available and easily accessible across sectors for monitoring and analysis of the food and nutrition security of a country
- b) Ensuring that available food and nutrition security data, statistics and information are well analysed and meet the needs of a variety of decision-makers in a timely and credible manner for policy formulation and investment decisions aimed at hunger eradication; and
- c) Strengthening institutional structures for easy exchange and coordination of information and for consensus building and harmonised approaches.

The policy basis for a comprehensive approach to FNS information in South Africa is directly set out in the 2013 National Policy on Food and Nutrition Security (NPFNS) and the 2017 National Food and Nutrition Security Plan (NFNSP). These policy instruments emphasise the availability of good quality and timely information on food and nutrition for policy formulation and for managing food and nutrition security strategies, programmes and interventions. To that end, and as already earlier stated, this literature review report therefore critically engages with issues around the nature of existing FNS information and data collection, analysis, management and dissemination systems in the country, and the status and levels of FNS institutional coordination and integration as well as capacity gaps and needs. The report is organised into five sections. Following this introduction and background is an exploration of frameworks and approaches that have been used for the capacity development of FNS information systems in Africa and internationally using selected country cases in Section 2. This is important for comparative analysis purposes, and for drawing lessons and best practices for South Africa. Section 3 characterises the policy framework within which FNS information systems operate as well as the existing national FNS-related information systems in South Africa, describing the information/data/indicators produced by various institutions and the nature and levels of institutional coordination and data/information integration. Section 4 reviews gaps and needs in South Africa's FNS information collection, analysis, management and dissemination chain

as well as capacity development options for the creation of a comprehensive and integrated FNS information system. Lastly is the conclusion and recommendations section.

## **2. INFORMATION SYSTEMS CONCEPTUAL OVERVIEW**

As a sub-discipline of applied computer science, the Information Systems (IS) field concentrates on maximising the benefits of information and communications technologies for the systematic and smooth handling of information. It concentrates on the use of systematic approaches, principles and techniques in managing information. With the adoption and expansion of IS in business administration, automation of major organisational management processes became more sophisticated and started covering wider ranges of operations and activities of organisations. This trend eventually took off in the state sector too, with e-governance and informatics for public policy monitoring strongly advocated in New Public Management and New Public Governance literatures. The prolific growth of applied information management systems continues, with a Food and Nutrition Security Information Management System (FNSIMS) that is well-integrated across multiple dimensions and sectors being but one example of a wider and well-established trend.

At the cutting edge of IS as a field of knowledge, disputes rage among competing paradigms on underlying theoretical principles and epistemic logics. Mindful of these disputes, our purpose here is not to engage with paradigmatic disputes at the frontier of IS<sup>2</sup>. Our primary concern is not on what sets one school of thought (or tradition of scholarship) apart from another within IS. Instead, the purpose of this exercise is far more modest, motivated by a search for practical solutions to data-intensive policy implementation problems. How should South Africa go about to set up, institutionalise and operationalise mechanisms for managing food and nutrition security information through an integrated digital platform? What options (based on experiences from elsewhere) exist for constructing a Food and Nutrition Security Information Management System (FNSIMS) that is able to integrate diverse sources of data? This feasible solution-driven exercise has a threefold purpose. First, to learn from best practices through a scan of documented examples of informatics (IS applied case studies). Second, to explore how to incorporate and apply the lessons from informatics case studies to food and

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<sup>2</sup> This report applies ‘Information Systems’ in its generic sense, i.e. as a digital framework for data management. It treats the differences between ‘information systems’, ‘information management system’ and ‘information systems management’ as semantic. In contrast to some conceptual perspectives in the IS literature, the report uses these three concepts interchangeably.

nutrition security policy. Third, to consider the capacity building and coordination needs of information management systems that involve multiple stakeholders in policy implementation.

Two sets of attributes characterise any information system. Knowing these attributes is not merely useful to distinguish one informatics framework from another but also to grasp how complex (or simplified) it often becomes in terms of structure and functionality. As a sequence of automated procedures for managing information, one set of attributes entails the digitisation of data collection, processing, utilisation and sharing. In the lexicon of research, this simply automates the reasonably well-known data generation-processing-use cycle (or input-process-output flow chain). This stepwise management of information is a generic attribute with zero-to-minimal variation across customised informatics. The second group of attributes broadly incorporates what information contents the stepwise operations should manage. This set of substantive contents attributes defines the uniqueness of an informatics system. Its fit-for-purpose functionality derives from its substance. Taken together, these defining attributes of information management systems, stepwise procedures combined with substantive contents, are inseparable from the scale and scope at which the informatics system operates. This means that informatics for a single sector is unlikely to be as complex as multi-sectoral systems that integrate diverse data types (metrics, scales, quality, consistency, size, etc.) and, more often than not, must make provision for appropriate coordination networks and functions across multiple role-players.

Systematising the measurement, evaluation and coordination of food and nutrition security interventions increasingly rely on newer (modern state-of-the art) information management tools. A growing body of evidence documents and illustrates the usage of information and communication technologies in different FNS metrics platforms, ranging from climate-related early warning indices to real-time indicators about agro-food supply and demand to nutrition surveillance. However, the incorporation of the conceptual principles, frameworks and methodologies from IS into new advances in FNS metrics is highly uneven across countries and what dimension of food security the information system prioritises.

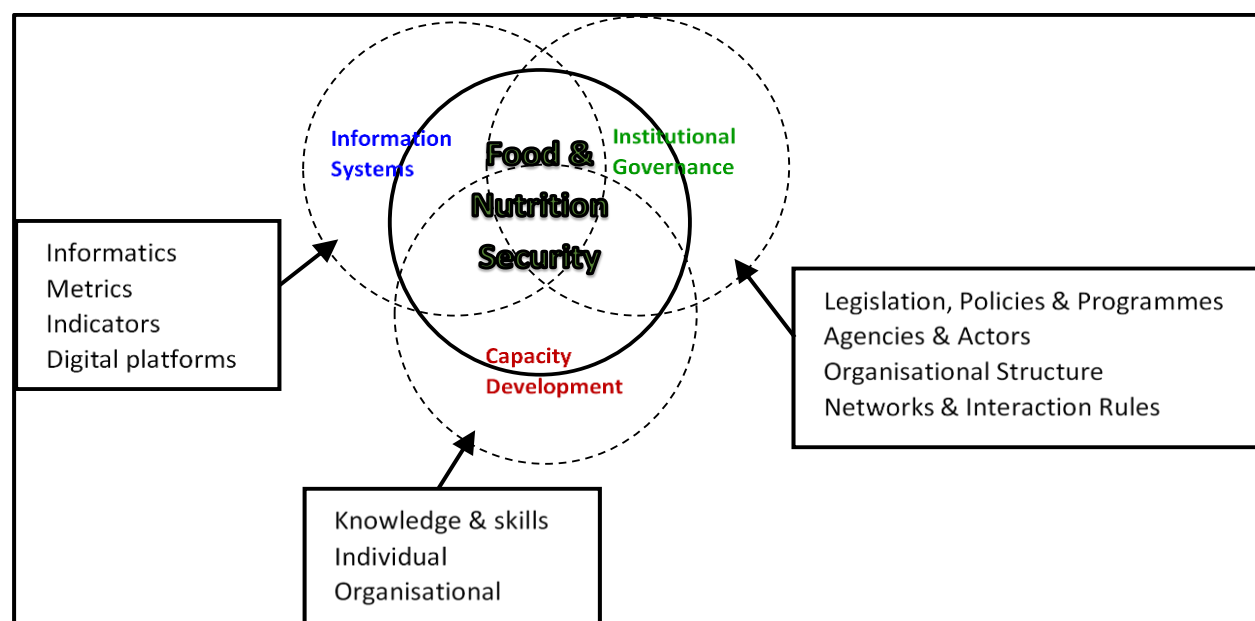
How households and individuals produce or access adequate food to meet their dietary needs is an old and persistent preoccupation of food and nutrition policy thinking and grassroots practice. However, these food availability and access concerns have grown more complex primarily due to rising complexities in the structure and workings of agro-food systems. That said, it is unsurprising that FNS informatics became synonymous with agricultural information

systems, whether emphasising a production or trade orientation. Sometimes these information systems ventured beyond staple crops in their monitoring frameworks to include a diverse range of agro-food commodities. With the emphasis on primary agricultural productivity as well as factors influencing it, especially sufficient rainfall, linkages with weather or climate information systems became essential too. Alongside these old ‘sufficient food supply’ concerns, how people prepare and consume food is inseparable from the policy aspiration for the realisation of the best nutritional, health and quality of life outcomes for all. Nutritional surveillance systems, for instance, often form an integral subsystem of health information systems while being disconnected from systems that track volumes of food produced, purchased (farm gate and retail) and traded in cross-border markets (Tuffrey and Hall 2016).

From the onset, it is logical to align FNS informatics platforms with coherent food and nutrition policies. Embedding FNSIMS in a fitting conceptual frame is both sensible and essential – as depicted in Figure 1 – explicitly defining what informs technical methods and procedures. Advances in the popularity of integrated and dynamic approaches to the conceptualisation and implementation of FNS policy have reached a kind of new benchmark – a promising trend not limited to developing countries. This new thinking in food policy is about ‘a joining up of nutrition, food safety, sustainable food supply and consumption’ with clear social and ecological sustainability dimensions (Barling, Lang and Caraher 2002:p558). Joined-up food policies in Norway and Finland are standout examples of this trend. Barling, Lang and Caraher (2002) apply this approach to trace the evolution of food policy in the UK, revealing its fragmented and weak institutional architecture (particularly the Food Standards Agency) and the need reconfigure the multi-level governance of food.

Figure 1 is a birds-eye view of how basic informatics ingredients intersect with elements of institutional governance and capacity development in the FNS context. This schematic snapshot does not map the detailed mechanisms – micro/meso channels and feedback loops-through which and how these interactions work.

**Figure 1: Schematic overview of FNSIS, capacity development and institutional governance**



Some low-and-middle-income countries have had considerable success in institutionalising and operationalising FNS informatics whereas several comparable countries have been unable to do so. This unevenness is a consequence of wide-ranging factors, especially poor ICT infrastructure, missing or weak capacity of state agencies and adequate external support (from donors and global multilateral agencies). Against the backdrop of these varied experiences and possible determinants, acknowledgement of the importance of information systems to support the implementation of FNS policy has given impetus to growing multilateral support in setting up and operating FNSIMS in developing countries. The WHO and UNICEF, for instance, have been at the forefront surveillance and information systems centred on maternal, infant and young child nutrition in Africa, Asia and Latin America. Each year since 2008, UNICEF has supported around 15 national-level nutrition surveys in West and Central Africa. Demographic and Health Surveys (DHS), for example, remain a primary source for anthropometric data, an essential component of integrated and dynamic FNS approaches, with USAID supporting such surveys in many countries.

Multilateral agencies have also published guidelines, derived from good-practice syntheses, on data collection and processing principles (or data quality criteria) for the generation of reliable information. A case in point is the SMART guidelines developed by UNICEF, constructed through good-practice learning on enhancing rigour in data quality. Small-scale SMART surveys have been conducted in localities in Kenya and South Sudan. At least in the case of

nutrition surveillance systems, these global agencies usually cooperate closely with appropriate government agencies for data collection and processing. However, there is no one-size-fits-all institutional cooperation model as non-governmental actuals and local universities frequently link up with government agencies at a stage of the information management cycle, periodically covering the full cycle.

Data source, types and quality vary considerably as well as the territorial scale of analysis and the roles different actors/agencies play in managing information. Broadly defined, the data could be administrative data, survey data and contextual data. To underscore the importance of contextual data, consider the experiences of the Food Security and Nutrition Surveillance Project (FSNSP) in Bangladesh. This surveillance initiative includes food security as an explicit outcome and it combines administrative and survey data. However, ‘data collection has been expanded to collect data in zones included in programmes of the US government’s global hunger and food security initiative “Feed the Future”’ (Tuffrey and Hall 2016:13).

**Table 1: Characteristics of National Information Systems East and Southern Africa**

Country	SMART Classification	Information Systems Characteristics
Tanzania	National Nutrition Surveys using SMART methods	Existence of Early Warning System (EWS) Government leads NNS and SMART Development/routine context
Kenya	Regional and small-scale Nutrition Surveys using SMART methods	No EWS Humanitarian context or development/routine context Nutrition partners conduct SMART surveys
Malawi	No-to-Little Data from SMART Surveys (regular sub-national surveys 2015 and thereafter)	No EWS Humanitarian context No partners conduct SMART surveys
Mozambique	No-to-Little Data from SMART Surveys (regular sub-national surveys 2015 and thereafter)	No EWS Humanitarian context No partners conduct SMART surveys

*Source: Daher et al (2017)*

### **3. STATUS OF FNS INFORMATION SYSTEMS IN SOUTH AFRICA**

#### **3.1. The policy context**

This section discusses the policy context within which FNS-related information systems in South Africa operate. This is important as FNS policies set the tone for the type of information that is collected and disseminated. The policy context also defines the coordinating structures which regulate information flow and information sharing among different FNS actors.

Since 1994, the FNS policy context in South Africa has reflected recognition of the multisectoral nature of FNS; facilitating the extensive collection and dissemination of information across the four FNS dimensions as spearheaded by different government departments and entities. The 2017 NFNSP notes that South Africa has had almost 60 FNS-related policies, strategies, plans and programmes. For the purposes of this analysis, the formulation of key FNS-related policies in post-apartheid South Africa can be divided into 3 waves (see Appendix 1).

The first wave includes the 1994 Reconstruction and Development Programme (RDP) which identified food security as a basic human need and mainstreamed food security as a priority policy objective, and the Zero Vat Rating of Basic Foodstuffs (ZVRBF) spearheaded by the National Treasury also in 1994. The second wave starts from 2002 to around 2004 and it includes such policies and programmes as the 2002 Integrated Food Security Strategy (IFSS), the 2002 Integrated Nutrition Programme (INP), establishment of the Food Price Monitoring Committee under the National Agricultural Marketing Council in 2003, the 2003 Regulations Relating to the Fortification of Certain Foodstuffs (RRFCF), and the 2004 Social Assistance Act which paved the way for the institution of the existing social grants system which plays a crucial role in alleviating hunger for beneficiaries. The third wave starts from 2009 to date and includes such policies and programmes as the 2009 Zero Hunger Strategy, Outcome 7 (2009), the 2012 National Development Plan Vision 2030, the 2013 Roadmap for Nutrition in South Africa, the Social Relief of Distress Grants (2013), the 2014 NPFNS, and the 2017 NFNSP, among others.

Whilst the country has evidently had a fairly good mix of FNS-related policies over the years, a number of concerns have been raised vis-à-vis these policies with implications for the realisation of robust FNS-related information systems that are hinged on well-coordinated structures. Firstly is the concern that FNS policies have consistently been rural-biased, with



focus disproportionately on food production, and, subsequently, food availability indicators; and with land reform and agriculture receiving more attention than factors/indicators affecting urban informal food security (Boatemaa et al, 2018; Battersby, 2015; McLaren et al, 2015). A second concern is that whilst there have been attempts by government to approach the FNS issue in a coordinated, interdepartmental way, especially and more directly through the 2002 IFSS, the 2014 NPFNS, and the recent 2017 NFNSP; there appears to be lack of political will to actualise this coordinated approach in practice, for example, through the creation of a strategically positioned FNS Unit which can effectively coordinate FNS issues in the country. As a result, individual departments have continued to execute their FNS policy mandates in silos, with little intersectoral coordination of activities and with limited prospects for programmes overseen by different entities to complement each other in planned and structured ways. Until recently – where strong calls have been made in the 2017 NFNSP for the creation of an intersectoral National FNS Council chaired by the Deputy President and associated committees and forums at the subnational level to coordinate FNS issues in the country; the task of coordinating national efforts to address food security has continued to be given to the Department of Agriculture, Forestry and Fisheries (DAFF). Yet DAFF does not have adequate convening powers nor the resources to ensure interdepartmental accountability.

A third concern is that most FNS policies have been formulated and developed by government departments with little or no engagement with other stakeholders. This lack of engagement at policy formulation level sets the tone for continued lack of engagement in other FNS-related activities, such as in FNS data/information collection, analysis, management and dissemination. There are critical challenges therefore with South Africa's FNS policy framework, particularly with respect to the policy formulation process, the framing of the FNS problem, and the implementation of calls for adequate coordinating structures. All this has implications for the existence of robust FNS information systems in the country. It should be noted however that despite the discussed challenges, the policy basis for the creation of an efficient synchronised FNSIS hinged on well-coordinated structures remains fairly strong.

### **3.2. Existing FNS-related information systems**

This section discusses the nature and status of FNS-related information systems in South Africa. We explore the various indicators and information reported across different FNS-related information systems (i.e. meteorological and hydrological information system, agriculture information system, marketing information system, health and nutrition

information system and general vulnerability assessment information system), the institutions involved, and the nature of communication and dissemination structures (see Appendix 2 for a detailed analysis of actors and the FNS information they manage).

### ***3.2.1. Agriculture information system***

The agriculture information system is highly developed in South Africa, with regular production and dissemination of relevant information on crop and livestock production and food balance sheets. The agriculture information system mainly supports the food availability dimension of FNS. DAFF is the key institution that collects and disseminates crop and livestock production data in the country. DAFF is the institution currently mandated with coordinating food security in South Africa. The department acts as the secretariat of the Crop Estimates Committee (CEC), which comprises government and private sector experts in the crop production sector.

The CEC is the main source of crop production estimates in South Africa. It generates monthly data, reporting and forecasting crop area planted and production levels of main summer crops and winter cereals, such as maize, sorghum, wheat, soya beans, barley, sunflower seed, oats, etc. The CEC information is disseminated in the form of monthly word/pdf reports, as well as excel spreadsheets, through various channels such as the websites of DAFF, the National Agricultural Marketing Council (NAMC), the South African Grain Information Services (SAGIS), and Grain SA. The CEC data generation, analysis and dissemination activities are coordinated across the government and private sector institutions.

DAFF's monthly food security bulletin also reports CEC generated crop production data, as well as cereal balance sheets – the supply and demand of cereals; to determine food availability and the quantities to be imported/exported. DAFF also reports livestock numbers quarterly. Further to these, DAFF also keeps administrative data that pertains to production activities undertaken in various interventions/ projects that they implement, which they report on in their annual reports.

Several private/ non-governmental institutions (such as Grain SA, SAGIS, First National Bank (FNB)'s Farmers Weekly, ABSA's Agri Insights, Bureau for Food and Agricultural Policy/BFAP) also disseminate crop data, mainly using the CEC as their main source. The crop and livestock production data is mostly reported in the form of reports (word & pdf) as well as excel spreadsheets. Furthermore, NAMC's SA Supply and Demand Estimates Committee (SASDE) generates monthly reports of the supply and demand of grains and oilseeds,

indicating the mechanisms established by the NAMC to bring about transparency and price stability in the oilseed and grain markets of South Africa and ultimately, food security in the country as a whole. The monthly reports are arranged into supply, demand and stock levels and they cover information on imports, exports and consumption.

Statistics South Africa (Stats SA) conducts a Census of Commercial Agriculture (CoCa), which, though meant to be done after every 5 years, has only been conducted intermittently (i.e. in 1993, 2001, 2008 and 2017) due to lack of funding. The CoCa collects and releases detailed information on crop and livestock production in commercial farms countrywide, including information on the number of farms, land use, farm products, farm size, acreage of major crops, inventory of livestock and poultry etc. The Department of Environmental Affairs (DEA) also used to release metadata reports which provided information on the proportion of land allocated for both commercial and subsistence agriculture countrywide. These reports are however no longer being produced, with the latest version being last updated and produced in 2016.

Among international agencies, the FAO is an important source of crop and livestock information and data. On its land portal and food security indicators link, FAO reports indicators such as average dietary supply adequacy, average value of food production, share of dietary energy supply derived from cereals, roots and tubers, average protein supply, and average supply of protein of animal origin. This information is reported annually, and at the country level. The United States of America's Department of Agriculture (USDA) through its Foreign Agriculture Service also provides estimates on the planted area and production levels for main crops in South Africa, largely mirroring the information produced by the CEC. FAO, USDA and the World Bank also report on information around cereal import dependency ratio, percent of arable land irrigated, value of food imports, domestic food price volatility index, and per capita food production/supply variability.

At the subnational (provincial and district) levels, the agriculture information/data that exists is ad hoc, and is collected by local non-governmental organisations (NGOs) and international UN agencies to guide their local interventions. Provincial governments also have flagship agricultural projects through which information on crop and livestock production is disseminated using such means and platforms as information leaflets, workshops, radio talk shows, regular meetings and newsletters. Universities are also a key source of crop and

livestock production data and information at the subnational level through ad hoc surveys conducted by students in pursuit of their educational qualifications.

### ***3.2.2. Health and nutrition information system***

The health and nutrition information system mainly supports the food utilisation dimension of FNS. The Department of Health (DoH) is the major disseminator of health and nutrition data through its District Health Information System (DHIS). The DoH monitors indicators such as underweight for age incidence (children under 2 years), nutritional supplementation coverage (children under 5 years), incidence of severe acute malnutrition (under 5 years), nutrition status at schools, vitamin A dose coverage (1 – 5 years), food safety, and mortality disease burden at both national and subnational levels. A digital platform called the National Department of Health Data Dictionary (<https://dd.dhmis.org/>) keeps a large volume of these health and nutrition indicators at national, provincial and district levels, and they are updated monthly. Garrib et al (2008) provide a detailed outline of DHIS' data collection process. The data is collected at facility level as services are offered, through periodic clinic surveys, paper-based system of registers, tally sheets, and monthly data collation forms. The collated data are sent monthly to the sub-district or district level where they are uploaded onto computers using DHIS software, then analysed, and a report is submitted to district, provincial and national health departments. Mechanisms for feedback and data quality check exist (ibid). The DHIS digital platform allows selected information to be downloaded as pdfs, excel, and CSV formats.

The Department of Basic Education (DBE) also contributes to health and nutrition information in South Africa. Through its National School Nutrition Programme (NSNP), the DBE provides annual reports on the total number of learners fed, number of feeding days, and the total number of vegetable gardens. The reports are published annually at the provincial level, with the aim of reflecting on the general performance of the NSNP.

Regular surveys such as Stats SA's Living Conditions Survey also collect anthropometric indicators. The National Income Dynamics Study (NIDS) data, which is repeated every two years, as well as the South African National Health and Nutrition Examination Survey (SANHANES), only done once in 2012 so far, and the Demographic Health Survey (conducted 3 times so far in 1998, 2003 and 2016) are also important sources of data on anthropometric measures. DAFF also reports on key anthropometric indicators through the South Africa Vulnerability Assessment Committee (SAVAC), while the Department of Planning, Monitoring and Evaluation (DPME) reports one nutrition indicator generated through the

NIDS data. International organisations such as the World Health Organisation through its Nutrition Landscape Information System (NLIS), UNICEF and FAO also report on key health and nutrition indicators for South Africa, compiling these indicators from various sources.

### ***3.2.3. Meteorological and hydrological information system***

The meteorological and hydrological information system mainly contributes to the food stability dimension of FNS as it helps with reporting on indicators that are critical in understanding whether food availability and access levels will be consistent over time. The South African Weather Services (SAWS) is the main entity mandated with reporting on weather and climate information in the country. SAWS reports on weather forecasts as well as severe weather conditions (e.g. droughts, floods, strong winds, thunderstorms, hail, veld fires, etc.) which may lead to disruptive or disastrous conditions, thus affecting human life (loss of life) or cause loss of crops, livestock, and livelihood assets.

On the other hand, the Department of Water and Sanitation (DWS) hosts and manages the National Integrated Water Information System (NIWIS) (<http://niwis.dws.gov.za/niwis2/>), which provides information that facilitates efficient analysis and reporting across the water value chain in South Africa. The climate change dashboard of the NIWIS reports on climate change indicators including changes in temperature, wet spells, dry spells, irrigation demand, potential evaporation, mean annual precipitation and streamflow. The NIWIS also includes a Drought Status and Management information system (DSMIS) dashboard, designed to provide regular overview and outlook of the drought status in South Africa. The DSMIS dashboard currently integrates rainfall, river flow, dam level and groundwater level data as the main indicators for generating drought status information. Additionally, the DSMIS shows which settlements will be affected by drought across the country's nine provinces.

DAFF, NAMC and private players such as Agri SA, and FNB's Farmers Weekly also disseminate regular climate information generated by SAWS to agricultural producers to facilitate decision making and adequate responses/appropriate coping strategies. Information on impending natural disasters is also disseminated through various media, such as newspapers, television and radio. The Climate Systems Analysis Group (CSAG) based at the University of Cape Town is also an important source of particularly medium to long term climate data in the country. CSAG operates one of the few empirical downscaled models used for the whole of Africa, which simulates responses to global climate change at several meteorological station locations across the continent (Ziervogel and Zermoglio, 2009). USAID's FEWS NET (Famine

Early Warning Systems Network) also provides regular data and updates on agro-climate and weather hazards covering the Southern Africa region.

#### ***3.2.4. Marketing information system***

The marketing information system mainly contributes to supporting the food access dimension of FNS as it deals with where and how people get food, and the kinds of food people are able to obtain. The NAMC is the key source of crop and livestock marketing data and information in the country. It regularly monitors overall food inflation, reports monthly price trends of various agricultural inputs as well as food items for rural and urban areas. DAFF hosts and manages the Marketing Information System digital platform (<http://webapps.daff.gov.za/amis>) where relevant national and provincial marketing information (e.g. grading standards, current market prices, price trends and marketing opportunities) of different horticulture products, field crops and livestock is released. DAFF's monthly food security bulletin also reports the producer price index (PPI) and the consumer price index (CPI).

Private players such as the Red Meat Abattoir Association (RMAA), Agrimark Trends (Pty) Ltd, SAGIS, FNB's Farmers Weekly and ABSA's Agri Insights also release their own weekly, monthly and annual crop and livestock marketing information at both the national and provincial levels.

#### ***3.2.5. Vulnerability assessment information system***

The general vulnerability assessment information system contributes to supporting all the four dimensions of FNS as they release data on broad issues around household poverty and hunger levels, the nature and status of infrastructure and basic services at the national level and in different localities in the country, expenditure levels, coping strategies as well as access to social protection measures.

The national statistical agency (Stats SA) is a key source of vulnerability data and information at both the national and subnational levels. Through its various surveys, Stats SA provides data on access to infrastructure and basic services, such as roads, rail, water and sanitation; food consumption/expenditure levels as well as perception-based food access. The main national surveys by Stats SA (such as the General Household Survey, Living Conditions Survey, Community Survey) report data on hunger experiences using adapted versions of the Household Food Insecurity Access Scale (HFIAS), as well as food consumption and expenditure. The Income and Expenditure Survey, also by Stats SA, provides food expenditure

data that is used to indicate food poverty levels, and informs the updating of the CPI basket used to track and monitor inflation levels.

Various government departments are also involved in the production and dissemination of important vulnerability information. DAFF coordinates the SAVAC, which produces yearly reports on food and nutrition as well as food insecurity and vulnerability. SAVAC also provides early warning information about the food insecurity and vulnerability of certain populations, especially rural inhabitants, due to extreme weather conditions or natural disasters. This information is shared in government, as well as annually to the Southern Africa Development Committee (SADC). The Department of Social Development (DSD), through the South Africa Social Security Agency (SASSA), produces quarterly reports on the numbers of beneficiaries of different social grants at the provincial level. Social grants are the main source of money to buy food for most poor households. DSD also reports on the amount of food parcels awarded to poor households, as well as community gardens supported by the department.

The Department of Economic Development (DED), as well as the Department of National Treasury, track and monitor key financial and economic data important in determining the country's economic performance. Included in this data are relevant vulnerability assessment variables related to FNS such as inflation, employment levels and employment growth (i.e. number of new jobs added to the economy), youth and women employment, and income (GDP) growth. The DPME reports annual development indicators at the national and provincial levels, which include relevant vulnerability-related FNS indicators such as levels of income per capita, inflation, poverty indices, access to social grants, roads, water, electricity and sanitation. DPME disseminates these in the form of a yearly report and excel spreadsheets. Additionally, DPME provides ad hoc case study evaluations of different government interventions aimed at improving access to food, infrastructure and services.

The Department of Science and Technology (DST) in conjunction with the Council for Scientific and Industrial Research (CSIR) runs the South African Risk and Vulnerability Atlas (SARVA) digital platform, which aims at providing decision makers at the national and subnational levels with information on the impacts of and risks associated with global change. The platform provides access to and visualisation of data dealing with the impacts of global change on human and natural environments through selected themes which include climate change, agriculture and forestry. The SARVA platform also provides detailed information on the geographical distribution of population and economic activity across the country. Through

advanced spatial analyses, such information sets as population growth, migration trends and population densities are then used to quantify South Africa's socio-economic patterns and multi-stressor areas (Van Huyssteen et al, 2013). All the information and analyses are available through the SARVA portal (<http://sarva2.dirisa.org/>), a hard copy atlas, series of newsletters and structured series of seminars and capacity building workshops throughout the country (ibid).

Universities and research councils in the country also collect ad hoc vulnerability-related information at both the national and subnational levels through postgraduate student researches as well as commissioned studies, and the information/data is disseminated through student theses, institutional websites, project reports and seminar series.

### **3.3. Coordination and integration**

#### ***3.3.1. Institutional coordination, networking and partnerships***

As shown in the preceding section, the institutional architecture of FNS-related information systems in South Africa involves a complex web of public, private, international organisation and academic actors who collect and disseminate information and data at both the national and subnational levels. This is expected as addressing food and nutrition insecurity requires a multi-sectoral approach and efforts from different stakeholders. Coordination, networking and partnerships between those stakeholders is however critical for the purposes of coherence, in this case, in as far as data and information collection, analysis, management and dissemination is concerned. This has ultimate implications for improved data and information quality and quantity. Whilst there appears to be some level of coordination among institutions collecting some similar types of FNS information e.g. the CEC platform in the case of agriculture information; this does not seem to be widespread in and across other information systems. For example, there seems to be no systematic way of information sharing across different stakeholders in all FNS-related information systems, with information in the majority of the discussed information systems only being shared in an ad hoc manner.

This lack of coordination and networking is explicitly acknowledged in the NFNSP (GoSA, 2017), which states that one of the biggest game changers in as far as FNS in the country is concerned will be the institution of processes that guide the coordination of actions among different stakeholders and the monitoring of progress vis-à-vis FNS. It is also acknowledged that there is currently no coordinating body above line ministries, which can hold line ministries accountable in delivering their FNS mandates as well as ensuring private sector, experts and



civil society organisation participation. To that end, the Plan suggests the establishment of a National FNS Council chaired by the Deputy President, and associated committees and forums, whose immediate task will be to review the activities of various FNS stakeholders and to come up with guidelines for the integration of these activities, as well as the integration of related policies and programmes to achieve coherence (ibid).

Besides the recent 2017 NFNSP document, previous FNS-related policy documents such as the 2002 Integrated Food Security Strategy (IFSS), the 2012 National Development Plan (NDP: Vision 2030) and the 2013 National Policy on Food and Nutrition Security (NPFNS) have all called for improved coordination and partnerships among different FNS stakeholders in all aspects of their work. These policy documents mainly indicate that coordination mechanisms should be instituted at two levels, i.e. between different government departments/sectors, and between government and non-governmental stakeholders. Coordination, networking and partnership mechanisms and platforms suggested in these policy documents include the establishment of committees and councils as well as the organisation of indabas, regular meetings and working groups. It is clear therefore that whilst the need for and importance of coordination, networking and partnerships among different FNS stakeholders is recognised, action towards the actualisation of these coordination activities on the ground is limited.

### ***3.3.2. Data harmonisation and integration***

As will be discussed in detail in the next section on capacity needs and development, the different actors involved in the various FNS-related information systems use their different preferred methods and processes of data and information collection, aggregation, and analysis resulting in significant variations in the content, quality, quantity and frequency of dissemination of the data and information collected (Misselhorn and Hendriks, 2017). Institutions manage their own different data sets and there is no conscious effort to integrate data and information within and across different FNS-related information systems. In essence, there appears to be no standard data and information collection, analysis, management and dissemination guidelines, processes and methodologies which, in turn, makes data harmonisation and integration difficult. This is partly a direct result of the lack of strong institutional coordination, networking and partnership arrangements among FNS stakeholders as already discussed. Furthermore, the lack of data and information harmonisation at both the national and subnational levels has resulted in the lack of a holistic picture of food and nutrition security conditions in the country.

## **4. CAPACITY NEEDS AND DEVELOPMENT**

This section aims at providing a general assessment of FNS stakeholder capacities in the country in terms of gaps and constraints in information collection, management, analysis and dissemination, as well as options for capacity development towards an integrated FNS information system. A capacity assessment aims at providing a clear picture of a system, sector or country's capacity in terms of strengths, weaknesses and opportunities (FAO, 2015). Whilst analysis is guided broadly by FAO's approach to capacity assessment, which seeks to explore capacities across the three dimensions of individuals, institutions/organisations and the enabling environment, review in this instance is limited to *general* capacity needs and options for capacity development towards a comprehensive and integrated FNS information system as highlighted in literature. The review looks at gaps and needs within different FNS-related information systems towards understanding what is required for functional individual information systems and a robust integrated system. Comprehensive capacity assessment across the three FAO dimensions will be concretised through key informant interviews and stakeholder workshops in the next phase of the project.

### **4.1. Capacity gaps and needs**

#### ***4.1.1. Data/information collection***

In terms of FNS data collection across institutions and types of information, the first major gap appears to be the lack of standardisation of information being collected by different institutions at all administrative levels (i.e. national, provincial and district). This is partly because there is currently no official measure of food and nutrition insecurity in the country. This has resulted in different institutions reporting on different indicators among various indicators currently used for FNS analysis and monitoring. Looking at the vulnerability assessment information system for example, there is a collection of a large number of vulnerability indicators by different actors at all administrative levels, some of which are often poorly selected and not sensitive enough to track changes in service delivery and coverage. A second related capacity gap vis-à-vis data collection relates to differences in frequencies of data collection among various institutions across all types of FNS information, with some collecting data/information on an ad hoc basis, others monthly, quarterly, bi-annually and/or annually. In the case of the agriculture information system for example, this has subsequently led to poor alignment between measurements of food and nutrition security processes, key indicators, and integrated FNS objectives and goals. The uncoordinated collection of information by different FNS

stakeholders has also led to inadequate data on some FNS components as well as duplication and overlaps in other components. For example, in as far as agriculture information is concerned, there has been a bias towards the collection of crop information and less on livestock information especially at subnational levels (Ntshephe, 2011, Musemwa et al, 2010). There also appears to be gaps in nutrition data for health and nutrition information, especially for information collected by institutions other than the Department of Health.

#### ***4.1.2. Data/information analysis and management***

With regards to data/information analysis and management; firstly, the formats of information shared by some institutions reflected, to some extent, clear gaps in data analysis skills. This relates mainly to hydrological and meteorological information where, in some instances, raw data has been shared as is without simplifying the data/information in layman's language and for non-technical recipients (Archer et al, 2007). For meteorological information for example – which is critical for extreme weather events early warning as well as fluctuations in average rainfall and temperature patterns, there seems to be limited technical capacity to downscale seasonal forecasts to local levels to support local decision-making.

Garib et al (2008) also note that a severe shortage of health informatics skills needed to provide the necessary support, feedback and training in information utilisation has been reported within the DoH's District Health Information System. In as far as data management is concerned, the main gap noted in literature is the lack of standardised data management processes for similar data/information across different institutions and across all types of FNS information, which has resulted in varied quality of the FNS information that is being disseminated by different players (cf. Marais, 2017).

#### ***4.1.3. Information dissemination***

Information has value when it is disseminated in such a way that targeted end-users are reached and get maximum benefit in applying its content (Weiss et al, 2000). A number of gaps came up in literature with respect to FNS information dissemination in South Africa. The first gap involves coverage. Coetzee et al (2005), for example, noted that most agricultural marketing information is released mainly at the national level by both state and non-state actors, with inadequate information being released at subnational levels, especially at district level. Furthermore, some of the limited marketing information released at the subnational level is inaccessible to poor communal farmers as it requires one to be a member of organisations releasing the information to be able to access it, or alternatively some fee payment before

accessing if one is not a member. A typical example is the one noted by Ntshepe (2011), who highlighted the case of the South African Red Meat Abattoir Association distributing weekly sales information in each abattoir to its members only, with any other person being charged around R60.00 per week for this information then, which, for most smallholder farmers, was not affordable.

The focus of CEC generated information also seems to be on commercial farming output at the country and provincial levels, and not at local levels. Data and information released by such international organisations as FAO are also at the country level, limiting its usefulness for regular monitoring of FNS at subnational levels. Information released by such players as academic institutions is often based on small samples and not representative of localities even at the subnational levels. For health and nutrition information, while the DoH collects and updates monthly relevant health and nutrition indicators, this seems to be only disseminated within the DoH.

A second gap noted was that effective dissemination of some FNS-related information, particularly weather and climate information, is hampered by language challenges (Vincent et al, 2016; Vogel, 2000). Information is not being fully translated into all of South Africa's 11 official languages resulting in limited uptake in some areas. Still on climate and weather information, another clear gap noted is that this information is typically disseminated using such vague terms as 'normal', 'average', 'above average' – with large uncertainties in predictions, which compromises the usability of the information especially at the local level (Vincent et al, 2016). A third major gap with respect to FNS information dissemination is the lack of maintenance of a number of digital platforms on which some important FNS information is released. For example, the SARVA digital platform seems not to be up to date, whilst some information on the agricultural marketing information system digital platform maintained by DAFF has not been updated for some time<sup>3</sup>.

#### ***4.1.4. The overarching coordination and integration gap***

Coordination and integration across the FNS information value chain (i.e. information collection, analysis, management and dissemination) appears to be the most significant gap (cf. Boatemaa et al, 2018; DAFF, 2013). In so far as information collection is concerned, and as

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<sup>3</sup> E.g. trade-related information was last uploaded/released in 2011, relevant information from the majority of the country's provinces last uploaded/released in 2016, and the grain market early warning report last released in February 2018

already discussed in section 4.1.1, the lack of coordination is mainly reflected in the lack of standardisation of information being collected resulting, in some cases, in a large number of poorly targeted and poorly streamlined indicators. Lack of coordination among FNS stakeholders is also the major reason for the different frequencies in collection and dissemination of similar types of FNS information as already discussed. The lack of standardised procedures in the collation and management of FNS data controlled by different state and non-state institutions is also a reflection of serious lack of coordination. There is ultimately no conscious triangulation and integration of data/information that is being collected by different stakeholders which results in varied quality of information that is being disseminated since data management has a direct bearing on the resultant quality of information produced.

The lack of coordination and convergence among different state and non-state actors vis-à-vis FNS information collection, analysis, management and dissemination ultimately affects the validity and reliability of the information that is being shared. Problems around resource mobilisation to improve processes along the FNS information value chain, clarity of mandates among different FNS stakeholders and functionality of some information dissemination platforms may all be effectively addressed through planned stakeholder coordination and data/information harmonisation. Drimie (2015) suggests that the coordination gap probably betrays a more serious issue of the lack of political will or impetus to effectively address food and nutrition insecurity as a political priority.

## **4.2. Capacity development**

Options for FNS-related information systems capacity development in South Africa discussed in this section revolves around three aspects. These are (a) intersectoral coordination – which speaks mainly to capacity development aspects at the institutional and enabling environment levels when linked with FAO’s 3 dimension capacity assessment approach (b) training and/or hiring personnel with relevant skills towards effective data/information collection, analysis, management and dissemination – which links with FAO’s individual level capacity development aspects and (c) seriously considering the demand side of some of the information being disseminated towards improving access to and uptake of the information.

### ***4.2.1 Intersectoral coordination***

The first main recommendation for developing the capacities of FNS information systems across the information collection, analysis, management and dissemination chain is the creation

of intersectoral coordination mechanisms involving both state and non-state actors in all those activities. As the RFSAN (2016) notes, whilst pluralistic means of data/information collection, analysis, management and dissemination may exist, a coordinated approach should be designed to enable:

- a) the streamlining and standardisation of indicators/information being collected thereby avoiding missing important data/information across different types of FNS information and duplication of efforts by multiple stakeholders, and
- b) the standardisation of methods of data/information analysis and rationalising the frequency of information dissemination coming from different institutions to increase the impact of released information e.g. vis-à-vis policy formulation and policy reviews

A coordinated approach to data/information collection, analysis, management and dissemination will therefore ensure consistency in good quality data/information as well as improved impact of disseminated information. Key areas of coordination between and among state and non-state actors across different types of FNS-related information systems may include joint data/information assessments and analysis, increased convergence of data/information collection, management and dissemination activities through joint planning and programming and reciprocal accessibility to data across sectors and institutions with an objective to make relevant analysis replicable at both the national and subnational levels.

#### ***4.2.2. Enskilling and hiring relevant skilled personnel***

A second major recommendation for FNS-related information systems capacity development is advanced training and hiring of personnel with critical skills required for effective FNS data/information collection, analysis and management (Marais, 2017; FAO, 2010; Archer, 2007). For such information as meteorological information, marketing, and agricultural information, a basic starting point, especially at the subnational level, would be to train agricultural extension officers in effectively collecting such information. These are the technical people who work closely with communities and who are therefore best placed not only to assist with collecting very fine and accurate data and information particularly at the district level, but also to advise those who analyse the information, on proper formats which would be most effective for uptake and use at the local level (Zuma-Netshiukhwi and Stigter, 2016). Yet, currently, extension officers do not play a significant role in the collection and dissemination of early warning information beyond that which has to do with crop and livestock production (Department of Environmental Affairs, n.d).

As highlighted in the previous section on capacity needs, the unusable formats of some FNS-related information shared by some institutions is a clear indication of a skills gap in data analysis. Hiring skilled personnel or adequately equipping available personnel with data analysis skills for those working with such highly technical information as meteorological and hydrological information would be an effective capacity development tool towards building and maintaining an effective FNS information system. In the case of meteorological information for example, there is need for personnel with advanced technical capacity and knowhow of not only downloading seasonal and medium-term forecasts to local levels, but also of integrating local meteorological knowledge and practices with scientific information so as to strengthen information quality and uptake at the local level.

The non-functionality of digital platforms of FNS related information in some government departments particularly is also partly a reflection of lack of technical skills to manage and maintain those digital platforms (among other reasons). The availing of personnel with advanced information and communication technology skills will therefore be critical in the development and maintenance of functional digital platforms within the different FNS-related information systems.

#### ***4.2.3. Working on the demand side information to improve access and uptake***

Disseminating FNS information that is not only specific to particular user needs but also accessible to targeted users, be they at national or subnational levels, will increase the relevance and impact of the released information. The main users of FNS information are government departments at both the national and subnational levels for policy formulation, monitoring and review; non-governmental organisations in their programmatic activities mainly at subnational levels; and ordinary citizens for their livelihoods. Improvements are required in the way some FNS information e.g. meteorological and hydrological information, is packaged and delivered particularly to non-technical people. User views and concerns on information released have to be considered and taken on board within the entire information value chain. To that end, regular stakeholder meetings at both the national and subnational levels may be useful platforms for establishing FNS information user views and concerns, and how the concerns may be addressed. The National FNS Council and associated committees at the subnational level suggested in the 2017 NFNSP may act as conveners of these regular meetings. Furthermore, to be able to adequately address the demand side of information being released, the development of a communication strategy is essential for all types of FNS-related information systems

(Economic Commission for Africa, 2011). A typical communication strategy should involve six basic steps i.e. identifying and analysing the audiences or users of the information, defining communication objectives, deciding on the formats of the messages to be conveyed to the users, selecting the channels of communication to use, creating a communication work plan, and evaluating communication activities (ibid).

***Textbox 1: Innovation Capabilities for Equitable Socioeconomic Transformation***

The implementation of food and nutrition policy has a lot in common with state-driven provision of basic social services through local, provincial or national spheres of government. A question that cuts across these domains is suggestive of this commonality: Are public agencies who are responsible for service delivery able to execute this mandate? Do the implementers of public policies have appropriate capacities to implement policies and programmes? Delivering water, energy, sanitation, education, health and various administrative services, for instance, are basic public services that are vital for human wellbeing. Both the mode of supplying these essential services and the intended quality-of-life improvements (outcomes) are comparable with how food and nutrition programmes work in practice, with emphases on information managing systems vital for policy actions and building capacities for doing so.

One example with comparable insights is a tool that the HSRC designed and pilot tested. This tool, known as the Municipal Innovation Maturity Index (MIMI), has as its main goal the strengthening of capabilities of municipalities with the mandate to deliver innovative basic services to local residents. A brief description of the underlying conceptual framework and methodology should illustrate why MIMI holds valuable lessons for the FNSIMS.

Conceptually, the innovation maturity index rests on the idea of innovation capabilities, using an open-ended definition of innovation premised on the knowledge and ability to find new ways of doing things better. Organisations and people within them learn and apply learning in various ways. From this basic proposition of learning for and through innovation, key questions arise: How do actors, through interactive and self-reflective learning, arrive at and use new and creative solutions to societal problems? What are the feedback loops and channels between organisational and individual learning? How do forces beyond the direct control of organisations and individuals (i.e. external institutional governance) affect their innovation capabilities and the societal outcomes?

The methodology operationalises this innovation capabilities framework into an information collection, processing, reporting, sharing and use tool. In addition to these information management steps, three axes define this methodology. A maturity scale serves as a crosscutting axis. It is adapted to each item in the questionnaire, with responses ranked from limited innovation capabilities to transformative capabilities with a strong orientation towards knowledge exploration, sharing and testing beyond the immediate context. The other two axes group items in the questionnaire around two 'units of observation and analysis': organisational and individual. Each of these units of observation consist of a two constructs, a composite variable made up of a coherent set of items. This enables the calculation of an average index score per construct, or at a higher level of aggregation, a score for the innovation capability of an organisation or individuals.

A strong user-oriented approach guides the processing, analysis and utilisation of collected maturity index information. Here the overriding aim is to distil quantitative information into meaningful indicators for innovation-



driven decisions and action. This objective also governs the different ways in which researchers share information with municipal officials and other stakeholders, including the DST. It includes the translation of major insights from detailed and lengthy research (or assessment) reports or publications aimed at the scientific community into actionable policy briefs. With digitisation, an appropriate web-based platform should improve access to this information.

Information sharing also occurs through learning forums, an integral element of this blended methodology. Learning forums are highly interactive platforms to share and reflect on innovation capability indicators. In this discussion forum, diverse practitioners that provide basic municipal services exchange experiences in groups of varied sizes with researchers serving as facilitators. Grounded in principles of participatory action research, it helps upgrade innovation capabilities for socioeconomic transformation.

*Note: Researchers at HSRC, UKZN and SALGA are developing a digital platform of this innovation maturity index for public service delivery. The vision is that with digitisation, the scope of its applicability can expand to a wider sphere of municipal services, including housing and ecological services.*

## 5. CONCLUSIONS AND RECOMMENDATIONS

This literature review report set out to explore the FNS institutional architecture as well as capacity gaps, needs and capacity development options vis-à-vis FNS-related information systems in South Africa. The report also reviewed FNS-related information systems in selected African countries and internationally for the purposes of drawing best practices and lessons for South Africa. The main message emerging from this literature review is that whilst many state and non-state actors are involved in the collection, analysis, management and dissemination of FNS information in the country, their activities are not well-coordinated and the data/information emerging is not harmonised for maximum impact. This lack of coordination has led to a number of challenges along the entire FNS information chain such as duplication and gaps in the data collected, lack of standardisation in data analysis and data management methods and practices resulting in differences in quality of information released as well as differences in frequencies of information dissemination even for similar types of information.

In essence, the following observations were made with respect to the FNS institutional architecture and FNS-related information systems in South Africa:

1. Incorporation of the conceptual principles, frameworks and methodologies from the broad Information Systems field into new advances in FNS metrics is highly uneven across countries, including the dimensions of food and nutrition security that different countries' FNS information systems prioritise.

2. There are varied state and non-state actors collecting, analysing and disseminating FNS-related data and information at both the national and subnational levels in South Africa. This data/information, which addresses the four dimensions of food and nutrition security (i.e. availability, access, utilisation and stability) can largely be categorised into one or more of the following FNS-related information systems: the agriculture information system, marketing information system, health and nutrition information system, vulnerability assessment information system, and meteorological and hydrological information system.
3. The FNS information/data/indicators being produced by the different actors are largely fit for the purposes of monitoring FNS, especially for the specific institutions. However, the different institutions appear to be working separately at both the national and subnational levels, without conscious data/information sharing and with very little coordination towards implementing FNS objectives. Even within government departments, there is limited sharing of information, resulting in duplication of efforts. The different players in the individual FNS-related information systems work in silos, resulting in a fragmented information system which makes it difficult to holistically contribute towards building a composite understanding and effective monitoring of FNS in the country.
4. There are a number of capacity gaps along the FNS information value chain in South Africa. These include lack of standardisation of data/information being collected by different institutions resulting in duplication, omissions and overlaps; different frequencies in similar data/information dissemination which then limits the impact of the information systems vis-à-vis various FNS objectives; data management and data analysis skills gaps in some information systems; and lack of maintenance of/updates on a number of digital platforms on which information is disseminated for most of the information systems.
5. The policy basis for intersectoral coordination among FNS stakeholders in South Africa appears to be strong on paper, with past and current FNS policy documents calling for improved coordination among FNS stakeholders at all levels. However, the implementation aspect of these policy calls has been weak. There have also been concerns around the lack of inclusivity of South Africa's FNS policy formulation process to include views and input of non-state actors, as well as issues around rural-bias in the framing of the FNS problem.
6. Given the existence of varied FNS-related information systems and calls for intersectoral coordination among stakeholders in various FNS policy documents over the years, there is a fairly strong foundation for the development of a synchronised multi-level FNS information system anchored on well-coordinated FNS institutional structures in South Africa.

In light of these observations, we make the following recommendations vis-à-vis FNS information systems in South Africa:

1. There should be the development of standardised FNS data/information collection, analysis and management guidelines, processes and/or methodologies across FNS-related information systems, or, at least, within individual information systems, to allow for data interoperability within and across individual information systems.
2. There is need to capacitate officials with information, communication and technology skills, and/or hire personnel with ICT skills, to improve data analysis and data management in some FNS-related information systems. Furthermore, institutions should take on board information users' views and concerns towards disseminating information that is not only specific to user needs but also accessible to targeted users at all levels.
3. There should be concerted efforts towards soliciting the buy in of stakeholders, and improving intersectoral coordination among stakeholders across all FNS-related activities at all administrative levels, as recommended in various past and current FNS policy documents. A starting point towards intersectoral coordination would be the establishment of the proposed national FNS coordinating body – the FNS Council chaired by the Deputy President, and associated committees and forums at the subnational level, as suggested in the 2017 NFNSP.
4. A department with convening powers, which is also well-positioned to mobilise for adequate technical, human and financial resources should drive the FNS intersectoral coordination as well as oversee the envisaged synchronised multi-level FNS information system. This should ideally be the Presidency, or the DPME, which currently sits in the Presidency.

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## APPENDICES

### Appendix 1. Selected FNS policies in South Africa

	Year	Policy/Related initiative	Department	Focus/Objective	Comment/Observation
First Wave	1994	The Reconstruction and Development Programme (RDP)	Multisectoral	Identified food security as a basic human need and mainstreamed food security as a priority policy objective.	Food security centred on production, rural development and access to land.
	1994	Zero Vat Rating of Basic Foodstuffs (ZVRBF)	National Treasury	Allowed consumers to purchase 19 staple food items without the VAT levy. 19 staple foods are tax free because of this policy	One of the few initiatives which addresses the access dimension to FNS in South Africa.
Second Wave	2002	Integrated Food Security Strategy (IFSS)	Department of Agriculture	Food security (broad scope)	This was the first broad, interdepartmental initiative on food security in the country. Despite the IFSS acknowledging the importance of a broader developmental approach to FNS, it was still criticised for overly focusing on availability at the expense of other FNS dimensions
	2002	Integrated Nutrition Programme (INP)	Department of Health	<p>Improve the nutritional status of all South Africans</p> <p>The programme focuses heavily on nutrition education, fortification and supplementation, and growth monitoring.</p>	<p>The programme as a whole is limited by a narrow, health based approach to food security. It has however been widely lauded for bringing nutrition to a level of high priority at the provincial level</p> <p>It has also been relatively successful at disseminating a range of developed norms and guidelines on nutrition to relevant stakeholders, such as training volunteers preparing food through the NSNP initiative.</p>
	2003	Food Price Monitoring Committee under the National Agricultural Marketing Council (NAMC)	Department of Agriculture	Consumer protection (food prices)	An ongoing outcome of this work is NAMC's Food Price Monitor: a quarterly publication that explores key information on food pricing. This includes, but is not limited to, monitoring the prices of a basic basket of food, urban-rural price differentials, inflation rates of various food items, and an outlook based on current market trends. What has resulted from the initiative is relatively robust information on food pricing



	2003	Regulations Relating to the Fortification of Certain Foodstuffs (RRFCF)	Department of Health	Regulated the importation and production of fortification mix; Required all food vehicles to be micronutrient fortified; Regulated the labelling of fortified foods	
	2004	Social Assistance Act	Department of Social Development	Paved the way legislatively for the existing social grants system, which plays a critical role in alleviating hunger for beneficiaries.	
Third Wave	2009	Zero Hunger Strategy/ Food for All Campaign	Department of Agriculture	Focus on small-scale agriculture and food access – not implemented.	Modelled after the Brazilian initiative. The campaign was launched in 2009 but was barely implemented.
	2009	DPME Outcome 7 is entitled ‘Vibrant, equitable and sustainable rural communities and food security for all’	Department of Rural Development and Land Reform	The delivery agreement for this Outcome frames food security around the general recognised standards of availability, access, utilization, and affordability.	Longer-term targets indicated a largely production-based understanding of food security.
	2011	New Growth Path (NGP)	Department of Economic Development	Promote economic development and job creation	
	2012	National Development Plan Vision 2030 (Chapter 6) (NDP)	National Planning Commission	Reduce food insecurity and address malnutrition	Locates food security under the chapter on rural development. It includes a few economic and market based elements of food security, such as reducing the urban/ rural price gap, but does not go far enough to expand the framing of food security from a health / nutrition / supplementation and availability/production approach.
	2013	Roadmap for Nutrition in South Africa (RNSA)	Department of Health	Optimal nutrition for all South Africans	
	2013	Strategic Plan for the Prevention and Control of Non-Communicable Diseases (SPPCNCD)	Department of Health	Prevention of NCDs and promotion of health and wellbeing	

	2013	Social Relief of Distress Grants (SRDG)	Department of Social Development	Provides immediate response to a crisis situation where citizens are without the means to provide the basic necessities for themselves	Overall, this programme has the potential to provide a needed safety net to the most food insecure. However, lack of information and other challenges in access mean that it is unlikely to fulfil this role. People are not identified to receive but rather they self-select, meaning that those most in need of food may be excluded.
	2013	Fetsa Tlala (“End Hunger”)	Department of Agriculture	1 million hectares of land under production by the 2018/19 production season	The impression with this initiative was that the framing of food security within DAFF had regressed to the production/availability perspective
	2014	Medium Term Strategic Framework (MTSF)	National Planning Commission	Reduce inequality and promote economic development	
	2014	National Policy on Food and Nutrition Security (NPFNS)	Department of Agriculture	It is the current reference point for coordinated government work on food security, serving as a successor to the IFSS.	
	2014	National Aquaculture Policy Framework for South Africa	Department of Agriculture	Food security (production and some economic access)	While this policy framework considers the role of large and small-scale fishers in food security, it is limited in scope due to its narrow focus. It however does go further in linking local demand, food security, and economic development.
	2014	Agricultural Policy Action Plan (APAP)	Department of Agriculture	Provide steps to improve decent employment and food security	
	2015	DAFF Strategic Plan (DAFFSP)	Department of Agriculture, Forestry and Fisheries	Outlines programmes and activities for agriculture, fisheries and forestry for the period	
	2015	Strategy for the Prevention and Control of Obesity in South Africa (SPCOSA)	Department of Health	To reduce the prevalence of obesity by 10% in 2020	
	2016	Taxation of Sugar-sweetened Beverages (TSSB)	Department of Health	A tax rate of 2.29 cents was imposed on sugar-sweetened beverages per gram of sugar. To help reduce the intake of excessive sugar	
	2016	Industrial Policy Action (IPAD)	Department of Trade and Industry	To improve production, employment and economic development in agro-processing	

	2017	National Food and Nutrition Security Plan (NFNSP)		to implement a priority set of actions and establish the necessary institutional architecture to lead, coordinate, budget and monitor the implementation of these actions to deliver significant improvements in food and nutrition status by 2030	
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*Sources: Boatemaa et al, 2018; McLaren et al, 2015*

## Appendix 2. Current FNS-related information systems in South Africa

<b>FNS-related information systems</b>	<b>Institution/Actors</b>	<b>Description</b>	<b>FNS Information (indicators/ data/ variables)</b>	<b>Comments</b>
Agriculture information system	Department of Agriculture, Forestry & Fisheries (DAFF)	Monthly Food Security Bulletin	-grain production: forecasts of crop area planted & production levels -cereal balance sheets: supply & demand of imports and exports of wheat, maize, sorghum, soybeans, sunflower seed, etc. Exports & imports; Projected closing stocks of crops for the year	-these reports focus on agricultural production, commercial farming in particular; -information is at the national level, not at subnational level; -households' access to food/ vulnerability to food insecurity not highlighted; -no nutrition indicators are reported
		Monthly reports Crop estimates	-forecasts of area planted by different crops, and production levels (winter cereals & summer crops)	
		Quarterly reports on livestock estimates	-quarterly estimates of livestock numbers	
	National Agricultural Marketing Council (NAMC)	Monthly reports: SA Supply and demand estimates for grains and oilseeds	-supply and demand of white maize, yellow maize, sorghum, wheat, sunflower oilseed, soybeans	-the SA Supply and Demand Estimates Committee (SASDE) is supply and demand reporting mechanism established by the NAMC with the aim of bringing about transparency and price stability in the oilseed and grain markets of South Africa and ultimately, food security in the country as a whole -the monthly reports are arranged into supply, demand and stock levels and cover information on

				imports, exports and consumption
	Statistics South Africa (Stats SA)	Census of Commercial Agriculture (CoCA) (Every 5 years, but lack of funding has affected this regularity. Done in 1993, 2001, 2008 & 2017 – currently underway)	- collect information on the number of farms, land use, production expenses, value of land, buildings, and farm products, farm size, characteristics of farm operators, market value of agricultural production sold, acreage of major crops, inventory of livestock and poultry, and farm irrigation practices, etc.	-detailed information on crop and livestock production – inputs, output, costs and revenue -while it should be collected every five years, this has not been the case due to financial challenges, resulting in irregularly data
	Department of Environmental Affairs	SA land cover metadata reports	-cultivated subsistence crops -cultivated commercial annual crops (pivot and non-pivot) -cultivated commercial permanent orchards -cultivated commercial permanent vines	-reports are old: the latest versions were last updated and published in June 2016 -the report contains information on the proportion of land (in hectares) allocated for agricultural production (both commercial and subsistence agriculture) in SA as a whole -regular updates of this information could be useful
	Food and Agriculture Organisation	Suite of Food Security Indicators <a href="http://www.fao.org/faostat/en/#data/FS">http://www.fao.org/faostat/en/#data/FS</a>  -Land portal <a href="https://landportal.org/voc/regions/south-africa">https://landportal.org/voc/regions/south-africa</a>	-Provides annual data on key indicators of: - Average Value of Food Production - Cereal Import Dependency Ratio; Percent of Arable Land Equipped for Irrigation; Value of Food Imports in Total Merchandise Exports; Per capita food production variability; Depth of the Food Deficit; Prevalence of Food Inadequacy	
	USDA	Foreign Agricultural Service	- survey data, crop condition assessment relies heavily on computer-aided analyses of satellite, meteorological, agricultural, and related data -country level forecasts on main crop planted area and production levels	

Health and Nutrition information system	Department of Health	District health management information system (DHMIS) (introduced in 1996, extended to the whole country in 2001)	<ul style="list-style-type: none"> <li>- Monitors nutrition indicators such as underweight for age incidence (under 2 years); food nutritional supplementation coverage (under 5 years); Incidence of severe acute malnutrition (under 5 years); nutrition status at schools; vitamin A dose coverage (1 – 5 years); etc.</li> </ul>	<ul style="list-style-type: none"> <li>- a digital platform called the National Department of Health Data Dictionary (<a href="https://dd.dhmis.org">https://dd.dhmis.org</a>); aim is to support the DHMIS policy</li> <li>-keeps a large volume of health &amp; nutrition indicators at national, provincial &amp; district levels;</li> <li>-updated monthly</li> <li>- Data collection process: data collected at facility level as they offer services; and through periodic clinic surveys; using paper-based system of registers, tally sheets, and monthly data collation forms. The collated data are sent monthly to the sub-district or district level where they are entered onto computer using DHIS software, then analysed, and a report is submitted to district, provincial and national health departments; mechanisms for feedback, data quality check, etc., exists. (<i>see Garrib et al., 2008: 550</i>)</li> <li>-the digital platform allows selected information to be downloaded as pdfs, excel, CSV, etc., formats</li> </ul>
	Department of Basic Education	Annual reports on the performance of the National School Nutrition Programme	<ul style="list-style-type: none"> <li>-total number of learners fed</li> <li>-Number of feeding days</li> </ul>	<ul style="list-style-type: none"> <li>- Providing learners with nutritious meals is the key outcome of this programme</li> </ul>

			<ul style="list-style-type: none"> <li>-Meal cost per learner (Q1-3 primary, secondary &amp; special school)</li> <li>-Total number of vegetable gardens</li> <li>-Number of cooked meals served per week</li> <li>-Number of uncooked meals served per week</li> </ul>	<ul style="list-style-type: none"> <li>-The reports are published annually with the aim of reflecting on the general performance of the NSNP</li> <li>-provides a summary of the NSNP performance per province</li> <li>-Does not report on any key nutrition indicators</li> </ul>
	Department of Planning, Monitoring and Evaluation (DPME)	Development indicators	-annual development indicators at national & provincial level - stunting (severe acute malnutrition indicator)	-reports only one nutrition indicator
	Statistics South Africa (Stats SA)	Demographic and Health Survey (3 surveys so far, 1998, 2003, latest 2016)	<ul style="list-style-type: none"> <li>-Anthropometric measures/ nutrition status (height, weight, BMI, height-for-age (stunting), weight-for-height (wasting), and weight-for-age (underweight), etc.)</li> <li>-Breastfeeding, infant feeding practices &amp; supplementation</li> </ul>	<ul style="list-style-type: none"> <li>-useful for generating key anthropometric indicators, complementing other national surveys</li> <li>- no information on food consumption patterns, expenditures on food, or food frequency is captured</li> </ul>
		Living Conditions Survey (every 5 years, latest 2014/15)	-Anthropometric measurements: height, weight & mid-upper arm circumference/ hip measurements	
	Southern Africa Labour and Development Research Unit (SALDRU)	National Income Dynamics Study (started in 2008, repeated every two years, latest 2017)	-Anthropometric measurements: height, weight, waist and blood pressure measurements	
	Human Sciences Research Council	The South African National Health and Nutrition Examination Survey (SANHANES) -2012	-Anthropometric measures, nutrition status: dietary intake/ diversity/ practices	was only conducted in 2012
	Department of Agriculture, Forestry & Fisheries (DAFF)	SA Vulnerability Assessment Committee -SADC initiative, since 2005	-% wasting, stunting, overweight & underweight	

	World Health Organisation	<p>Nutrition Landscape Information System (NLiS) (Global Nutrition Monitoring Framework)</p> <p><a href="http://apps.who.int/nutrition/landscape/global-monitoring-framework?ISO=zaf">http://apps.who.int/nutrition/landscape/global-monitoring-framework?ISO=zaf</a></p> <p><a href="http://apps.who.int/nutrition/landscape/report.aspx?iso=zaf">http://apps.who.int/nutrition/landscape/report.aspx?iso=zaf</a></p>	<p>-indicators contributing to a comprehensive view of nutrition for health and development in South Africa</p> <p>-Primary &amp; intermediate outcome indicators: stunting in children (0 – 59 months), Anaemia in pregnant &amp; non-pregnant women, Low birth weight, Overweight and obesity in children, adolescents &amp; women, Exclusive breastfeeding under 6 months, Wasting in children (0 – 59 months), underweight,</p> <p>Process indicators: Minimum dietary diversity (MDD) in children 6-23 months; Population using improved drinking-water sources; Population using improved sanitation facility; Any antenatal iron supplementation; Births in baby-friendly facilities; Availability of national-level provision for breastfeeding counselling services in public health and/or nutrition programmes; etc.</p> <p>-Policy, environment, and capacity indicators: Nutrition professionals density; Maternity protection: Compliance with international labour standards; etc.</p>	<p>-use different sources of data, such as NIDS, SADHS, Global Health Observatory (GHO), UNICEF, International Labour Organisation</p> <p>-some variables are outdated, some reporting data that is over 10 years old</p> <p>-data at national level, not possible to disaggregate it to lower levels</p>
	Food and Agriculture Organisation	Prevalence of Undernourishment: indicator developed by FAO to measure food insecurity, reported since 1974	<p>-Provides annual data on key indicators of:</p> <ul style="list-style-type: none"> <li>- Average Dietary Supply Adequacy</li> <li>- Average Supply of Protein of Animal Origin</li> </ul>	-challenge seems to be that it always lags in terms of years; and not forward looking



	UNICEF	<a href="https://data.unicef.org/topic/nutrition/malnutrition/">https://data.unicef.org/topic/nutrition/malnutrition/</a> [UNICEF/WHO/World Bank]	<p>- ; Prevalence of Food Inadequacy; Children aged &lt;5 years wasted (%); Children aged &lt;5 years stunted (%); Children aged &lt;5 years underweight (%); Percentage of adults underweight in total adult population; Prevalence of anaemia among children under 5 years of age; Prevalence of Vitamin A deficiency in the population; Prevalence of Iodine deficiency; Prevalence of anaemia among pregnant women; Number of people undernourished; Minimum Dietary Energy Requirement (MDER); Average Dietary Energy Requirement (ADER); "Minimum Dietary Energy Requirement (MDER) - PAL 1.75"; Coefficient of variation of habitual caloric consumption distribution (CV); Skewness of habitual caloric consumption distribution (SK); Incidence of caloric losses at retail distribution level; Dietary Energy Supply (DES); Average Fat Supply</p> <p>-child nutrition indicators: stunting, wasting, overweight &amp; underweight in children under 5 years</p> <p>-vitamin A &amp; iron deficiencies</p>	
	IFPRI	-The Global Hunger Index (GHI)	<p>-a tool that measures and tracks hunger at the global, regional, and country levels</p> <p>-scores calculated each year to assess progress, or the lack thereof, in combating hunger</p>	- The source for undernourishment data is FAO; the source for child mortality data is UN Inter-agency Group for Child Mortality Estimation (UN

			- GHI scores are based on the following four indicators: undernourishment, child wasting, stunting & mortality	IGME); and the primary sources for the child undernutrition data are the WHO, World Bank, and UNICEF.
Marketing information system	National Agricultural Marketing Council (NAMC)	Quarterly and monthly reports: food price monitor	-Overall inflation and food inflation -Rural and urban food price trends -Estimated impact of food inflation on consumers -Commodity and product price trends	-the Stats SA Income and Expenditure Survey (IES) is used as the source of information -a good food security monitoring system which keeps track of trends in prices of various food items -high food costs could put a strain on poorer households, leading them into food insecurity
		Quarterly reports: farm to retail food price-spread (FTRPS)	-price trends , price spreads and farm values: Beef, pork, milk, poultry, maize, wheat, lamb	-basket of food products obtained from Stats SA Income and Expenditure Survey are used in these reports - these quarterly reports monitor farm gate and retail food prices by calculating farm values of selected food products and the FTRPS
		Quarterly reports: input costs monitoring	-international and domestic price of selected fertilisers (urea, muriate of potash, di-ammonium phosphate, potassium chloride) -fuel, paraffin prices	-reports on the costs of selected agricultural inputs -input costs play a pivotal role to food production -higher input costs could impact negatively on farmers (especially smallholder) as in most cases they are not

				financially stable, thus leading to low production and ultimately impact on food security.
		Yearly reports: Food cost review	<ul style="list-style-type: none"> <li>-urban and food price trends</li> <li>-price trends in the meat sector (beef, pork, lamb)</li> <li>--price trends in the dairy sector (milk, powdered milk, cheese, margarine)</li> <li>-price trends in the maize sector</li> <li>-production. Stock levels and consumption of white and yellow maize</li> <li>-white and yellow maize price trends</li> <li>-real farm value of super maize meal</li> <li>-real farm gate and retail prices of white and brown bread</li> </ul>	<ul style="list-style-type: none"> <li>-these annual reports provide more insight into complex factors driving the agriculture commodity and food prices in the country</li> <li>-availability, affordability and affordability of nutritious food play is crucial in each of the households</li> <li>-the aim is to monitor food prices in South Africa on a regular basis, because food prices play a central role to food security in each country</li> </ul>
	Department of Agriculture, Forestry & Fisheries (DAFF)	Monthly Food Security Bulletin	-Market information: Consumer Price Index (CPI) & Producer Price Index (PPI); future contract prices; machinery sales	
Meteorological and hydrological information system	SA Weather Services	Severe weather warning reports (1-3 days in advance)	-heavy rainfall, disruptive snowfalls, floods, severe thunderstorms (hail, gusts, tornadoes) strong winds, veld fires	<ul style="list-style-type: none"> <li>- reports on the probability of severe weather conditions that could lead to disruptive or disastrous conditions, thus impacting on human life (loss of life) and cause damage</li> <li>-weather conditions play a key role to agriculture. Severe weather conditions could lead to damage of agriculture property, crops, loss of livestock etc. and consequently impact on the</li> </ul>

				food security of the country. -useful information to report. Should consider reporting this severe weather conditions perhaps a month/ two months in advance?
	Department of Water Services (DWS)	National Integrated Water Information System (NIWIS) ( <a href="http://niwis.dws.gov.za/niwis2/">http://niwis.dws.gov.za/niwis2/</a> )	- information that facilitates efficient analysis and reporting across the water value chain - changes in temperature, wet spells, dry spells, irrigation demand, potential evaporation, mean annual precipitation and streamflow. -regular overview and outlook of drought status in South Africa.	
	Department of Agriculture, Forestry & Fisheries (DAFF)	Monthly Food Security Bulletin	-weather conditions: Rainfall & dam levels	
	Climate Systems Analysis Group (CSAG)		medium and long-term climate information	
Vulnerability assessment information system	Statistics South Africa	General Household Survey (yearly survey, latest GHS 2017)	- vulnerability to hunger/ food insecurity: using an adapted version of the Household Food Insecurity Access Scale (HFIAS) -asks questions pertaining to hh members going hungry because of inadequate food; hh members leaving on the streets; hhs running out of money to buy food; cutting of meal sizes; skipping meals; & eating fewer food varieties. The survey also specifies the	

			frequency specific food types were consumed; hh expenditure categories	
		Living Conditions Survey (every 5 years, latest 2014/15)	-HFIAS: Similar to the GHS	
		Community Survey (large inter-censal survey, every 10 years, latest CS2016)	-two food security questions (a) households running out of money to buy food & frequency; (b) households skipping meals & frequency	-Food security module: Q4.105 - Q 4.108
		Income & expenditure Survey (every 5 years, latest 2011)	-household food consumption expenditure to inform the updating of the CPI basket	-the food expenditure levels can be used to indicate food poverty levels (food expenditure below food poverty line)
	Department of Planning, Monitoring and Evaluation (DPME)	Development indicators	-annual development indicators at national & provincial level, which include relevant FNS indicators such as: levels of GDP per capita, inflation, poverty indices, grants access	-the indicators are provided in the form of a report or excel spreadsheet: no digital platform
	Department of Social Development	SASSA quarterly fact sheets SASSA annual reports Register of NPOs	- Summary of beneficiaries per grant type (seven grant types) per province; -Number of Social Relief of Distress (SRD) applications awarded and how many awarded as food parcels, cash, or vouchers -Reports on the amount of social grants (cash payments) awarded to recipients per provinces -reports on the amount of food parcels awarded to poor households with no means to buy own food	-the focus is on access to social grants, and no information is given about the current food insecurity status of the recipients;  -information is given at provincial and national levels, and not at local levels;  -only summaries are shared publicly, but there seems to be an administrative database of beneficiaries of social grants

		National Integrated Social Information System (NISIS)	<ul style="list-style-type: none"> <li>-Approved by cabinet in 2006, has gone through process of conceptualisation, feasibility study, etc., and now being implemented;</li> <li>-aim is to develop an integrated database of poor households to manage poverty related information to inform service needs, enhance coordinated targeting &amp; tracking of households as they graduate from poverty;</li> <li>-seems to derive most of its lessons from Latin American countries (Mexico)</li> </ul>	<ul style="list-style-type: none"> <li>-phase 1 of the NISIS set to be launched in 2019/20 financial year;</li> <li>-this is a promising source of information, if successfully implemented;</li> <li>-would provide valuable data/ indicators for particularly the food access dimension;</li> <li>-its coordination across the social protection &amp; human development cluster, and at the three levels government, will minimise duplications</li> </ul>
		Register of NPOs	<ul style="list-style-type: none"> <li>-publicly shares excel spreadsheets of registered NPOs (CBOs &amp; NGOs) per province to increase transparency and accountability</li> <li>-the spreadsheet provides address, contact information, sector and a description of services offered by the different NPOs</li> </ul>	<ul style="list-style-type: none"> <li>-the database can be used to profile NPOs offering FNS related services</li> </ul>
	Department of Economic Development	Annual reports	<ul style="list-style-type: none"> <li>-Employment growth (number of new jobs)</li> <li>-growth in women employment</li> <li>-employment (total)</li> <li>-Growth in youth jobs</li> <li>-Youth jobs (total)</li> <li>-agriculture value add</li> </ul>	<ul style="list-style-type: none"> <li>-these are the key economic highlights for period 2016/17</li> <li>-the report does not report on specific nutrition information</li> <li>-the department should perhaps consider creating a platform where their target</li> </ul>

				food security related information is updated on a regular basis (perhaps on a monthly/quarterly basis)
	Department of Agriculture, Forestry & Fisheries (DAFF)	SA Vulnerability Assessment Committee -SADC initiative, since 2005	-reports and maps the numbers & % of food insecure population -disasters e.g., disease outbreaks, droughts, floods, etc.	-this initiative reports key FNS indicators; -various sources of information are used, such as the GHS (vulnerability to food insecurity), crop estimates committee (expected crop output & stocks), -the yearly frequency limits its usefulness in tracking & addressing food & nutrition insecurity, which varies throughout the year
	Human Sciences Research Council	South African Social Attitudes Survey (SASAS), annually since 2003; Hunger scale module included in 2008	Hunger scale module: HFIAS questions on occurrence & frequency of occurrence of: running out of money to buy food; reducing food varieties & meal sizes; etc.	-SASAS 2008 Q2: Q125 – 148 -It seems the Hunger scale module was only included in 2008;
	Food and Agriculture Organisation	Suite of Food Security Indicators <a href="http://www.fao.org/faostat/en/#data/FS">http://www.fao.org/faostat/en/#data/FS</a>	-Provides annual data on key indicators of - Percent of paved roads over total roads; Road Density (per 100 square km of land area); Rail lines Density (per 100 square km of land area); Domestic Food Price Level Index; Percentage of Population with Access to Improved Drinking Water Sources; Percentage of Population with Access to Sanitation Facilities;	

	World Bank	World Bank poverty and rural development indicators	-poverty & agriculture & rural development indicators: crop production/ food production index, poverty headcount, GDP, etc.	
	Southern Africa Labour and Development Research Unit (SALDRU)	National Income Dynamics Study (started in 2008, repeated every two years, latest 2017)	-food expenditure & consumption	- food expenditure & consumption: Household questionnaire: Section E1