DEFINING A MULTI-LEVEL FOOD AND NUTRITION SECURITY INFORMATION SYSTEM (FNSIS) FOR SOUTH AFRICA

PREPARED 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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ACRONYMS AND ABREVIATIONS

CCHIP	Community Childhood Hunger Identification Project
CoCa	Census of Commercial Agriculture
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
FIES	Food Insecurity Experience Scale
FNS	Food and Nutrition Security
FNSIS	Food and Nutrition Security Information System
GIS	Geographical Information System
NAMC	National Agricultural Marketing Council
NIDS	National Income Dynamics Study
NIWIS	National Integrated Water Information System
NLiS	Nutrition Landscape Information System
NFNSC	National Food and Nutrition Security Council
NFNSP	National Food and Nutrition Security Plan
PFNSC	Provincial Food and Nutrition Security Council
RMAA	Red Meat Abattoir Association

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
USAID	United States Agency for International Development
USDA	United States of America's Department of Agriculture

EXECUTIVE SUMMARY

This report defines and elaborates on the multi-level Food and Nutrition Security (FNS) information system to be managed through a digital platform which the Government of South Africa led by the Department of Agriculture intends to develop, including the information (data/indicators/variables) to be managed as well as the means, frequency and responsibility of collection. The report also includes recommendations on how the FNS information management system should enable data/information interoperability, integration and promote synchronisation with other digital platforms and data servers within and across sectors. The report has been prepared as part of a project commissioned by the Food and Agriculture Organisation of the United Nations (FAO) in collaboration with South Africa's Department of Agriculture: the FAO/ DAFF TCP/SAF/3701 Project *"Supporting the Development and Implementation of the Food Security and Nutrition Plan for South Africa"*. The following key aspects form the foundation of this definition of the multi-level FNS information management system for South Africa:

1. There are currently 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.
2. 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 are largely 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.

3. The envisaged multi-level integrated FNSIS must not be designed to duplicate or replace existing FNS-related information systems, but to be an instrument for the provision of a synchronised picture of FNS in the country. In essence, it should feed from and rely on the already existing different FNS-related information systems;
4. The system should provide streamlined but comprehensive data and information reflecting the 4 dimensions of FNS in the country (i.e. food availability, access, utilisation and stability), to assist in efficient and effective FNS resource allocation and emergency preparedness at both the national and subnational levels;
5. A suite of indicators covering agricultural and marketing information, health and nutrition information, vulnerability, meteorological and hydrological information are suggested for inclusion into the system. Also proposed are the frequency in information collection and the main institutions which must be involved in the collection of that information.
6. The selection of indicators included should be based on national priorities but should also allow for global / regional comparisons and should therefore be reflective of the Sustainable Development Goal indicators and the Malabo Declaration of the African Union.
7. Also included for consideration in the envisaged system are indicators related to informal food production (by smallholder farmers and informal traders) as they play a crucial role in the food markets but are often not captured.
8. A key element of the proposed system should be aggregation of most of the data at the household level.
9. The system should be coordinated and managed by an FNS Information Systems Unit (ISU), which is a technical Unit that should be housed in the envisaged National FNS Council. The Unit should also maintain personnel at the provincial level, who will manage the system at the subnational level;
10. Central national and provincial databases which feed from the different FNS information collected by different institutions at the subnational and national levels should be established as a key part of the system
11. A digital platform, which will be another key component of the system, should comprise of a control panel and should incorporate security functions and latest advances in Geographical Information System (GIS) functionalities. The platform should also have links to other key digital platforms underpinning individual FNS-related information systems and should allow for live feeds for such information as meteorological and hydrological information which have provision for such.

12. The system should include functions which allow for the downloading of standard reports in pre-defined formats, data visualisation functionalities allowing users to define time-series charts and thematic maps, and cloud computing to ensure better synchronisation, sharing and harmonisation of data
13. The sustainability and continuity of the system will be dependent upon 4 key elements: (a) updating of data on the agreed regular intervals, (b) strengthening and further development of existing individual FNS-related information systems, (c) a well-trained and qualified ISU technical team at both the national and subnational levels, and (d) ownership of the processes of the system by all institutions involved.

1. INTRODUCTION

The Human Sciences Research Council (HSRC) was contracted by the Food and Agriculture Organisation of the United Nations (FAO) in collaboration with South Africa's Department of Agriculture, to define a Food and Nutrition Security (FNS) information system to be managed through a digital platform, in support of the FAO/ DAFF TCP/SAF/3701 Project *"Supporting the Development and Implementation of the Food Security and Nutrition Plan for South Africa"*. This report outlines the FNS information (data/indicators/variables) to be managed through a digital platform which the Government of South Africa led by the Department of Agriculture intends to develop. It also elaborates on the means, frequency and responsibility of information collection and includes recommendations on how the FNS information management system should enable data/information interoperability, integration and promote synchronisation with other digital platforms and data servers within and across sectors.

The report is informed by consultations done with various state and non-state actors at both the national level and the subnational level in the form of key informant interviews and stakeholder workshops[1]. The report also feeds from a review of literature on FNS-related information systems carried out under this project. The objectives of the literature review were to (a) explore capacity gaps, needs and capacity development options of food and nutrition security (FNS)-related information systems in South Africa towards the creation of an efficient and effective synchronised multi-level FNS information system; 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 FNS information system.

This report is divided into 4 main sections. The following section presents an outline of the purpose of the envisaged multi-level FNSIS. This is followed by a discussion on FNS information currently being collected and the framework and scope of the envisaged integrated system; including the practicalities of setting up the system in Section 3. The report concludes with highlighting factors which will be critical for the sustainability and continuity of the planned integrated FNSIS in Section 4.

[1] The key informant interview and workshop guides used are included in the consultation report submitted together with this report.

2. PURPOSE OF THE ENVISAGED MULTI-LEVEL FNSIS

As Haile and Bydekerke (2012) articulate, a comprehensive and integrated multi-level FNSIS should provide constantly updated information that allows for answering the following four pertinent FNS questions:

- Who are the food and nutrition insecure and vulnerable?
- Where do they live and what is the nature, frequency and depth of their food insecurity and vulnerability?
- Why are they food and/or nutrition insecure and vulnerable, and
- What intervention options are most appropriate?

A need to tackle these questions was emphasised by one of the Chief Directors in the then Department of Agriculture, Forestry and Fisheries (DAFF), who noted that currently,

> *"…the problem is in the detail. When we say there are 13.9 million people that are food insecure in South Africa and 3.6 million of those are in KwaZulu Natal province – who in KwaZulu Natal are those people? That information is not available. We want (to know) who they are; what they are doing currently; why their circumstances are putting them where they are now? Because we will need that information to design our interventions..."*

Similar sentiments were echoed by a Director in the then Department of Rural Development and Land Reform in relation to survey based data, stating that there is a dire need to disaggregate data to the level of the household in order to provide an effective FNSIS.

> *"At national level, we cannot decode and analyse information from StatsSA that is being collected from the subnational level as their information is aggregated and provided at a provincial level. We need to know… District X have got X number of individuals experiencing inadequate access to food, but, (the question will be) can you get down to the household level? If we want to develop the system in a way that it should be functional, we should not be pushing it to…a level where we can routinely collect information (at a household level)?"*

Furthermore, this comprehensive and integrated information system should directly and unambiguously contribute to the following three objectives:

a) Building national capacity for efficient FNS information sharing and national FNS resource allocation, emergency preparedness and effectively directing humanitarian interventions
b) Laying the foundation for strategy formulation in food insecure provinces and localities
c) Providing a roadmap for monitoring, reporting and planning FNS interventions at national and subnational levels

These objectives have been supported during various consultations. The need to reduce existing duplication of interventions which occur as a result of the current 'silo' way of service delivery was raised as an issue that could be addressed to improve FNS-related interventions. A Director of Programme and Policy Evaluation in the Department of Social Development noted that,

> "*We have the problem within Government that there is duplication of services; duplication of information. For example, you cannot say clearly that this household (that) is receiving (assistance is on) an indigent register. They would probably also (most likely be) getting meals from certain NGOs. Their children are receiving a grant. The children would also be receiving food at school. There are other primary health services they are getting. And maybe there is somebody who is also getting an old-age grant in that household. We (therefore) cannot accurately say the number of social interventions that are needed and that somebody is getting."*

An official with one of the key international FNS partners which works with various government departments on FNS in South Africa also underscored the need for and importance of linking information (and registries) from various sources in order to streamline service delivery:

> *"DSD has its own database, DOH has another database, and they do not match… a synergised information system for various different indicators would be worthwhile, it would streamline service delivery. It would reduce repeated tasks between the different departments… for example, DSD has an enormous amount of funding for food parcels but DOH can't access it or can't get them to release it in a way when they see a need. It would be helpful if they all had the same information and that their budgets (be) lined up to that same information, that same service delivery"*

3. FRAMEWORK AND SCOPE OF THE ENVISAGED INFORMATION SYSTEM

The envisaged multi-level FNSIS should not be designed to duplicate or replace existing individual FNS-related information systems. Rather, the integrated multi-level FNSIS should draw on existing individual FNS-related information systems to provide an integrated picture of FNS in the country. Currently, 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, albeit in an uncoordinated and fragmented manner. This data/information, which addresses the four dimensions of food and nutrition security (i.e. availability, access, utilisation and stability of supply) can largely be categorised into one or more of the following FNS-related information: agriculture information, food marketing

information, health and nutrition information, vulnerability assessment information, and meteorological and hydrological information. Section 3.1 discusses the different types of information that is currently being collected, the nature of that information (i.e. indicators/data/variables), the frequency of information collection and institutions involved (See also Appendix 1).

Section 3.1. Current FNS-related information

3.1.1. 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.

3.1.2. 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.

3.1.3. 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.

3.1.4. Food marketing information system

The food 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.

3.1.5. Vulnerability information system

The general vulnerability 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 availed 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.

3.2. Mapping of selected indicators for the envisaged FNSIS

It is important to note that, of the indicators discussed in Section 3.1 (and collated in Appendix 1), current information systems are mainly focussed on collecting routine programme (process) data, and not necessarily outcomes or impact data. This sentiment was also echoed by a number of officials especially during national-level consultations. As noted by one senior official in the then Department of Rural Development and Land Reform,

"Government departments in general are collecting routine data from primarily programmed data which helps them to analyse their progress to their set objectives and targets"

In order for the envisaged FNSIS to be successful however, it should review the data currently collected by existing information systems and clearly identify the impact indicators that will need to be collected to achieve the various FNS imperatives. Some of these impact indicators were identified by a Deputy Director General in the Department of Planning Monitoring and Evaluation (DPME)

"We are looking for a system that will be able to track our progress towards impacting indicators. When we talk of 'impact indicators', we are talking of indicators such as stunting; obesity; anaemia; vulnerability to hunger at household level and individual level"

Furthermore, during the national validation workshop for the project carried out with various stakeholders, it was concluded that the selection of indicators included into the envisaged information system should not only be based on national priorities but should also allow for global/regional comparisons and should therefore be reflective of the Sustainable Development Goal indicators as well as the indicators identified during the Malabo Declaration of the African Union.

The need to include indicators related to informal food production by small holder farmers and informal traders was also mentioned at the validation workshop as they play a crucial role in the food markets but are often not captured.

This subsection expands on the specific FNS information (indicators/data/variables) suggested for inclusion into the envisaged information system; the levels of information collection i.e. where the information should be collected; frequency of information collection; the unit of observation; and the key institutions that should be involved in the collection of the various types of information (see Table 1). These suggestions emanate not only from the consultations and literature reviews done as part of this work, but the 2014 National Policy on Food and Nutrition Security (NPFNS) and the 2017 Food and Nutrition Security Plan (NFNSP) also heavily influenced the suggested indicators, the means, frequency and responsibility of information collection.

During consultations with academics at the University of the Western Cape (UWC) as well as Directors in the Department of Health and DRDLR, respondents identified gaps in the data that

is currently being collected and provided specific examples of indicators that should be included in the FNSIS. These included, information on diet patterns, food safety, nutritional status of youth and adolescents, childhood diarrhoea, access to food, dietary diversity, stunting, obesity, anaemia, vulnerability to hunger at household level and individual level as well as information on small holder farms. Commenting on shortcomings on information around diet patterns and food safety for example, one eminent scholar working on FNS at UWC noted that:

> *"We are not gathering adequate information on diet patterns. The information is still too broad. And that means that when, for example, we want to look at whether sugar tax is going to have an impact, current data sets will not help us. Furthermore, there is an unrecognised need for comprehensive data sets that record the characteristics of bacteria or viruses or other kinds of microbe. The reason why that is important is that if we have concerns about food safety, you need to have a catalogue of all types of Listeria, for example, to be able to find out what kind of Listeria we are dealing with…*"

Table 1. Suggested FNS information, frequency of collection and actors involved for the envisaged FNSIS

Type of information	FNS dimension	Specific data/indicators	Type of indicator (Process / Result / Output / Impact)	Levels of information collection	Frequency	Units / measurement data generation	Main institution responsible/ coordinating information collection	Key institutions involved
Agricultural information	Food availability	Crop production patterns (maize, sorghum, groundnuts, sunflower seed, soybeans, and dry beans, wheat, malting barley, oats and canola)	Result / Output	District, Province	Monthly	Tonnes	DoA	DoA, NAMC, StatsSA, FAO, BFAP
		Fresh produce production patterns (apples, pears, oranges, lemons, avocados, bananas, papayas, pineapples, potatoes, sweet potatoes, onions, tomatoes, carrots, cabbage, cauliflower, lettuce, green beans, pumpkins, gem squashes, butternut squashes, peppers, English cucumbers)	Result / Output	District, Province	Monthly	Tonnes	DoA	
		Livestock production patterns (cattle, sheep, goats, rabbits, ducks, chickens)	Result / Output	District, Province	Quarterly	LSU / SSU	DoA	
		Fisheries and Aquaculture	Result / Output	District, Province	Monthly	Tonnes	DoA	
		Yields estimates	Result / Output	District, Province	Quarterly	Rands	DoA	
		Productivity patterns of small scale food producers (Small holders and informal sector) wrt crops, livestock and fisheries	Result / Output	District, Province	Quarterly	Tonnes	DoA	

Type of information	FNS dimension	Specific data/indicators	Type of indicator (Process / Result / Output / Impact)	Levels of information collection	Frequency	Units / measurement data generation	Main institution responsible/ coordinating information collection	Key institutions involved
		Income patterns of small scale food producers (Small holders and informal sector) wrt crops, livestock and fisheries	Result / Output	District, Province	Quarterly	Rands	DoA	
		Export and import quantities of food commodities (food balance sheets)	Result / Output	National	Monthly	Tonnes, Rands parity price	DoA	
		Commodity stocks (wheat)	Result / Output	National	Quarterly	Tonnes	DoA	
		Post-harvest losses	Result / Output	District, Province	Quarterly	Tonnes, Rands parity price	DoA	
		Per capita total amount of net calories available	Result / Output	District, Province	Quarterly	Tonnes	DoA	
		Net share of energy supply (calories) derived from cereals, roots and tubers	Result / Output	District, Province	Quarterly	Tonnes	DoA	
		Average supply of protein derived from animal sources	Result / Output	District, Province	Quarterly	Tonnes	DoA	
		Food fortification	Result / Output	Province, National	Quarterly	Tonnes, Rands parity price	DoA	
	Stability of supply	Per capita food supply variability	Result / Output	District, Province	Quarterly	Tonnes	DoA	
Food Marketing information	Food access	Agricultural input costs	Result / Output	Province, National	Quarterly	Rands	DoA	NAMC, DoA, Private Organisations (e.g. Red Meat
		Rural and urban food prices (food basket)	Result / Output	District, Provincial	Quarterly	Rands	DoA	

Type of information	FNS dimension	Specific data/indicators	Type of indicator (Process / Result / Output / Impact)	Levels of information collection	Frequency	Units / measurement data generation	Main institution responsible/ coordinating information collection	Key institutions involved
		Ratio of food expenditures to total expenditures	Result / Output	Province	Quarterly	Rands	DoA	Abattoir Association, Agrimark Trends etc.)
		Average share of food expenditures in total household expenditures	Result / Output	Province	Quarterly	Rands	DoA	
		Indicator of food price anomalies	Result / Output	Province, National	Quarterly	Rands	DoA	
		Consumer and producer price indexes	Result / Output	Province, National	Quarterly	Rands	DoA	
	Stability of supply	Domestic food price volatility	Result / Output	Province, National	Quarterly	Rands	DoA	
Health and Nutrition information	Food utilisation	Prevalence of stunting (children < 5 years)	Impact	District, Province, National	Monthly	Individual level – z scores height for age	DoH	DoH, DBE, StatsSA, WHO, UNICEF
		Prevalence of underweight (children < 5 years)	Impact		Monthly	Individual level – z scores weight for age	DoH	
		Prevalence of wasting (children < 5 years)	Impact		Monthly	Individual level – z scores weight for height	DoH	
		Prevalence of overweight (10 years and older)	Impact		Monthly	Individual level – z scores, BMI	DoH	
		Prevalence of obesity (10 years and older)	Impact		Monthly	Individual level – z scores, BMI	DoH	

Type of information	FNS dimension	Specific data/indicators	Type of indicator (Process / Result / Output / Impact)	Levels of information collection	Frequency	Units / measurement data generation	Main institution responsible/ coordinating information collection	Key institutions involved
		Anaemia in women of reproductive age	Impact		Monthly	Individual level – blood serum levels	DoH	
		Anaemia in children under 5 years	Impact		Monthly	Individual level – blood serum levels	DoH	
		Iron deficiency in women of reproductive age	Impact		Monthly	Individual level – blood serum levels	DoH	
		Iron deficiency in children under 5 years	Impact		Monthly	Individual level – blood serum levels	DoH	
		Vitamin A deficiency in women of reproductive age	Impact		Monthly	Individual level – blood serum levels	DoH	
		Vitamin A deficiency in children under 5 years	Impact		Monthly	Individual level – blood serum levels	DoH	
		Iodine deficiency in children 6-12 years	Impact		Monthly	Individual level – blood serum levels	DoH	
		Zinc deficiency in children 6-12 years	Impact		Monthly	Individual level – blood serum levels	DoH	
		Infant mortality rate	Impact		Monthly	Facility level – IMR	DoH	
		Under 5 mortality rate	Impact		Monthly	Facility level – U5MR	DoH	
		Low birth weight rate	Impact		Monthly	Facility level	DoH	

Type of information	FNS dimension	Specific data/indicators	Type of indicator (Process / Result / Output / Impact)	Levels of information collection	Frequency	Units / measurement data generation	Main institution responsible/ coordinating information collection	Key institutions involved
		Mid upper arm circumference	Impact		Monthly	Facility level – U5MR	DoH	
		Morbidity	Impact		Monthly	Facility level	DoH	
		Anthropometric measures of school children	Impact		Monthly	Facility level – z-scores	DoH	
		Access to improved sanitation services	Impact		Monthly	Household level	DoH	
		Access to improved water services	Impact		Monthly	Household level	DoH	
	Food availability	Diet patterns and dietary diversity	Impact		Quarterly	Household level – DDS	DoH	
		Prevalence of exclusive breastfeeding	Impact		Monthly	Individual level	DoH	
		Duration of breastfeeding	Impact		Monthly	Individual level	DoH	
		Minimum acceptable diet in children under 2 years (combines dietary diversity and frequency)	Impact		Quarterly	Individual level	DoH	
		Prevalence of moderate or severe food insecurity	Impact		Quarterly	Household level – (FIES)	DoH	
		Prevalence of moderate or severe food insecurity	Impact		Quarterly	Individual level – (FIES)	DoH	
		Vulnerability to hunger: Households	Impact		Quarterly	Household level – CCHIP Index	DoH	
		Vulnerability to hunger: Individuals	Impact		Quarterly	Individual level – CCHIP Index	DoH	

Type of information	FNS dimension	Specific data/indicators	Type of indicator (Process / Result / Output / Impact)	Levels of information collection	Frequency	Units / measurement data generation	Main institution responsible/ coordinating information collection	Key institutions involved
		Number of learners eating meals at schools	Process		Monthly	Facility level	DBE	
Meteorological and Hydrological information	Stability of supply	Average rainfall	Result / Output	Province	Quarterly		SAWS	SAWS, DWS, CSAG, FEWSNET
		Average temperatures	Result / Output	Province	Quarterly		SAWS	
		Medium and long term climate projections	Result / Output	National	Quarterly		SAWS	
		Dam and water capacity	Result / Output	District, Province, National	Quarterly		DWS	
		Irrigation demand	Result / Output		Quarterly		DWS	
Vulnerability and Early Warning information	Cross-cutting	Extreme weather events		District, Province, National	Quarterly		SAWS	StatsSA, DSD, DoA, DED, National Treasury, DHA, DPME, DST
		Household food requirements estimates	Impact		Monthly	Household level	DoA	
		Pest infestation and surveillance information	Result / Output		Monthly	Household level	DoA	
		Grants access	Process		Monthly	Individual level	DSD	
		Number of people in need of food assistance	Process		Monthly	Individual level	DSD	
		Proportion of population receiving food assistance	Process		Monthly	Individual level	DSD	
		Proportion of displaced population relying on food assistance	Process		Monthly	Individual level	DSD	
		Migration profiles	Process		Monthly		DHA	
		Rail-lines & road density	Result / Output	Province, National	Quarterly		DT	
		Employment trends	Result / Output		Monthly	Individual level	StatsSA	
		Strategic reserves information	Result / Output	National	Quarterly		DoA	
		Stock-level estimates	Result / Output		Quarterly		DoA	

Impact/Outcome Indicators: *These are indicators that measure the extent to which objectives and goals have been achieved. Indicators of* ***impact*** *relate to objectives, and indicators of* ***outcome*** *relate to goals*

Type of information	FNS dimension	Specific data/indicators	Type of indicator (Process / Result / Output / Impact)	Levels of information collection	Frequency	Units / measurement data generation	Main institution responsible/ coordinating information collection	Key institutions involved
***Process Indicator**: These are indicators which directly measure the performance of key **processes** that affect objectives.* ***Result indicators** capture the expected effects on participants or entities brought about by an operation. **Result indicators** shall correspond to the specific objectives set out for each investment priority selected* ***Outputs** tell the story of what you produced or your organization's activities. **Output** measures do not address the value or impact of your services for your clients*								

3.3. Setting up the system

3.3.1. Establishment of a Food and Nutrition Security Information Systems Unit (ISU)

A critical initial step in setting up the multi-level FNSIS would be the establishment of a FNS Information Systems Unit (ISU) which will be a technical unit which sits in the proposed National Food and Nutrition Security Council (NFNSC)[2]. The Unit will be responsible for managing and overseeing the flow of data uploaded from the subnational to the national levels, as well as all aspects related to the maintenance, updating and interoperability of the digital and software components of the FNSIS. This Unit should be composed of a dedicated staff with technical expertise in data/information management, advanced information and communication technology skills, as well as FNS-related data analysis skills. The Unit must also maintain personnel at the provincial level who will be responsible for managing the flow of data and information at the subnational level and from the subnational to the national level.

Box 1. Specific roles of the Information Systems Unit

- Manage and maintain centralised national and provincial FNS databases
- Define the hardware requirements and algorithms required for the system to function to expected standards
- Developing and consistently updating the system's national and provincial digital platforms
- Ensure that data/information is being uploaded correctly and in standardised ways
- Develop and install security functions for the system and monitor the system for security breaches to protect sensitive FNS information
- Research on latest ICT trends and advise the NFNSC on appropriate software which may enhance the effectiveness and efficiency of the system in line with the government's information sharing and security procedures

[2] The nature, form and function of the envisaged NFNSC are fully discussed in the guidelines for the establishment of multilevel FNS coordination structures submitted as a separate report of the overall project

3.3.2 Formation of Information System Working Groups

Among important initial initiatives in setting up the system also will be for the proposed Food and Nutrition Security Councils[3] particularly at the subnational level to organise the various state and non-state actors who are part of these structures into three working groups which mirror the different existing FNS-related information that is currently being collected and disseminated i.e. an agriculture and marketing information working group; a health and nutrition information working group; and a vulnerability, meteorological and hydrological information working group (cf. FAO, 2000).

From the consultations undertaken and the extensive review of literature on FNS-related information systems in South Africa carried out under this project, it is noted that every FNS-related information type in the country has institution(s)/department(s) which act as the main anchor e.g. DAFF for agricultural information, Department of Health for health and nutrition information, South African Weather Services and the Department of Water and Sanitation for meteorological and hydrological information, Statistics South Africa and the Department of Social Development for general vulnerability information, and the National Agricultural Marketing Council for marketing information. These institutions/departments can be allocated coordinating roles and oversee activities in the different working groups, including the standardisation of data and information collection, analysis and data management within their individual working groups. As the envisaged multilevel information system becomes operational, the coordinating institutions should then be given rights to upload and update data and information related to their specific FNS information on both the subnational feeder databases and the central national database under the supervision of the ISU.

3.3.3. Digital platform – design and core functionalities

Another critical aspect in the setting up of the multi-level integrated FNSIS will be the development of a one-stop digital platform composed of the following:

a) Central national and provincial databases where all the data filtering from both the national and subnational levels as fed by coordinating institutions of different working groups will be deposited.

[3] The nature, form and function of the envisaged subnational FNSCs are fully discussed in the guidelines for the establishment of multilevel FNS coordination structures submitted as a separate report of the overall project

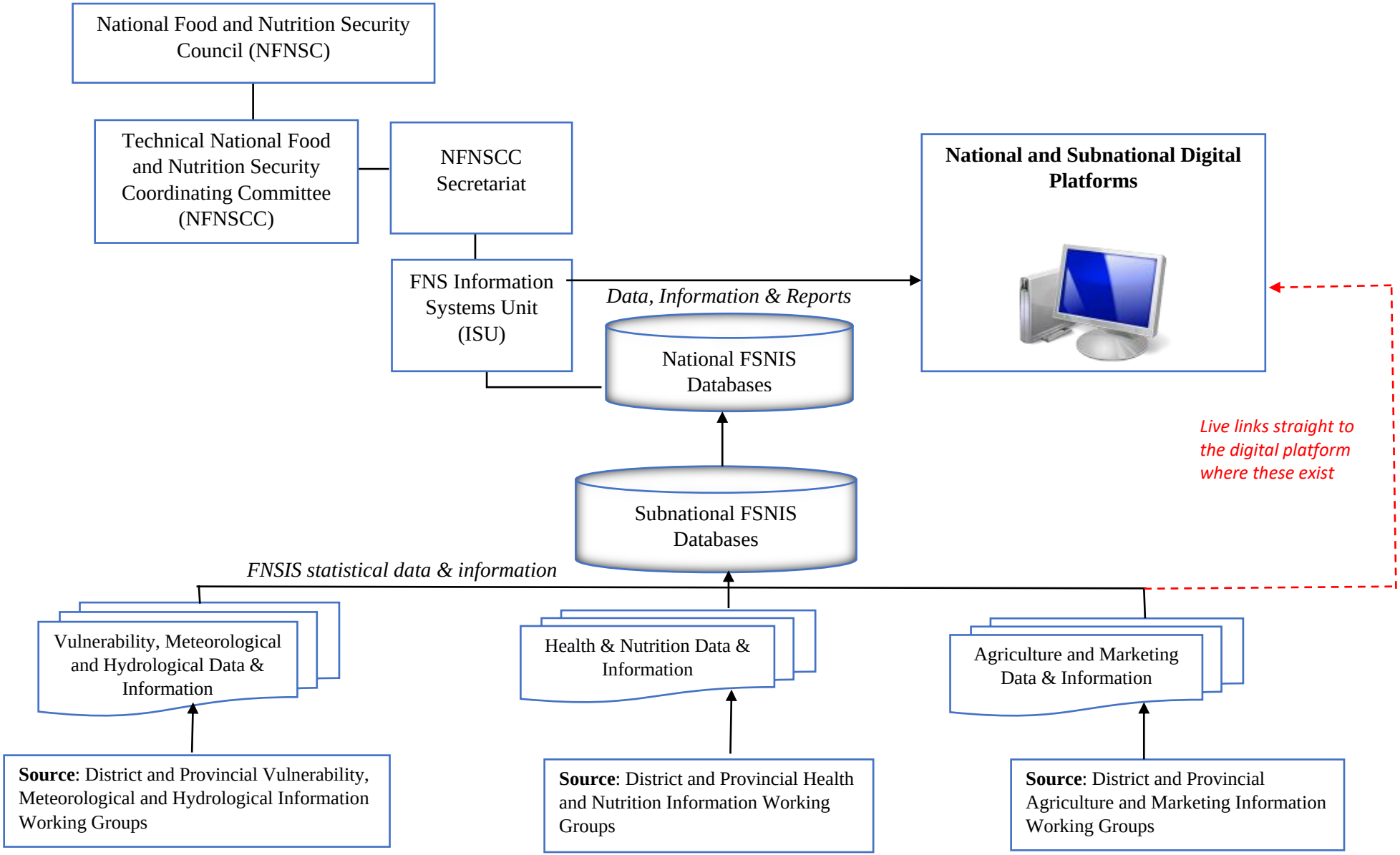
b) A control panel that is meant to show early warning information which should alert information users on issues that require immediate responses and/or planning[4].

The digital platform should also act as a central gateway to accessing other key digital platforms underpinning individual FNS-related information systems as well as links to relevant information products released by different FNS stakeholders such as regular bulletins, text documents, updated photos and maps as well as earth observation data. It should also have links to live feeds for such information as hydrological and meteorological information. The platform should incorporate latest advances in Geographical Information Systems (web-GIS) functionalities and spatial technology, to enable users to, for example, view and generate information on the various 'estimation types' and measures for food and nutrition security at different administrative levels e.g. district, provincial and national, through dynamic maps, graphs and charts. The digital platform should be configured in such a way as to ensure that the provincial databases feeding into it use similar formats and software to allow interoperability of systems.

Security functions should be built into the digital platform so as to avoid unauthorised commands as well as unauthorised access to some databases. As highlighted earlier, only institutions coordinating the different working groups should be given rights to upload and update information related to their specific working groups, whilst all the other institutions may be given access rights to upload and update by the ISU. Access to databases with sensitive data, for example, around health and nutrition, should be password protected and users who need such data/information should seek permission from the ISU. Access restrictions should not, however, impede data sharing among key institutions working on FNS-related issues in the country. During national-level key informant interviews, there were, for example, complaints by officials in various government departments around the Department of Health data being largely inaccessible and it was noted that 'patient confidentiality' is raised each time they ask for DoH data.

[4] FAO (2000) equates the purpose of the control panel to that of a vehicle dashboard which presents different kinds of information that can be analysed to anticipate events which may destabilise each of the 4 FNS dimensions (i.e. food availability, access, utilisation and stability). The control panel may make use of simple colour indexes similar to the ones used in the Integrated Phase Classification System for alerting when FNS situations (vis-à-vis the different dimensions) in different provinces are to be considered as generally secure (FNS-wise), borderline secure, acute/crisis situation, an emergency, or a catastrophe. This will however require that consistency be built into the actual statistical calculations which will determine these colour index interpretations across the country's 9 provinces

Figure 1. Configuration of the multilevel FNSIS



Given the massive technical and financial resources needed in setting up a composite national information system of this kind, the integrated FNSIS should be set up in phases. In the first phase of its establishment, the system may, for example, start with a few indicators (agreed across the different working groups), representing the four widely accepted dimensions of FNS (i.e. availability, access, utility and stability of supply). These indicators may then be expanded in subsequent phases as the system becomes fully operational. In the same vein, in the initial phase, the digitalisation process may start with a few experimental provinces and districts then spread these as the system develops. Whilst the provision of information below the district level may be too ambitious especially in its formative phase, the system should, ideally, be able to start by providing district-level summary information upward (to provincial and national levels).

4. RECOMMENDATIONS FOR SUSTAINABILITY OF THE SYSTEM

If the integrated FNSIS is to be useful for continued monitoring, planning and targeting into the long term, the following factors are critical:

a) Data and information must be updated on a regular basis. Whilst indicators across different working groups may be updated once every year, intervals for uploading data/information should be mutually agreed by actors within and across the different working groups, working within the ambit of the FNSCs at different levels.
b) The integrated FNSIS will virtually depend on the existing individual FNS-related information systems for it to efficiently function. It is therefore critical that individual FNS-related information systems continue to strengthen and further develop their own collection, analysis and dissemination of information at both the national and subnational levels for the sustainability of the integrated system.
c) The FNSISU directly controlling the technical aspects of the integrated system should comprise of staff that is well-trained in data processing and data management. In addition, those responsible for uploading and updating data and information at the provincial level should have the requisite data entry and computing skills. In essence, the technical team within the ISU at the national level should be in regular contact with those responsible for processing and uploading data and information at the provincial level to make sure that the work is being done in harmonised and synchronised way according to expected standards
d) FNSCs at different levels should be at the centre of building ownership for process sustainability. All key FNS-related state and non-state actors must be incorporated into

FNSC platforms at all levels so that they are actively involved in contributing the needed information and data into the system and that every institution's role vis-à-vis the success of the system is clear.

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Appendix 1. Current FNS-related information systems in South Africa

FNS-related information systems	Institution/Actors	Description	FNS Information (indicators/ data/ variables)	Comments
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 http://www.fao.org/faostat/en/#data/FS -Land portal	-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	

		https://landportal.org/voc/regions/south-africa	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)	- 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.	- a digital platform called the National Department of Health Data Dictionary (https://dd.dhmis.org); aim is to support the DHMIS policy -keeps a large volume of health & nutrition indicators at national, provincial & district levels; -updated monthly - 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. (*see Garrib et al., 2008: 550*) -the digital platform allows selected information to be downloaded as pdfs, excel, CSV, etc., formats
	Department of Basic Education	Annual reports on the performance of the National School Nutrition Programme	-total number of learners fed -Number of feeding days -Meal cost per learner (Q1-3 primary, secondary & special school) -Total number of vegetable gardens -Number of cooked meals served per week -Number of uncooked meals served per week	- Providing learners with nutritious meals is the key outcome of this programme -The reports are published annually with the aim of reflecting on the general performance of the NSNP -provides a summary of the NSNP performance per province -Does not report on any key nutrition indicators
	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	-Anthropometric measures/ nutrition status (height, weight, BMI, height-for-age (stunting), weight-for-height (wasting), and weight-for-age (underweight), etc.) -Breastfeeding, infant feeding practices & supplementation	-useful for generating key anthropometric indicators, complementing other national surveys - no information on food consumption patterns, expenditures on food, or food frequency is captured
		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	Nutrition Landscape Information System (NLiS) (Global Nutrition Monitoring Framework) http://apps.who.int/nutrition/landscape/global-monitoring-framework?ISO=zaf http://apps.who.int/nutrition/landscape/report.aspx?iso=zaf	-indicators contributing to a comprehensive view of nutrition for health and development in South Africa -Primary & intermediate outcome indicators: stunting in children (0 – 59 months), Anaemia in pregnant & non-pregnant women, Low birth weight, Overweight and obesity in children, adolescents & women, Exclusive breastfeeding under 6 months, Wasting in children (0 – 59 months), underweight, 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;	-use different sources of data, such as NIDS, SADHS, Global Health Observatory (GHO), UNICEF, International Labour Organisation -some variables are outdated, some reporting data that is over 10 years old -data at national level, not possible to disaggregate it to lower levels

			Births in baby-friendly facilities; Availability of national-level provision for breastfeeding counselling services in public health and/or nutrition programmes; etc. -Policy, environment, and capacity indicators: Nutrition professionals density; Maternity protection: Compliance with international labour standards; etc.	
	Food and Agriculture Organisation	Prevalence of Undernourishment: indicator developed by FAO to measure food insecurity, reported since 1974	-Provides annual data on key indicators of: - Average Dietary Supply Adequacy - Average Supply of Protein of Animal Origin - ; Prevalence of Food Inadequacy; Children aged <5 years wasted (%); Children aged <5 years stunted (%); Children aged <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	-challenge seems to be that it always lags in terms of years; and not forward looking

	UNICEF	https://data.unicef.org/topic/nutrition/malnutrition/ [UNICEF/WHO/World Bank]	(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 -child nutrition indicators: stunting, wasting, overweight & underweight in children under 5 years -vitamin A & iron deficiencies	
	IFPRI	-The Global Hunger Index (GHI)	-a tool that measures and tracks hunger at the global, regional, and country levels -scores calculated each year to assess progress, or the lack thereof, in combating hunger - GHI scores are based on the following four indicators: undernourishment, child wasting, stunting & mortality	- The source for undernourishment data is FAO; the source for child mortality data is UN Inter-agency Group for Child Mortality Estimation (UN 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	-urban and food price trends -price trends in the meat sector (beef, pork, lamb) --price trends in the dairy sector (milk, powdered milk, cheese, margarine) -price trends in the maize sector	-these annual reports provide more insight into complex factors driving the agriculture commodity and food prices in the country -availability, affordability and affordability of

			-production. Stock levels and consumption of white and yellow maize -white and yellow maize price trends -real farm value of super maize meal -real farm gate and retail prices of white and brown bread	nutritious food play is crucial in each of the households -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
	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	- 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 -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 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) (http://niwis.dws.gov.za/niwis2/)	- 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-censual 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)	-Approved by cabinet in 2006, has gone through process of conceptualisation, feasibility study, etc., and now being implemented; -aim is to develop an integrated database of poor households to manage poverty related information to inform service needs, enhance coordinated targeting & tracking of households as they graduate from poverty; -seems to derive most of its lessons from Latin American countries (Mexico)	-phase 1 of the NISIS set to be launched in 2019/20 financial year; -this is a promising source of information, if successfully implemented; -would provide valuable data/ indicators for particularly the food access dimension; -its coordination across the social protection & human development cluster, and at the three levels government, will minimise duplications
		Register of NPOs	-publicly shares excel spreadsheets of registered NPOs (CBOs & NGOs) per province to increase transparency and accountability -the spreadsheet provides address, contact information, sector and a description of services offered by the different NPOs	-the database can be used to profile NPOs offering FNS related services
	Department of Economic Development	Annual reports	-Employment growth (number of new jobs) -growth in women employment -employment (total) -Growth in youth jobs -Youth jobs (total)	-these are the key economic highlights for period 2016/17 -the report does not report on specific nutrition information

			-agriculture value add	-the department should perhaps consider creating a platform where their target 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 http://www.fao.org/faostat/en/#data/FS	-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