Enhancing food security through the regulation of organic farming in South Africa

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ABSTRACT

South Africa faces a triple burden of malnutrition, namely undernutrition, micronutrient deficiencies and obesity. Food security is not just about having enough food, but rather about nutrition, which is achieved by adequate amounts of essential nutrients that are eaten on a daily basis. The South African government supports commercial farming with its green revolution technologies such as monocropping, chemical inputs and irrigation mechanisation that are associated with environmental and soil degradation, public health hazards, biodiversity loss and the use of excessive water. There is a need for a sustainable agricultural system such as organic farming. Organic farming does not use synthetic fertilisers and pesticides and, in addition to providing nutritious food, it also contributes to the reduction of CO_2 emissions and contributes to food security. This study aims to investigate how organic food production should be regulated in order to contribute to food security in South Africa. This mini-dissertation provides an overview of organic farming with its main advantages and disadvantages and how it can affect food security in South Africa. As organic farming is not formally regulated in South Africa at this stage, the policy framework and voluntary standards regarding organic farming are evaluated. This study proposes that organic agriculture be regulated to provide credibility to organic produce in the export and local markets. As organic products fetch high price premiums, it may contribute to the prevention of food fraud. Organic farming may also contribute to the reduction of climate change as greenhouse gas levels are reduced.

Keywords: Food security, sustainability, organic farming, climate change, policy framework, regulation of organic farming, voluntary standards, South Africa

LIST OF ABBREVIATIONS

AAMP	Agro-processing Masterplan 'social compact'
ADHD	Attention Deficit Hyperactivity Disorder
Afr Health Sci	African Health Sciences
AMR	Antimicrobial Resistance
APAP	Agricultural Policy Action Plan
Biomed Res Int	BioMed Research International
Br J Cancer	British Journal of Cancer
CA	Conservation Agriculture
CFS	Crop Fertility Services
CFS	Committee on World Food Security
DAFF	Former Department of Agriculture, Forestry and Fisheries
DALRRD	Department of Agriculture, Land Reform and Rural Development
DBE	Department Basic Education
DEFF	Department of Environment, Forestry and Fisheries
DPME	Department of Planning, Monitoring and Evaluation
DSA	Development Southern Africa
EC	European Commission
EEC	European Economic Community
EC-FAO	European Commission-Food Security Programme
EIP-AGRI	European Innovation Partnership for Agricultural Productivity and Sustainability
EPRS	European Parliamentary Research Service
EU	European Union
European J Nutr Food Saf	European Journal of Nutrition & Food Safety
FAO	Food and Agriculture Organisation of the United Nations
FRIDGE	Fund for Research into Industrial Development, Growth and Equity
Front Environ Sci	Frontiers in Environmental Science
GFSA	general standard for food additives
GG	Government Gazette

GHG	Greenhouse Gas
GHS	General Household Survey
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
GM Crops Food	Genetically Modified Crops and Food
GMOs	Genetically/Genetic Modified Organisms
HHP	Highly Hazardous Pesticides
H+	Hydrogen Ions
HLPE	High-Level Panel of Experts
IFOAM	International Federation of Organic Agriculture Movements
IJER	International Journal of Environmental Research
IISD	International Institute for Sustainable Development
Indian J Clin Biochem	Indian Journal of Clinical Biochemistry
IPC	Integrated Food Security Phase Classification
J Alzheimer's Dis	Journal of Alzheimer's Disease
J Environ Manage	Journal of Environmental Management
J Public Health Res	Journal of Public Health Research
JSA	Journal of Sustainable Agriculture
KCOA	Knowledge Centre for Organic Agriculture and Agroecology in Africa
Nat Hum Behav	Nature Human Behaviour
NDCs	National Determined Contributions
NDoH	National Department of Health
NDP	National Development Plan
NFNS	National Food and Nutrition Security
NIH	National Institute of Health
NLM	National Library of Medicine
NNIA	Nestlé Nutrition Institute Africa
NPK	Nitrogen, Potassium and Phosphorus
NRDC	Natural Resources Defence Council
NSW-DPI	New South Wales Department of Primary Industries
OA	Organic Agriculture
PELJ	Potchefstroom Electronic Law Journal

PGS	Participatory Guarantee System
Plant Biotechnol Rep	Plant Biotechnology Reports
PMC	PubMed Central
PMG	Parliamentary Monitoring Group
POPs	Persistent organic pollutants
SABS	South African Bureau of Standards
SA J Agric Ext	South African Journal of Agricultural Extension
SAJSc	South African Journal of Science
SANAS	South African National Accreditation System
SANS	South African National Standards
SAOSO	South African Organic Sector Organisation
SDGs	Sustainable Development Goals
SMME	Small, Medium and Micro-enterprises
SPSS	Strategic Plan for Smallholder Support
Stats SA	Statistics South Africa
TCA	True Cost Accounting
UN	United Nations
UNCA	United Nations Climate Action
UNEP	United Nations Environmental Program
UNFCCC	United Nations Framework Convention on Climate Change
UNFSS	United Nations Forum on Sustainability Standards
UPFs	Highly Processed Foods
USA	United States of America
WHO	World Health Organisation
WWF	World Wildlife Fund

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Chapter 1: Introduction

1.1 Problem statement

An estimated 815 million people worldwide lack access to sufficient nutritious food.[1] In South Africa, approximately 9.3 million people (16% of the almost 60 million population) are experiencing high levels of acute food insecurity and 1.2 million people suffer severe food insecurity.[2] 683 211 households with children five years or younger reported experiencing hunger in South Africa in 2021.[3] Malnutrition has three dimensions, namely undernutrition, micronutrient deficiencies and obesity.[4] The economic impact of obesity in South Africa, including obesity-related costs, amounts to R701 billion each year.[5] Despite the millions of hungry people, an estimated 134kg per capita of household food is wasted per year.[6] Food security is defined as follows:

> When all people, at all times, have physical and economic access to sufficient safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life.[7]

Food security is not just about having enough food, but rather about nutrition, which is achieved by the intake of adequate amounts of essential nutrients that are eaten on a daily basis. To ensure this, sufficient nutritious food needs to be produced and provided. Nutritious food is not produced by industrial farming, which generally involves monoculture and the use of synthetic pesticides and fertilisers, which have a negative impact on human health, the environment and climate change.[8] In addition, industrial agriculture also contributes to deforestation, biodiversity loss, soil degradation, water scarcity and impacts on water quality and

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1 FAO 2017 State of Food Security and Nutrition in the World. Referred to as under nutritious. 1.
2 IPC 2021 *Acute Food Insecurity Analysis, September 2020 – March 2021* 4. Also see Shushu, Swanepoel and Mmbengwa 2021 *SA J Agric Extension* 43–58.
3 Stats SA 2021 *Focus on food inadequacy and hunger in South Africa. 1.*
4 FAO 2022 *Food Systems Profile – South Africa* 14.
5 NDoH 2023 *Strategy for the Prevention and Management of Obesity in South Africa, 2023-2028* 20.
6 UNEP *Food Waste Index Report 2021* 8.
7 Food and Agriculture Organisation (hereafter FAO) of the United Nations (UN). On food security also see Terblanche 2012 *PELJ* 236; Snyman and Gildenhuys 2015 *PELJ* 1691–1724.
8 NRDC 2020 *Industrial Agriculture 101* 1.

damage marine systems.[9] There is a need for a sustainable agricultural[10] system that provides nutritionally adequate, safe and healthy food while optimising natural and human resources.

Organic agriculture is a sustainable system that enhances agro-ecosystem health as well as biodiversity.[11] It is the only system that explicitly avoids the use of synthetic fertilisers, pesticides[12] as well as genetically modified organisms (GMOs) and nanomaterials.[13] In a study by the EAT-Lancet Commission together with 37 scientists, it was found that organic agriculture can provide enough food for the 2050 population.[14] Africa had more than two million hectares of certified organic agriculture in 2022,[15] while, in 2019, 154 South African organic producers farm on only 30 000 hectares of land.[16] It takes in most instances three years to convert from industrial to organic agriculture.[17] Although the demand for organic products is growing, the South African government supports mostly industrial farming.[18] There, are, however, approximately four million small-scale farmers in South Africa.[19] Although most of them are not certified as organic farmers, they meet the principles of organic agriculture.[20]

Farmers may choose one of three forms of voluntary organic certification, namely (a) first-party (face-to-face) or "self-claim" certification, (b) second-party certification (participatory guarantee system (PGS)), which is based on a group concept, and (c) third-party certification, normally used by producers who want to export their products.[21] The South African Organic Sector Organisation (SAOSO)

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9 Lomax (UNEP) 2020 *10 Things you should know about industrial farming. 1-11*

10 The words "agriculture" and "farming" are used interchangeably in the study with the same meaning.

11 Halberg and Muller *Organic Agriculture for Sustainable Livelihoods* 10.

12 Halberg and Muller *Organic Agriculture for Sustainable Livelihoods* 10.

13 IFOAM 2020 *Genetic Engineering and Genetically Modified Organisms* 4.

14 Willett *et al* 2019 *The Lancet* 485.

15 Willer *et al* (EC) 2022 *The world of organic agriculture – Statistics and emerging trends* 1.

16 Sinxo 2022 *What's holding Mzansi's organic fruit producers back* 1.

17 SAOSO 2023 *Standard for Organic Production and Processing* (Version 2) section B 4.2.3 on 34.

18 FRIDGE Study 208; Kriel *Organic fruit production almost non-existent in South Africa* 2; Kelly and Metelerkamp *Smallholder Farmers and Organic Agriculture in South Africa* 8.

19 Kelly and Metelerkamp *Smallholder farmers and organic agriculture in South Africa* 19.

20 Thamaga-Chitja and Hendriks 2008 *Development Southern Africa* 318.

21 SAOSO 2023 *Standard for Organic Production and Processing* (Version 2); UNEP *Trade in Certified Organic Agriculture* 35.

drafted the Standard for Organic Production in South Africa (version 2), which was published in January 2024. Organic farmers who want their products to be certified as organic must comply with this standard.[22] This standard is based on the International Federation of Organic Agriculture Movements (IFOAM) Standard and the European Union (EU) Standard for Organic Agriculture.[23] The South African Bureau of Standards published SANS 1369:2016, which is also based on the IFOAM and EU Standards, and is similar to the SAOSO Standard. In their document, SAOSO envisaged that the South African government will, through appropriate legislation, recognise SANS 1369:2016 as the National South African Standard.[24]

Although there is no legislation regarding organic agriculture in South Africa, the government released the 10th draft of the *National Policy on Organic Production* in 2019. By June 2024, it was still a discussion paper.[25] There are other policies, plans and legislation that have an effect on organic agriculture;[26] however, none of them deal with organic farming as such. The only formal document available is the SANS standard, but adherence to the document remains voluntary. There seems to be a need to regulate organic farming to ensure that it contributes to food security in South Africa.

1.2 Research question, aims and objectives of the study

The research question is therefore: How should organic farming be regulated in order to contribute to food security in South Africa?

This study aims to investigate how organic farming (particularly organic food production) should be regulated in order to contribute to food security in South Africa. In the furtherance of this aim the following sub-aims are stated:

22 SAOSO 2023 *Standard for Organic Production and Processing* (Version 2) 8.
23 SAOSO 2023 *Standard for Organic Production and Processing* (Version2) on 2 and section A-2 para 7.
24 Section A-2 para 2.
25 Paragraph 4.2.3 below.
26 See chapter 4.2 – 4.3.7 below.

- To discuss food insecurity in South Africa and the need for a sustainable agricultural system.
- To provide an overview of organic farming with its main advantages and disadvantages and how it may impact food security in South Africa.
- To discuss the South African policy framework relating to organic farming.
- To analyse the South African legislation that may impact organic farming.
- To make recommendations as to how organic farming can contribute to food security in the country.

1.3 Research methodology

This mini-dissertation is based on a desktop study. The applicable policy and legislation framework regarding organic farming is investigated, and supported by textbooks, journal articles and other literature.[27] Other literature includes non-legal materials. The researcher does not purport to be an expert in the field of agricultural science,[28] but the materials are used to provide an understanding of the concept of organic farming and its standards. It is not possible to propose legal requirements if the concept is not well understood.[29]

1.4 Chapter division

Chapter 2 discusses the problem of food insecurity in South Africa, the burden and consequences of malnutrition, food waste and industrial farming with its devastating techniques of monocropping, synthetic fertilisers and pesticides with their effect on human health and the environment, soil gradation and biodiversity loss. Water availability, deforestation and antimicrobials, the impact of climate change and the need for a sustainable agriculture system are furthermore discussed.

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27 The research for this study was concluded March 2024 but important new or additional information was added where necessary.

28 The student practices limited organic farming and has therefore some practical experience thereof.

29 See in this regard Du Plessis and Du Plessis "Doctoral research in environmental law (Part 1)" 212–215.

Chapter 3 focuses on organic farming as a sustainable agricultural method. The definitions and principles of organic farming as well as the relationship with agro-ecological approaches are touched upon. The implications of organic food for human health on climate change will be discussed. GMOs, nanomaterials as well as the technology and training regarding organic farming, organic farming globally and in South Africa, small-scale farming, the problems changing conventional farming to organic farming as well as the certification system and the markets and labels regarding certified products will be discussed. The possibility of organic farming to feed the world in 2050 will be investigated. I will touch briefly on other sustainable agricultural methods.

Chapter 4 analyses the legal framework (plans, policies and legislation) regarding organic farming, namely the National Food and Nutrition Security Plan, the Aro-Processing Masterplan, the 10th Draft of the National Policy on Organic Production as well as policies and plans regarding small-scale farmers, which include the National Development Plan, the Strategic Plan for Smallholder Support, National Policy Framework on the Support and Development of Small and Medium Agro-Processing Enterprises, Agricultural Policy Action Plan, Agri-Parks and the Strategic Plan 2020-2025. Legislation relevant to organic farming will be investigated. They include the Foodstuffs, Cosmetic and Disinfectant Act 54 of 1972, Agricultural Products Standard Act 12 of 2023, the Fertilizers, Farm Feeds, Agricultural Remedies *and Stock Remedies Act* 36 of 2018 and the *Plant Breeders' Rights Act* 12 of 2018. The SAOSO Standard for Organic Production and Processing as well as the SANS 1369:2016 Standard will be discussed. An agricultural policy needed in line with the realities of climate change and the triple burden of malnutrition will be investigated.

Chapter 5 concludes the study with recommendations for the regulation of organic farming.

Chapter 2: Food insecurity and the need for a sustainable agriculture system

2.1 Introduction

The aim of this chapter is to discuss food security in South Africa and the need for a sustainable agricultural system. The chapter addresses the three dimensions of food insecurity, namely malnutrition (with its three dimensions namely undernutrition, micronutrient deficiencies and obesity) the problem of food waste as well as the six dimensions of food security.

Industrial farming (with its green revolution technologies) and monoculture associated with environmental degradation, excessive water use and conventional tillage techniques are investigated as well as the damage caused by industrial farming through the use of chemical pesticides and fertilisers, biodiversity loss and deforestation. The influence of climate change on agriculture and the contribution of agriculture to climate change will also be addressed.

2.2 Food security in South Africa

South Africa is food secure at the national level, but challenges such as poverty, unemployment, the energy crises and rising food prices are influencing food security at the household level.[30] In 2020, following the Covid-19 pandemic, 9.3 million people (16% of the population) in South Africa faced high levels of food insecurity.[31] In 2021, 15% (about 2.6 million) of the estimated 17.9 million households in South Africa reported that they have inadequate access to food and 6% (1.12 million) reported that they have severely inadequate access to food.[32]

Therefore, approximately seven million people experience chronic hunger.[33] Two-thirds of these households are located in urban areas.[34] 17.3%, (3.1 million) of

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30 Stats SA 2021 *Assessing food inadequacy and hunger in South Africa in 2021 using the General Household Survey* (GHS) 1.
31 IPC 2021 *Acute Insecurity Analysis, September 2020 – March 2021* 4.
32 Stats SA 2021 *Assessing food inadequacy and hunger in South Africa in 2021 using GHS* 3.
33 FAO 2022 *Food Systems Profile – South Africa* 14.
34 Stats SA 2021 *Assessing food inadequacy and hunger in South Africa in 2021 using GHS* 16.

households in South Africa are involved in agriculture activities, but only 12% reported that it is the main food source for their household.[35]

South Africa faces a triple burden of malnutrition despite the fact that a sufficient quantity of food is produced.[36] Not all food reaches those who are in need of it, or nutritious food is unaffordable.[37] Malnutrition has three dimensions, namely undernutrition, micronutrient deficiencies, and overweight or obesity.[38] Many children in South Africa die as a result of acute malnutrition.[39] Children who suffer from malnutrition struggle to learn and concentrate.[40] Approximately 50% of pregnant women in South Africa have anaemia (caused by a lack of nutrients), which is a major cause of maternal mortality.[41] Twenty-seven percent of children under five are stunted.[42] Chronic undernutrition causes stunting, and affects both physical and cognitive development.[43] South Africa loses in excess of US$1.1 billion in GDP due to vitamin and mineral deficiencies.[44] More female-headed households than male-headed households are experiencing inadequate or severely inadequate access to food.[45] Thirty percent of children in South Africa live "in households with a per capita income of less than R571 per month", which is obviously not enough to secure their nutritional needs.[46]

That said, obesity has become an urgent public health crisis in South Africa, with 31% of adult males, 67% of adult females and 13% of children under five years old being either overweight or obese in 2016.[47] The economic impact of obesity,

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35 Stats SA 2021 *Assessing food inadequacy and hunger in South Africa in 2021 using GHS* 16.
36 FAO 2022 *Food Systems Profile – South Africa* 14.
37 Stats SA 2021 *Focus on food inadequacy and hunger in South Africa*.1.
38 FAO 2022 *Food Systems Profile – South Africa* 14.
39 Sonday *South Africa's burden of child malnutrition remains unacceptably high – Child Gauge 2020 report*. 4.
40 Stats SA 2021 *Focus on food inadequacy and hunger in South Africa in 2021* 1.
41 Hoque, Hoque and Van Hal 2022 *Afr Health Sci* 81-92.
42 DPME 2017 *National Food and Security Plan for South Africa 2018-2023* 28.
43 DPME 2017 *National Food and Security Plan for South Africa 2018-2023* 28-29.
44 The World Bank 2011 *South Africa – Nutrition at a glance* 1.
45 Stats SA 2021 *Assessing food inadequacy and hunger in South Africa in 2021 using GHS* 4.
46 Sonday *South Africa's burden of child malnutrition remains unacceptably high – Child Gauge 2020 report* 1.
47 NDoH 2023 *Strategy for the Prevention and Management of Obesity in South Africa, 2023-2028* 12.

including obesity-related costs such as medical spending, loss of productivity and absenteeism, amounts to R701 billion each year. [48]

Diabetes, cardiovascular diseases, cancers and osteoarthritis are common health consequences of being overweight and obesity.[49] Obese children experience, in addition to increased future risks such as premature death and disabilities, risks of fractures, hypertension, breathing problems, insulin resistance and psychological effects.[50]

Hall[51], in his study on the causes of the obesity epidemic, found the following:

> Obesity probably resulted from changes in caloric quantity and quality of the food supply in concert with an industrialized food system that produced and marketed convenient, highly-processed foods from cheap agricultural inputs. Such food often contains high amounts of salt, sugar, fat and flavour additives and are engineered to have supernormal appetitive properties driving increased consumption.

Synthetic chemicals used as food additives may cause health issues such as asthma, cancer, heart difficulties, attention deficit hyperactivity disorder (ADHD) and obesity.[52] The *Codex Alimentarius*[53] defines a food additive as: "Any substance not normally consumed as the food itself and not normally used as a typical ingredient of the food, whether or not it has nutritive value".[54] Synthetic additives are harmful, not only for human health, but also for the environment. They consist of chemical substances that can lead to a loss of biodiversity and the contamination of water and soil.[55]

The Department of Health finalised its Strategy for the Prevention and Management of Obesity in South Africa 2023-2028[56] in 2023, with the goal to: "reduce the

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48 NDoH 2023 *Strategy for the Prevention and Management of Obesity in South Africa, 2023-2028* 20.
49 WHO 2024 *Obesity and Overweight* 3.
50 WHO 2024 *Obesity and Overweight* 3.
51 Hall 2019 *Obesity* 11-13.
52 Sambu *et al* 2022 *Biomed Res Int* 1-11.
53 FAO 2024 *Codex Alimentarius*: "The *Codex Alimentarius* or 'Food Code' is a collection of international standards, guidelines and codes of practice to protect the health of consumers and to ensure fair practices in the food trade."
54 Pinto *et al* 2022 *Cleaner Environmental Systems* 1-12.
55 Pinto *et al* 2022 *Cleaner Environmental Systems* 1-12.
56 NDoH 2023 *Strategy for the Prevention and Management of Obesity in South Africa, 2023-2028* 13.

prevalence of obesity and diet-related non-communicable disease in the South African population." The mission is to "empower South Africans to make healthy choices by enabling equitable access to healthy food, physical activity opportunities and a capacitated healthcare system that supports the prevention and management of obesity." Highly-processed or ultra-processed foods (UPFs) are classified as NOVA group 4 foods.[57] UPFs make use of several ingredients, such as food additives (that improve palatability), processed raw materials, such as modified starches and hydrogenated fats and ingredients, such as soy protein or meat that has been mechanically separated.[58] These foodstuffs are of industrial origin, as they can be stored for long periods and are pleasant. UPFs are affordable, highly profitable for their producers and heavily flavoured. They are sold in supermarkets and are aggressively marketed.[59] They are also cheaper than nutritious food. UPFs also use extensive packaging. Apart from the fact that they may contain compounds of carcinogenic properties, the packaging is also a source of environmental waste.[60]

Malnutrition occurs, not because of a lack of available food, but because of income and multi-dimensional poverty as well as the difference in price of healthy foods compared to these highly-processed foods.[61] Consumers determine what they eat.[62] Some people are obese, not on account of poverty, but due to their food choices. Government, the private sector and organisations can help consumers make healthier choices by providing accurate information and education and ensuring access to nutritious foods (but again only if they are affordable).[63] Although, according to the National Food and Nutrition Security Plan for South Africa 2018-2023, the emphasis in South Africa is on food production (quantity) and not on

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57 The Nova Classification System was designed by the Centre for Epidemiological Studies in Health and Nutrition, School of Public Health, University of Sao Paulo, Brazil. NOVA" (the name, not an acronym) helps people group foods "according to the extent and purpose of the processing they undergo. Group 1: Unprocessed or minimally processed foods; Group 2: Oils. fats, salt and sugar; Group 3: Processed foods; Group 4: Ultra-processed foods".

58 Morea 2021 Merieux NutriSciences Italy *Ultra-processed foods: Nova classification*.2.

59 Morea 2021Merieux Nutri Sciences Italy *Ultra-processed foods: Nova classification.2.*

60 Seferidi *et al* 2020 *Lancet Planetary Health* e437-e438.

61 FAO 2022 *Food Systems Profile – South Africa* 17-18.

62 FAO 2013 *State of food and agriculture 2013: Food systems for better nutrition* 5.

63 FAO 2013 *State of food and agriculture 2013: Food systems for better nutrition* 5.

nutrition (quality and diversity),[64] sustainable agricultural systems that produce nutritious foods are not mentioned.

The National School Nutrition Programme ensures that children in schools situated in destitute areas receive at least one nutritious meal per day in order to improve their concentration.[65] This is a very commendable programme, although studies affirmed problems "with delayed payment of food suppliers and poor monitoring." The food is not always sufficient and the vegetables are not always fresh.[66] Proper storage, preparation, cooking and eating facilities that adhere to health and safety standards are absent in several schools.[67]

2.3 Food waste

Although there are millions of undernourished people in South Africa, an estimated 134kg/per capita of household food is wasted per year,[68] at a cost of approximately R21.7 billion.[69] Worldwide "1.3 billion tons of food are wasted every year, while almost two billion people go hungry or undernourished."[70]

Avoidable food waste concerns not only someone who could have had a meal, but also the resources wasted in producing the food as well as environmental issues such as CO_2 emissions along the food supply chain.[71] In accordance with Sustainable Development Goal (SDG) 12.3,[72] the per capita global food waste must be halved by 2030 and food wastage (losses) along production and supply chains must be reduced, including post-harvest losses. Food waste and food loss are not the same thing; food loss occurs "along the supply chain from harvest up to the

64 DPME 2017 *National Food and Security Plan for South Africa 2018-2023* 4.3(a) on 48. Also see 4.2.1 below.
65 DBE 2021 *National School Nutrition Programme* 1.
66 Mafugu 2021 *J Public Health Res* 1–8.
67 Mafugu 2021 *J Public Health Res* 1–8.
68 UNEP *Food Waste Index Report 2021* 8.
69 See Food Waste 2024 https://ufs.ac.za/natagri/departments-and-divisions/Sustainable-food-Systems-and-Development/ research/food-security 1.
70 UN DESA date unknown *Sustainable Development Goals* 12.3.
71 See Food Waste 2024 https://ufs.ac.za/natagri/departments-and-divisions/Sustainable-food-Systems-and-Development/ research/food-security 1.
72 UN DESA date unknown *Sustainable Development Goals*.

retail level, (but not including the retail level), while food waste occurs at the retail, food service and consumption levels."[73]

A study by the United Nations Environment Program (UNEP) discovered that food wastage in households, per capita, is similar across country income groups and that it is therefore not only a "rich country" problem.[74] There are many reasons for food losses or waste. Losses on the farm are driven by factors such as disease, pests, weather, low market prices or high labour costs. Farmers or distributors cannot always afford the energy costs of drying, storage or refrigerated transport.[75] South Africa's load-shedding problems affect farmers as well as consumers – especially the poor.

2.4 Six dimensions of food security

Food security occurs:

> 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.[76]

Definitions of food security varied over time but the definition cited above, adopted in 1996 and updated in 2001 to add the word "social", remains the authoritative definition.[77] The four dimensions of food security (availability, access, utilisation and stability), frequently used in scholarly and policy literature, were incorporated in the definition.[78] The Integrated Food Security Phase Classification (IPC) Guidelines suggest that these four dimensions must be viewed as interacting "in a sequential manner: food must be available; households must have access to it; they must utilise it appropriately and the whole system must be stable."[79]

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73 UNEP 2021 *Rethinking Food systems* 13.
74 UNEP 2021 *Rethinking Food Systems* 13.
75 Quinton 2019 *UC Davis News and Media Relations* 3.
76 EC-FAO 2008 *An introduction to the Basic Concepts of Food Security* 1.
77 Clapp *et al* 2022 *Food Policy* 2-10.
78 Clapp *et al* 2022 *Food Policy* 2-10.
79 Clapp *et al* 2022 *Food Policy* 2-10.

The High-Level Panel of Experts (HLPE)[80] on Food Security and Nutrition proposed two additional dimensions that should be added to the definition of food security, namely agency and sustainability.[81] The six dimensions are explained in more detail in the following paragraphs.

2.4.1 Food availability

Food availability suggest that sufficient amounts of acceptable and quality food from domestic production, food reserves or commercial imports are available on a consistent basis.[82] Food needs to be available in socially acceptable ways and may include household food production and transport systems to ensure availability at source points.[83]

2.4.2 Food access

Food access entails that people must have economic and physical access to food. It refers to food needed at the household level and the adequate supply of food on a national or international level.[84] *Food access* acknowledges dietary requirements and preferences for optimal nutrition.[85]

2.4.3 Food utilisation

Food utilisation refers to sufficient nutrient and energy food intake as well as the ability and resources to safely prepare meals and store them. It includes a diet that is diverse as well as the intra-household distribution of food.[86]

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80 The HLPE on food security and nutrition is members of the UN's Committee on World Food Security (CFS- "the UN body assessing the science related to world food security and nutrition".

81 HLPE 2020 *Food security and nutrition: Building a global narrative towards 2030* 7-9.

82 FAO 2013 *The state of food insecurity in the world: Measuring different dimensions of food security* 18-22.

83 FAO 2013 *The state of food insecurity in the world: Measuring different dimensions of food security* 18-22.

84 The World Bank 2024 *What is Food Security?*

85 FAO 2013 *The state of food security in the world: Measuring different dimensions of food security* 18-22.

86 The World Bank 2024 *What is Food Security?*

2.4.4 Food stability

Stability refers to the first three dimensions over time. Food security presupposes availability, access and utilisation to be stable and to not be subject to economic factors (unemployment, rising food prices), weather variations or civil conflict.[87]

2.4.5 Agency

Agency is defined as: "[w]hat a person is free to do and achieve in pursuit of whatever goals or values he or she regards as important.[88] Agency also includes the ability of individuals or groups to make their own decisions about what foods they eat, as well as how the food is produced and distributed and their ability to engage in processes regarding the policies and governance of food systems.[89] Achieving agency implies the need and the right to information to any aspect "of food security as well as access and control over resources required for production, harvesting and preparation of foods".[90] Agency embraces the concept of active food citizens instead of passive food consumers.[91]

2.4.6 Sustainability

SDG 2: "End hunger, achieve food security and improved nutrition and promote sustainable agriculture" emphasises sustainability in food security. Sustainability accentuates the connections between livelihoods, ecosystems, society and a political economy to sustain food systems and support food security in the future.[92] Food systems include the:[93]

> Gathering all the elements (environment, people, inputs, processes, infrastructure, institutions, etc.) and activities that relate to the production, processing, distribution, preparation and consumption of food, and the output of these activities, including socio-economic and environmental outcomes.

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87 The World Bank 2024 *What is Food Security?*
88 With reference to the definition of Sen - HLPE 2020 *Food security and nutrition: Building a global narrative towards 2030* 7.
89 HLPE 2020 *Food security and nutrition: Building a global narrative towards 2030* 7-8.
90 HLPE 2020 *Food security and nutrition: Building a global narrative towards 2030* 7-8.
91 Clapp *et al* 2022 *Food Policy* 2-10.
92 Clapp *et al* 2022 *Food Policy* 2-10.
93 Clapp *et al* 2022 *Food Policy* 2-10.

The sustainability dimension is explained by the ecological footprint of food systems as it takes into consideration what people consume as well as the production, processing, transportation and use of food.[94] Good nutrition contributes to the health, well-being, as well as physical and brain development of people as well as an economically productive life.[95]

It is apparent that food security is dependent on a food system that determines whether the food people need for good nutrition is available, affordable, acceptable, of adequate quantity and quality[96] and based on their preference of foods they want to eat and produce.[97] Sustainability as a dimension of food security implies food system practices that protect as well as respect ecosystems over the long term.[98]

2.5 The need for a sustainable agricultural system

> Sustainable consumption is captured by the concept of sustainable diets, that is: those diets with low environmental impacts which contribute to food and nutrition security and to healthy life for present and future generations. Sustainable diets are protective and respectful of biodiversity and ecosystems, culturally acceptable, accessible, economically fair and affordable, nutritionally adequate, safe and healthy; while optimizing natural and human resources.[99]

It is said that the current food and farming systems (industrial agriculture) have done more damage to the natural environment than any other human enterprise.[100] In the next paragraph, industrial farming, with its green revolution techniques and monocropping, is discussed.

2.5.1 Industrial farming

Industrial farming, developed in the 1800s and 1900s, refers to the industrialised production of crops, animals and animal products.[101] It uses heavy agricultural machinery, genetic technology, techniques for economical production and the

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94 HLPE 2020 *Food security and nutrition: Building a global narrative towards 2030* 9.
95 FAO 2013 *State of food and agriculture 2013: Food systems for better nutrition* 7.
96 FAO 2013 *State of food and agriculture 2013: Food systems for better nutrition* 9.
97 HLPE 2020 *Food security and nutrition: Building a global narrative towards 2030* xv.
98 HLPE 2020 *Food security and nutrition: Building a global narrative towards 2030* xv.
99 FAO 2013 *State of food and agriculture 2013: Food systems for better nutrition* 1-10 2; Burlingame and Dernini (eds) "Sustainable diets and biodiversity" Chapter 4 7.
100 Von Bormann 2019 *Agri-food Systems: Facts and Futures* 4.
101 NRDC 2020 *Industrial Agriculture 101* 1.

creation of new markets.[102] Synthetic fertilisers and pesticides were subsequently developed and used.[103] The discovery of the role of vitamins in animal nutrition as well as vaccines and antibiotics made it easy to raise livestock in concentrated, controlled animal feed operations.[104]

The Green Revolution,[105] commencing during the 1940s and 1950s, "used science and technology to develop modern agricultural production systems for the countries of Asia, Africa and Latin America".[106] The Green Revolution developed high-yielding varieties of maize, wheat and rice and also introduced the spread of existing technologies such as synthetic pesticides and fertilisers in countries outside the industrialised nations.[107]

2.5.2 Monoculture

Industrial agriculture (whether or not in reference to the Green Revolution) generally involves monoculture.[108] Monoculture is agriculture in which only one type of crop is grown at a time. It is easier to use heavy farm machinery customised to only one crop that makes monoculture well suited to industrial farming.[109] Growing the same crop year after year degrades the soil and reduces nutrient availability.[110] The three cereals (as mentioned above) account for more than 40 percent of the world's food calorie supply, therefore, global diets are becoming more homogenous.[111] The variety of plants being cultivated is declining as well as the number of species of animals reared around the world.[112] The risks of disease and pest outbreaks increase without other species, which means the use of larger

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102 NRDC 2020 *Industrial Agriculture 101* 1.
103 Penn State College of Earth and Mineral Science GEOG 30N *Industrial Agriculture* 1.
104 NRDC 2020 *Industrial Agriculture 101* 1.
105 The term "Green Revolution" was used in contrast to the term "Red Revolution" (communism) in the cold war by capitalist countries to make Third World countries more supportive of capitalism than communism. Baka *Environment and Society in a Changing World* 3.
106 Penn State College of Earth and Mineral Science GEOG 30 N *Industrial Agriculture* 4.
107 Penn State College of Earth and Mineral Science GEOG 30 N *Industrial Agriculture* 3.
108 Baka 2023 *Environment and Society in a Changing World* 4.
109 Baka 2023 *Environment and Society in a Changing World* 4.
110 Balogh 2021 *Horizon EU Research & Innovation Magazine* 2.
111 HLPE 2020 *Food security and nutrition: Building a global narrative towards 2030* 23.
112 HLPE 2020 *Food security and nutrition: Building a global narrative towards 2030* 23.

amounts of pesticides.[113] Monoculture has a negative impact on the environment as well as on farm productivity and expenses.[114]

Although global agricultural productivity has increased substantially with industrial agriculture, it remains the largest contributor to deforestation, biodiversity loss, soil degradation, water scarcity and quality, and damage to marine ecosystems, and accelerates climate change.[115] It also has a major impact on the health of humans as discussed in the paragraphs below.[116]

2.5.3 Chemical (synthetic) pesticides

Pesticides are chemical compounds including insecticides, herbicides, nematicides, fungicides, molluscicide, rodenticides, plant growth regulators and other compounds.[117] The FAO of the UN defines them as substances, or mixtures thereof, to control, "prevent or destroy any pest, animal or human disease-causing vectors, undesirable plants or animal species affecting food production, managing, selling, storage and transportation".[118] The global pesticide use in 2019 was approximately 4.19 million metric tons.[119] In 2015, the International Conference on Chemicals Management called for cooperation to address highly hazardous pesticides (HHPs), with an emphasis on the promotion of agro-ecological-based alternatives and fortifying national regulatory capacity to conduct risk assessments and promote proper management.[120] Exposure to pesticides[121] can either be directly (farmworkers who mix and spray the pesticide or people living near agricultural fields) or indirectly through agricultural products, the food chain and contaminated water.[122] The long-term intake of vegetables and fruits that are grown in soil and water contaminated by pesticides increases the concentration of toxins in organs

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113 Balogh 2021 *Horizon EU Research & Innovation Magazine* 2.
114 Balogh 2021 *Horizon EU Research & Innovation Magazine* 4.
115 Von Bormann 2019 *Agri-food Systems: Facts and Futures* 4.
116 Lomax (UNEP) 2020 *10 things you should know about industrial farming.*
117 Pathak *et al* 2022 *Frontiers in Microbiology* 2.
118 Pathak *et al* 2022 *Frontiers in Microbiology* 2.
119 Pathak *et al* 2022 *Frontiers in Microbiology* 2.
120 UNEP 2023 *Guidelines on alternatives to highly hazardous pesticides* 4.
121 Herbicides have similar impacts. See e.g. The Institute for Functional Medicine 2024 https://www.ifm.org/news-insights/exposure-pesticides-herbicides-insecticides-human-health-effects/; Ghazi *et al* 2023 *Bioengineered* 1-21.
122 Pathak *et al* 2022 *Frontiers in Microbiology* 17.

and can cause chronic diseases such as cancer, necrosis, cardiac disease, asthma, reproductive disorder and diabetes.[123]

"Breast cancer is the most common in all cancer types and is associated with organophosphorus".[124] Glyphosate (e.g. a component of the pesticide Roundup), classified as a probable human carcinogen, is widely used in South Africa's staple food and maize production.[125] Human exposure to pesticides is a significant risk factor in especially neurological disorders such as Alzheimer's and Parkinson's diseases, multiple sclerosis as well as birth defects, foetal deaths, still births, and neurodevelopment disorders.[126] Pesticides cause allergies and asthma.[127] Their vapours invade the soil, air and water, and in so doing enter the food chain, thereby threatening human health.[128] Food contaminated with pesticide residues leads to a higher level of toxicity compared to drinking or inhaling contaminated water or air, according to studies.[129] 25 million people suffer yearly from pesticide poisoning[130] with an estimated 160 000 deaths.[131]

Pesticides have many effects on non-targeted creatures/persons.[132] The spraying of pesticides causes air pollution, as persistent organic pesticides (POPs) in the air transform to a "highly toxic form through oxidation and photochemical reactions".[133] Soils can become a "secondary source of the pollutants with respect to air soil exchange" by absorbing them into the soil, depending on their persistence, bio-accumulation and toxicity.[134] Undue use can cause harm to beneficial biota such as bees, birds, plants, microorganisms, plants and small animals.[135]

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123 Pathak *et al* 2022 *Frontiers in Microbiology* 16.
124 Pathak *et al* 2022 *Frontiers in Microbiology* 16. Organophosphorus is a chemical compound that is used in pesticides.
125 FAO 2022 *Food Systems Profile – South Africa* 23.
126 Kori *et al* 2018 *Indian J Clin Biochem* 2.
127 Pathak *et al* 2022 *Frontiers in Microbiology* 21.
128 Pathak *et al* 2022 *Frontiers in Microbiology* 21.
129 Pathak *et al* 2022 *Frontiers in Microbiology* 21.
130 UNEP 2021 *Rethinking Food Systems* 16.
131 UNEP 2023 *Guidelines on alternatives to highly hazardous pesticides* 4.
132 MD Farugue Ahmad et al: Heliyon Vol. 10 Issue 7, 15 April 2024. Pesticides impacts on human health and the environment with their mechanics of action and possible countermeasures. 1.
133 Pathak *et al* 2022 *Frontiers in Microbiology* 11.
134 Pathak *et al* 2022 *Frontiers in Microbiology* 11.
135 Pathak *et al* 2022 *Frontiers in Microbiology* 11.

"Surface runoff and leaching carry pesticides into water bodies", where it is absorbed by plants and then leached into groundwater. The pesticides may affect the quality of the water, which then again affects human, animal and plant well-being.[136] Acute exposure to pesticides can lead to mortality, while lower exposure to these chemicals causes changes in blood cells or plasma and can therefore lead to histological abnormalities that affect the kidneys, other organs as well as the brain and gut of fish in the water.[137]

The use of chemical pesticides decreases soil quality, and can cause resistance to transformed pesticides. In the field of pesticide studies, plant growth is impaired by pesticide accumulation that causes several metabolic disorders. Most scientists found that pesticides adversely affect plant growth and development.[138]

2.5.4 Synthetic (chemical) fertilisers

The manufacturing of synthetic fertilisers began after nitrogen, phosphorus and potassium (NPK) were identified as critical factors in plant growth.[139] Although nitrogen (in its organic or synthetic form) is an essential nutrient for crop production, excess nitrogen has serious health and environmental consequences.[140] The industrial use of fertilisers in agriculture was valued at approximately 193 billion dollars in 2021.[141] In 1999, the UN issued a serious warning regarding the excessive use of nitrogen in agriculture. Chemical fertilisers are the main source of nitrogen, followed by livestock manures.[142] The FAO, in 2019, produced "voluntary guidelines for sustainable soil management" namely *the International Code of Conduct for Sustainable Use and Management of Fertilizers* in the hope that governments, industry, farmers, traders and civil society will make use thereof. The overuse or

136 Pathak *et al* 2022 *Frontiers in Microbiology* 12.
137 Pathak *et al* 2022 *Frontiers in Microbiology* 15.
138 Pathak *et al* 2022 *Frontiers in Microbiology* 16.
139 CFS date unknown *What is NPK in Fertiliser and Why Does it Matter?* 1-2.
140 Grossman 2000 *Environmental Affairs* 567.
141 Statista 2023 *The global fertiliser market size in 2020 and 2021, with a forecast for 2030.*
142 Grossman 2000 *Environmental Affairs* 574.

misuse of fertilisers leads to greenhouse gas emissions and the pollution of waterways, while underusing can lead to low yields.[143]

The Warren Alpert Medical School of Brown University undertook research that indicates that nitrosamine exposure could lead to Alzheimer's disease, diabetes mellitus and non-alcoholic steatohepatitis, which are the result of a chemical reaction between nitrites and secondary proteins. It can cause "DNA damage, lipid peroxidation, oxidative stress and pro-inflammatory cytokine activation and may lead to cellular degeneration and death".[144]

A link has been determined between excessively high levels of nitrate and stomach cancer in adults.[145] Methemoglobinemia or 'blue baby' syndrome, a form of oxygen starvation in infants, is acquired through the ingestion of nitrates through well water or foods. Excess nitrates in drinking water may cause spontaneous miscarriages.[146]

The effect of fertilisers on the environment includes amongst others, the manufacturing and use of nitrogen fertiliser that contribute approximately 5% to anthropogenic greenhouse gas emissions.[147] Soil bacteria can convert nitrogen fertiliser into nitrous oxide. By 2021, global nitrous oxide emissions reached a high of 2.97 billion metric tons of carbon dioxide.[148] "Nitrous oxide has become the third most important greenhouse gas after carbon dioxide and methane" but is 300 times more potent than an equal amount of carbon dioxide. It is also instrumental to stratospheric ozone depletion.[149] Methane emissions caused by humans are between 350 and 380 million tons per year, of which 40 to 46% are from agriculture.[150]

Small amounts of heavy-metal contaminants from phosphate rock, such as cadmium, arsenic, lead, mercury, nickel and vanadium can be found in phosphate

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143 FAO 2019 *The International Code of Conduct for Sustainable Use and Management of Fertilizers* iv.
144 Tong *et al* 2009 *J Alzheimer's Dis* 827-828.
145 Grossman 2000 *Environmental Affairs* 577.
146 Grossman 2000 *Environmental Affairs* 577.
147 Gao and Serrenho 2023 *Nature Food* 1.
148 Statista 2024 *Annual nitrous oxide (N_2O) emissions worldwide from 1990 to 2021*.
149 Shankman 2019 *What is nitrous oxide and why is it a climate threat?* 1.
150 Searchinger *et al* 2021 *Opportunities to Reduce Methane Emissions from Global Agriculture* 4.

fertilisers.[151] Phosphate fertilisers increase soil fluoride concentrations. Although it does not have an effect on food consumption, it does have an effect on soil microorganisms and may cause fluoride toxicity in livestock that consume contaminated soils.[152]

Eutrophication is a natural process in which nutrients accumulate in water causing increased growth of micro-organisms that may deplete the water of oxygen.[153] Cultural or anthropogenic eutrophication occurs when human activity speeds up the ageing process caused by excessive concentrations of nutrients, usually phosphate and nitrate. Agricultural runoff containing fertilisers and animal wastes are of the main sources of nitrogen pollution.[154] "Water blooms or large concentrations of algae and microscopic organisms often develop on the surface preventing light penetration and oxygen absorption for underwater life leading to the death of aerobic organisms".[155]

Nitrogen is the main culprit for eutrophication in coastal waters.[156] Data indicates that 76% of major water impoundments and up to 70% of major river systems in South Africa are eutrophic.[157] Water hyacinth control alone costs South Africa approximately R12 million per annum.[158]

Nitrogen-containing fertilisers can furthermore lead to soil acidification (this is when soil becomes more acidic over time). The concentration of hydrogen ions (H+) is increased, which lowers the pH of the soil.[159]

2.5.5 Soil degradation

A change in the soil health status resulting in a diminished capacity of the ecosystem to provide goods and services for its beneficiaries can be referred to as soil

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151 Mortvedt 2004 *Fertilizer Research*: *Heavy Metal contaminants in inorganic and organic fertilizers* 55.
152 Dalefield "Agricultural and Feed-related Toxicants" 343–360.
153 Van Ginkel 2011 *Water SA* 693–702.
154 Van Ginkel 2011 *Water SA* 693–702.
155 Van Ginkel 2011 *Water SA* 693–702.
156 Grossman 2000 *Environmental Affairs* 573.
157 Lukhele and Msagati 2024 *IJER* 1.
158 Van Ginkel 2011 *Water SA* 693–702.
159 NSW-DPI) date unknown *Don't let nitrogen acidify your soil.*

degradation.[160] The FAO's Director General addressed the Global Forum for Food and Agriculture in Berlin in January 2022, stating that:

> As much as 95 percent of global food production depends on soil. However, unsustainable agricultural practices, the overexploitation of natural resources and a growing population are putting increased pressure on our soils. A third of them are already degraded, and experts estimate that soil erosion could lead to a 10 percent loss in crop production by 2050.[161]

The accelerated removal of topsoil from the land surface through water, wind and tillage is referred to as soil erosion.[162] Soil erosion significantly (up to 1000 times) increases through the use of unsustainable human activities by means of intensive agriculture, deforestation, overgrazing and improper land-use changes.[163] "Soil formation is a slow process – therefor farming practices and the trend toward agricultural intensification are major causes of erosion.[164] South Africa as a water-scarce country cannot tolerate the pollution and sedimentation of its water bodies. The Welbedacht Dam near Dewetsdorp is an example – it reduced rapidly from 115 million cubic metres to 16 million cubic metres due to siltation.[165] It is costly to rehabilitate eroded areas and must therefore be prevented. According to Le Roux and Smith,[166] "the potential of conservation agriculture to protect and improve soil resources and improve production has been well documented."

2.5.6 Water

Agriculture is globally responsible for 70% of all water withdrawal.[167] South Africa is characterised by harsh natural conditions and is among the top 20 ecosystems that are considered to be in a fragile state. 70 the agricultural land in South Africa is classified as degraded. South Africa's water availability is limited. To service the needs of agriculture, groundwater is increasingly extracted, with irrigation for

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160 FAO 2020 *Soil degradation* 1.
161 Rigillo 2022 *Healthy soils for a healthy people and planet: FAO calls for reversal of soil degradation.*
162 FAO 2019 *Global Symposium on Soil Erosion* 1.
163 FAO 2019 *Global Symposium on Soil Erosion* 1.
164 Le Roux and Smith 2014 *Soil erosion in South Africa - its nature and distribution* 1.
165 Le Roux and Smith 2014 *Soil erosion in South Africa - its nature and distribution* 1.
166 Le Roux and Smih 2014 *Soil erosion in South Africa – its nature and distribution 3.*
167 FAO 2017 "Competition for natural resources" 36.

agriculture utilising 62% of the country's supply of water.[168] About 1.3 million ha of land in South Africa is under irrigation.[169] As set out above,[170] 70 to 76% of reservoirs are eutrophic and waterbodies are threatened by pollution and sedimentation due to unsustainable agricultural practices. Crop yields on compacted soil due to conventional ploughing are lower due to shallow root development because water and nutrients are not effectively taken up. This is also the cause of surface crusting, reducing water infiltration and leading to increased runoff.[171] Agriculture in South Africa is responsible for two-thirds of wetland destruction.[172]

2.5.7 Biodiversity loss

In an undated publication entitled "Wild" (International Journal of Wilderness) it is said "Biodiversity is the sum of all life on earth. Every single individual lifeform from the smallest bacteria to the largest whale is a component of earth's biodiversity". It also refers to the relationship between these lifeforms and their habitat.[173]

The primary driver of biodiversity loss is the global food system, with agriculture alone being the threat to 86% of species at risk of extinction. Today "the global rate of species-extinction is higher than the average rate over the past 10 million years".[174] During the past 50 years, the conversion of natural ecosystems for crop production has been the main cause of habitat loss, in turn reducing biodiversity.[175] The *cheaper food paradigm* leads to increased inputs such as fertilisers, "pesticides, energy, land and water to produce more food at lower costs". The impacts thereof are not only limited to biodiversity loss, but cause around 30 per cent of human-produced emissions.[176]

According to a Chatham House Report, food systems must urgently reform and focus on the following: (a) "dietary patterns need to move towards plant-heavy

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168 FAO 2017 "Global economic growth, investment, trade and food prices" 21.
169 Notten, Bole-Rentel and Rambaran 2014 *Understanding the Food Energy Water Nexus* 15.
170 See 2.5.4.1 above.
171 FAO 2022 *Food Systems Profile – South Africa* 21.
172 Von Bormann 2019 *Agri-food Systems: Facts and Futures* 19.
173 Wild Foundation date unknown *What is biodiversity?* 1.
174 UNEP 2021 *Our global food system is the primary driver of biodiversity loss. 1.*
175 Benton *et al* 2021 *Food systems impacts on biodiversity loss*. 2.
176 UNEP 2021 *Our global food system is the primary driver of biodiversity loss. 1.*

diets due to the disproportionate impact of animal agriculture on biodiversity, land use and the environment"; (b) more land must be protected and set aside for nature and converting land for agriculture must be avoided to gain biodiversity; (c) monoculture must be replaced with polyculture farming practices. Farming must occur "in a nature-friendly, biodiversity-supporting way."[177]

The Kunming-Montreal Global Biodiversity Framework was adopted by the Conference of the Parties to the Convention on Biological Diversity on 19 December 2022 with the request to the parties and other governments to implement this framework.[178] Its aim is to maintain, enhance or restore ecosystems, use biodiversity sustainably and minimise the impact of climate change and ocean acidification.[179]

2.5.8 Deforestation

The removal of a forest or stand of trees from land that is then converted for non-forest use is called deforestation. Between 2000 and 2010, large-scale commercial agriculture continued to be the main driver for 40% of deforestation and local subsistence farming for another 33%, with cattle ranching and the cultivation of soya beans and oil palm being the primary industries.[180] Tropical rainforests produce about 30% of the earth's freshwater (99% of water absorbed by the roots from groundwater moves up to the leaves and is transpired). Deforestation therefore increases drought, desertification, flooding, melting of the polar ice caps and crop failures.[181] About 80% of the world's known biodiversity can be found in tropical forests, and therefore deforestation has a major impact on biodiversity loss. It is estimated that about 50 000 plant, animal and insect species go extinct every year due to rainforest deforestation. The destruction also results in an increase and

177 UNEP 2021 *Our global food system is the primary driver of biodiversity loss. 1.*
178 UNEP 2022 *Convention on Biological Diversity: Kunming-Montreal Global Biodiversity Framework* Point 4 2.
179 UNEP 2022 *Convention on Biological Diversity: Kunming-Montreal Global Biodiversity Framework* Targets 8 on 10 and 14 on 11.
180 FAO and UNEP 2020 *The State of the World's Forests* xvi.
181 Pachamama Alliance 2024 *Effects of Deforestation.2.*

exposure of people to zoonotic diseases, which include malaria, HIV, Ebola, sleeping sickness including the SARS-CoV-2 virus that caused the COVID-19 pandemic.[182]

The long-lasting effect from the destruction of rainforests will be the mass extinction of species that provide the earth with biodiversity.[183] Recently, trees have been cut down for bioenergy. Over 500 scientists and economists had signed a letter to the presidents of the United States, the European Union, Japan and South Korea regarding the use of forests for bioenergy.[184] This causes an increase in carbon emissions, creating a *carbon debt* that increases over time by cutting more trees for bioenergy use.[185] They stated:[186]

> Regrowing trees and displacement of fossil fuels may eventually pay off this carbon debt, but regrowth takes time the world does not have to solve climate change. As numerous studies have shown, this burning of wood will increase warming for decades to centuries. That is true even when the wood replaces coil, oil or natural gas. The reasons are fundamental. Forests store carbon - approximately half the weight of dry wood is carbon.

In paragraph four of the letter, it is declared that wood burned for energy "emits more carbon up smokestacks than using fossil fuels." More than 40 000 European people have signed a petition to the EU in a bid to end the burning of forests.[187]

2.5.9 Antimicrobials

"Antimicrobials are substances used to prevent and treat infections in humans, animals and plants".[188] "There is strong evidence that bacteria, parasites, viruses and fungi are becoming resistant to antimicrobials", which makes it difficult or impossible to treat infections in humans, animals and plants. Antimicrobial resistance (AMR) is becoming a principal health problem. AMR was, directly and indirectly, responsible for approximately five million deaths in 2019.[189]

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182 Kulkarni 2022 *Biodiversity loss can increase the spread of zoonotic diseases* 1-2, 4.
183 Butler 2019 *Consequences of deforestatio*n. 17.
184 Raven 2021 *Letter regarding use of forests for bioenergy*.
185 Raven 2021 *Letter regarding use of forests for bioenergy.*
186 Raven 2021 *Letter regarding use of forests for bioenergy* para 3.
187 Mason and Azau 2021 *500+ scientists tell EU to end tree burning for energy*.
188 WHO 2024 *Antimicrobial resistance* 1.
189 UNEP 2023 *Bracing for Superbugs* 5.

Fungicides, antibiotics and other chemicals, when applied to crops, could affect AMR development. Fungicides and bactericides used in agriculture were an estimated 605 986 tons in 2020. In humans, fungicide use in agriculture is linked to azole-resistant lung infections.[190] The use of untreated wastewater for irrigation, "sewage and manure in crop production can develop and spread AMR. AMR consumed through contaminated plant-based foods or water may be hazardous even at low concentrations".[191] Antimicrobials are used to maintain livestock health, including disease control in intensive animal production systems. In some jurisdictions, antimicrobials are still used as growth promoters.[192]

In a study by UNEP (United Nations Environmental Programme) to the effect of antimicrobials the conclusion was: "A sustainable global food system would phase out antibiotic use in livestock for growth promotion and routine use of antimicrobials in food animal production and instead focus on best practices in the production of healthy animals".[193]

2.6 Climate change

Climate change refers to long-term shifts in temperatures and weather patterns. Although these shifts may also be natural, human activities have, since the 1800s, been the main driver of climate change.[194] The *greenhouse effect* is the term used to describe the way certain atmospheric gases *trap* heat that would otherwise have radiated into outer space.[195] Rising greenhouse gas concentrations lead to rising global surface temperatures, resulting in increased drought, severe storms, loss of species, a rising ocean and health risks. Therefore, climate change and increased extreme weather events can also cause a global rise in hunger and poor nutrition.[196]

The World Bank in the run-up to COP 27 said in an article about food security and climate change :" Although climate change can have consequences for the global

190 UNEP 2023 *Bracing for Superbugs* 34.
191 UNEP 2023 *Bracing for Superbugs* 37.
192 UNEP 2023 *Bracing for Superbugs* 38.
193 UNEP 2023 *Bracing for Superbugs* 38.
194 UN 2024 *Climate action*.
195 Turrentine 2022 *What are the causes of climate change?* 1.
196 UNCA date unknown *Causes and effects of climate change.*

food system, agriculture is responsible for an estimated third of greenhouse gas emissions-- second only to the energy sector, it is also the biggest source of methane and biodiversity loss".[197] Methane is the second biggest contributor to greenhouse gases after CO_2, but is 28 to 34 times as warming as CO_2 over a century.[198] Atmospheric levels of methane have increased 150% over the past 200 years, while CO_2 levels have climbed 50%.[199] At COP26, *The Global Methane Pledge* to decrease methane emissions by 30% from 2020 levels in all industries by 2030 was signed by 100 countries, but not by South Africa. The third most important greenhouse gas, nitrous oxide, and its role in chemical fertilisers has already been discussed above.

In a study by Poore and Nemecek they found that food production creates 32 percent of global acidification and 78 percent of eutrophication.[200] Higher temperatures and less reliable supplies of water due to climate change will create severe hardships for small-scale livestock producers. A research study in relation to the mitigation of climate change through producers found that only two of nine changes assessed delivered significant reductions in both land use and greenhouse gas emissions, namely: "changing from monoculture to diversified cropping and improving degraded pasture".[201] In a 2024 study, it is foreseen that the correct agricultural practices, for example, a reduction in or elimination of tilling, can actually reduce CO_2 emissions.[202] The South African President signed the *Climate Change Act* 22 of 2024 in July 2024.[203]

2.7 Conclusion

This chapter examined the problem of food insecurity, especially at the household level, in South Africa. The three dimensions of malnutrition and its consequences, particularly the deficiency of good nutrition in food that is aggravated by climate

197 The World Bank 2022 *Climate explainer: Food Security and Climate Change.*
198 Rodriguez 2021 *The Global Methane Pledge at COP26*.
199 Rodriguez 2021 *The Global Methane Pledge at COP26*.
200 Poore and Nemecek 2018 *Science* 987.
201 Poore and Nemecek 2018 *Science* 989.
202 Nogrady *Nature Comment*.
203 GN 5050 in GG 50966 of 23 July 2024. Due to the scope of the mini-dissertation, the climate change legislation is not discussed.

change and the damage caused by the *industrial agriculture* system through monocropping, soil degradation and contamination of waterbodies has been highlighted.

Food security for the purpose of this study is "when all people at all times have access to healthy and nutritious food that meets their dietary needs and food preferences for an active and a healthy life". The six dimensions of food security are implied in the definition, namely food availability, access, utilisation, stability, agency and sustainability.

Good nutrition and food security are linked to agriculture.[204] The devastating consequences of synthetic pesticides and fertilisers to human health and the environment as well as the loss of biodiversity, deforestation and antimicrobial resistance have been discussed. Climate change can have consequences for the global food system while agriculture is responsible for a third of CO_2 emissions.

There is a need for a sustainable agricultural system based on agro-ecological principles. Organic farming is such a system that enhances agro-ecosystem health as well as biodiversity. It is the only system that explicitly avoids the use of synthetic pesticides, fertilisers and drugs. The next chapter will focus on organic farming as a sustainable agriculture method.

[204] Hendriks 2016 *Food Security in Rural South Africa – Homegrown solutions for South Africa's hungry. 2.*

Chapter 3: Organic food farming as a sustainable agricultural method

3.1 Introduction

As indicated in the previous chapter, the impact of industrial agricultural practices has serious environmental consequences;[205] as "global food production threatens climate stability and ecosystem resilience."[206]

The aim of this chapter is to discuss organic farming and its main principles as a sustainable agricultural system that promotes the production of healthy food with a low carbon footprint. In this chapter, the definition, principles, practices and aims of organic agriculture are discussed. The implications of organic food and agriculture on human health, climate change and the environment are indicated. The chapter also considers that organic agriculture forbids the use of GMOs and nanomaterials.

Organic farming as an agricultural system globally and in South Africa, as well as the role of smallholder farmers, will further be investigated. Organic production involves high-level skills and education. The certifications of organic products as well as the marketing and labelling thereof are furthermore explained. The conversion period and its challenges are highlighted.

The ability of organic farming to feed 10 million people in 2050 and other sustainable farming systems are briefly discussed. This chapter makes use of non-legal studies. It does not purport to be a scientific study of the particular science of organic farming; however, in order to understand what should be regulated and how it should be regulated, it is necessary that lawyers also understand the context of organic farming.

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205 HLPE 2019 *Agroecological and other innovative approaches for sustainable agriculture and food systems that enhance food security and nutrition* (Report 14) 87.

206 Willett *et al The Lancet* 447-492. See Rockström "Food in the Anthropocene: the EAT-Lancet Commission on healthy diets from sustainable food systems" Summary Report 19. See the discussion of the EAT-Lancet Commission's findings in 3.11 below.

3.2 Definition and principles of organic farming

The IFOAM defines organic farming as:[207]

> A productive system that sustains the health of soils, ecosystems and people. It relies on ecological processes, biodiversity and cycles adapted to local conditions, rather than use the inputs with adverse effects. Organic agriculture combined tradition, innovation and science to benefit the shared environment and promote fair relationships and a good quality of life for all involved.

The East African Community defines organic agriculture as:[208]

> A holistic production management system, which promotes and enhances agroecosystem health, including bio-diversity, biological cycles and soil biological activity. It seeks to minimise the use of external inputs, avoiding the use of synthetic drugs, fertilisers and pesticides and aims at optimising the health and productivity of interdependent communities of soil life, plants, animals and people. It builds on East Africa's rich heritage of indigenous knowledge combined with modern science, technologies and practices.

The IFOAM identified four guiding principles of organic agriculture; they are:[209]

- Health: Organic agriculture should sustain and enhance the health of soil, plant, animal, human and plant as one and indivisible;
- Ecology: Organic agriculture should be based on living ecological systems and cycles, work with them, emulate and help sustain them;
- Fairness: Organic agriculture should build on relationships that ensure fairness regarding the environment and life opportunities;
- Care: Organic agriculture should be managed in a precautionary and responsible manner to protect the health and wellbeing of current and future generations and the environment.

In order to define organic agriculture for the purpose of this definition it would be necessary to refer to (a) holistic production management, (b) the production of food in a sustainable manner, (c) avoidance of drugs, fertilisers, herbicides and pesticides, (d) the relationship between agriculture and biodiversity and ecological processes, (e) the introduction of the principles, (f) the importance of traditional knowledge, and (g) the role of innovation and science. In addition, the importance of climate change adaptation should be acknowledged as farmers in many areas in

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207 SAOSO 2023 *Standard for Organic Production and Processing* (Version 2) 26.

208 Halberg and Muller *Organic Agriculture for Sustainable Livelihoods* 10.

209 IFOAM 2020 *Genetic Engineering and Genetically Modified Organisms*; Halberg and Muller *Organic Agriculture for Sustainable Livelihoods* 7.

South Africa might not have a choice other than to introduce climate-smart agriculture.[210]

For purposes of this study, organic agriculture is therefore defined as:

> A production management system that promotes the environmentally, socially, culturally and economically sound production of food by sustaining the holistic health of soils, avoiding the use of drugs, synthetic fertilizers, herbicides and pesticides, acknowledging the interrelationship of ecological cycles, traditional knowledge, the role of innovation and technology, adapting to the challenges of climate change and adhering to the principles of health, ecology, fairness and care.

The next paragraph discusses the relationship between agro-ecological approaches and organic agriculture.

3.3 Relationship between agro-ecological approaches and organic agriculture

In recent years, the concept of agro-ecology gained prominence in agricultural, political and scientific discussions despite the absence of a universally-agreed definition or a definitive set of practices that could be labelled as agro-ecological.[211] Agro-ecology is referred to as an overarching, holistic concept, a science, a social movement and a set of agricultural practices that advocate for transformation towards sustainable agricultural systems.[212]

Agro-ecology, as well as organic movements, aims to transform the current food system towards increased sustainability that can contribute to achieving the SDGs.[213] Organic agriculture, while sharing similar principles with agro-ecology, has defined minimum requirements, for instance, while synthetic pesticides and fertilisers are strictly forbidden in organic farming, they are not forbidden in agro-ecology practices.[214] Another difference is that organic farming is often certified,

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210 Also see 3.2.4 below. DFFE 2020: *Actionable Guidelines for the Implementation of Climate Smart Agriculture in South Africa*; Shew *et al* 2020 *Nature Communications* 1-9; also see Calzadilla *et al* 2014 *Water Resources and Economics* 24-48; Blignaut, Uckermann and Aronson 2009 *SAJSc* 61-68.

211 HLPE 2019 *Agroecological and other innovative approaches for sustainable agriculture and food systems that enhance food security and nutrition* (Report 14).

212 GIZ 2020 *Agroecology and organic farming*.

213 IFOAM 2019 *Position paper on agroecology* 7.

214 IFOAM 2019 *Position paper on agroecology* 8.

while there is no verification system for agro-ecology farming.[215] Organic farmers in Europe mostly apply agro-ecological practices.[216] Agro-ecology allows farmers to go beyond the organic regulation.[217] According to IFOAM "the development of organic agriculture and its principles should be seen within the agro-ecological production model."[218]

3.4 Organic management practices and aims

Organic agriculture management practices include various methods such as strip-cropping and manipulation of crop rotations (deep and shallow-rooted plants contain different nutrients); under-sowing; growing green manure; the application of manure, crop and agricultural residues, compost, soil tillage with an implement that aerates the soil only.[219] IFOAM stated in their 2019 position paper on agroecology that organic agriculture management should aim, among others, to (a) "maintain and increase long-term fertility of soils"; (b) "conserve soil and water"; (c) "enhance and encourage biological cycles within the farming system;" (d) "produce food of high nutritional quality in sufficient quantity"; (e) "work within a closed system with regard to organic matter and nutrient elements and use substances and materials which can be reused or recycled"; (f) "maintain the genetic diversity of the agricultural system including the protection of plants and wildlife habitats"; (g) "give all livestock conditions of life; and (h) allow them to perform the basic aspects of their innate behaviour".[220] Pest management may include, for example, the manipulation of crop rotations; strip cropping (to moderate pests over large areas), the manipulation of pH levels and plant dates, biological control and the trapping of insects.[221]

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215 IFOAM 2019 *Position paper on agroecology* 8.
216 IFOAM 2019 *Position paper on agroecology* 8.
217 IFOAM 2019 *Position paper on agroecology* 9.
218 IFOAM 2019 *Position paper on agroecology* 9.
219 Wynen 1998 *Evaluating the potential contribution of organic agriculture to sustainability goals* 2.
220 To move freely, groom themselves, sleep and nest comfortably and to assume all natural postures and movements such as stretching. See Wynen 1998 Evaluating the potential contribution of organic agriculture to sustainability goals 2.
221 Wynen E 1998 *Evaluating the potential contribution of organic agriculture to sustainability goals* 2.

The next paragraph considers the human health implications of organic agriculture.

3.5 Implications of organic food and agriculture on human health

Three European studies[222] have found that consumers of organic food eat more fruit, vegetables, whole grains and legumes and eat less processed meat and sweets than other consumers.[223] The studies indicate a reduced risk of type II diabetes, some cancers, cardiovascular diseases and all-cause mortality, as well as convincing evidence of the reduction of the risk of coronary heart disease, strokes and hypertension.[224]

Whole grain and dietary fibre intake are inversely associated with the risk of cardiovascular disease.[225] The consumer's dietary pesticide exposure decreases with the consumption of organic food. Milk and dairy products produced organically have an approximately 50% higher content of omega-3 polyunsaturated fatty acids (linked to a number of beneficial effects) than conventional products do.[226] Antibiotic resistance may be restricted or even decreased due to organic production as the use of antibiotics is restricted in organic husbandry.[227]

Organic meat is free from contaminants and additives such as chemicals, antibiotics and hormones because livestock graze naturally with 90% of their feed produced on the farm or occurring naturally.[228] The positive health impacts of organic agriculture can therefore not be denied.

The next paragraph deals with climate change and the environment in more detail.

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222 Kesse-Guyot *et al* 2013 *PLoS One* e76998; Eisinger-Watzl 2015 *European J Nutr Food Saf* 59-71; Bradbury *et al* 2014 *Br J Cancer* 2321-2326.
223 EPRS 2016 *Human health implications of organic food and organic agriculture* 19.
224 EPRS 2016 *Human health implications of organic food and organic agriculture* 19.
225 EPRS 2016 *Human health implications of organic food and organic agriculture* 19.
226 EPRS 2016 *Human health implications of organic food and organic agriculture* 54.
227 EPRS 2016 *Human health implications of organic food and organic agriculture* 53.
228 Zylemsa (Pty) Ltd date unknown *Organic farming in South Africa* 9.

3.6 Implications of organic agriculture in relation to climate change and the environment

Organic farming's carbon footprint is significantly lower because the use of synthetic pesticides and fertilisers is prohibited. The Rodale Institute, in a 40-year study, showed that organic farms utilise between 28 and 32% less energy compared to conventional farms.[229] In another study, data from 30 organic and 30 conventional farms in Germany shows that the energy input was 50% lower on organic farms.[230]

Gunstone *et al*[231] reviewed nearly 400 studies on the effects of pesticides on non-target invertebrates that have egg, larval or immature development in the soil. Their review indicates that synthetic pesticides and fertilisers pose a clear hazard to soil invertebrates, which caused the decline of 60% of all insects.[232] They found that soil organisms' burrowing activity alters "soil porosity by increasing aeration, water infiltration and retention and reducing compaction". Earthworms, for instance, can construct up to 8.9km of channels per hectare, which decreases soil erosion.[233] Ground nesting insects "transform decaying material and minerals into usable forms", increase soil fertility and recycle nutrients.[234]

Organic farming systems lead to building soil organic matter and sequestering atmospheric carbon.[235] It can therefore be concluded "that organic farming has considerable potential to contribute to the mitigation of climate change".[236] Crop rotations and organic materials can improve the fertility of soil and combat the erosion and degradation of soils.[237] As stated before,[238] organic farms support greater biodiversity, leading to less pollution of surface and groundwater while improving soil conditions, reducing water stress in plants and leading to more

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229 Pimentel *et al* 2005 *BioScience* 575.
230 Chmelíková *et al* 2024 *Scientific Reports* 1806.
231 Gunstone *et al* 2021 *Front Environ Sci* 1.
232 Gunstone *et al* 2021 *Front Environ Sci* 2.
233 Gunstone *et al* 2021 *Front Environ Sci* 2.
234 Gunstone *et al* 2021 *Front Environ Sci* 2.
235 Holka *et al* 2022 *Agriculture* 1–21.
236 Holka *et al* 2022 *Agriculture* 1–21.
237 Wynen 1998 *Evaluating the potential contribution of organic agriculture to sustainability goals* 13.
238 See para 3.2 above.

efficient water usage.[239] Wild fauna and flora are more abundant and diverse, while vast food resources and shelter for birds and arthropods (thus natural pest control) are established.[240]

The following paragraph discusses the use of genetically modified organisms (GMOs) and nanomaterials in organic farming.

3.7 GMOs and nanomaterials in organic farming

A GMO is defined as a plant, animal or micro-organism that is transformed by genetic engineering,[241] thereby containing altered DNA.[242] Global GMO production has grown to 206.3 million hectares in 2024.[243] According to an article in *PubMed Central* (PMC), "GMOs offer advantages in food production including increased yield", disease resistance and decreased pesticide usage, but is met with heavy criticism from the public.[244]

Consumers demand the clear and consistent labelling of products containing GMOs.[245] By 2023, 26 countries had partially or fully banned GMOs and another 60 countries had restrictions on the use of GMOs.[246] Although many European countries prohibit the growth of GMOs, "more than 30 million tons of biotech corn and soy for livestock feed are imported each year".[247]

GMOs may not be used in organic farming; according to IFOAM Organics International, GMOs have caused and continue to cause significant reductions in soil fertility, biodiversity, ecosystem damage, human and animal nutrition and health.[248] The deployment of GMOs must be evidence-based regarding its benefits

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239 FRIDGE Study 7.
240 FRIDGE Study 16.
241 IFOAM 2020 *Genetic Engineering and Genetically Modified Organisms* 2.
242 Sohi, Pitesky and Gendreau 2023 *GM Crops Food* 1–9.
243 Agbio Investor 2024 *GM monitor: Global GM crop area review* 2.
244 Sohi, Pitesky and Gendreau 2023 *PubMed Central* 1-9. Biomedical and Life sciences journal literature at the US National Institute of Health's National Library of Medicine) ; Mmbando 2024 *GM Crops and Food* 185–199.
245 Waddle 2022 *U.S. Becomes 65th Country to L GMOs – But Whose Laws Are the Best?*
246 Sohi, Pitesky and Gendreau 2023 *GM Crops Food* 1-9. Also see Lim Tung 2014 *PELJ* 1739–1787.
247 Agbio Investor 2024 *GM monitor: Global GM crop area review* 2. Also see Lim Tung 2017 *Law & Politics in Africa, Asia & Latin America* 3–29.
248 IFOAM 2020 *Genetic Engineering and Genetically Modified Organisms* 4.

and should be submitted to, through participatory processes, a rigorous, democratic and transparent assessment of the technology.[249] A problem is that safety studies are conducted by the same companies that developed and profited from the GMOs. These companies usually have legitimised patents on seeds and animals and present a strong lobby group for the use and application of GMOs vis-à-vis other practices.[250] The Standard for Organic Production and Processing prohibits the use of ingredients, additives or processing aids derived from GMOs in organic farming.[251]

Nanoparticles are small particles ranging from 1 to 100 nm in size. At this stage, the hazardous effects of nanoparticles on health and the environment are less well-established.[252] SAOSO[253] also prohibits "the use of nanomaterials in organic production and processing, including packaging and product contact surfaces". The "incidental particles in the nanoscale range created during traditional food processing such as homogenisation, milling, churning and freezing as well as naturally occurring particles" are, however, permitted.[254]

3.8 Organic farming globally and in South Africa

In addition to what was mentioned as an introduction in Chapter 1, in 2020, 190 countries practised organic farming on an area of 74.9 million hectares (which had grown from 11 million hectares in 1999) worldwide.[255] Australia has the most certified organic hectares – 35.6 million, which accounts for 51% of the world's certified organic agricultural land and 8.8% of Australia's agricultural land.[256] Certification is the procedure employed by the Accredited Certification Bodies and

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249 IFOAM 2020 *Genetic Engineering and Genetically Modified Organisms* 4.

250 IFOAM *Resolution on the organic movement in favour of a system-based approach of innovation and sustainability – Keep Organic GMO-free.* Also see Fernbach *et al* 2019 *Nat Hum Behav* 251-256; Uslu 2020 *Plant Biotechnol Rep* 741-751; *Monsanto Canada Inc v Schmeiser* 2004 SCC 34 (CanLII), [2004] 1 SCR 902*; Bowman v Monsanto Co* 2013 657 F.3d 1341. IFOAM 2020 *Genetic Engineering and Genetically Modified Organisms* 7-8.

251 SOASO 2023 *Standard for Organic Production and Processing* (Version 2) on 25 and para 2.3.1 – 2.3.4 on 31.

252 Kumah *et al* 2032 *BMC Public Health* 1-28.

253 SAOSO 2023 Standard for Organic Production and Processing (version 2) 26.

254 SAOSO 2023 *Standard for Organic Production and Processing* (Version 2) 25.

255 Willer *et al* (EC) 2022 *The world of organic agriculture – statistics and emerging trends* 1.

256 Paull and Hennig 2019 *Acres Australia* 35–36.

Participatory Guarantee Systems (PGS) approved by PGS-SA "to provide written or equivalent assurance that a product, process or service complies with acceptable standards".[257] In 2020, there were 3.4 million producers (including smallholders) and the organic market sales reached 120.6 billion euros.[258] "In 2022 the global organic food market was valued at USD 183.35 billion and is expected to be worth around USD 546.97 billion by 2032".[259]

Africa had more than two million hectares of certified organic agricultural land in 2022 (with a 7.7% increase from 2019) and nearly 834 000 producers.[260] Tunisia had the largest organic area (more than 290 000 hectares) in 2020, while Ethiopia had the largest number of organic producers (almost 220 000).[261] In addition, "a large number of farmers practise informal forms of organic agriculture, following the principles of organic agriculture but are not certified".[262] Showing the growing importance of organic agriculture in Africa, the 5th Africa Organic Conference was held in Kigali Rwanda in December 2023.[263] The theme of the conference was: *Strengthening Resilient and Sustainable Food Systems in Africa through Organic Agriculture.*

The South African Biodynamic Association was one of the five founders of the IFOAM in 1972.[264] As said before, in 2019, there were just 154 certified organic producers in South Africa, farming on only 30 000 hectares of land.[265] In 2003, there were between 200 to 250 organic farmers cultivating between 45 000 and 515 000 hectares of land.[266] Although premium prices are paid for organic products, there are several reasons for the decline of organic agriculture. One of the main

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257 SAOSA 2023 *Standard for Organic Production and Processing* (Version 2) 23. Also see 3.10 below.

258 Willer *et al* (EC) 2022 *The world of organic agriculture – statistics and emerging trends* 1.

259 "Organic Food Market – Global Industry Analysis, Size, Share, Growth, Trends Regional Outlook, and Forecast 2023-2032" in Precedence Research 2023 Environment Health & Safety Market Size, Share, and Trends 2024 to 2034.

260 Willer *et al* (EC) 2022 *The world of organic agriculture – statistics and emerging trends* 1.

261 Willer *et al* (EC) 2022 *The world of organic agriculture – statistics and emerging trends* 1.

262 Halberg and Muller *Organic Agricultural for Sustainable Livelihoods* 6.

263 KCOA 2023 "Strengthening resilient and sustainable food systems in Africa through organic agriculture".

264 Uhunamure *et al* 2012 *Agriculture* 3.

265 Sinxo 2022 *What's holding Mzansi's organic fruit producers back* 1. Also see 1.1 above.

266 FRIDGE Study 7.

reasons is the lack of support and control from the government.[267] Kelly and Metelerkamp[268] refer to Chikazunga's 2012 view that the then government "was not supporting organic agriculture because officials of the then Department of Agriculture, Forestry and Fisheries (DAFF) do not believe it is the best approach given South Africa's poor agricultural potential – they rather promote GMOs, fertilizers and pesticides."[269] The position seems to be the same today.[270]

Other reasons for the decline in organic farming include the lack of technical support and information; high certification costs (driven by international accreditation systems); South Africa (at the time) did "not have an official inspection and certification programme";[271] conversion to organic farming takes about three years with no financial resources available in the form of incentives or subsidies to support the farmers in the meantime; and the mindset of conventional farmers regarding organic farming is negative.[272] Labour costs can be a hindrance because organic systems are more labour-intensive. On the other hand, organic farming can provide employment opportunities, especially for women.[273] With the introduction of the SAOSO and SANS Organic Farming Standards, it is expected that there will be more interest in organic farming.[274]

The demand for organic products is growing in South Africa. Woolworths reported that its "free range and organic category grew to R4 billion in 2013" (although it was not possible to ascertain what the value of just the organic produce was). According to Pick n Pay, their organic category grew by 50 percent in 2012.[275] South Africa exported 25 430 tonnes of organic products to the EU and organic products

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267 FRIDGE Study 208; Kriel *Farmer's Weekly* 2; Uhunamure *et al* 2012 *Agriculture* 2.

268 Kelly and Metelerkamp *Smallholder farmers and organic agriculture in South Africa* 8.

269 This opinion was also supported by articles in the Farmers' Weekly, a popular scientific journal for the farming community. Kelly and Metelerkamp *Smallholder farmers and organic agriculture in South Africa* 8.

270 Also see para 4.2.3. As stated before in Chapter 1, South Africa still lacks a policy on organic agriculture and it is not regulated. The 10th draft of the *National Policy on Organic Production* by DAFF was released in 2019, but by May 2024 it was still a discussion paper.

271 DAFF 2019 *National Policy on Organic Production* (10th draft) 12.

272 Waarts *et al* 2009 *Organic Produce from the Republic of South Africa* 28.

273 Wynen 1998 *Evaluating the potential contribution of organic agriculture to sustainability goals* 11.

274 Also see paras 3.2.5 and 3.3.4.3.

275 Kelly and Metelerkamp *Smallholder farmers and organic agriculture in South Africa* 13.

to the value of 1.1 million USD to the USA in 2019.[276] The main certified organic crops from South Africa are tropical fruit, citrus fruit, grapes, vegetables, herbs and spices.[277]

According to UNEP Rooibos tea is exported to the European Union and the USA. The biggest segment of Rooibos farming is organic certified.[278] Honeybush tea is mostly exported to Germany, the UK and the Netherlands. Seventy-five to 80% of Honeybush tea is harvested from the wild on approximately 30 000 hectares. Although all the wild harvested honeybush is grown organically, only 15 percent is certified as organic "due to the high cost of organic certification. South Africa produced 915,5 million litres natural wine" in 2013 "of which 525,6 million litres were exported to ten main export destinations" of which seven were European countries. South Africa has 41 organic wine producers.[279] It is therefore evident that the organic food market can offer opportunities for the export of products, especially during the European and United States winter season. It is, however, a challenge to find correct information on organic agriculture as neither the South African government nor industry bodies collect data regarding organic produce, which leaves the provisioning of market information to international organic certification bodies that do not follow a standardised format and one has to rely on press releases and *ad hoc* reports in this regard.[280]

Smallholdings usually only produce organic food. 84% of the world's 570 million farms are smallholdings (farms less than two hectares in size).[281] Cousins defines smallholders as:[282]

> Small-scale farmers who use farm produce for home consumption to some degree, and use family labour within the farming operation to some degree, but for whom farming contributes a highly variable amount of cash income via marketing of farm

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276 GIZ (in cooperation with IFOAM) 2020 *Boosting Organic Trade in Africa* 8.
277 UNEP *Trade in certified organic agriculture* 30.
278 UNEP *Trade in certified organic agriculture* 31.
279 UNEP *Trade in certified organic agriculture* 31.
280 UNEP *Trade in certified organic agriculture* 26.
281 Ritchie 2021 *Smallholders produce one-third of the world's food, less than half of what many headlines claim* 2.
282 Kelly and Metelerkamp *Smallholder farmers and organic agriculture in South Africa* 20.

produce. Levels of mechanisation, capital intensity and access to finance are also variable among such farmers.

Approximately 12% of all agricultural land produces approximately 35% of the world's food.[283] In an FAO report, it was claimed that smallholder farms produce 70 to 80% of the world's food.[284] This was an error by using the terms *small farms* and *family farms* interchangeably. The update estimates that around the world there are more than 608 million family farms producing around 80% of the world's food in value terms (not all family farms cover an area of less than two hectares).[285]

Poverty and a lack of land and resources are the main limitations of smallholder farming in developing countries, and their position will be aggravated by climate change.[286] In South Africa, approximately four million individuals (2.5 million households), practise some form of agriculture. They are mostly based in the Eastern Cape, Limpopo and KwaZulu-Natal.[287] Although most of them are not certified as organic farmers, they meet the principles of organic agriculture.[288] The IFOAM uses the term "informal" or "non-certified" for agricultural systems that meet the principles of organic farming. These farms' produce is usually consumed by households or sold on local markets with little or no price premium.[289]

Contract farming arrangements are used for certified organic smallholder farming to take place in developing countries. A firm supplies inputs, information and credits "in exchange for a marketing agreement that fixes a price for the product and binds the farmer to follow a particular production method".[290] Although this may lead to exploitation, Halberg and Muller recommend it as a means to increase small farming's productivity and thereby reduce poverty and income inequality.

283 FAO 2021 *Small family farmers produce a third of the world's food* 1.
284 FAO 2014 *The State of Food and Agriculture: Innovation in family farming* vi (foreword).
285 FAO 2021 Small family farmers produce a third of the world's food 2.
286 Halberg and Muller *Organic Agriculture for Sustainable Livelihoods* 21.
287 Kelly and Metelerkamp *Smallholder farmers and organic agriculture in South Africa* 19.
288 Thamaga-Chitja and Hendriks 2008 *DSA* 319.
289 Halberg and Muller *Organic Agriculture for Sustainable Livelihoods* 22.
290 Halberg and Muller *Organic Agriculture for Sustainable Livelihoods* 23.

3.9 Information, technology and training

Organic production involves high skill levels and education.[291] The absence of knowledge can adversely affect the success of organic farming, especially for smallholder farmers who seek certification. This could be overcome through training and education. It is recommended by Uhunamure *et al*[292] "that government and non-governmental organisations as stakeholders should organise an educational approach such as farmers field schools". Thamaga-Chitja and Hendriks[293] are also of the opinion that smallholder farmers "need appropriate information to make informed decisions regarding organic farming". SAOSO is using training programmes and several value chains, for instance, PGS, to develop the organic sector and to empower local farmers.[294] Through their *Training of Teams of Trainers*, they train rural service providers and inspire them to train others. Information and communication technologies such as mobile phones have great potential to inform farmers and rural entrepreneurs about the weather, market prices, financial services and connecting them with buyers.[295]

The 10th draft of DAFF's *National Policy on Organic Production* in point 9.1. of the document (Education and training programmes on organic farming) suggests that "organic agriculture should be integrated in the curricula of schools and that higher education programmes in organic agriculture should be developed and implemented".[296]

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291 Uhunamure *et al* 2012 *Agriculture* 13.
It is acknowledged that traditional farmers may also provide traditional knowledge and insights in organic farming and that such training should not be a one-way process only. See in this regard Buthelezi and Huges 2014 *Indigenous Knowledge systems: Returning to South Africa's Roots*; Aprakua, Morton and Apraku Gyampoh 2021 *Scientific African* 1–13.

292 Uhunamure *et al* 2012 *Agriculture*

293 Thamaga-Chita and Hendriks 2008 *DSA 318.*

294 SAOSO 2022 *How SAOSO is Strengthening organic in Southern Africa* 4.

295 FAO 2017 *The future of Food and Agriculture – Trends and Challenges* 54.

296 DAFF 2019 *National Policy on Organic Production* (10th draft) 14.

3.10 Voluntary certification programmes

As indicated before, farmers have the possibility to voluntarily certify their farming practices as organic.[297] The IFOAM (the international umbrella organisation for organic agriculture organisations, was established in 1972. The IFOAM "created a globally applicable Organic Standard that can be used directly for certification". The *Codex Alimentarius*, created by FAO and the World Health Organisation (WHO) and other bodies in 1999, "is a collection of internationally standards, codes of practice and guidelines relating to foods, food production and food safety".[298] Guideline 32-1999 of the Codex refers to organic production and foods. There are therefore two internationally based standards for organic agriculture, namely the IFOAM Standard and the *Codex Alimentarius*.[299] The South African standard, SANS 1369:2016, is based on the IFOAM framework and EU standards.[300]

There are three forms of certification, namely first-, second- and third-party certification. If farmers choose to be certified through the second- or third-party scheme, they must comply with the SAOSO Standards for Organic Production and Processing or the SANS Standard 1369:2016.[301] There are accredited certifiers in South Africa, for example, A Greener World – South Africa, which use their own private standards based on the objectives and principles set by the EU.[302]

3.10.1 First-party (face-to-face or self-claim) certification

Where there is a direct relationship between the producer and consumer and trust has been established by consistently providing quality produce, a person may

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297 On voluntary standards, see Nel and Alberts "An Introduction" 22-31; UNFSS 2021 *Standards and Poverty Reduction: What role do Voluntary Sustainability Standards play?*; Rousset *et al* 2015 "Voluntary environmental and organic standards in agriculture: Policy implications" 1-41. Also see 1.1 above.

298 Walsh "Codex Alimentarius – an overview" "Postharvest Regulation and Quality Standards on Fresh Produce" 51-98.

299 UNEP *Trade in Certified Organic Agriculture* 34.

300 SANS 1369:2016. Ed1 South African National Standard - Organic Agriculture – Production and Processing (SABS 2016); UNEP *Trade in Certified Organic Agriculture* 35.

301 See 3.8 above.

302 Certified Organic by A Greener World – South Africa 2021 available at https://agreenerworld.org.za/wp-content/uploads/2021/04/Certified-Organic-by-A-Greener-World-Private-Standard-South-Africa-v1.pdf.

describe his or her produce as organic. This is a first party organic certification or 'self-claim' which is not verified by outside parties.[303]

3.10.2 Second-party certification: Participatory guarantee systems (PGS)

The IFOAM Organic International formalised the PGS (based on a group concept) that smallholders normally use.[304] It is "a low-cost certification system run by local producers and consumers, without an external accredited organic certifier".[305] These systems emerge worldwide because "they are built on trust, social networks and knowledge exchange".[306] The producers take a public pledge that they will follow the standard.[307] A team of a minimum of three persons (including one experienced person and one peer operator) conducts farm reviews or assessments at least once a year.[308]

When a group has been approved, a *licence agreement* is signed and a certificate issued.[309] "The procedure to be used for approval of PGS initiatives and for use of the SAOSO organic PGS endorsed logo", is set out in the SAOSO 2023 Standard for Organic Production and Processing.[310] Although SANS 1369:2016 does not refer to a specific logo, it states that "the labelling of products endorsed in accordance with PGSs should always display the words PGS Organic."[311] PGS SA, established in 2011 as a voluntary association and then as a non-for-profit organisation in 2013, is the body representing PGS groups in South Africa. PGS SA and SAOSO jointly offer

303 South African Smallholder 2022 *How to get Organic Certification* 3.
304 SAOSO 2023 *Standard for Organic Production and Processing* (Version 2) Section C Appendix B: Criteria for Approval of PGS 94-95.
305 FAO 2018 *Participatory Guarantee Systems (PGS) for Sustainable Local Food Systems* 1; SANS 1369:2016 3.18 (b) (NOTE) 6; SAOSO 2023 *Standard for Organic Production and Processing* (Version 2) Section C Appendix B (a) 93.
306 FAO 2018 *Participatory Guarantee Systems (PGS) for Sustainable Local Food Systems* 1.
307 SAOSO 2023 *Standard for Organic Production and Processing* (Version 2) Section C Appendix B (c) 93.
308 SAOSO 2023 *Standard for Organic Production and Processing* (version 2) Section C Appendix B (g) 93.
309 SAOSO 2023 *Standard for Organic Production and Processing* (Version 2) 57.
310 SAOSO 2023 *Standard for Organic Production and Processing* (Version 2) 55-58.
311 SANS 1369:2016 para 4.9.9.

modular training courses to teach farmers about organic farming.[312] The standards for approval are set out in the SAOSO as well as SANS 1369:2016 standards.[313]

3.10.3 Third-party certification

Producers who want to export their products usually choose *third-party certification*. It is the most formal and expensive certification process and is carried out by an accredited independent certifying body.[314] Certification is a procedure, by which a third party provides written assurance that a product or system meets the requirements of a standard- organic certification therefore refers to the minimum requirements in the relevant standard for organic production.[315]

SAOSO has adopted the IFOAM Norms for Organic Production and Processing Version 2014 edited in 2019 as the basis of the SAOSO Standard version 2 (in effect also SANS 1369:2016). Additional context-sensitive South African clauses to cater for specific local circumstances are included.[316] The certification process involves rigorous inspections and documentation reviews. Certification helps to build trust between farmers and consumers and as such helps to maintain the integrity of organic farming as a whole.[317] In an article on Trade in Certified Organic culture by UNEP it is said that "A system of standards is fundamental to the functioning of global trade, it protects consumers from unsafe products, reduces unequal information and lowers consumer search and transaction costs".[318] Organic food fraud is a problem, especially in the EU, as fraudsters attempt to profit from the high price tags attached to organic food.[319] Certification and correct labelling aim to combat organic food fraud.

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312 PGS South Africa 2021 *The Organic Farmer Journey* 1.

313 SAOSO 2023 *Standard for Organic Production and Processing* (Version 2) Section C Appendix B and C and SANS 1369:2016 3.18 5-6. Also see a discussion of the standards in 4.5.1 and 4.5.2.

314 UNEP *Trade in Certified Organic Agriculture* 34.

315 UNEP *Trade in Certified Organic Agriculture* 35.

316 SAOSO 2023 *Standard for Organic Production and Processing* (Version 2) 7.

317 The importance of Certification in Organic Farming 2023 available at https://zahrarosewaterco.com/the-importance-of-certification-in-organic-farming/.

318 UNEP *Trade in Certified Organic Agriculture* 37.

319 Industry Insights 2024 *Organic Food Fraud in the EU: Meaning, Examples and Prevention* 2.

The South African National Accreditation System (SANAS), due to a lack of formal legislation, approved SANS 1369:2016 in 2015 to accredit certifying bodies and their assessors to assess organic agricultural role-players.[320] Subsequently, South Africa has local as well as international bodies that can do the certification. SAOSO has a partnership with the control union,[321] because they based their certification on South African standards.[322]

To be considered for third party certification, producers must have records of all the cultivation, input usage, cropping (weeding, irrigation, fertilising and pest control) for three years as well as a written biodiversity plan.[323] After certification, the farm is inspected at least once a year.[324] "Selling produce with an internationally accepted certificate has many benefits for" producers, which cause farmers to use internationally accredited bodies for certification.[325]

In the next paragraph, it is discussed how farmers can move from conventional farming to organic farming in order to get certified.[326]

3.10.4 Conversion to organic farming

Conversion to organic agriculture means that farmers need to consider their management strategy for weed, disease, nutrient supply, pest management and crop diversification. As indicated above, if they want to be certified as organic, farmers have to comply with the SAOSO Standards for Organic Production and Processing or the SANS 1369:2016 Standard.[327] "The process of certification is lengthy, technical and costly" and "includes checks of the production chain from processing to labelling".[328] During the conversion process, yields may be lower and

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320 South African Bureau of Standards (SABS) / South African National Standards (SANS 17065)

321 Control Union 2023 *The proof to your promise* has a history operating in the field of commodity inspection, quality, certification and risk management in 70 countries.

322 SAOSO 2023 *Standard for Organic Production and Processing* (Version 2) 7-75; South African Smallholder 2022 *How to get organic Certification* 3.

323 SAOSO 2023 *Standard for Organic production and Processing* (Version 2) 7-75; South African Smallholder 2022 *How to get Organic Certification* 3.

324 SAOSO 2023 *Standard for Organic Production and Processing* (Version 2) 12.

325 UNEP *Trade in Certified Organic Agriculture* 22.

326 The content of the Standards is discussed in chapter 4.5, 4.5.1 – 4.5.2.

327 Halberg and Muller *Organic Agriculture for Sustainable Livelihoods* 83.

328 Thamaga-Chitja and Hendriks 2008 *DSA* 321.

investments higher than at the stage when the organic farm has been established.[329]

To keep certification costs lower and incomes on "an acceptable level throughout the conversion period", some farmers, at first, convert only a part of their farm to organic farming and do conventional production on the rest of the farm (split production). The SAOSO Standards require that, in the case of "split production the organic and conventional parts of the farm shall be clearly and continuously separated."[330] Soil health and fertility are built during the conversion period, which "is calculated from the date an application has been received and agreed to". The length of the conversion period "shall be at least 12 months before sowing or planting in the case of annual production; 12 months before grazing or harvest for pastures and meadows and 18 months before harvest for other perennials". Where a farmer can prove organic practices three years prior to his or her application, exceptions may be granted.[331] Most smallholder farmers in South Africa already use organic methods and can gain certification faster especially through the PGS as set out above.[332]

3.10.5 Markets and labels for certified products

As stated, "the organic food market is one of the fastest-growing markets in the developed world", with huge potential for benefitting smallholder farmers.[333] As stated before,[334] "South Africa is one of few African countries with a substantial domestic market for organic products".[335] Export markets are primary markets in Europe, the US and the Far East.[336] An internationally accepted certificate has many benefits for producers of organic produce, including price premiums, opportunities

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329 Wynen 1998 *Evaluating the potential contribution of organic agriculture to sustainability goals* 13.

330 SAOSO 2023 *Standard for Organic Production and Processing* (Version 2) Section B 3.1.-3.2.1. 32. See also SANS 1369:2016 4.1.9 8.

331 SAOSO 2023 *Standard for Organic Production and Processing* (Version 2) Section B 4.2 – 4.2.4. 34. See also SANS 1369:2016 4.1.8 7.

332 Thamaga-Chitja and Hendriks 2008 *DSA* 318.

333 Halberg and Muller *Organic Agriculture for Sustainable Livelihoods* 5.

334 See 3.8 above.

335 UNEP *Trade in certified Organic Agriculture* 27. Also see 3.3.1 above.

336 DAFF 2019 *National Policy on Organic Production* (10th draft) 11.

for new markets and increased market access in existing export markets.[337] Certification systems use labelling to help consumers recognise products that meet certification standards. Organic certification makes labelling with the word *organic* possible.[338] Abuse of the term *organic* (i.e. consumer deception) is prevented by binding legislation in different parts of the world, which has consequently contributed to fight fraud by building up certification and control systems.[339] Several requirements for labelling, for example, for processed products, multi-component products (such as vegetable boxes) and *in-conversion* are set out in the SAOSO Standards and the SANS 1369:2016 Standards.[340] If less than 95% of processed products, "but not less than 70 percent of the ingredients are organic the product cannot be labelled as organic, but words such as 'made with organic ingredients' can be used".[341] Multi-component products, and live or unprocessed products may only be marketed as organic if all the components (including the box) are organic.[342]

In the next paragraph, the possibility of organic farming to contribute to food security by 2050 is alluded to.

3.11 Possibility of organic farming to feed the world in 2050?

Hunger and malnutrition are not necessarily matters of food production but may have many different reasons such as poverty, unequal access to food[343] or a lack of knowledge regarding the nutritional value of food.[344] Global food security means nutritious food for all but with the smallest negative impact on the environment and

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337 UNEP *Trade in certified Organic Agriculture* 22.

338 FRIDGE Study 30.

339 IFOAM 2019 *Position paper on agroecology* 5.

340 SAOSO *2023 Standards for Organic Production and Processing* (Version2) 64; SANS 1369:2016 4.8.2, 4.8.3 22 and 4.9.1 24.

341 SAOSO *2023 Standards for Organic Production and Processing* (Version 2) 22.1.3(b) 64. SANS 1369:2016 496(b) 25.

342 SAOSO *2023 Standards for Organic Production and Processing* (Version 2) 64. According to SANS 1369:2016 products where a minimum of 95 percent of the ingredients are of organic agricultural origin shall be labelled as organic. 4.9.6(a) 25. There is no reference in SANS 1369:2016 that the box or packaging must also be organic, only that material used for packaging shall not contaminate the products. See 4.8.2 22.

343 HLPE 2019 *Agroecological and other innovative approaches for sustainable agriculture and food systems that enhance food security and nutrition* (Report 14) 46.

344 HLPE 2019 *Agroecological and other innovative approaches for sustainable agriculture and food systems that enhance food security and nutrition* (Report 14) 46.

ecosystems.[345] Co-chaired by Willett and Rockström, the EAT-Lancet Commission, together with 37 scientists and experts from 16 countries, published an article in *The Lancet* on *Food in the Anthropocene: a comprehensive analysis of the world food system with recommendations for how ten billion world inhabitants can be fed by 2050*.[346] The Commission recommended increased consumption of plant-based foods (fruits, vegetables, nuts, seeds and whole grains) while substantially limiting animal-source foods, sugar and refined grains by more than 50%.[347] According to the Commission "the current global food system requires a new agricultural revolution that is based on sustainable intensification and driven by sustainability and system innovation[348] with a zero expansion policy of new agricultural land into natural ecosystems and forests".[349] Food losses during production and waste at the consumer side must be reduced.[350] Although a specific agricultural system is not mentioned in the report, organic farming measures up to the mentioned criteria for a sustainable system. In 2017, researchers, connected to several environmental and agricultural organisations in the EU, conducted a study to analyse "the role that organic agriculture could play in sustainable food systems". Although organic agriculture was proposed as promising, its feasibility was contested.[351] It was commonly assumed that to feed more than nine billion people in 2050, agricultural output will have to increase with 50 percent.[352] The result of the study was that organic agriculture can provide enough "food for the 2050 population – simultaneously reducing environmental impacts". It can only be done if enough proportions of legumes are produced with significant reductions in livestock and food wastage:[353]

> The development of organic agriculture in the future should take up these challenges on the consumption side, and not only focus on sustainable production.

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345 UNEP *Trade in Certified Organic agriculture* 20.

346 Willett *et al* 2019 *The Lancet* 485. Also see Braaksma *Food in the Anthropocene: The EAT-Lancet Commission on Healthy Diets from Sustainable Food Systems* 21.

347 Willett *et al* 2019 *The Lancet* 448.

348 Willett *et al* 2019 *The Lancet* 449.

349 Willett *et al* 2019 *The Lancet* 481. See also Willet and Rockström *The EAT-Lancet Summary Report-Strategies* 3, 4, 23-24.

350 Willett *et al* 2019 *The Lancet* 482, 499. See also Willet and Rockström *The EAT-Lancet Summary Report- Strategy* 5, 25.

351 Muller *et al* 2017 *Nature Communications* 1-13.

352 Muller *et al* 2017 *Nature Communications* 1-13.

353 Muller *et al* 2017 *Nature Communications* 1-13.

> This would, in particular, reduce the necessity for yield increases, and a wise combination of production and consumption measures could provide an optimal food system.[354]

The above-mentioned study contradicts the arguments of several governments, including the South African government, who do not believe organic agriculture can produce enough food. Consumer-side challenges may also relate to sufficient portions of legumes (plant protein) and a reduction of livestock (animal protein). "Proteins are the building blocks of life. The basic structure of protein is a chain of amino acids in every cell in the human body".[355] Except for meat, fish, poultry and eggs, other good sources of protein are all kinds of beans (legumes) as well as nuts and seeds, tofu, cereals, grains and low-fat dairy products.[356] Africa has more than 381 million heads of cattle of which Ethiopia had the highest number in 2022, namely 68 million.[357] In 2020, Ethiopia had 40 million sheep, 51 million goats, and eight million chickens.[358] Still, Africa has the highest protein deficiency in the world.[359] Food insecurity, climate change, a lack of knowledge about basic nutrition and poverty,[360] as well as land pressures from animal agriculture have forced farmers to leave their land and as a consequence stop farming.[361] These are noted as reasons for Africa's protein deficiency. On the other hand, red meat and processed meats are often higher in saturated fat and may cause several cancers.[362] Cohen,[363] a registered dietitian, says:

> Eating plants is objectively healthier than eating animals, but research shows that the Mediterranean diet – which has plants as its foundation and also includes lean protein sources and seafood – reigns supreme. Diversity is best.

However, it must be noted that such a diet may be possible in the developed world, but that it may not be possible in the developing world and within disadvantaged communities, also where there is a scarcity of water. Alternative forms of

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354 Muller *et al* 2017 *Nature Communications* 1-13.
355 MedilinePlus 2023 *Medical Encyclopedia* 1.
356 British Heart Foundation 2024 *Heart matters: How to get protein without the meat* 1-6.
357 Statista 2024 *Cattle population in Africa as of 2022, by country* 1.
358 Statista 2024 *Cattle population in Africa as of 2022, by country* 1.
359 Morrison "Why on Earth do Africans need to get more excited about plant-based diets".
360 NNIA 2022 *Why Africa's protein intake still lags behind the global average* 2.
361 Morrison "Why on Earth do Africans need to get more excited about plant-based diets" 2.
362 Rossiaky *Healthline Media* 3.
363 Rossiaky *Healthline Media* 4. Also see Willet et al 2019 *The Lancet* 478.

sustainable farming need to be introduced, also within disadvantaged communities. Possible alternative farming methods are discussed in the next paragraph.

3.12 Other sustainable farming methods

There are various other agricultural methods that have links to organic agriculture. They are regenerative agriculture, sustainable intensification, climate-smart agriculture and conservation agriculture.

Sustainable food systems embody human and ecosystem health.[364] Regenerative agriculture is a rehabilitation and conservation approach to food and farming systems. Similar to organic agriculture, it also focuses on topsoil generation, increasing "biodiversity, enhancing ecosystem services and increasing resilience to climate change".[365]

Sustainable intensification is defined as the "substantial growth of yields in currently unimproved or degraded areas while at the same time protecting or even regenerating natural resources",[366] while climate-smart agriculture refers to the environmental, social and economic dimensions of sustainable development. It furthermore focuses on increasing farm-level productivity by addressing food-security challenges, as well as strengthening the adaptive capacity of producers by building resilience and mitigating greenhouse gases.[367] "Conservation agriculture is an agricultural management system, based on three principles, namely "minimum mechanical soil disturbance; an organic soil cover throughout the year" and the use of crop and animal diversity, including crop rotations and associations as well as the integration of livestock.[368]

Although the abovementioned farming methods correspond on several levels with organic farming, and even if the producer uses bio-fertilisers and pesticides, organic

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364 HLPE 2019 *Agroecological and other innovative approaches for sustainable agriculture and food systems that enhance food security and nutrition* (Report 14) 116.

365 RegenZ (Pty) Ltd 2023 *Regenerative Agriculture in South Africa: All You Need to Know* 1-13.

366 HLPE 2019 *Agroecological and other innovative approaches for sustainable agriculture and food systems that enhance food security and nutrition* (Report 14) 155.

367 HLPE 2019 *Agroecological and other innovative approaches for sustainable agriculture and food systems that enhance food security and nutrition* (Report 14) 155.

368 Maize Trust 2022 *Conservation Agriculture (CA)* 2.

farming remains the only agricultural system that prohibits the use of chemical pesticides and fertilisers as well as GMOs and has a certification system in place that ensures the consumer of its validity.

3.13 Conclusion

This chapter focused on organic farming as a sustainable agricultural system globally as well as in South Africa and indicates its benefits for human health, the environment and adaptation to climate change. The role of smallholder farmers was investigated. The certification of organic farmers, markets and labelling as well as conversion to organic farming were discussed.

Organic agriculture is a sustainable agricultural system that takes climate change and the health of people, plants and the soil into consideration and was defined, for the purpose of this study, as:

> A holistic production management system that promotes the environmentally, socially culturally and economically sound production of food by sustaining the health of soils, avoiding the use of drugs, fertilizers, herbicides and pesticides, acknowledging the interrelationship of ecological cycles, traditional knowledge, the role of innovation and technology, adapting to the challenges of climate change and adhering to the principles of health, ecology, fairness and care.

The certification of organic farming is a voluntary process. The three forms of certification include first- (face-to-face or *self-claim*), second- (PGS) and third-party certification. In South Africa, the SAOSO Standard for Organic Production and Processing was developed based on the IFOAM standard. A SANS Standard (SANS 1369:2016) was developed but adherence remains voluntary. There is no obligation for organic farmers to apply for certification, although exports and internal markets may require of them to do so. Conversion to organic farming takes about three years. Some small-scale farmers already comply with the requirements and can be certified through PGS, which is a low-cost system based on a group concept. The PGS is a grassroots system that establishes trust, social networks and knowledge exchange. It integrates capacity-building that helps small-scale farmers solve their practical problems and develops short supply chains in mainly informal local markets. The standard requires farm site reviews or assessments that involve a

team of a minimum of three persons. Organic production involves high skills and education.

Organic farming has a lower carbon footprint and allows greater biodiversity than other agricultural systems because the use of synthetic pesticides and fertilisers is forbidden. The positive impacts of organic food on health are clear from several studies. GMOs as well as nanotechnologies may not be used in organic farming.

Demand for organic products in the domestic as well as the export market, especially to Europe, the USA and the Far East is growing. Organic certification makes the labelling of products as organic possible. Although the then Department of Agriculture, Forestry and Fisheries in South Africa has drafted a National Policy on Organic Farming (10th draft), organic agriculture is still not regulated in South Africa, which may enable fraud regarding organic labels.

Transformation to healthy diets by 2050 will require substantial dietary shifts. In a study by several environmental and agriculture organisations, it was found that organic agriculture could indeed provide enough food to feed nine million people in 2050. Other sustainable agricultural systems were briefly discussed, namely "regenerative agriculture, sustainable intensification, climate-smart agriculture and conservation agriculture". Although these systems are all sustainable and have several elements of organic agriculture, like the generation of soil, mitigation of greenhouse gases, and crop rotation, organic farming is the only agricultural system that prohibits the use of synthetic fertilisers, pesticides, GMOs and antibiotics.

Transformation to healthy diets by 2050 will require substantial dietary shifts. In a study by several environmental and agriculture organisations, it was found that organic agriculture could indeed provide enough food to feed nine million people in 2050.[369] Organic farming is a sustainable agricultural system that takes climate change and the health of people, plants and the soil into consideration. The SAOSO and SANS Standards are still voluntary standards, while the PGS is a grassroots system that establishes trust, social networks and knowledge exchange. It

[369] Muller *et al* Strategies for feeding the world more sustainably with organic farming.

integrates capacity-building that helps small-scale farmers solve their practical problems and develops short supply chains in mainly informal local markets.

The next chapter will focus on the legal framework and legislation regarding organic farming, as well as discuss the procedures of the SAOASA and SANS1369:2016.

Chapter 4: Legal framework concerning organic farming

4.1 Introduction

The aim of this chapter is to discuss the legal framework that has an impact on organic farming in South Africa. The framework includes policies, plans, legislation and standards. In this chapter, the National Food and Nutrition Security Plan for South Africa; the Agriculture and Agro-processing Masterplan "Social Compact", the 10th draft of the National policy on organic production as well as policies and plans dealing with small-scale farmers, such as the National Development Plan 2030, the Strategic Plan for Smallholder Support, the National Policy Framework on the Support and Development of Small and Medium Agro-processing Enterprises in the Republic of South Africa, and the Agricultural Policy Action Plan will be discussed.

There is still no official legislation in South Africa regarding organic farming. In the *National Policy on Organic Production* (10th draft), it is said that the former Department of Agriculture, Forestry and Fisheries (DAFF) "shall develop an effective and affordable certification programme for organic products as a matter of urgency".[370]

The SAOSO Standard for Organic Production and Processing as well as the SANS Standard will also be discussed. The need for an agricultural policy in line with the realities of climate change and the triple burden of malnutrition will be investigated.

Firstly, the planning and draft policy framework is discussed.

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370 DAFF 2019 *National Policy on Organic Production* (10th draft) 16. The precise words were used in the 7th draft – DAFF 2011 *National Policy on Organic Production* (7th draft) (30/07/2011) 19. S 27(1)(b) of the *Constitution of the Republic of South Africa*, 1996 safeguards the right to sufficient food and water to everyone in South Africa, while ss 28(1)(c) and (d) guarantee every child the right to basic nutrition, shelter, health care and social services as well as the right to be protected from maltreatment, neglect and abuse. The right implies that government needs to address nutrition and therefore agricultural practices that do not give effect to the constitutional mandate. Due to the scope of the study on the regulation of organic farming and not as a rights' issue, these sections of the Constitution are not discussed.

4.2 Planning and draft policy framework concerning organic farming

The National Food and Security Plan (NFNS) for South Africa 2018-2023; the Agriculture and Agro-processing Masterplan "Social Compact" (AAMP) and the 10th Draft of the *National Policy on Organic Production* form the policy framework for organic farming. The NFNS will be discussed first.

4.2.1 National Food and Nutrition Security Plan (NFNS) for South Africa 2018-2023

In 2017, the Department of Planning, Monitoring and Evaluation in the Office of the President published the NFNS. The objectives of the plan are to establish a multisectoral Food and Nutrition Security Council to oversee the alignment, coordination and implementation of policies and programmes; "establish inclusive local food value chains to support access to nutritious and affordable food" (with the focus on raising the productivity of smallholder producers); "expand targeted social protection measures and sustainable livelihood programmes; scale up high-impact nutrition interventions targeting woman and children; influence people across the life cycle to make informed food and nutrition decisions through an integrated communications strategy and to develop a monitoring" and evaluation system for food and nutrition security, including an integrated risk-management system to monitor food and nutrition security-related risks.[371] Paragraph 1.10.4 of the NFNS refers to the SDGs and declares that the plan "seeks to contribute directly to implementation programmes aimed at five of the Goals", *inter alia* Goal 2 that states as its goal "to end hunger, achieve food security and promote sustainable agriculture".

More than four years after the NFNS was published, there has been no movement to establish the National Food and Nutrition Security Council (the plan's first strategic objective). This council should have been set up at each level of government (national, provincial and district) as well as in the Office of the Deputy President, the Provincial Premiers and district mayors would have been accountable

[371] NFNS Table 2 on 15.

to this Council indicating how they work towards the NFNS's goals.[372] In addition, the NFNS, budgeted at R86.8 billion, had by mid-2024 not been funded.[373]

In a plan on food security where malnutrition is one of the problems identified, one would expect references to sustainable food production. However, the only link between nutrition and agriculture makes reference to "nutrition sensitive interventions include agriculture",[374] and "pathways of nutrition sensitive agriculture to nutrition outcomes are food production, agricultural income and empowerment of women".[375] The nature of the food production and agriculture is not clarified. Although, according to the acknowledgements to the plan, inputs of role-players, organisations, several government departments and technical support from the UN have been obtained, it seems that there was a lack of consultation with people in rural communities and those most affected by hunger as well as with organic farmers. This was a golden opportunity that could have involved the rural communities as well as to obtain knowledge about indigenous knowledge systems. The same could be said with regard to organic farmers.

The next paragraph deals with the Agriculture and Agro-processing Masterplan "Social Compact", Agriculture and Agro-processing Masterplan (AAMP), May 2022.

The vision of the AAMP is to build a growing, equitable, inclusive, competitive, job-creating, low-carbon and sustainable agriculture and an agro-processing sector[376] The plan also aims "to unlock R7 billion in agricultural financing for farmers and small medium micro enterprises (SMMEs) through a blended finance scheme, state grants, agro-processing fund, statutory levies", supplier development programmes and industry trust.[377] Unfortunately, after two years, there has been very little to show in terms of implementation on the ground (June 2024).[378]

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372 Devereux *et al* 2022 *Challenging the Normalisation of Hunger in Highly Unequal Societies* 25; Sulcas 2022 *Daily Maverick* 1.
373 Devereux *et al* 2022 *Challenging the Normalisation of Hunger in Highly Unequal Societies* 25.
374 At 3.8.1 on 44.
375 At 3.8.1 on 43.
376 Agro-processing Masterplan "social compact" vi.
377 Agro-processing Masterplan "social compact" 6.
378 Sihlobo 2024 *Agricultural Economics Today* 468.

The "Social Compact" refers to cooperation between government and industries,[379] and although mention is made of small-scale and emerging farmers, it seems that they were not involved in the drafting of the plan. However, the AAMP states specifically that "to create a 'Transformation Initiative', the government and private sector should combine existing resources and implement initiatives that help marginalised farmers and new entrants who have limited support structures, financing capacities, infrastructure, technical expertise and necessary networks to participate in production processes and value chains".[380] The plan does not specify whether new entrants will have to focus on conventional farming or whether organic farmers will also be included.

The AAMP, under pillar 4, states that "the efficiency and effectiveness of state-owned enterprises", namely Foskor and Sasol, must be improved in producing and distributing fertiliser, chemical components and lime with "the goal to replace 30 percent of fertilizer imports by 2030".[381] The use of more affordable sources in fertiliser production must be promoted,[382] while pillar 1 states that "measures to reduce carbon emissions should be considered as contribution of the agriculture and food sectors to South Africa's achievement of its Paris Agreement and Glasgow commitments."[383]

Approximately a third of greenhouse gas emissions is contributed by agriculture.[384] The "total emissions from nitrogen fertilizers and crop residues in South Africa in 2018 were 7.3 metric tonnes of carbon dioxide equivalent (CO_2e), while cattle produced a total of 35.37 million metric tonnes of CO_2 emissions in 2019, with methane from enteric fermentation accounting for the majority of emissions".[385] One of the specific aims of the plan "is to enhance resilience to the effects of climate

379 Agro-processing Masterplan "social compact" vi.
380 Agro-processing Masterplan "social compact" 8.
381 Agro-processing Masterplan "social compact" 34.
382 Agro-processing Masterplan "social compact" 34.
383 Agro-processing Masterplan "social compact" 19.
384 The World Bank 2022 *Climate explainer: Food Security and Climate Change*.
385 Tongwane, Moeletsi and Tsubo 2020 *J Environ Manage* 1-8.

change and promote sustainable management of natural resources",[386] but the *how* has not been addressed.

The effects of synthetic pesticides on health and damage caused to the environment have already been discussed.[387] Through the use of organic fertilisers, it is expected that carbon emissions will be reduced and that it will also help to rebuild topsoil and soil holding capacity.[388] Nearly 60% of land in South Africa is degraded (which leads to the depletion of soil fertility and results in lower crop productivity) and 91% is prone to desertification.[389] Indigenous knowledge systems such as mixed and rotational cropping and grazing as well as zero tillage could improve soil health and increase carbon capture of the soil by storing it underground.[390]

The government, supported by the main agro-producers, prioritises "agricultural intensification using green revolution technologies", which may be short-term solutions, but are not sustainable due to their impact on soils, biodiversity, pollution and human health.[391] Smallholders are also marginalised by it.[392] Hidden costs[393] should be incorporated into decision-making processes to transform the way agrifood systems function. According to the FAO,[394] the primary results of global hidden costs of agrifood systems exceed USD 10 trillion.

Hidden costs result, for example, from greenhouse gas and nitrogen emissions, blue water use, pollution from pesticides and fertilisers, agricultural labour and productivity resulting undernourishment and obesity.[395]

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386 Agro-processing Masterplan "social compact" vii, 4-5.
387 See 2.3.2 above.
388 Okole *et al Improved food security in South Africa* ii.
389 Okole *et al Improved food security in South Africa* 5.
390 Okole *et al Improved food security in South Africa* 5.
391 FAO 2022 *Food Systems Profile – South Africa* 21.
392 FAO 2022 *Food Systems Profile – South Africa* 21.
393 The FAO define hidden costs as: "any cost to individuals or society that is nor reflected in the market price of a product or service. It refers to external costs (negative externality) or economic losses triggered by other market, institutional or policy failures".
394 FAO 2023 *The state of Food and Agriculture --- revealing the true cost of food to transform agrifood systems* 26.
395 FAO 2023 *The state of Food and Agriculture – revealing the true cost of food to transform agrifood systems* 26.

The costs linked to non-communicable diseases and their mortality would exceed USD 1.3 trillion per year by 2030 if the current food consumption patterns continued.[396] The FAO [397]states:

> In contrast, shifting to healthy diets would lead to an estimated reduction of up to 97 percent in direct and indirect health costs, generating significant savings that could be invested to lower cost of nutritious food.

The adoption of alternative diets would reduce climate-related costs and greenhouse gas emissions associated with current dietary patterns by an estimated 41 to 74% in 2030.[398] Organic food from organic agriculture will support healthy diets as well as a healthy environment. Because organic farming is labour intensive, it could contribute to employment opportunities.

4.2.3 National Policy on Organic Production 10th Draft

The 10th draft of the DAFF's *National Policy on Organic Production* is reasonably comprehensive, but as stated before, by June 2024, it was still a discussion paper. The policy considers organic farming as "an alternative production system that will contribute towards the realisation of the envisaged Green Economy as well as complying with agendas such as Sustainable Agriculture and the Clean Development Mechanism."[399] Organic farming will co-exist with conventional farming systems.[400]

The policy does not set organic production standards but leaves it to SAOSO to develop national organic standards in collaboration with the South African Bureau of Standards,[401] which SAOSO has done. The policy states that "there are many compelling reasons why the South African government should develop and implement the policy on organic farming".[402] The following reasons are mentioned:

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396 FAO 2023 *The state of Food and Agriculture – revealing the true cost of food to transform agrifood systems* 57.

397 FAO 2023 *The state of Food and Agriculture – revealing the true cost of food to transform Agrifood systems*. 57.

398 FAO 2023 *The state of Food and Agriculture – revealing the true cost of food to transform agrifood systems* 57.

399 DAFF 2019 *National Policy on Organic Production* (10th draft) 5.

400 DAFF 2019 *National Policy on Organic Production* (10th draft) 5.

401 DAFF 2019 *National Policy on Organic Production* (10th draft) 10.8 24.

402 DAFF 2019 *National Policy on Organic Production* (10th draft) 2 on 5.

a) protection of consumers from unfair practices such as false labels on products; b) environmental benefits; c) health benefits; d) climate change; e) "social justice – one of the fundamental principles of the South African Constitution is the freedom of choice"; and f) economic benefits – organic agriculture is not dependant on input costs of manufactured products such as fertilisers and pesticides and because organic agriculture is labour intensive it would create work.[403] The policy also refers to "education and training programmes because organic farming requires skills and expertise" as well as awareness programmes.[404] It states that the organic sector needs effective leadership; therefore, the Organic Sector Strategy Implementation Committee assisted the sector to establish a national umbrella body namely SAOSO.[405] The policy also refers to traditional farming and indigenous knowledge as sustainable agriculture practices.[406] Most traditional and substance farmers use organic practices and some are currently certified through the PGS system.[407]

The policy stipulates that "an effective regulatory system is critical for the development of a sustainable organic sector and that South Africa should prioritise the development of legislation and regulations regarding organic products".[408] As such, it summarises the concept of organic farming and its benefits and the rationale for a national policy on organic farming. There is currently no legislation dealing with organic agriculture specifically. Policy as such is not legally binding or enforceable.[409] A policy review by Hendriks and Olivier[410] found that South African agricultural policies do not actively promote food security. It is therefore difficult to coordinate existing policies due to a lack of enforceable food security policies.[411] Lim Tung states that "consumers cannot be sure of the validity of claims on labels without a legal framework regulating the production and sale of organic

403 DAFF 2019 *National Policy on Organic Production* (10th draft) 2.1 – 2.6, 5 – 8.
404 DAFF 2019 *National Policy on Organic Production* (10th draft) 9.1 – 9.2, 14 – 15.
405 DAFF 2019 *National Policy on Organic Production* (10th draft) 9.4 17.
406 DAFF 2019 *National Policy on Organic Production* (10th draft) 31.
407 See para 3.10.2 above.
408 DAFF 2019 *National Policy on Organic Production* (10th draft) 19.
409 Hendriks and Olivier 2015 *DSA* 568.
410 Hendriks and Olivier 2015 *DSA* 555.
411 Hendriks and Olivier 2015 *DSA* 555.

products".[412] Recognition of local organic production as well as credibility in the export market will be established through the regulation of organic agriculture.[413]

4.3 Government policies and plans dealing with small-scale farmers

The majority of small-scale farmers, even if their farms are not certified, follow organic principles of farming.[414] In this paragraph, the government policies referring to small-scale farmers are briefly discussed. These policies and plans include the NDP, Strategic Plan for Smallholder Support (SPSS) 2011-2014/15, the National Policy Framework on the Support and Development of Small and Medium Agro-Processing Enterprises in the Republic of South Africa 2014/30, the Agricultural Policy Plan (APAP) of 2015, Agri-parks, and the Strategic Plan 2020-2025.[415] Problems regarding policies concerning small-scale farmers are discussed in 4.3.5.

4.3.1 National Development Plan (NDP) 2030: Our Future – make it work (2011)

Chapter 6: An integrated and inclusive rural economy of the NDP deals specifically with smallholder (small-scale) farmers as well as rural communities. The NDP's vision for an integrated rural economy includes better integration through "land reform, infrastructure development, job creation and poverty alleviation through the driving force" of an expansion of irrigated agriculture.[416] The NDP states that agriculture can create close to a million jobs by 2030.[417] An estimated "25 000 small-scale farmers with access to more than five hectares of dry land do not farm in areas that can be irrigated". According to the plan about 50 000 jobs will be created if each of these farmers employs two workers.[418] Underused land in communal areas could be used for commercial agriculture.[419] The NDP does not mention organic farming as such.

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412 Lim Tung 2016 *PELJ* 20.
413 Lim Tung 2016 *PELJ* 19; also see Lim Tung 2018 *PELJ* 1–38.
414 See 3.3.2 above.
415 Agriculture is listed in Schedule 4 of the Constitution as a concurrent legislative competence. Due to the scope of the study, the focus is on national policies only.
416 NDP 2030 218.
417 NDP 2030 219.
418 NDP 2030 221.
419 NDP 2030 219.

4.3.2 Strategic Plan for Smallholder Support (SPSS) 2011-2014/15

The SPSS[420] addressed immediate challenges facing smallholder producers and provided alternative solutions for producers in the medium- and long term.[421] The reason for the plan to support smallholders was because it was an area "with potential to create economic opportunities especially in rural areas".[422] According to the plan, smallholder producers played a critical role in the supply of food for their families, supplying surplus food to the market and creating employment, but were not playing the role that they could.[423] The plan aimed to coordinate and align all programmes that targeted development and support towards achieving sustained food security and economic returns.[424] The SPSS had the vision to ensure a more prosperous smallholder sector that contributes to economic empowerment, food security and rural development.[425] According to the SPSS, in terms of enlarging the sector, many would be from the subsistence sector and therefore support to *smallholders* also implied subsistence producers who had the potential to *graduate* to smallholder status.[426] It is stated that, at the same time, government did not seek to promote the smallholder sector at the expense of large commercial agriculture.[427] Although the plan did not refer to organic farming, many smallholder and almost all subsistence farmers use organic principles to farm. This plan was replaced by a Strategic Plan 2020-2025 that is discussed in more detail below.[428]

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420 A DAFF Strategic Plan 2013/2014–2017/2018 with the title: "The Strategic Plan for supporting smallholder producers is a broader initiative that seeks to improve coordination of support to smallholder producers" appear on the internet. The Strategic Plan 2013/2014-2017/2018 just refer, under the heading: Policy Mandates, to the Strategic Plan for Smallholder Support (SPSS) 2011–2014/15 (see 4.3.2 above) which was completed and formalised in July 2013. This specific Strategic Plan 2013/14–2017/2018 is not dealt with, because there is a similar newer Strategic Plan 2020–2025 that is dealt with in 4.3.6 below. In this plan there are also references to smallholder support.

421 Dept of Agriculture, Forestry and Fisheries (DAFF) Strategic Plan for Smallholder Support (SPSS) 1.

422 DAFF SPSS 1.

423 DAFF SPSS point 4 3.

424 DAFF SPSS 1.

425 DAFF SPSS point 5 4.

426 DAFF SPSS 3.

427 DAFF SPSS 3.

428 See 4.3.6.

4.3.3 National Policy Framework on the Support and Development of Small and Medium Agro-Processing Enterprises in the Republic of South Africa 2014/30

The vision of this Policy is to enhance the active participation of small and medium agro-processing enterprises in the mainstream agro-processing industry.[429] "Agro-processing refers to activities that change the form of agricultural products into various forms to facilitate easier handling, increase shelf-life" and market access.[430] As South Africa has become a net importer of processed agriculture, the import differentially presents an opportunity to develop the rural processing industry. The policy "intends to create downstream agro-processing activities in rural areas while encouraging and stimulating production of primary products."[431] This may be an opportunity for organic farmers to participate in these activities.

4.3.4 Agricultural Policy Action Plan (APAP) 2015

Although the AAMP[432] is the most recent policy on agriculture, there is no specific reference in the AAMP to smallholder farmers, but the APAP refers to the Fetsa Tlala (eradicate hunger) National Programme.

The Fetsa Tlala Integrated Food Production Intervention focuses on supporting smallholder and subsistence farmers to increase the area under production and to work their land optimally.[433] Three different kinds of smallholder farmers are targeted: "farmers in the former homelands; land redistribution beneficiaries and farmers on irrigation schemes".[434] The APAP recognised farmers as "persistent innovators in the effort to adapt to conditions and survive". Innovations developed by large-scale and particularly small-scale farmers must be identified and blended with scientific knowledge to develop appropriate solutions.[435] The high cost of technology and the implications of these costs on production are of concern. APAP

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429 DAFF 2016 *National Policy Framework on the support and development of SME's 2014/30* 1.
430 DAFF 2016 *National Policy Framework on the support and development of SME's 2014/30* 1.
431 DAFF 2016 *National Policy Framework on the support and development of SME's 2014/30* 1.
432 See 4.2.2 above. There are currently no updates on the AAMP.
433 APAP 6.1 on 103.
434 APAP on 104.
435 APAP on 105.

states that an innovative response by the smallholder sector is more limited than within the commercial sector.[436] As stated before,[437] the agricultural sector contributes to climate change that leads to declining production capacity with the potential to undermine food security.[438] The department responsible for agriculture (at the time DAFF) acknowledges the development and implementation of climate-smart agriculture, namely organic, agroecology and conservation "agriculture as a means of adaptation and mitigation against the impacts of climate change".[439]

According to the APAP, one of the constraints faced by smallholder farmers is the lack of access to local and international markets. Large retail markets in smaller rural towns have to an extent replaced the role of smallholder farmers as local food producers. It is also difficult to comply with standards such as food quality and safety.

4.3.5 Agri-parks

"An agri-park is defined as a networked innovation system of agro-production, processing, logistics, marketing, training and extension services, located in a District Municipality".[440] The Agri-Parks model was launched in 2015. The aim of the parks was to create central points with processing and storage facilities and infrastructure to get farmers' products to markets and where the guidance of extension officers could be accessed.[441] Of the 44 agri-parks throughout South Africa, many are in a terrible state.[442] Several problems are experienced within "Agri-parks, for example, a) they are only a few hectares in size, as opposed to covering an area of 20 km radius around an Agri-hub and therefore represent only one" Farmer Production Support Unit; b) water use problems; and c) poor adoption of technologies and socio-economic problems.[443] The Department of Rural Development and Land

436 APAP on 106.
437 See 2.4 and 4.2.2 above.
438 APAP on 109.
439 APAP on 110. At the time it seemed that the majority in the government did not support such a view, also see 4.2.2 and 4.2.3.
440 DALRRD 2023 *Agriparks*.
441 Manoko 2022 *Lifeless agri-parks: Government ready to try harder.*
442 Manoko 2022 *Lifeless agri-parks: Government ready to try harder*.
443 WRC 2022 *The Water Wheel* January/February 30.

Reform admitted that the Department had "spread itself thinly and forgot it did not have proper planning expertise".[444] Speaking at a North West event in 2022, Minister Didiza said that the "Agri-parks programme may not have taken root, but we are working to reignite it once more."[445] Agri-parks are a very good idea and it is hoped that the second round will be very successful. It can be used to introduce organic farming within communities.

4.3.6 Strategic Plan 2020-2025

Every department in government and even municipalities has composed its own revised strategic plan 2020-2025. The Department of Agriculture, Land Reform and Rural Development (DALRRD) concentrates its strategy on "the following outcomes: a) improved governance and service excellence; b) spatial transformation and effective land administration; c) redress and access to land and producer support; d) increased production in the agricultural sector; e) increased market access and maintenance of existing markets; f) an integrated and inclusive rural economy; and g) enhanced biosecurity and effective disaster risk reduction".[446] The plan does not deal with agriculture specifically, but focuses on land reform, job creation, markets, the problem of urbanism in rural areas and increasing agriculture production. The plan refers to subsistence agriculture that plays an important role in food security for the nation to provide additional sources of food.[447] It is mentioned that despite the financial implications posed by the *Carbon Tax Bill* after 2022 (now *Carbon Tax Act* 15 of 2019), "it also poses an incentive for the shift to alternative climate smart agricultural practices." The policy refers to the Draft Conservation Agriculture Policy and the draft Climate Smart Agricultural Framework. At this stage, as with the National Policy on Organic Farming, they are still both just draft policies. It is evident that the government believes that commercialised agriculture is the only way to produce enough food, as can also be seen by outcome 4 in this plan.[448]

444 PMG (22 October 2019) *Agri-Parks progress report*.
445 Manoko 2022 *Lifeless agri-parks: Government ready to try harder*.
446 Strategic Plan 2020-2025 6.
447 Strategic Plan 2020-2025 40.
448 Strategic Plan 2020-2025 63-64.

4.3.7 Discussion of the policies regarding smallholder farmers

Smallholders produce very little at present and it seems that they are withdrawing from farming.[449] By 2008, an estimated 71% of those with access to land did not use it for production – most of the land was used for free-range livestock.[450] Households produce, on average, only 20% of their food – the bulk of their food is purchased.[451] Hebinckt *et al*,[452] in a 2023 publication, addressed the "issues and questions about the nature and orientation of rural development policies and programmes in South Africa." They are of the opinion that the underlying rationale behind government interventions and governance mechanisms is highly technocratic. The various dimensions and realities of everyday life are disregarded. Unfounded assumptions about the reality of poor rural households are usually expressed in terms that strip them of their political-economic and historical contexts. The plans and policies are often met with resistance from the communities on whom they were imposed.[453] The structure of village-based lives is more complex and diverse than generally assumed. Home gardening is, in contrast to production at scale, more popular – it carries fewer risks and investments of limited financial resources.[454] Notwithstanding its considerable expenditure, the Fetsa Tlala Programme accounts for a relatively small share of maize production. It was unsuccessful because the conditions through which it was provided did not fit local needs and practices. The Fetsa Tlala Programme wanted to incite change in agricultural practice, aiming to increase agricultural production under the notion of targeting local agriculture. The NDP estimates that 500 000 ha could be added to the existing 1300 ha of irrigated land by 2030, which is, according to Beinart and Delius, very unlikely to be achieved.[455] Approximately half of the 110 000 ha of

449 Beinart and Delius 2018 *Viewpoints* 1.
450 Beinart and Delius 2018 *Viewpoints* 3.
451 Beinart and Delius 2018 *Viewpoints* 5.
452 Hebinckt, Smith and Aliber 2023 *Land Use Policy* 1-3
453 Hebinckt, Smith and Aliber 2023 *Land Use Policy* 5.
454 Hebinckt, Smith and Aliber 2023 *Land Use Policy* 11.
455 Beinart and Delius 2018 *Viewpoints* 7.

irrigation schemes in former homelands are not operating effectively. There is limited success in regenerating some of the schemes.[456]

Despite the policies and plans to assist smallholder farmers, they are withdrawing from farming, as mentioned above.[457] We know remarkably little about small-scale farmers and their constraints. South Africa has a diverse population with diverse ideas and it will be best for government to consult with these farmers as well as persons from every relevant group when they consider new policies and legislation also in relation to organic farming.

4.4 Legislation relevant to organic farming

As stated before, there is no legislation that specifically regulates organic farming. However, a number of acts are or may be, in certain circumstances, applicable to organic agriculture or its products. They include the *Foodstuffs, Cosmetic and Disinfectants Act* 54 of 1972; *Agricultural Products Standards Act* 12 of 2023; *Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies Act* 36 of 1947 and the *Plant Breeders' Rights Act* 12 of 2018,

4.4.1 Foodstuffs, Cosmetic and Disinfectants Act 54 of 1972

The *Foodstuffs, Cosmetic and Disinfectant Act* regulates the selling, manufacturing and importation of foodstuffs, cosmetics and disinfectants as well as the advertising and labelling thereof. "Foodstuff" in this act means "any article or substance ordinarily eaten or drunk or purporting to be suitable, sold or manufactured for human consumption."[458] False advertisements or misleading descriptions constitute an offence.[459] Draft regulations (GN R3337 of 21 April 2023) were published for comment.[460] On 16 February 2024, six months after the closing of the public comment period, the Department of Health has not yet started to review

456 Hebinckt, Smith and Aliber 2023 *Land Use Policy* 15.
457 See 4.3.7 above.
458 Section 1(vii) of the *Foodstuffs, Cosmetics and Disinfectants Act* 54 of 1972.
459 Sections 5(a)–(b) of the *Foodstuffs, Cosmetics and Disinfectants Act* 54 of 1972.
460 In GG 48460. Initially GN R2986 in GG 47965 of 31 January 2023 were issued for comment in terms of the Act. It was replaced by GN R3287 in GG 48428 of 14 April 2023 (which was an incorrect version) then by GN R3320 in GG 48445 of 21 April 2023 which was an incorrect number.

comments.[461] GN R3337 relates to the labelling and advertising of foodstuffs and introduced the concept of *Front of the Pack Labelling*, which is a black triangle that has to be added to packaging with warnings such as 'high in saturated fat' or 'high in sugar' in white letters.[462] The WHO encourages countries to implement front-of-label-policies as a way to improve food choices and health.[463] In consideration of the obesity rate in South Africa, this is welcoming.[464] The proposed regulations will ensure that consumers have correct information on the ingredients in each product, the manufacturer and the safety of the product.[465] It will also allow consumers to make informed decisions with regard to the food they want to eat and may also ensure that references to organic farming are not false. There is also critique against the draft regulations in that it could result in multinational companies exiting the South African market altogether.[466] However, the SAOSO Labelling and Marketing Standards are currently in line with the Act and its draft regulations.[467] These standards are discussed in section 4.5.

4.4.2 Agricultural Products Standards Amendment Act 12 of 2023

The *Agricultural Products Standards Act* 119 of 1990 was amended by the *Agricultural Products Standards Amendment Act* 12 of 2023 (*Amendment Act*). The President signed the *Amendment Act* on 3 April 2024 and the amendments will come into operation as noted in the *Government Gazette*.[468] The *Amendment Act* "provides for the control over the sale and export of certain agricultural products". According to the *Memo on the objects of the Agricultural Product Standards Amendment Bill,*[469] a key deficiency in the 1990 Act is the definition of "manage control system which covered all management systems pertaining to inspection, audits and production practices". The State Law Adviser commented that the

461 Sulcas 2024 *Daily Maverick* 1.
462 Annexure 10 of GN R2986 in GG 47965 of 31 January 2023.
463 WHO 2021 *State of play of WHO guidance on Front-of-the-Pack labelling* 1.
464 See 2.2 on obesity.
465 Bernardo 2023 *Five reasons to support draft labelling Regulation R2986* 1.
466 Opperman 2023 *The Citizen* 4.
467 SAOSO 2023 *Standard for Organic Production and Processing* (Version 2) Section B-22 "labelling" 64. See 4.5 below.
468 Section 6.
469 Memo on the objects of the *Agricultural Product Standards Amendment Bill* [B15B-2021] 5.

definition did not correctly capture what was intended. In point 4.2 of the memorandum (*Implications for National Government Departments and Public Entities*), it is said that farmers, sellers and exporters "may benefit from guarantees that may come with claims such as 'organic' or 'free range' that now may be authenticated".[470] "Audit"*,* in section 1(a) of the Act, means "an examination of the management control system in order to determine whether results and activities comply with the claims associated with the product."

'Management control systems" mean:[471]

> The prescribed method of production which may be claimed through the use of name, word expression, reference, particulars or indication in any manner, either by itself or in conjunction with any other verbal, written, printed, illustrated or visual material.

According to the amended section 2(a), the Minister may, with regard to a particular product, designate a person, institution or association with particular knowledge in respect of the product, but with no direct or indirect personal or financial interest, as an assignee in respect of that product. There is no reference or penalty clause in the Act regarding a fraudulent claim made by a person who wants to sell or export a product.

Organic farming has specific standards regarding every aspect of a product. Since there is a price premium on organic products, it is likely that there will be fraudulent claims. The possibility that outsiders may be involved to determine whether the claims are true, is to be welcomed.

4.4.3 Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies Act 36 of 1947

Although "organic production and processing styles are based on the use of natural, biological, renewable and regenerative resources", this Act may still be applicable, for example, where a farmer wants to produce a fertiliser (even if it is organic), for sale. Fertiliser is defined in the Act "as any substance which is intended or offered

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470 *Agricultural Product Standards Amendment Bill* [B15B-2021] 5.
471 Section 1(d) of the *Agricultural Products Act* 12 of 2023.

to be used for improving or maintaining the growth of plants or productivity of the soil."[472] No person may sell any fertilizer, farm feed or remedy unless it is registered under the Act.[473]

4.4.4 Plant Breeders' Rights Act 12 of 2018

The *Plant Breeders' Rights Act* provides "for a system whereunder plant breeders' rights relating to varieties of certain kinds of plants may be granted; for the requirements that have to be complied with for the granting of such rights; for the scope and protection of such rights; and for the granting of licenses in respect of the exercise of such rights".[474] The Registrar designated and appointed by the Minister[475] must enter "particulars in respect of all applications for plant breeders' rights" in a register.[476] In order to guarantee protection of a plant breeders' right, a licence must be obtained for a "person intending to undertake the production/reproduction of the protected variety; the conditioning for the purpose of propagation, sale or other form of marketing", the export or import or the stocking of the protected variety".[477] The plant breeders' "right is valid for a period of 20, 25 or 30 years depending on the particular kind of plant."[478] Because synthetic pesticides, fertilisers and GMOs are not allowed in organic agriculture, many organic farmers breed their own plants. It is not always desirable to import seeds or plants from Europe because it often does not have sustainable solutions for the unique production challenges experienced in South African soils.[479] Breeding your own plant or seed also has financial implications because the plant breeder has the right to sell the plants or seeds.[480] Organic plant breeding is sustainable, enhances genetic diversity and works according to the ecosystem.[481] Traditional knowledge may be utilised in the development of new varieties for which plant breeder

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472 Section 1 of Act 36 of 1947.
473 Section 6(a) of Act 36 of 1947.
474 Preamble *Plant Breeders' Rights Act* 12 of 2018.
475 Appointed in terms of s 2(1). The Registrar's functions are set out in ss 2-5.
476 Section 4(1) of Act 12 of 2018.
477 Section 7(1) of Act 12 of 2018.
478 Section 8(1) of Act 12 of 2018.
479 Kriel *Farmers Weekly* 29 June 2018.
480 Section 7(2) of Act 12 of 2018.
481 See Vathsa Sagar and Kulkari 2022 *The Pharma Innovation Journal* 3575-3584. Also see para 4.5.2 and footnotes 537–539 below.

protection can be claimed. There was much critique against the Act. The African Centre for Biodiversity and civil society organisations campaigned against it as "part of the architecture that entrenches and deepens historically unequal seed, agricultural and food systems." They also called for exemptions for smallholder farmers and their farming systems from the Bill (now the Act)[482] that were not granted.

As there is no specific regulation of organic farming in South Africa, farmers resort to adherence to voluntary standards.

4.5 Voluntary standards

As stated before, SAOSO and the SABS developed voluntary standards for organic production and processing. SAOSA published *The South African Organic Sector Organisation (SAOSO) Standard for Organic Production and Processing (Version 2),* in January 2024, based on the Standard for Organic Production and Processing of IFOAM.[483]

The SAOSO standard deals with the entire scope of organic farming from production, animal husbandry, labelling and marketing, conversion to organic farming, certification standards and the organic logo. The SABS standard, SANS 1369:2016, is based on the IFOAM and EU standards.[484] Under the heading: *Intention of the SAOSO standards,* it is envisaged:[485]

> [T]hat the South African Government will, through appropriate legislation, formally recognise The South African Bureau of Standards (SABS) SANS 1369 Standard as the National South African Standard and the SAOSO Standard as being a formal implementation thereof.

SAOSO also claims that, by virtue of its membership to the IFOAM Family of Standards, this standard will be considered as being regionally applicable within the

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482 Mayet, Lewis and Greenberg *South Africa's new Plant Breeders' Rights Act* 6.
483 SAOSO 2023 *Standard for Organic Production and Processing* (Version 2) 1.
484 See footnote 301 above.
485 SAOSA 2023 *Standard for Organic Production and Processing* (Version 2) Section A-2 7. Also see paras 1.1 and 3.3.4.3.

greater South African Development Community and will be accepted internationally (by other countries recognising the IFOAM family of standards).[486]

The SAOSO Standards Minimum Inspection Requirements are based on the EU 2092/91 Annex 3.[487] Council Regulation of the European Economic Community (EEC) no 2092/91 and the National Standard of Canada (CAN/CGSB-32.310-2020) are also referenced by the SAOSO Standard.[488]

4.5.1 SANS 1369:2016

In the introduction to SANS 1369:2016, it is stated that "this document has been developed to assist in upholding the basic principles of organic agriculture to ensure the development, growth and improvement of organic agriculture."[489] It recognises the four principles of organic farming.[490] The scope of the standard relates to products where the labels claim that the product is based on organic production and processing.[491] The products include (a) "processed and unprocessed products for human consumptions that are derived mainly from plants, plant products and live animals"; (b) products from bee-keeping; and (c) wild harvesting and participatory guarantee schemes. It does not include "wine making, aquaculture, game farming, medicinal products, cosmetics and textiles".[492] SANS 1369:2016 sets out the requirements for organically produced products in general[493] as well as in relation to the specific products.[494] The standard prescribes additional rules for pest and disease control,[495] cleaning, disinfection and sanitising,[496] processing, handling,

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486 SAOSO 2023 *Standard for Organic Production and Processing* (Version 2) Section A-2 7.
487 SAOSO 2023 *Standard for Organic Production and Processing* (Version 2) Section A-3 10.
488 SAOSO 2023 *Standard for Organic Production and Processing* (Version 2) 2.
489 The document must be read with Codex general standard for food additives (GSFA) and SANS 17065/ISO/IEC 17065, Conformity assessment – Requirements for bodies certifying products, processes and services – para 2. It is not possible to discuss the Standard in detail due to the scope of the mini-dissertation. Merely an overview is provided.
490 See 3.2 above. Principles of "(a) the principle of health; (b) the principle of ecology; (c) the principle of fairness; and (d) the principle of care".
491 See SANS 1369:2016 para 1.
492 See SANS 1369:2016 paras 1.1 – 1.3.
493 See SANS 1369:2016 para 4.1.
494 See SANS 1369:2016 paras 4.1 – 4.5.
495 SANS 1369:2016 para 4.6.
496 SANS1369:2016 para 4.7.

packaging, storage, distribution and retailing,[497] as well as for labelling and marking.[498] The standard includes normative and informative rules in its annexures. The normative rules include criteria for the evaluation and input into organic agriculture,[499] rules in relation to fertilisers and soil conditioners,[500] pest and disease control for plants,[501] minimum surface areas and types of housing for different species and types of production;[502] prescriptions as to which products can be used for cleaning and disinfection;[503] as well as the use of ingredients of non-agricultural origin;[504] and the processing aids for the preparation of production.[505]

The informative annexures deal with the acceptability of manure from non-organic sources and guidelines for the density of livestock.[506] The general rules include, among others, that the production process should include measures to improve "the landscape and biodiversity, contribute to the equilibrium of agricultural production systems by providing for the nutrient requirements of crops and by improving the organic matter content of the soil."[507] Animal husbandry must occur on land and landless animal husbandry is prohibited.[508] Synthetic fertilisers (except if permitted by the standard), the use of GMOs and ionising are furthermore prohibited.[509]

Farmers must introduce a quality and safety management system.[510] "A product certification audit and certification process [must be] conducted before a product can be regarded as being organic. If the PGS system is followed, then the PGS process must be followed.[511] Before any product can be certified as organic, the conversion period should be completed. Specific requirements are prescribed in this

497 SANS 1369:2016 para 4.8.
498 SANS 1369:2016 para 4.9.
499 Annexure A.
500 Annexure B.
501 Annexure C.
502 Annexure E.
503 Annexure G.
504 Annexure H.
505 Annexure I.
506 Annexes D and F.
507 Paragraph 4.1.1.
508 Paragraph 4.1.2. Landless husbandry includes "animal feedlots, container growing, hydroponic production and plant production systems that use soil and gravel as anchoring substrate only".
509 Paragraphs 4.1.3, 4.1.4 and 4.1.5.
510 Paragraph 4.1.6.
511 Paragraph 4.1.7.

regard.[512] In exceptional circumstances and under specific requirements, the farmers may conduct "organic, organic-in-conversion and conventional production."[513]

In order to be certified by a certification body, the farming practices as well as the product must comply with the requirements of the standard.[514] The farmer or producer must continuously update all documents and records as prescribed by the standard.[515]

It is important to note that SANS 1368:2016 specifically states that organic products may not be produced in[516]

> Heavy industrial and mining areas and conventional farming areas that are heavily reliant on conventional input where pollution occurs and where there is a risk of contamination of the operation with substances from the environment or other sources that are not compatible with the principles of organic production as stipulated in the requirements of this standard.

In addition, the risks of using certain equipment or the risks from other pollution sources must be investigated and eliminated.[517] The only legal measures that the standard refers to are in relation to packaging and labelling in terms of the *Foodstuffs, Cosmetics and Disinfectants Act* 54 of 1972 and the *Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies Act* 36 of 1947.[518]

SANS 1369:2016 provides the technical details and basic rules for organic farming that must be complied with. Although the standard refers to the four principles of organic farming, they are not described nor is there any reference to the definition of organic farming.

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512 Paragraph 4.1.8.
513 Paragraph 4.1.9.
514 Paragraph 4.1.10.
515 Paragraph 4.1.11.
516 Paragraph 4.1.12.
517 Paragraph 4.1.12 refers to examples "such as storm water from roads, the use and disposal of equipment oil, vehicle oil leaks, household chemicals in wastewater used for food gardens, and the handling, storage and disposal of allowed chemicals".
518 See 4.4.1 and 4.4.3 above. See Foreword of SANS 1369:2016 and its paras 4.2.2(j)(4), 4.9.4, tables H.1, H.2, H.3.1, H.3.2(b), and H.5, 4.4.17(f), and notes to tables B.1 and C.1.

4.5.2 SAOSO standard

The essence of organic farming is contained in the definition of the SAOSO standard, namely soil health, ecosystems, people, biodiversity and the environment.[519] It has a broader scope than SANS 1369:2016. The standard requires from operators to "design and implement measures to maintain and enhance biodiversity quality, by maintaining on-farm wildlife refuge habitats or where" none exists to establish them. A list of probable habitats is provided.[520] "Clearing or destruction of High Conservation Value Areas is prohibited and farming areas installed on" such cleared land shall not be considered compliant with the standard.[521] The clearance of virgin forests for agriculture is also forbidden.[522] Farms "must show commitment to the maintenance of farm biodiversity." If the biodiversity reserve does not reach 10% of the total farm area, a biodiversity plan that sets out how this will be achieved must be approved.[523]

As a "general principle organic farming methods must conserve and improve the soil, maintain water quality and use water efficiently and responsibly".[524] Measures to prevent erosion and minimise the loss of topsoil must be taken.[525] Soil and water salinisation must be prevented and remedied where it occurred.[526] Water quality must be preserved and where possible rainwater must be recycled and water extraction monitored.[527] The use of nanomaterials is prohibited.[528]

The SAOSO Standards cover "the areas of general organic management, crop production (including plant breeding) animal production, beekeeping, insect production, aquaculture, wild collection, winemaking, mushroom production

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519 SAOSO 2023 *Standard for Organic Production and Processing* (Version 2) 4. See also 3.2 above for the definition and principals of organic farming.
520 Paragraph 2.1.1 29.
521 Paragraph 2.1.2 29.
522 Paragraph 2.1.3 29. Also see SANS 1369:2016 4.2.2 (o) 11.
523 Paragraph 2.1.4 29.
524 Paragraph 2.2 30. Also see SANS 1369:2016 para 4.2.2 (q) read: "That water resources shall not be exploited and depleted excessively".
525 Paragraph 2.2.1 31. Also see SANS 1369:2016 para 4.2.2 (p) 11.
526 Paragraph 2.2.5 31. Also see SANS 1369:2016 para 4.2.2 (s) 11.
527 Paragraph 2.2.6 31.
528 Paragraph 2.3.5 31. GMO's is also forbidden (paras 2.3.1 – 4 31) as also set out in the SANS Standard (see footnote 511).

processing and handling, labelling and social justice".[529] The standards contain "provisions for regional variations in the form of regional or other exceptions" as well as specific clauses that may be *normative* (prescriptive), or exceptions or informative (guidance).[530] According to SAOSO, [531]the standards should be seen as:

> A reference resource, as much as a Standard, being for the producer a 'first stop' when looking for answers to organic production and associated claims.

Section 4.8 of the SAOSO standards refers to the breeding of organic varieties and not the use of production of organic seeds from conventional varieties.[532] "It aims for new varieties particularly suited for organic production systems and is a holistic approach that respects natural crossing barriers".[533] Plant breeders must "select their varieties under organic conditions that comply with the SAOSO standard".[534] It is further stated that:

> Organic plant breeders shall make the information about the methods, which were used to develop an organic variety, available for the public latest from the beginning of marketing of the seeds.[535]

The genome and cell are respected as impartible entities.[536]

With the initial inspection the operator must "fill in an application document containing a full description of the unit, premises or activity"; "measures to be taken to ensure compliance with the standard" as well as precautionary measures "to reduce risk of contamination by cleaning measures or unauthorised products", such as in storage. The operator must also sign a declaration that he or she undertakes to perform operations in accordance with the standards.[537]

In section 2.5, reference to a quote of the FAO was made in connection with a sustainable agriculture system that refers to sustainable "diets that: a) have low

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529 Section A-2 para 3 8.
530 Section A-2 para 3 8.
531 Section A-2 para 3.8.
532 Section B para 4.8 39. Also see 4.4.4 above (the *Plant Breeders' Rights Act* 12 of 2018).
533 Section B para 4.8 39.
534 Section B para 4.8.1 39.
535 Section B para 4.8.3 39.
536 Section B 4.8.4–5.
537 Section A-3 para 1.2.1 – 1.2.2.

environmental impacts; b) contribute to food and nutrition security; c) a healthy life for present and future generations; d) are protective and respectful of biodiversity and ecosystems; e) that are culturally acceptable, f) accessible; g) economically fair; h) nutritionally adequate; i) safe and healthy; and j) optimise natural and human resources".[538]

To cater for specific South African circumstances, additional context-sensitive South African-specific clauses are included, such as the poultry and aquaculture derogations.[539] Derogations have a limited span of five years from the date of publication of the standard, but can be reviewed if necessary.[540] There are two logos that can be used on organic-certified products, namely the ZA organic SAOSO certified logo under the third-party certification scheme (mostly for the export market) and the SA Organic SAOSO PGS certified logo for products certified under the PGS scheme.[541] Game farming, medical products, cosmetics and textiles are not covered by the standards.[542] The SANS 1369:2016 and SAOSO standards work together towards the ideal of a sustainable agricultural system and nutritious food that takes climate change and the environment into consideration, as set out in the quote.

4.6 An agriculture policy needed in line with the realities of climate change and the triple burden of malnutrition

South Africa signed both the Paris Agreement[543] and the Glasgow Climate Pact,[544] committing to reduce carbon emissions. At this stage, South Africa is experiencing an energy crisis and inevitably uses "fossil fuels – the main driver of climate change" to lessen the energy problem.[545] "The Paris Agreement puts an obligation on South Africa to submit nationally determined contributions (NDCs)" with a mitigation

538 See chapter 2.5 above.
539 SAOSO 2023 *Standard for Organic Production and Processing* (Version 2) Section A-2 8.
540 SAOSO 2023 *Standard for Organic Production and Processing* (Version 2) Section A-2 8.
541 SAOSO 2023 *Standard for Organic Production and Processing* (Version 2) 92.
542 SAOSO 2023 *Standard for Organic Production and Processing* (Version 2) Section A-2 9.
543 UNFCCC 2015 *The Paris Agreement* available at https://unfccc.int/process-and-meetings/the-paris-agreement.
544 UNFCCC "Glascow Climate Pact" FCCC/PA/CMA/2021/10/Add.1 of 8 March 2022.
545 IISD 2024*South African Fossil Fuel Subsidies Hit Record Highs as Country's Energy Crisis Deepens*.

focus.[546] Parties must pursue steps to achieve the communicated contribution.[547] Climate change's impacts on food security relate not just to the food supply, but also to food access and utilisation, quality and stability of food security and the impact on the nutritional properties of some crops.[548] Food systems, on the other hand, are "currently responsible for a third of GHG emissions or 18 gigatons of CO_2 equivalent".[549]

The South African government prioritises agricultural intensification using green revolution technologies and monocropping that impact negatively on the environment.[550] The availability of certain nutrients is reduced by growing the same crop every year, which degrades the soil and leads to soil exhaustion.[551]

Growing different crops together limits erosion, reduces the amount of nitrogen in water and improves the storage of carbon.[552] The current commercial agricultural system is not sustainable due to the impact on soils and long-term fertility, biodiversity and pollution.[553]

Synthetic fertiliser applications can lead to soil degradation.[554] "Overall, excessive fertiliser application is a major contributor to overstepping planetary boundaries".[555] Studies report that insecticides used in intensive agriculture are responsible for the

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546 DFFE *Minister Barbara Creecy launches South Africa's Nationally Determined Contribution* 30 March 2021.

547 Article 3 of *The Paris Agreement*.

548 FAO 2017 *The Future of Food and Agriculture – Trends and Challenges* 43–44.

549 UNEP 2022 *Emissions gap report: The closing window: Climate crisis calls for rapid transformation of societies* 54.

550 FAO 2022 *Food Systems Profile – South Africa* 22–23. Also see para 2.5.1 above.

551 Balogh 2021 *Horizon EU Research & Innovation Magazine* 1.

552 Balogh 2021 *Horizon EU Research & Innovation Magazine* 2.

553 FAO 2022 *Food Systems Profile – South Africa* 25.

554 HLPE 2019 *Agroecological and other innovative approaches for sustainable agriculture and food systems that enhance food security and nutrition* (Report 14) 84.

555 HLPE 2019 *Agroecological and other innovative approaches for sustainable agriculture and food systems that enhance food security and nutrition* (Report 14) 84; Sandström *et al* 2023 *Global Environmental Change* 1–11. "In sub-Saharan Africa biological nitrogen fixation plays a major role in supporting food production, providing over 90 percent of the activated nitrogen over the last century. Biological nitrogen fixation alone covered almost 80 percent of the planetary boundary accounting for climate impact".

decline of insect populations over the world.[556] The implications of synthetic fertilisers and pesticides on human health were discussed above.[557]

South Africa can therefore reduce CO_2 emissions by promoting and endorsing a sustainable agricultural system that produces nutritious food. Organic farming is such a system. The APAP[558] states that organic agriculture:

> [A]dvocates the adoption of production practices that simultaneously mitigate climate change, build resilient farming systems, reduce poverty and improve food security. Organic production emits much lower levels of greenhouse gases (GHG) and quickly, affordably and effectively puts carbon in the soil. In addition, organic production helps to make farms and people more resilient to climate change, mainly due to its water retention efficiency, resilience to extreme weather events and lower risk of complete crop failure.

Notwithstanding this remark in one of the government's own documents, it still pursues commercial farming (which decreases the number of producers, operating on larger production units, with high influence in value chains[559]), probably because they are of the opinion that organic farming will not provide the yields that commercial farming does and that there would not be enough food to feed the nation.

Hunger is, however, caused by poverty and inequality, not necessarily scarcity.[560] According to FAO, the world produces more than one and a half times enough food to feed everybody on the planet.[561] In a study by the United Nations Conference on Trade and Development and UNEP, it was found that yields from organic systems do not fall (when converting to organic), but increase with the improvement of capital assets that match more conventional input-intensive systems. It was also found that with organic conversion in tropical Africa, yields increased.[562] The focus should not be on how food is produced or how more food can be produced.[563] Food

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556 HLPE 2019 *Agroecological and other innovative approaches for sustainable agriculture and food systems that enhance food security and nutrition* (Report 14) 87.
557 See 2.3.2.1 and 2.3.3.1 above.
558 See 4.3.4 above.
559 Midgley *et al Implications for a future agrarian structure in South Africa* 5.
560 Holt-Giménez *et al* 2012 *JSA* 595-598.
561 Holt-Giménez *et al* 2012 *JSA* 595-598.
562 UNEP-UNCTAD 2008 *Organic Agriculture and Food Security in Africa* viii.
563 Chappell *Beginning to End Hunger* 15.

security deals with whether individuals can access food within their own circumstances.[564] Tilman and Clark[565] state that "there would be no net increase in food production emissions if the global diet becomes the average of the Mediterranean, pescetarian and vegetarian diets" – if production and food wastage are addressed, emissions could be reduced even further.

It seems that the government must focus, in light of climate change, on malnutrition, South Africa's degraded soil and water problems and on sustainable production systems. Organic farming has very high standards and rules and may not be popular with all producers, but there are also other sustainable systems like climate-smart agriculture, conservation agriculture, regenerative farming and sustainable intensification. Although the consumer will not know whether harmful pesticides, fertilisers and GMOs were used, what kind of feed was given to animals when cattle are sent to feedlots, more nutritious food will be produced. Organic farming and any of the other mentioned systems will also create employment opportunities.

There is international consensus that an essential condition for realising the 2030 Agenda for Sustainable Development is the transformation of agrifood systems towards greater resilience, efficiency, inclusiveness and sustainability.[566] The interactions of agrifood systems with the environment, nutrition, health, the economy and society are fundamentally connected to the SDGs.[567] To transform agrifood systems, a true cost accounting (TCA)[568] approach is a good starting point for a comprehensive assessment. This includes the hidden costs and benefits of an agrifood system. The hidden costs in the current commercial production system are, for example, natural resources and soil degradation, the costs of eutrophication

564 Chappell *Beginning to End Hunger* 15.

565 Tilman and Clark *Global diets link environmental sustainability and human health* Narure 2014 515,518-522.

566 FAO 2023 *The state of Food and Agriculture – revealing the true cost of food to transform agrifood systems* xvii.

567 FAO 2023 *The state of Food and Agriculture – revealing the true cost of food to transform agrifood systems* xvii.

568 True cost accounting is defined "as a systemic and holistic approach to measure and value the environmental, social, health and economic costs and benefits generated by agrifood systems to facilitate improved decisions by policymakers, businesses, farmers, investors and consumers".

of water systems due to runoff by fertilisers, hidden health costs caused by pesticides, greenhouse gas emissions emitted along the entire food chain, water scarcity and undernourishment caused by producing nutrient-poor food.

The South African priority emphasises "production and the efficiency of integrated value chains with insufficient focus on nutrition and public health, livelihoods, environment and spatial planning".[569] "Government does not have an integrated food systems strategy to jointly address the different goals" of a sustainable natural environment, food and nutrition security, livelihoods and socio-economic progress, spatially balanced and equitable development and managing the trade-offs between these dimensions:

According to the FAO the results of food-related policies in South Africa are very poor in terms of food system outcomes which highlights important government issues.

4.7 Conclusion

In this chapter, recent government policies on agriculture, namely the NFNS 2018-2023 AAMP, the 10th draft of the *National Policy on Organic Production*, and policies referring to small-scale farmers, namely the NDP, SPSS 2011-2014/15, National Policy Framework on the Support and Development of Small and Medium Agro-Processing Enterprises in the Republic of South Africa 2014/30 as well as the APAP 2015 were investigated. SANS 1369:2016 and the SAOSO Standard for Organic Processing of 2024 were also discussed as well as South African legislation that may be applicable to organic farming. There is no specific regulation of organic farming and the voluntary standards therefore do not have credibility regarding the export market. An internationally accepted certificate, although very expensive, has many benefits for producers who want to export their produce.[570]

Climate change and the triple burden of malnutrition are realities in South Africa. An agricultural policy addressing both these issues is needed. The South African

[569] FAO 2022 *Food Systems Profile – South Africa* 32.
[570] See para 3.10.5 above.

government prioritises agricultural intensification using green revolution technologies that have a negative impact on the environment. Certain nutrients are reduced by means of monocropping. The interactions of agrifood systems with the environment, health, nutrition, economy and society are connected to the SDGs. Organic farming is a sustainable agricultural system that, while mitigating climate change, also puts carbon in the soil, because synthetic fertilisers, pesticides and GMOs are not allowed in organic farming, healthy food is produced. The 10th draft of the National Policy on organic farming is still a discussion document and should be finalised as a matter of urgency. Organic farming should be regulated in South Africa and should not only rely on voluntary standards.

South Africa's food and agricultural policies do not actively promote food security. The government prioritises commercial farming and monocropping, which is not sustainable. An integrated policy that addresses the different goals of climate change, a sustainable natural environment as well as food and nutrition security is therefore needed.

Chapter 5: Conclusion

In 2021, in South Africa, approximately 9.3 million people experienced high levels of food insecurity and 1.2 million people severe food insecurity. South Africa "faces a triple burden of malnutrition namely undernutrition, micronutrient deficiencies and obesity".[571] The growing obesity pandemic is especially worrying. Preaching healthier eating habits alone would not alter the situation; there is a growing realisation that the food industry needs to change. Food security is not just about having enough food, but rather about nutrition, which is only achieved "by adequate amounts of essential nutrients that are eaten on a daily basis".[572]

For purpose of this study, food security was defined as:

> 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.[573]

The green revolution technologies, such as selected seeds, GMOs and chemical inputs used in commercial farming practices in South Africa are associated with environmental degradation, public health and hazards, the use of excessive water, soil degradation and climate change. Organic agriculture is a sustainable farming system that sustains the health of soils, avoids the use of synthetic fertilisers and pesticides, monocropping and the use of excessive water. "It relies on ecological processes, biodiversity and cycles adapted to local conditions" that sustain the health of ecosystems and people. The aim of this study therefore was to investigate how organic farming should be regulated in order to contribute to food security in South Africa.[574]

Organic farming, for the purpose of this study, was defined as:

> A production management system that promotes the environmentally, socially, culturally and economically sound production of food by sustaining the holistic health of soils, avoiding the use of drugs, synthetic fertilizers, herbicides and pesticides, acknowledging the interrelationship of ecological cycles, traditional

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571 See chapter 2.2.
572 See chapter 2.2 – 2.3.
573 See chapter 2.4.
574 See chapters 1.1 and 2.5.

> knowledge, the role of innovation and technology, adapting to the challenges of climate change and adhering to the principles of health, ecology, fairness and care.

At this stage, South Africa has no legislation on organic farming. The *Foodstuffs, Cosmetic and Disinfectant Act* 54 of 1972 applies to organic farming only in relation to the labelling of products; the *Agricultural Products Standards Amendment Act* 12 of 2023 provides that claims on products can be authenticated by a designated person, which may reduce food fraud regarding organic foods; the *Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies Act* 36 of 1947 relates to organic farming in that fertilisers (also if they are organic) must be registered if they are produced to be sold; while the *Plant Breeders' Act* 12 of 2018 relates to plants (including organic plants) that must be registered to guarantee protection of the breeder's right. A licence can be obtained for the production or reproduction of the protected variety.[575]

Government has published several policies on farming during the last few years, namely the NFNS, AAMP, NDP and APAP, but none of them refer to organic agriculture as such. Despite a review of the issues facing agriculture in some of these policies, a common vision based on sustainability principles, nutritional and social outcomes is not incorporated in these policies. This is partly because conventional agricultural practices are powerfully entrenched in the existing agricultural system, and it seems that government is of the opinion that it is the only system that can feed the growing population.[576]

Government does not take regard of *true-cost* accounting such as the degradation of soil and water by the current conventional agricultural system, malnutrition and the influence of the current system on climate change, when considering agricultural policies.[577] Sustainable agricultural systems, such as organic farming, are already practised in rural areas of South Africa.[578] The 10th draft of the National Policy on Organic Farming is still a discussion paper and has not been finalised yet.

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575 See chapters 4.4.1 – 4.4.4.
576 See chapters 4.2 – 4.3.
577 See chapters 4.2.2 and 4.6.
578 See chapters 3.10 and 4.5.

SANS 1369:2016 and SAOSO's Standard for Organic Production and Processing, based on the Standard for Organic Production and Processing remain voluntary standards for certification. Although they are comprehensive[579] and read together complete the standards for organic farming, they lack credibility because organic farming is not regulated in South Africa.

It has been found that organic farming in South Africa needs to be regulated especially in light of the growing export market for organic products. It is also a way to feed the nation with nutritious foods. Legislation will establish credibility in the export market and prevent the abuse of the term *organic* on products. There are price premiums on organic food, but no legal penalty that can prevent food fraud.

In order to address your research question as to how should organic farming be regulated in order to contribute to food security in South Africa, the following recommendations are made:

- Organic farming should be regulated. It can be done by referring to SANS 1369:2016 and the SAOSO Standard for Organic Production and Processing either in regulations in terms of the above legislation or in a separate piece of legislation.[580]
- The National Policy on Organic Farming must be finalised as it will provide more certainty to the organic farming sector.
- In addition to regulation, there must be clear incentives for actors across sustainable agricultural systems that produce nutritional food, reduce CO_2 emissions, and protect the soil (70% of agricultural land in South Africa is classified as degraded) and biodiversity.
- Government should introduce agriculture policy in line with the realities of climate change and the triple burden of malnutrition.[581]
- Government should consult with actors from the total agricultural sector when compiling policies relating to agriculture and the food sector. Small-scale

[579] See chapters 4.5.1 – 4.5.2.
[580] See chapters 4.5.1 – 4.5.2.
[581] See chapters 2.2.1, 2.2.6 and 3.6.

farmers as well as people with experience of the environment, nutrition, the health sector, water management, food systems and other related stakeholders must be asked for inputs and the trade-offs between them managed. "Demand-side measures and actions to reduce emissions from food processing, storage and transportation of food" must also be incorporated in the policies.[582]

- *True cost* accounting must be done.[583]
- "Climate-resilient development in South Africa's rural areas will need to be transformational, with elements of irrigation development, improved fertilizer (not synthetic) usage," changes in the composition of animal feeds and increased market access.[584]
- Lastly, natural ecosystems and forests must be protected from being used for agriculture.[585]

[582] See chapters 2.2, 2.3 and 3.5.
[583] See chapters 4.2.2 and 4.6.
[584] See chapters 2.6, 3.8, 4.3.1, 4.3.4 and 4.3.6.
[585] See chapters 2.5.8 and 4.5.2.

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To whom it may concern

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28 August 2024

Dear Mr / Ms

Re: Language editing of mini-dissertation (Enhancing food security through the regulation of organic farming in South Africa)

I hereby declare that I language edited the above-mentioned dissertation by Ms Karien de Kock (student number: 10289186).

Please feel free to contact me should you have any enquiries.

Kind regards

Cecile van Zyl

Language practitioner

BA (PU for CHE); BA honours (NWU); MA (NWU)
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