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SUPPORTING SUSTAINABLE LIVESTOCK PRODUCTION AND CONSUMPTION FOR BETTER FOOD SECURITY AND NUTRITION: A CASE STUDY OF SOUTH AFRICA

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Highlights

- Environmental considerations for food systems are important
- Nutrition is not improving in South Africa
- Reviews policies and programmes that support sustainable livestock production and consumption
- Livestock production is being promoted for food security
- Animal source food consumption is being supported for better nutrition

ABSTRACT

The 2015 Global Nutrition Report illustrates persistent nutritional deficiencies in the midst of increasing incidence of overweight and obesity in many countries. The focus on food has expanded to include environmental concerns in addition to human health, and global efforts are being aligned to increase the sustainability of food systems. Most governments have committed to the set of Sustainable Development Goals (SDGs) set by the United Nations (UN). Subsequently they have drafted, or are in process of drafting, policies and programmes which aim to answer to these global requests, i.e. promoting income generation and food security, improving human nutrition while simultaneously preserving the environment.

South Africa provides for a unique case study. Despite economic growth, under nutrition has not improved when compared to other industrialised nations, while at the same time, dietrelated non-communicable diseases and obesity have exponentially increased. Furthermore, animal source foods, especially fresh meats, are a favourite and commonly consumed commodity within the country produced on communal farms as well as through formalised enterprises. Although animal husbandry is often considered to have a large negative impact

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on the environment, it provides for a source of income generation, provides various limited nutrients and thus contributes positively to food security and nutrition.

Access to healthy food is a constitutional right of all South Africans, and towards increasing food security, the livestock industry has been identified as part of a Key Action Programme within anAgricultural Policy Action Planto improve income generation and promote food security from 2014 to 2019. The inclusion of sustainably produced, nutrient dense animal-source food options (low in fat and kilojoules, high in protein and micronutrients) are promoted as part of healthy, sustainable diets in the national Food-Based Dietary Guidelines and Strategic Plan for the Prevention and Control of Non-Communicable Diseases. At the hand of the global development agenda and the particular focus on the livestock industry's environmental responsibility, the policy and programming landscape as related to sustainable livestock production and consumption in South Africa was reviewed.

Keywords: sustainability, human nutrition, food security, livestock, policy, programmes, South Africa

1. INTRODUCTION

The United Nations Millennium Declaration, signed in September 2000, committed world leaders to combat poverty, hunger, disease, illiteracy, environmental degradation, and discrimination against women. The eight Millennium Development Goals (MDGs) were derived from this declaration and range from halving extreme poverty rates to providing universal primary education by 2015 (WHO, 2013). Since the deadline is fast approaching, the United Nations has been working with governments, civil society and other partners to build on the momentum generated by the MDGs and carry on with an ambitious post-2015 development agenda, in-line with the current global focus on sustainable development(United Nations, 2014).

Globalization and commercialization have brought significant changes to agriculture and food systems, with subsequent new challenges and solutions. It is estimated that by 2050, global agriculture and food systems will need to be able to produce enough nutritious food to feed nearly 10 billion people, with a high percentage of this global population concentrated in low-income countries (Fan, *et al.*, 2012). Supplying the growing population with sufficient, nutritious food is one of the world's major challenges considering that more than 1.4 billion individuals were overweight or obese in 2008 and increasingly so, while at least 1 billion remain undernourished (WHO, 2013).

The modern food and agricultural system is often considered the culprit in the health and nutritional status of populations, equally so in developed and developing communities. In South Africa, despite considerable economic growth, under nutrition, and in particular

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stunting, has not improved in the last couple of decades when compared to other industrialised nations (Shisana, *et al.*, 2013). Simultaneously, diet-related non-communicable diseases and obesity have exponentially increased. In addition, emerging threats such as climatic and demographic changes contribute to the challenge of producing and supplying nutritious food in a sustainable way. The negative impact of climate change on agriculture, food systems and nutrition is increasingly being recognised (Herren, 2010).

In 1972 the United Nations hosted a Conference on the Human Environment, and since then, sustainable development governance has significantly expandedat local, national and global levels. In 1987 the Brundtland Report introduced the concept of integrating economic development, natural resource management and protection and social equity. This report further framed the discussion at the 1992 United Nations Conference on Environment and Development (Earth Summit) held at Riode Janeiro, Brazil. In 1993 the Commission on Sustainable Development (CSD) was established by the General Assembly. In 2002 the World Summit on Sustainable Development (Rio+10), held in Johannesburg, South Africa, advanced the mainstreaming of sustainable development in policies through the adoption of the Johannesburg Plan of Implementation (United Nations , 2013).

The Rio+20 conference on sustainable development, which took place in Rio de Janeiro, Brazil in June 2012 was the biggest United Nations conference ever. During the conference, the international community decided to establish a High-level Political Forum on Sustainable Development to subsequently replace the CSD. One of the further main outcomes of the conference was the agreement by member states to launch a process to develop a set of Sustainable Development Goals (SDG's) which will build upon the Millennium Development Goals (MDG's) and converge with the post-2015 development agenda. At Rio+20 it was decided to establish an *"inclusive and transparent intergovernmental process open to all stakeholders, with a view to developing global sustainable development goals to be agreed by the General Assembly"*.

Some relevant outcomes in the 283 point Resolution adopted by the General Assembly on 27 July 2012, entitled "*The Future We Want*", include among others the reaffirmation of the necessity to promote, enhance and support more sustainable agriculture, including crops, livestock, forestry, fisheries and aquaculture, that improves food security, eradicates hunger and is economically viable, while conserving land, water, plant and animal genetic resources, biodiversity and ecosystems and enhancing resilience to climate change and natural disasters (United Nations General Assembly, 2012).

According to the Food and Agriculture Organization (FAO, 2012) there are very strong linkages between the conditions to achieve universal food security and nutrition, responsible environmental stewardship and greater fairness in food management. To emphasize these linkages, the FAO prepared three messages for the RIO+20 summit, namely that 1)

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eradicating hunger and improving human nutrition are fundamental to achieving the Rio vision of sustainable development; 2) for healthy people and healthy ecosystems, food consumption and production must be sustainable and more inclusive; and 3) effective governance for agriculture and food systems is essential to making the policy changes required to achieve the Rio vision.

In anticipation of the 2014 Second International Conference on Nutrition (ICN2) organized by the United Nations, The Rome Accord (a draft political outcome document) recognizes that the multiple threats of malnutrition are a major challenge to global development, and provides a vision for global action to end all forms of malnutrition and reshaping current food systems to improve people's nutrition in a sustainable way (World Health Organization , 2014). One of the specific draft outcomes acknowledges that *food systems should produce more nutritious foods, not just more food, and guarantee adequate supply of fruit and vegetables, unsaturated fat and animal source foods while avoiding excess of sugars, saturated and trans-fat and salt; food systems should enhance nutrition by providing year round access to macro- and micronutrients, promoting food safety and balanced diets, and avoiding food processing that reduced or adversely affects nutrition* (World Health Organization , 2014).

As a member state to the United Nations, the South African policy environment are struggling to incorporate the multiplicity of concerns related to improving sustainable production and consumption at the hand of the current double-burden of disease observed within this industrialised economy. This paper provides a brief overview of the current South African nutrition situation, and summarises the objectives and possible impacts of some of the recent policies, programmes and interventions promoting sustainable practices, dietary behaviours, food security and other nutrition-related outcomes related to livestock production and consumption at national level. The livestock industry in particularly was identified because as populations grow, the emerging middle class can afford to consume higher quantities of more expensive foods, including animal protein. It is projected that nearly 80% more meat will be needed by 2050 (Fan, *et al.*, 2012). Such increased consumption and agricultural production trends and patterns are identified as one of the most important drivers of environmental pressures (FAO, 2012). As the global consumption and demand of meat, dairy and eggs continues to rise, increasing attention is being paid to the livestock sector's environmental performance.

2. DOUBLE BURDEN OF DISEASE IN SOUTH AFRICA

Studies to determine the nutritional situation of South Africa at a national level is unfortunately limited as only sporadic nationally representative studies have been performed (Van Heerden, *et al.*, 2012). From these studies, wasting in children, indicating acute or persistent lack of dietary energy, has been generally uncommon. Unfortunately, although still

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relatively low in comparison to stunting and the increased incidence of obesity, it seems that wasting in children is increasing. In 1994, only 2.6% of children (under 6 years of age) were wasted (South African Vitamin A Consultative Group (SAVACG), 1996), in 1999 this number increased slightly to 3.7% (Labadarios, *et al.*, 1999), and in 2005 4.5% of children were recorded as being wasted (Labadarios, *et al.*, 2008). Labadarios *et al.*, (1999) pointed out that at the national level, stunting was by far the most common nutritional disorder, affecting at that time nearly one in five children. Stunting is indicative of chronic long-term dietary inadequacy but is also reflecting socioeconomic deprivation, and mostly used as a measure of nutritional status in children (Vorster, et al., 1997). In the 2013 the South African National Health and Nutrition Examination Survey (SANHANES) stunting wasprevalent in 26.5% of children aged 1-3 years and 11.9% of children aged 4-6. The same study come with an underweight prevalence (wasting), of 6.1% of the children in the group 1-3 years and 4.5% of the children in the group 4-6 years(Shisana, *et al.*, 2013).

Furthermore, for South African children as a whole, the intakes of energy, calcium, iron, zinc, selenium, vitamins A, D, C and E, riboflavin, niacin, vitamin B6 and folic acid were below two-thirds of the Recommended Dietary Allowances (RDA) (Labadarios, *et al.*, 2008). In 2013, 43,6% of the children under 5 had a Vitamin A deficiency. Nearly a third of children between 10 and 14 years had no food in the house to eat during breakfast or lunch (Shisana, *et al.*, 2013).

In addition to underweight, the prevalence of overweight in South African is a growing reality, and increasingly so in children. In 1999 nearly 10% of South African children under 9 years were recorded as overweight or obese, with 4% being obese (Labadarios, et al., 1999). In 2005, nearly 5% of children under 5 years of age were recorded as overweight or obese (Labadarios, et al., 2008). Regional and international comparisons with more recent data indicate that South Africa's preschool children have a major and increasing problem of combined overweight and obesity. Morocco, Swaziland, Botswana, and Nigeria have a prevalence of about 11%, which is about half of South Africa's current prevalence of 22.9% (Shisana, *et al.*, 2013)[.]

Overweight and obesity incidence is also increasing in the adult population. Nearly a third (29%) of men and 55% of women were overweight, and 9% of men and 29% of women were obese in 1998 (Medical Research Council, 1998). By 2003, 56.2% of the total adult population was recorded as overweight or obese (Medical Research Council, 2003) In 2013, the SANHANES found that 20% of men and 68% of women in South Africa had a waist circumference that places them at risk of metabolic complications (Shisana, *et al.*, 2013) When compared to 2003 Demographic Health Survey (SADHS) data, the SANHANES found that underweight decreased, while overweight and obesity increased in adults. Obesity incidence in particular increased substantially in females, from 27% in 2003 to 39.2% in 2013 (Shisana, *et al.*, 2013).

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In 2000, the South African Medical Research Council (MRC) performed a comparative risk assessment, and found that eleven of the seventeen most common risk factors for deaths were directly or indirectly related to nutrition, and included among others high blood pressure, excess body weight, high cholesterol, diabetes, low fruit and vegetable intake, vitamin A deficiency and iron deficiency anaemia (Norman, *et al.*, 2006)[.] The rapid increase in NCD's such as diabetes, hypertension and cancers has led to the strengthening of the arguments to focus on dietary quality and is reflected in actions encouraging dietary diversity. Improving nutrition and food utilization is considered as a key tool to ensure sustainable development (FAO, 2012).

3. THE SOUTH AFRICAN POLICY ENVIRONMENT - CONSTITUTION AND PRESIDENTIAL OUTCOME ALIGNMENT TOWARDS SUSTAINABLE DEVELOPMENT

National policies, strategies, and plans play an essential role in defining a country's vision, priorities, budgetary decisions and course of action. In South Africa, the constitutional mandate of the country guides the development of policies and plans at departmental level, i.e. Departments of Health, Agriculture etc. The Bill of Rights in the Constitution of the Republic of South Africa (Act 108 of 1996) is considered the supreme law of the land and cannot be superseded by any other governmental action. It provides for interdependence, distinctive but inter-relatedness and spells out principles for cooperative governance to coordinate activities and legislation. The Constitution stipulates in Section 24 that everyone has the right to an environment that is not harmful to their health or well-being, and to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that prevent pollution and ecological degradation; promote conservation; and secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development. Furthermore, in Section 28, the Constitution states that everyone has the right to have access to sufficient food and water and that every child has the right to basic nutrition, shelter, basic health care services and social services (South African Government, 1996).

The Medium Term Strategic Framework (MTSF) (2009 to 2014) of South Africa is an electoral mandate, and a statement of intent identifying the development challenges facing South Africa during the electoral period of five years from 2009 to 2014. It outlines the medium-term strategy for improvements in the conditions of life of South Africans. The document was meant to guide planning and resource allocation, and national and provincial departments developed their own strategic plans and budgets taking the medium-term imperatives reported in this document into account. Priority areas include more inclusive economic growth, decent work and sustainable livelihoods; economic and social infrastructure; rural development, food security and land reform; improved health care; cohesive and sustainable communities; and sustainable resource management and use. Based

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on the objectives, a set of 12 national outcomes was developed, reflecting the desired development impacts the South African Government seeks to achieve. Each outcome is clearly articulated in terms of measurable outputs and key activities to achieve the outputs. Three outcomes that are relevant to this paper include Outcome 2: *A long and healthy life for all South Africans*; Outcome 7: *Vibrant, equitable and sustainable rural communities with food security for all*; and Outcome 10: *Environmental assets and natural resources that are well protected and continually enhanced*.

The National Development Plan (NDP) Vision 2030 is a broad strategic framework set out by the National Planning Commission to guide the development of the next three electoral presidential cycles' Medium Term Strategic Frameworks. The NDP Vision 2030 acknowledges the social and economic conditions, in addition to medical care, that influence the health of the population and recognizes the challenges related to climate change and the transition to a economically viable, low-carbon economy (National Planning Commission, 2011). The NDP Vision 2030 was based on a Diagnostics Report of the National Planning Commission (NPC) executed in 2010 but embargoed until June 2011 (National Planning Commission, 2011). The Diagnostics Report identified a failure to implement policies and an absence of broad partnerships as the main reasons for slow progress in South Africa, and set out 9 primary challenges, including high unemployment rates, high disease burden, poor educational outcomes, divided communities, uneven public service performance, crumbling infrastructure, spatial patterns marginalising the poor, corruption and a resource intensive economy. As part of the solution, the NDP Vision 2030 was developed to align future activities of the country at policy level, with the main aims to eliminate poverty and reduce inequality in the next three electoral periods. In summary, the principle indicators of the NDP are to eliminate income poverty by 2030 (reduce the proportion of households with a monthly income below R419 per person (in 2009 prices) from 39% to zero), and reduce inequality (the Gini coefficient should fall from 0.69 to 0.6 by 2030). Apart from increased employment (from 13 million in 2010 to 24 million in 2030), affordable access to quality health care and household food and nutrition security are listed as milestones required for enabling the achievement of these indicators (National Planning Commission, 2011).

According to the FAO, sustainable consumption and productionin food and agriculture *is a consumer-driven, holistic concept that refers to the integrated implementation of sustainable patterns of food consumption and production, respecting the carrying capacities of natural ecosystems. It requires consideration of all the aspects and phases in the life of a product, from production to consumption, and includes such issues as sustainable lifestyles, sustainable diets, food losses and food waste management and recycling, voluntary sustainability standards, and environmentally friendly behaviours and methods that minimize adverse impacts on the environment and do not jeopardize the needs of present and future generations. Sustainability, climate change, biodiversity, water, food and nutrition security, right to food, and diets are all closely connected (FAO, 2014). Various national policies and*

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programmes have been developed under the framework of the South African presidential framework towards sustainable production and consumption encompassing different aspects within the FAO definition of sustainable diets. These policies and programmes specifically relevant to sustainable livestock production and consumption are discussed.

4. POLICIES AND PROGRAMMES RELATED SO SUSTAINABLE LIVESTOCK PRODUCTION AND CONSUMPTION

Through sustainable production and consumption good nutrition can be achieved through income generation, availability and access to enough, and a diversity of, nutrient-dense foods, efficient use of natural resources, food waste reduction, and the promotion of sustainable diets through education.

Although livestock production is considered an agricultural activity which can promote food security and income generation potential in line with the South African NDP, livestock, and in particular red meat production, is often criticized as having negative environmental effects, and that it contributes to subsequent undesirable effects on food insecurity, hunger, malnutrition, nutrient deficiencies and excesses (obesity)(FAO, 2012). Often the reduction or elimination of animal product consumption is promoted as a sustainable dietary habit. However, adapting food systems towards environmental sustainability while also meeting nutritional demands requires a broader foundation of understanding. When considering the measurable impact which various industries have on for example greenhouse gas emissions, the contribution which these foods make to human dietary requirements and livelihoods need to be taken into consideration when aiming towards sustainable production and consumption.

4.1 Policies and programmes related to sustainable livestock production

In terms of improving food security, in 2002, Cabinet approved the national Integrated Food Security Strategy (IFSS) in order to streamline, harmonize and integrate the diverse food security programmes existing in South Africa. Some successes have been recorded in different priority areas of the Strategy, and South Africa is currently classified as nationally food sufficient (nationally food secure) through a combination of own production and food imports. The General Household Survey (GHS) has also indicated that the food access index has been improving, and the incidence of hunger declining. However, the limitations are that these indicators only report on the availability of energy, without the consideration of other essential nutrients.

The global economic slowdown, increased food price volatility and the impact of climate change have compelled a review of the IFSS and the development of a comprehensive National Food and Nutrition Security Policy in 2013. The National Food and Nutrition Security Policy was introduced and aims to target the threats towards food and nutrition

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security including globalisation, international trade regimes, climate change, and the poor storage and distribution of food. The Policy was developed by the national Department of Social Development and the national Department of Agriculture, Forestry and Fisheries, and focusses on the factors affecting the availability, accessibility, utilisation and stability of food and food supply. The Policy provides a platform for various strategies which will include targeted public spending in social programmes, efforts to increase food production and distribution, leveraging Government food procurement to support community-based food production initiatives and smallholders; and the strategic use of market interventions and trade measures which will promote food security (DAFF DSD, 2013).

It is estimated that nearly 16 million of the 53 million South Africans live in poverty, with 11 million of them living in rural areas. The 2013 Economic Review of the South African Agriculture states that the primary agricultural sector in South Africa has grown by an average of approximately 11.8% per year since 1970, while the total economy grew by 14.9%, indicating a drop in agriculture's share of the Gross Domestic Product (GDP) from 7.1% in 1970 to 1.9% in 2011 (DAFF, 2013). Compared to annual data, gross farming income from all agricultural products at the end of June 2013 was 10.1% higher than the previous year, with income from animal products in particular increasing by 11.2%. Animal production increased by 3.2%, mainly as a result of increased production in fresh milk (7.2% higher), more stock slaughtered (6.2%) and more poultry meat (3.1%) produced. The significance for animal production in terms of sustainable livelihoods is not only prevalent in the increase in production, but also when considered that prices of poultry meat increased by 13.3%, where the average price of slaughter stock actually decreased slightly by 0.7% since June 2012(DAFF, 2013).

Animal production contributed 46.4% to the total gross value of agricultural production in South Africa for the period June 2012 to June 2013, with the poultry industry making the largest contribution with 17.4%, followed by cattle and livestock at 10.1%. The gross income from animal products in total was 11.2% higher than in the previous year, with income from slaughtered cattle increasing by 3.4%, and from slaughtered sheep increased by 5.4% (DAFF, 2013).

South Africa is currently a net importer of meat (BFAP, 2013). With 40% of livestock being produced on non-commercial communal farms, and mainly used for traditional purposes, the red meat industry integrated value chain has been identified by the Agricultural Policy Action Plan (APAP) 2014 to 2019 as a Key Action Programme focussed on building South Africa's production capacity and the commercialisation of the livestock system to improve income generation and promote food security.

South Africa is considered a semi-arid country, with only 13% of its land area considered arable land. Only 22% of this being high-potential arable land suitable for crop production.

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In 2007, approximately 83% of agricultural land was used for grazing (DAFF, 2013). Livestock production provides a unique opportunity within these resource scare environments to increase food supply through the conversion of grass and other forage into meat and dairy products.

4.2 Policies and programmes related to sustainable livestock consumption

Since democratisation of the country, several nutrition intervention programmes have been implemented under a comprehensive national nutrition strategy for combating malnutrition, namely the Integrated Nutrition Strategy (INS). The INS was used as the basis for the development of the Integrated Nutrition Program (INP) which adopted United Nations Children Funds (UNICEF's) Conceptual Framework on malnutrition and targets nutritionally vulnerable communities and groups, including children under 5 years(Iversen, et al., 2012). Depending on the location of the target group and the nature of the intervention the INP is implemented at the level of population, communities, households, health facilities and schools. Apart from various programmes, to specifically address micronutrient status, the INP focussed on fortification of staple foods. Salt iodisation has been mandatory since 1995, and since 2003 it has been mandatory to fortify all maize meal and wheat bread flour with iron, zinc, vitamin A and the B vitamins. In 2005, the fortification baseline follow-up of the National Food Consumption Survey found that although manufacturers complied with legislation, neither the anthropometric status nor micronutrient status of children had improved, especially observed in rural communities. Possible reasons could be poor compliance, missed opportunities, incorrect implementation and the instability of added micronutrients (Iversen, et al., 2012). In 2009 the vitamin A supplementation programme was extended to include a national vitamin A campaign in September of each year and a new policy on zinc supplementation was implemented in 2010.

Despite mandatory fortification and supplementation, nutritional deficiencies were still observed, suggesting the limited ability of nutrient-based approaches to effectively eliminate nutritional deficiencies. In 1994 it was found that 33% of children under 6 years were marginally deficient in vitamin A (serum retinol <20mgdL-1), with the highest rates recorded among children aged 3 to 4 years(South African Vitamin A Consultative Group (SAVACG), 1996). In 1999 it was recorded that one out of two children under the age of 9 years consumed less than half of the recommended levels of energy, vitamin A, vitamin C, riboflavin, niacin, vitamin B6, folate, iron, zinc and calcium. In this national study, diets of children were found to be confined to a narrow range of foods of low micronutrient density. Dietary intakes were particularly inadequate in rural areas (Labadarios, *et al.*, 1999). After the mandatory fortification of staple food with a fortification mix (vitamin A, B-vitamins, zinc and iron) was legislated in October 2003, a follow-up national survey in 2005 still found significant nutritional deficiencies in children and women. Nearly 30% of children and

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women had anaemia, 64% of children and 28% of women had vitamin A deficiency and 45.3% of children had zinc deficiency (Labadarios, *et al.*, 2008).

Sustainable diets are defined by the Food and Agricultural Organization of the United Nations (FAO, 2014) as diets *that have a low environmental impact; contributes to food and nutrition security and the healthy life for present and future generations; which are protective and respectful of biodiversity and ecosystems; culturally acceptable, accessible, economically fair and affordable; nutritionally adequate; safe and healthy and optimizes natural and human resources.* According to the FAO (FAO, 2012), directing dietary habits to more sustainable diets include preserving balanced traditional food systems and promoting food-based approaches for improving nutrition and health as compared to more expensive and non-sustainable supplementary programmes. Nutrients also interact differently when presented as foods within a food matrix, and it is widely admitted that many bioactive compounds in fresh foods are not yet fully understood, further motivating a food-based approaches nutrients and bioactive compounds in a sustainable manner.

In 2013 a Roadmap for Nutrition in South Africa was developed based on recent reviews of the INP as well as a Landscape Analyses on Countries' Readiness to Accelerate Action in Nutrition (WHO, 2010), and seeks to direct nutrition-related activities in the health sector to achieve the focus areas of the Medium Term Strategic Framework for South Africa. The roadmap provides a framework for the repositioning of nutrition and nutrition-related issues and action, with particular reference to contribute to increased life expectancy of the entire population by improving the quality, coverage and intensity of specific nutrition interventions that support reduction of mortality rate, especially maternal, neonatal, infant and child mortality; to promote optimal growth of children and prevent overweight and obesity later in life, by focusing on optimal infant and young child nutrition; and to empower families and communities to make informed nutrition-related decisions, through advocacy regarding household food security, multisectorial collaboration and effective nutrition education (Department of Health, 2013).

Many South Africans consume a monotonous diet low in variety, dietary diversity and nutrient content, similar to the case in many other developing countries (FAO, 2012). In 1999 the National Food Consumption Survey indicated that the five most commonly consumed foods include maize meal porridge, brown bread and tea with small amounts of sugar and milk (Labadarios, *et al.*, 1999). The South African Food-Based Dietary Guidelines were developed to provide an effective tool to eliminate or greatly reduce nutrition-related diseases. The guidelines are food-based rather than nutrient-based and recommend healthy food consumption patterns for all South Africans five years and older. These guidelines are supported by published peer-reviewed scientific review papers justifying the scientific validity of each guideline. A visual Food Guide which serves to support the messages of the Guidelines for Healthy Eating has also been developed. This includes information on the

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suggested amounts of foods needed daily, from all the food groups. The set of 11 Food-Based Dietary Guidelines are presented in Table 1. As livestock products, including lean red meat, dairy products and offal contribute significant proportions of essential and highly bioavailable nutrients to the diet, the set of guidelines include that *fish*, *chicken*, *lean meat or eggs can be eaten daily*, and to *have milk*, *maas (cultured milk) or yoghurt every day*. To limit excess consumption of total and saturated fat, the set of guidelines recommend the consumption of *lean* meat, and also have an additional guideline related to *using fats sparingly*.

Table 1: The South African food-based dietary guidelines

Food-based dietary guidelines for South Africans 5 years and older

- Enjoy a variety of food
- Make starchy food part of most meals
- Fish, chicken, lean meat or eggs can be eaten daily
- Eat plenty of vegetables and fruit every day
- Eat dry beans, split-peas, lentils and soya regularly
- Have milk, maas or yoghurt everyday
- Use salt and food high in salt sparingly
- Use fat sparingly; choose vegetable oils rather than hard fats
- Use sugar and food and drinks high in sugar sparingly
- . Drink lots of clean, safe water
- . Be active!

Towards the obesity epidemic vividly prevalent in South Africa, incidence of noncommunicable diseases (NCDs) has also increased. In 2011 there was extensive global focus on NCDs culminating in the United Nations General Assembly High Level Meeting of Heads of State and Governments and the adoption of the Political Declaration on the Prevention and Control of NCDs (DOH, 2013). Leading up to this High level meeting a national summit was hosted by the South African Minister and Deputy-Minister of Health. The summit adopted a Declaration and set 10 targets to be reached by 2020, summarized in the Strategic Plan for the Prevention and Control of Non-Communicable Diseases 2013-17 (DOH, 2013). One of these targets are to reduce by 10% the percentage of people who are obese and/or overweight by 2020. According to this Strategic Plan of the Department of Health, the South African population suffers from a double burden of nutrition-related diseases as about a third of children suffer from some form of under-nutrition, while more than half of adults are either overweight or obese. Undernourished children develop into adults with an increased risk of overweight, obesity and NCDs when they are exposed to an unhealthy food environment.

Also, many obese individuals are micronutrient-deficient, which further increases their risk of NCDs. Dietary changes that are recommended by the Strategic Plan include consumption of

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less salt, less fast and fried foods and snacks, consumption of lean meat and low-fat dairy products, inclusion of 2-3 fish dishes per week, consumption of whole grains, fruit, vegetables and legumes, and other traditional foods and dishes, and decrease use and intakes of sweetened (sugary) foods and drinks.

5. CONCLUSIONS AND RECOMMENDATIONS

Healthy food is a constitutional right of all South Africans. In the context of access and availability to food, the increase in population growth is demanding further increased food production volumes and income generation potential. As part of the Agricultural Policy Action Plan 2014 to 2019 commercialisation of the South African livestock system has been identified as a Key Action Programme to improve income generation and promote food security. With the majority of South African small stock grazing on semi-arid land where little other food commodities could be procured, the industry in particular could contribute to increased food availability and income generation, while preserving natural resources.

In the context of the persistent nutritional deficiencies in South Africa along with the rising incidence of obesity, the inclusion of sustainably produced, nutrient dense animal-source food options (low in fat and kilojoules, high in protein and micronutrients) are imperative as part of sustainable diets. When considering the policies and programmes related to consumption, it is clear that the South African policy framework supports the consumption of products from livestock (lean meat, offal and dairy) as part of a healthy, balanced diet for better nourished people. Future focus could be placed on implementing programmes and consumer education initiatives targeting food waste, nutrient dense food choices within the food group, and adequate portion sizes towards sustainable consumption of livestock products.

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