

SUSTAINABLE DIETS FOR ALL

DISCUSSION  
PAPER

# Agriculture, food systems, diets and nutrition in Zambia

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# SUMMARY

Despite government policy aimed at improving food and nutrition security, Zambia's food and agriculture system is providing neither food security nor adequate nutrition for all. Seasonal hunger still affects many families; a significant proportion of children still suffer from stunted growth; and overweight and attendant diseases are increasing in adults. What connects the issues of hunger, malnutrition and chronic disease is the availability and accessibility of diverse foods all year round for healthy and sustainable diets. This policy brief describes the potential of agriculture and food systems in Zambia to contribute to improving Zambian food and nutrition security, and provides clear policy recommendations on how the food and agriculture sector can better serve the country's population with sustainable diets for all.

The major focus of the agriculture sector remains national food security through staple food production, normally equated in political rhetoric with maize self-sufficiency. While the Second National Agriculture Policy may address this, agricultural production in Zambia has been heading away from making diverse and healthy diets available; available calories from legumes, fish, eggs, and milk reduced from already low levels between 1971 and 2011; there is no change in the very low availability of calories from fruit and vegetables or meat; and the availability of fats, oils and starchy foods has doubled. Although food prices have fallen for almost all major food groups over the past two decades, high and worsening inequality mean many households cannot access diverse foods. Thus, diets in Zambia are heavily reliant on maize, and are known to be monotonous and lacking in diversity; however, little current dietary data is available.

National nutrition and agricultural policy in Zambia recognises the need to increase and diversify the production

of nutritious foods to improve availability and bring down prices. In practice, however, most government agricultural funding is spent on food security programmes promoting maize production, despite repeated findings that these do not reduce food insecurity in the most vulnerable farming households. The agriculture and food sectors beyond these government programmes – while subject to national policy – are largely private-sector driven, from wholesalers and retailers to seed and input companies, down to farmers and consumers themselves. Market access is limited for most Zambian farmers however, with producers constrained by the availability of inputs from local agro-dealers, and markets for selling produce beyond maize poorly developed in most areas. Agricultural policy and infrastructure in Zambia are therefore not supportive of diverse and sustainable diets as they currently stand.

The analysis in this brief shows that a lack of diversity in food production and availability is bad for diets, resulting in hunger, child stunting and overweight adults; and bad for agriculture, resulting in a lack of resilience in food systems. There is therefore a strong case for improving diversity in both food production and consumption. If improving diversity is the answer, there are multiple routes to achieve this at different scales, from large commercial agribusiness to smallholder homestead production; and at different timescales, from immediate 'quick wins' to longer-term social change. Recommendations include investments in research and development, and in agricultural extension and seed system services; improving diet and nutrition considerations in existing food security programmes, and making sure they target those households most vulnerable to hunger and malnutrition; increasing consumer demand for diverse nutritious foods; and collecting data on Zambian diets and food procurement strategies to better frame future responses.

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# ACRONYMS/

# ABBREVIATIONS

|      |                                       |
|------|---------------------------------------|
| BMI  | body mass index                       |
| FAO  | Food and Agriculture Organization     |
| FISP | Farmer Input Support Programme        |
| FRA  | Food Reserve Agency                   |
| HDDS | Household Dietary Diversity Score     |
| MAL  | Ministry of Agriculture and Livestock |
| NAP  | National Agriculture Policy           |
| SNAP | Second National Agriculture Policy    |
| USD  | American dollars                      |
| ZMW  | Zambian kwacha                        |

# 1. INTRODUCTION

Food plays many roles: food is a social glue, a cultural expression, an economic commodity, and a source of nutrition. The amount, variety and nutritional quality and safety of foods in diets are largely affected by the availability and accessibility of different foods, both on the market and from farmers' own production. In recent years, agricultural systems worldwide have principally concentrated on producing a handful of staple grain crops, providing for full bellies and farmer income, but not making available the range of foods needed for health. All too often therefore, agriculture systems fail to provide the foods that would allow for diverse, nutritious, affordable, sustainable diets for all.

Despite government policy aimed at improving food and nutrition security, Zambia's food and agriculture system is providing neither food security nor adequate nutrition for all. In Zambia as elsewhere, agricultural production is focussed on one staple cereal: maize. Maize contributes the major part of the food energy supply in Zambia, while nutrient-rich foods such as legumes, animal-source foods and fruit and vegetables are only minor contributors. Thus, the diets of most Zambians are poor, and many live with food insecurity and malnutrition as a result: seasonal hunger still affects many families; a significant proportion of children still suffer from stunted growth; and overweight and attendant diseases are increasing in adults. What connects the issues of hunger, malnutrition and chronic disease is the year-round availability and accessibility of diverse foods for healthy and sustainable diets.

This policy brief is based on a review of existing public data, policy documents and academic literature, combined with interviews with Zambian policymakers, researchers and business people. It describes the potential of agriculture and food systems in Zambia to improve Zambian diets, and provides clear policy recommendations on how to leverage agriculture to improve nutrition.

## 2. BACKGROUND

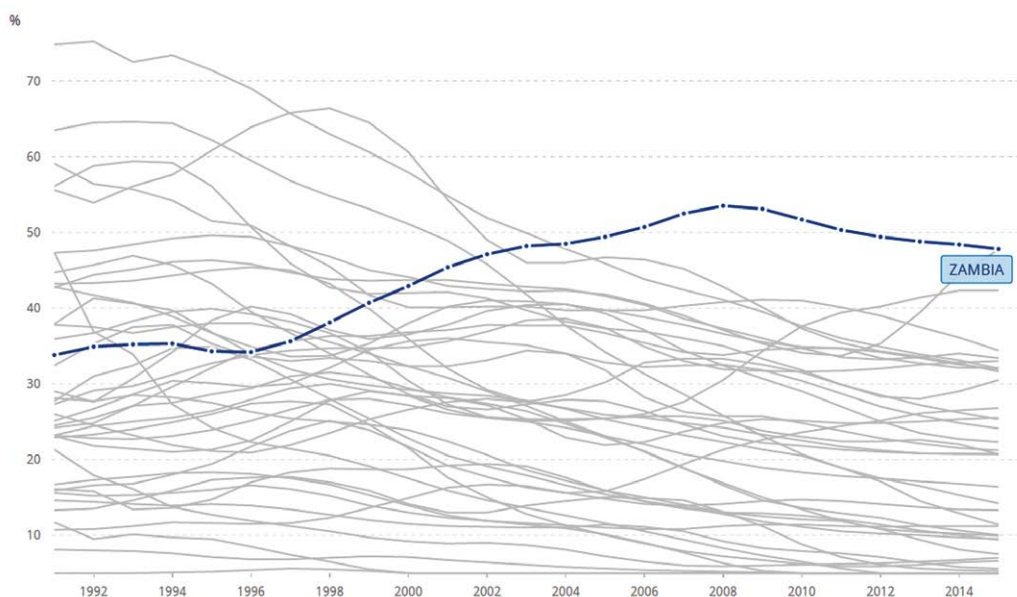
### Diets and nutrition in Zambia

In Zambia, food is maize. The introduction of maize to Zambia before colonial times, and its promotion as an aspirational crop by the colonial government, resulted in a gradual shift away from the consumption of indigenous crops like millet, sorghum and cassava – to the point that today, these traditional staples are marginalised by maize.<sup>1</sup> Traditional diets based on *nshima* (maize meal porridge) are still preferred by most Zambians, providing meals that are high in starches and generally low in nutrients.<sup>2</sup> Accompanying dishes (known as ‘relishes’) change throughout the year by season, but the consumption of indigenous vegetables has also declined, in favour of a narrow selection of introduced varieties.<sup>3</sup> As well as grains and vegetables, animal-source foods are a potentially

nutritious component of diets, particularly for the health and development of infants and young children, due to their high concentration of protein, vitamins and minerals. However, low availability and consumption of animal-source foods is seen among children in Zambia, due to factors such as its cost, families’ limited livestock holdings, a preference for selling rather than consuming livestock, and cultural norms and taboos about consumption.<sup>4</sup> Thus, rural Zambian diets in particular are characterised by monotony and periods of seasonal scarcity, and modern Zambian agriculture relies on a limited number of non-indigenous crops and limited diversity among different food groups.

Probably the most recognised form of malnutrition is hunger (technically known as undernourishment), defined

Figure 1. Undernourishment (hunger) in Zambia and the African region, 1992 to 2014



Source: Based on World Bank (undated-a) using FAOSTAT (undated) data for 1994-2014

as not having enough energy (calories) available from food each day for an active life. Hunger occurs particularly seasonally, in lean agricultural periods of the year, which in Zambia is directly before the maize harvest when maize stocks from the previous harvest are low. The per-capita annual availability of total calories has worsened over time in Zambia (Figure 1), with 48 per cent of the population currently classified as undernourished.<sup>5</sup> These undernourishment figures put Zambia close to the bottom of global hunger rankings, and make it the worst in Africa, far beyond the regional average of 23 per cent. The figures are challenged by government; such a stark assessment is difficult to understand, given high maize yields in recent years. However, a recent investigation into the data underpinning the calculations confirmed the analysis, based on the agricultural production and population figures currently available.<sup>6</sup>

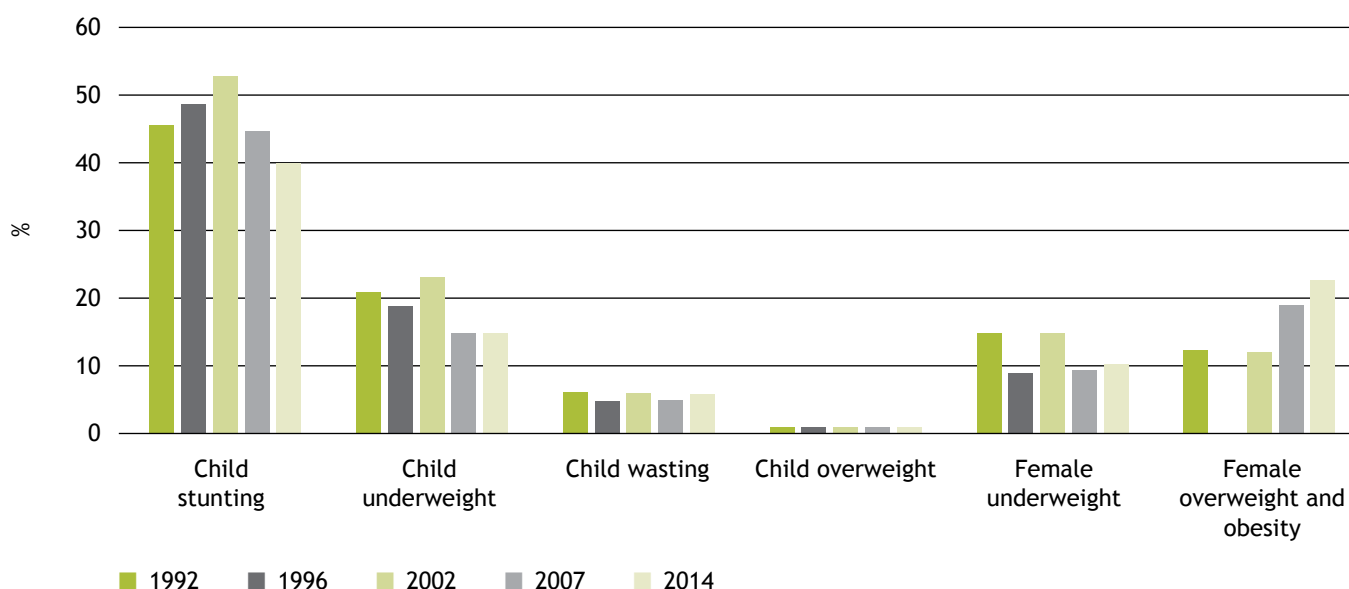
Related to its monotonous and deficient diets, Zambia has unacceptably high levels of child undernutrition. In Zambia, 40.1 per cent of children under five are suffering from stunted growth in height – a manifestation of chronic undernutrition – ranging from 35.7 per cent in Lusaka Province to 48.5 per cent in Northern Province.<sup>7</sup> The reduction of chronic undernutrition has been slow (Figure 2). While overall stunting rates have dropped 12 percentage points between 2002 and 2014, there has been little change in the lowest wealth quintiles (from 48.0 per cent to

47.3 per cent stunting between the last two surveys), most change in the second and third quintiles (7-10 percentage-point reduction) and some change in the wealthiest quintile (4-5 percentage-point reduction). In addition, Zambia has a persistent problem with child wasting (acute thinness, leading to increased risk of infection and death), standing at around 6 per cent of children under five over the past several decades.

At the other end of the malnutrition scale, 23 per cent of women in Zambia are considered overweight (with a body mass index or BMI of 25-30) or obese (BMI more than 30), also a result of poor diets,<sup>8</sup> and levels of related chronic disease such as hypertension and diabetes are high.<sup>9</sup> In Zambia, the transition from undernutrition to overnutrition – and the double burden these two forms of malnutrition place on families and health services – is becoming evident, particularly in some urban areas.

Zambia's food and agriculture system is therefore not providing food security for all, with almost half of Zambians hungry at certain times of the year; nor good nutrition for all, with 40 per cent of children suffering from stunted growth and increasing overweight in adults. Below we investigate how Zambian agriculture and food systems can better serve the country's population, in particular by contributing to sustainable diets for all.

**Figure 2. Trends in nutrition outcomes for women and children under five in Zambia, 1992 to 2013**



Source: Central Statistical Office et al. (2014) based on 1992-2014 data



### Pathways from agriculture to nutrition

Food security is defined by the Food and Agriculture Organization (FAO) as “when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preference for an active and healthy life”.<sup>10</sup> Healthy diets and good nutrition are inherent in the definition, but are often components that are minimised in favour of producing enough calories. Food security is based on four dimensions that must be fulfilled simultaneously:

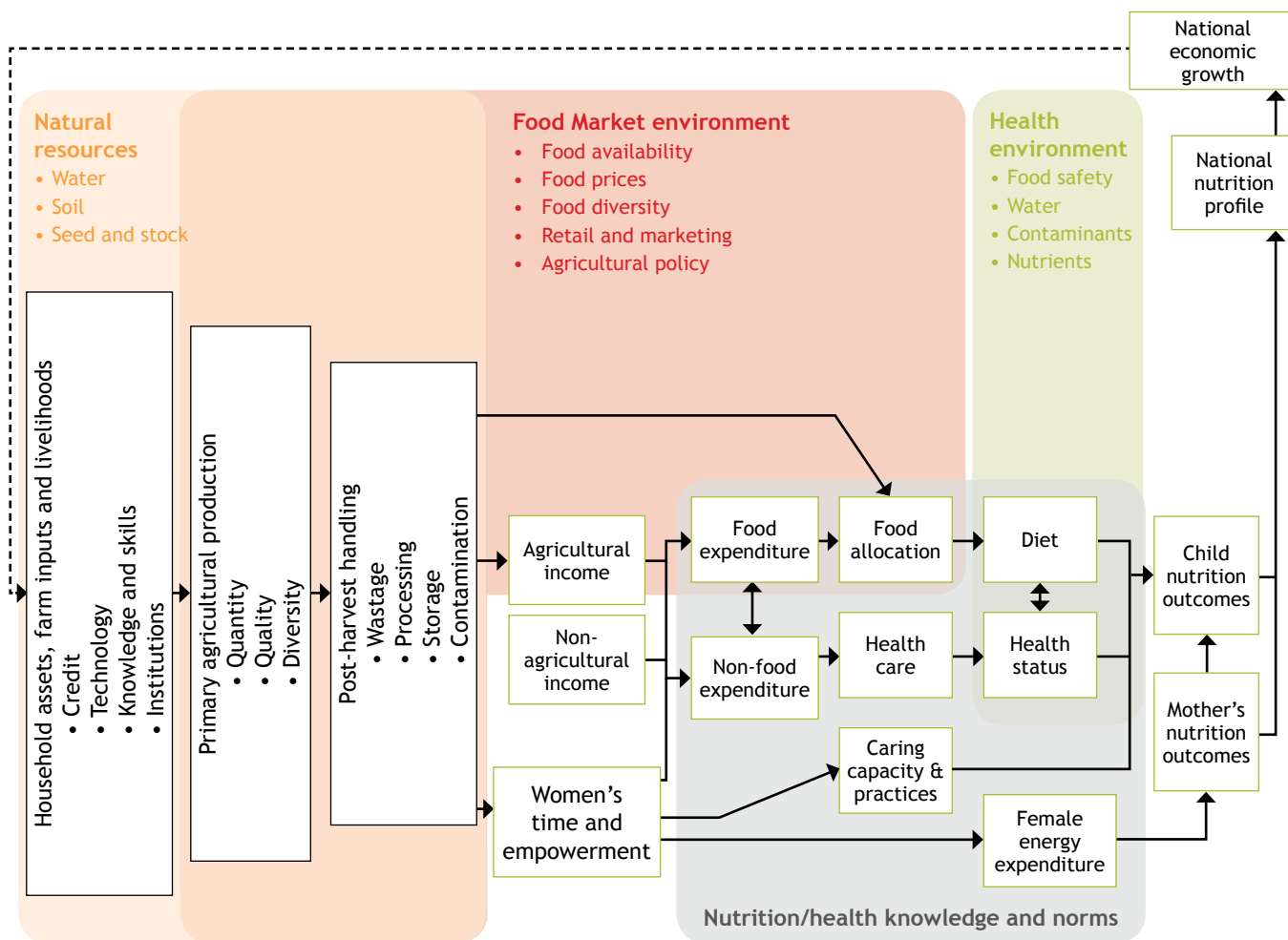
1. Food availability at national, community or household level, determined by food production, storage and net trade
2. Economic and physical access to food by households or individuals (eg affordability)
3. Food utilisation, commonly understood as energy and nutrient intake by individuals as a result of care and feeding practices, food preparation, diet diversity, and intra-household food distribution

4. Stability of the above dimensions over time.

To achieve food security by this definition, agriculture, food systems, diets and nutrition are linked in multiple ways (see Figure 3). The pathways between agriculture and nutrition can broadly be divided into three main routes:<sup>11</sup>

1. Agriculture as a *source of food*, either directly from home production or through the market
2. Agriculture as a *source of income*, either from produce sold or through wages earned in agricultural work, used for the purchase of food or other nutrition-relevant items such as health care
3. Agriculture as a gender issue, particularly as a *moderator of women’s time use and decision-making power*, and women’s own nutritional status, particularly during pregnancy.

Figure 3. Conceptual pathways from agriculture to nutrition



Source: Adapted from Herforth and Harris (2014) and Headey et al. (2012)

## Box 1. Measuring diversity

**Dietary diversity** is measured as the number of foods or food groups consumed by an individual over a reference period of 24 hours. The dietary diversity of a child's diet is assessed based on seven food groups: grains, roots, and tubers; legumes and nuts; dairy products; flesh foods; eggs; vitamin A-rich fruits and vegetables; and other fruits and vegetables. The minimum acceptable diet for young children is achieved when children consumed four out of seven food groups in the previous 24-hour period (WHO, 2010). The recently internationally agreed indicator to assess women's dietary diversity identified 10 food groups, with adequate diversity achieved when women consumed food from 5 or more groups in the previous 24 hours (FAO, 2015b).

In addition to individual-level dietary diversity, the household dietary diversity score (HDDS) provides an approach to measuring the diversity of household consumption as a proxy measure for household **food access diversity** and food security (Hoddinott and Yohannes, 2002). HDDS can also be used as a proxy

measure of the socio-economic status of the household, and to monitor seasonal fluctuations in food access, measure the impact of a project on food access, and serve as an indicator within an early warning system to flag likely food crises before they arise (SPRING, 2014). Household dietary diversity is most commonly constructed with 12 food groups as it does not focus solely on the most nutrient-rich foods (FAO, 2013).

**Agricultural diversity** within a farm or an agricultural system can be measured by an index of different variables, including 1) the total number of crops (including field crops, fruit and vegetables); 2) the proportionate share of the crop in the gross cropped area; 3) the total number of agricultural activities engaged in (production of field crops, production of fruit and vegetables, rearing animals, and production of animal-sourced foods); and 4) the production of the different food groups that correspond to those groups used in the individual or household dietary diversity indices (Kumar et al., 2015; Mofya-Mukuka and Kuhlitz, 2015).

In addition to these pathways, important moderating factors interact with the different routes (Figure 3), including:

1. The accessibility and quality of *natural resources and ecosystem services* used in agriculture and for health, such as soil and water
2. The food market environment, including food prices; the role of private sector companies, and policies that affect these
3. The health environment, including access to clean water and food safety issues along the food chain
4. Nutrition and health knowledge and norms, including cultural practices and the availability of nutrition information.

The conceptual pathways from agriculture to nutrition therefore cover several different issues from several different sectors, and it is supposed that these should be provided in a co-ordinated fashion for maximum effect. Agriculture is not only an input into nutrition; improved nutrition in a population also improves the productivity of agricultural and non-agricultural workers, and therefore national economic growth. In a country such as Zambia, with a large agricultural workforce and high levels of malnutrition, there are potentially large synergistic effects of improving nutrition and improving agriculture.



# 3. ZAMBIAN AGRICULTURE, FOOD AND DIETS

One way for agricultural systems to promote both resilient production and positive nutrition outcomes is through production diversity.

## **Food availability: agricultural production and trade**

Modern food systems tend towards uniformity in production and marketing, and much of the food produced today is grown in monocultures of a small number of crop varieties.<sup>12</sup> Maize is the major food security crop in Zambia, with a large majority of households reporting growing maize each year, including richer urban households who often have a piece of land cultivated in a rural area. Maize is not an indigenous crop to Africa, but was introduced from the New World by slave traders as a durable grain for long sea voyages, and later promoted by colonial governments as a transportable foodstuff to fuel workers in urban and mining centres.<sup>13</sup> During colonial rule, maize production was limited to white landowners and a few African farmers labelled 'advanced', hence it has been claimed that despite Zambia's generally unsuitable agro-ecological context, the production of maize through intensive methods remains linked in the collective psyche with progress, modernity and good farming, and so has retained a hold on the country's agricultural approach even since independence.<sup>14</sup> Because most voters in Zambia are from farming households, and farming is linked so intimately with maize, maize-supporting policy is tacitly a huge political and vote-winning issue in Zambia. Agriculture also forms the country's economic foundation along with copper mining, and is formally adopted by the 2016 National Agriculture Policy (NAP) as an engine to drive economic growth.<sup>15</sup>

The major focus of the sector therefore remains national food security through staple food production, normally equated in political rhetoric with maize self-sufficiency. Post-independence, the government encouraged maize production by introducing price differential subsidies and uniform prices for inputs (fertiliser, seeds and agricultural chemicals) and crop producer prices, resulting in high maize production, but at a huge cost to the economy.<sup>16</sup> These policies and preferences perpetuated maize-based diets across the country, particularly as diets based on maize became cheaper.

Smallholder agriculture makes a significant contribution to Zambian domestic food supply, with smallholder farmers (largely subsistence-oriented, on less than two hectares of land) representing 75 per cent of farming households, while emerging farmers represent 17 per cent and commercial farmers 8 per cent.<sup>17</sup> Most maize in Zambia is produced through either rain-fed traditional agriculture, or input-enhanced agriculture using improved seed and inorganic fertiliser. By either system, limited crop diversity leaves the sector open to pests and disease; an example is the recent fall army worm attack, which led some to question whether the country's reliance on maize was a contributing factor.<sup>18</sup> Crop diversification can improve resilience in a variety of ways: by engendering a greater ability to suppress pest outbreaks and dampen pathogen transmission; buffering crop production from the effects of greater

## Diversity is important on the farm, in the market and on the plate for resilient agriculture and nutritious diets.

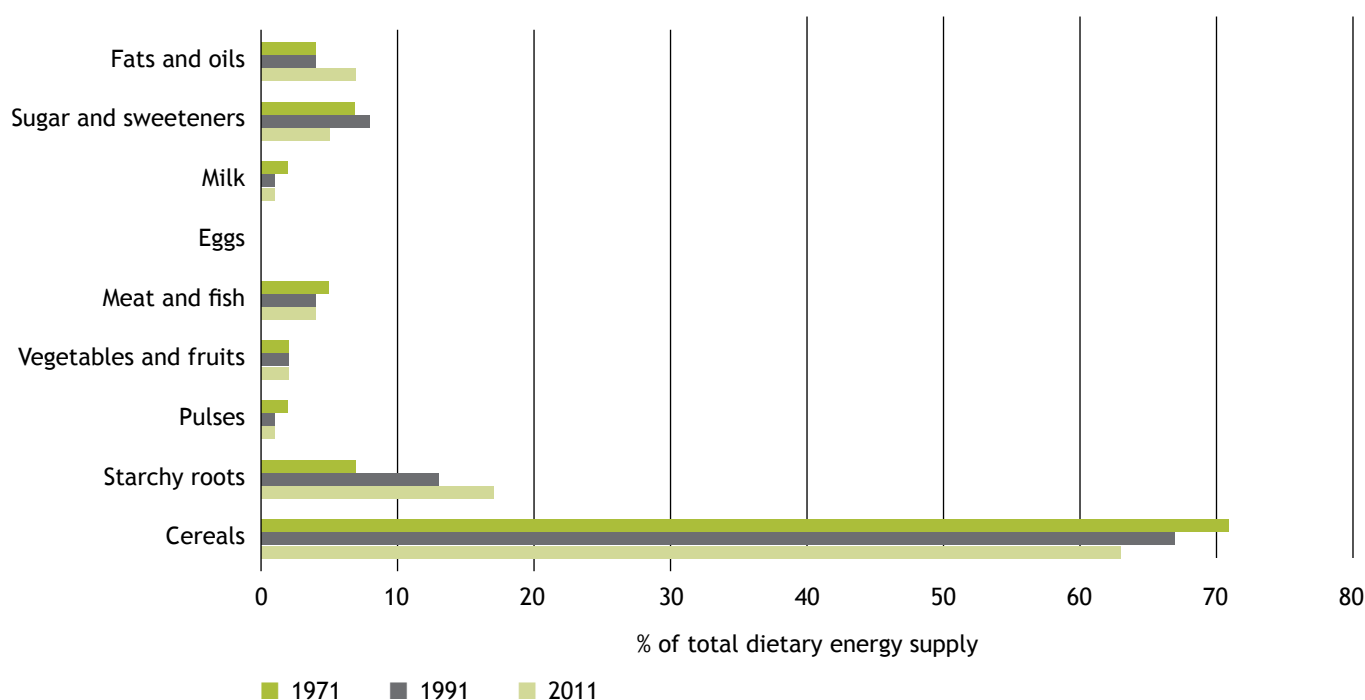
climate variability and extreme events; and improving soil fertility through diversification with leguminous crops.<sup>19</sup> A growing section of Zambian farmers practise conservation agriculture, supported as a farming system in Zambia for over two decades by various national and international organisations, with bilateral support from the Food and Agriculture Organization. One principle of conservation agriculture is rotating cereal crops with legumes, which has a positive impact on crop diversification.<sup>20</sup> Beyond this, the promotion of agricultural biodiversity includes using under-utilised, neglected or traditional species with under-exploited potential for contributing to income generation and ecosystem services.<sup>21</sup> Agricultural biodiversity is also important for food and nutritional security, where it can potentially act as a safety net against hunger, a source of nutrients for improved dietary diversity and quality, and a basis for strengthening local food systems and environmental sustainability.<sup>22</sup> One way for agricultural systems to promote both resilient production and positive nutrition outcomes is therefore through production diversity.

Beyond calories from staples such as maize, the availability of calories from nutrient-dense non-staple foods is vital for dietary quality. However, the availability of calories from legumes, fish, eggs, and milk reduced from already low levels between 1971 and 2011, and there has been no

change in the very low availability of calories from fruits, vegetables or meat (Figure 5). In the same period, the availability of fats, oils and starchy foods has doubled. Currently, Zambia has a positive trade balance of cereals, but the trade balance is negative for fruit and vegetables, meat, dairy products and fish.<sup>23</sup> Therefore, it can be concluded that the availability of nutrient-rich foods through national production and through international trade has barely kept pace or fallen behind population growth, while the availability of foods promoting excess weight has increased, as seen in the increase in overweight women in national statistics.<sup>24</sup> The availability of different food groups in Zambia is therefore heading away from the kind of diversity that is needed to promote varied, healthy diets.

Looking at the diversity of household crop production is also instructive about the possibility of diverse diets. The diversity of crops cultivated by smallholder households in Zambia is limited, with around 80 per cent of these households cultivating three or fewer crops.<sup>25</sup> Access to extension advice on crop diversification and access to markets tends to positively influence crop diversification,<sup>26</sup> and the promotion of agricultural diversification at household level in Zambia has been shown to increase the total number of foods produced, the number of agriculture activities engaged in and the number of months in which

**Figure 4. Changes in dietary energy supply from different food groups over time**



Source: Based on FAOSTAT data for 1971 to 2011

vitamin-A rich foods were produced.<sup>27</sup> More diverse household production is in turn associated with more diverse diets and improved nutrition by some measures, in Zambia and elsewhere.<sup>28</sup> Diversity is therefore important on the farm, in the market and on the plate for resilient agriculture and nutritious diets.

### Food access: prices and affordability

The availability of diverse foods is therefore important for sustainable diets, but households also need to be able to access these in the market and have enough income to buy them. Over time, the typical diet in Africa has gone from mainly home-produced to being to some extent purchased, even among the rural poor.<sup>29</sup> In Eastern and Southern Africa, 50-60 per cent of food consumption (by value) is purchased, which means that markets have overtaken home produce as the main source of food, even in rural areas.<sup>30</sup> Therefore, to increase dietary diversity, nutrient-rich and diverse foods need to be available on the farm for those who grow their own food, and affordable on the market for those who purchase it.

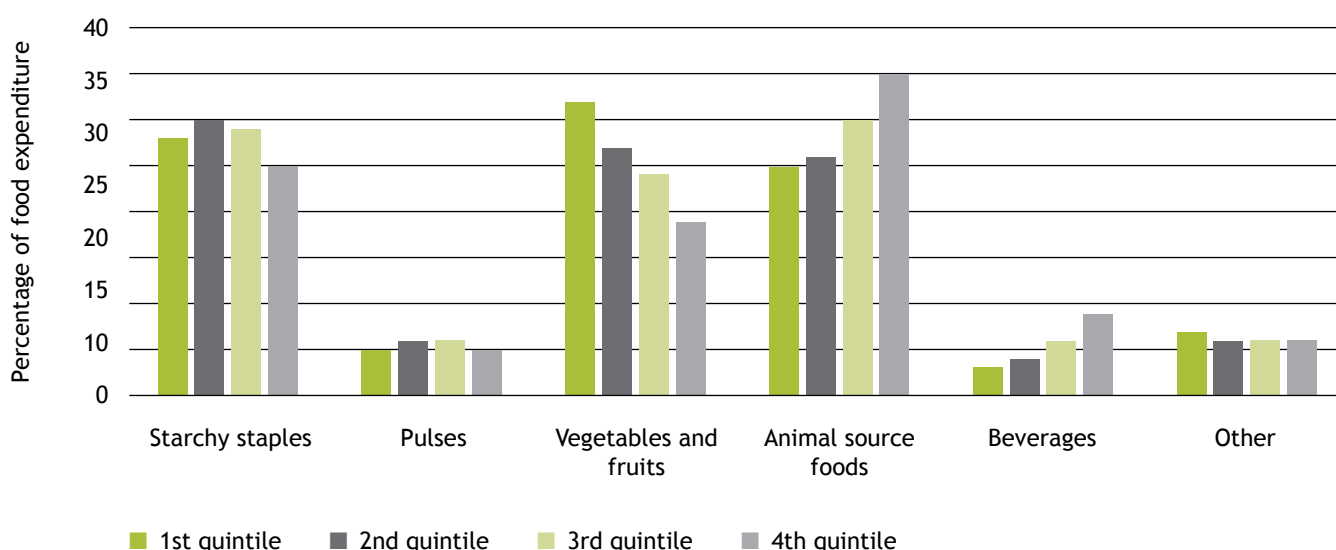
The Zambian grocery retail sector is highly varied, ranging from a rapidly increasing number of nationally and internationally branded supermarkets in urban areas, to small informal shops in both rural and urban areas. Most agricultural produce (such as fruit, vegetables, legumes and cereals) is still mainly sold through the traditional informal market channels rather than modern supermarket chains.<sup>31</sup>

Food prices in Zambia have fallen in real terms for almost all food groups over the past 20 years. For instance, the price of maize meal has fallen by 60 per cent, tomatoes and

onions by 45 per cent, and dried beans by 30 per cent; the exceptions are dried *kapenta* fish (10 per cent increase), and eggs (4 per cent increase).<sup>32</sup> While national income or gross domestic product per capita has risen significantly over the same period, there has also been a rise in both poverty, the percentage of the population living on less than USD1.90 per day, and inequality, measured by the GINI coefficient of income inequality.<sup>33</sup> The GINI index of inequality gives Zambia a score of 57/100, ranking it as one of the most unequal countries in the world: 138th out of 145 countries.<sup>34</sup> Falling food prices combined with rising inequality have led to different impacts on the affordability of foods for different groups – producers vs consumers, poorer vs richer, and urban vs rural – leading to the lack of access to diverse foods seen in many households.

In Lusaka, a recent study on food access found that households are not accessing a large variety of foods, with around 60 per cent of poor households consuming fewer than 5 out of 12 food groups.<sup>35</sup> The same study showed that in Southern Africa about a fifth of poor households were often unable to eat their preferred foods, had a limited variety of foods, or ate non-preferred foods because of a lack of resources.<sup>36</sup> Thus, where data exist, they do not show households in general accessing a diverse range of foods. A recent analysis of Zambian households beyond Lusaka shows clear changes to household food expenditure in Zambia over time in both urban and rural areas.<sup>37</sup> Rural households experienced a considerable drop in the share of food expenditure on starchy staples between 1996 and 2015, from 45 per cent to 29 per cent; meanwhile the share of vegetables and fruit in rural households' food expenditure rose substantially from 13 per cent to 29 per cent over the

Figure 5. Percentage of food group expenditure by income, 2015



Note: 1<sup>st</sup> quintile corresponds with wealthiest households

Source: Based on Chisanga and Zulu-Mbata (2017)

Staple crops such as maize are high in carbohydrates, but do not contain all the proteins, vitamins and minerals needed for a healthy diet, so increasing the availability of and access to a nutritionally diverse range of foods across and within different food groups is key to improving diets

same period. This increase may be due to a decline in per capita income among rural households and therefore may not reflect increased vegetable and fruit consumption, but only larger expenditures. Urban household expenditure saw a greater increase in meat, milk, eggs and fish expenditure compared to rural areas.<sup>38</sup>

Similarly, Figure 6 presents the percentage of food expenditure per food group for four income groups. The percentage of food expenditure on vegetables and fruit decreases with income, while the expenditure on animal-source foods such as meat, fish, eggs and dairy increases with income. Although the absolute amounts spent may increase with income, the percentages are smaller relative to total income. In addition, households spend just under 20 per cent of income on highly processed foods which are associated with increases in excess weight and chronic disease – a figure that has remained similar since 1996.<sup>39</sup>

#### Food utilisation: dietary diversity in Zambia

As the diet in Zambia is heavily dominated by maize, food security is often equated with maize production, or the ability of households to acquire enough calories from maize. However, the importance of dietary *quality*, in addition to *quantity*, is missing by this measure. Staple crops such as maize are high in carbohydrates, but do not contain all the proteins, vitamins and minerals needed for a healthy diet, so increasing availability of and access to a nutritionally diverse range of foods *across* and *within* different food groups is key to improving diets. Dietary diversity is widely recognised as an important dimension of dietary quality, with diverse diets increasing the likelihood of adequate intake of essential nutrients.<sup>40</sup> Therefore, staple foods must be complemented by nutrient-rich foods, from food groups such as vegetables,

fruits, beans, fish, dairy and meat, to make meals adequate in terms of total calories or *quantity*, as well as adequate in terms of nutrients or *quality*.

At the individual level, there is no recent population-level dietary data in Zambia beyond extrapolating from household expenditures, which do not account for how food is shared within households. In children, the most recent survey shows that only 22 per cent of children aged 6-23 months received food from four or more food groups, so dietary diversity of these young children is very low.<sup>41</sup> The rural-urban divide and the role of inequality are marked: 18 per cent of rural children and 31 per cent of urban children had at least 'minimally diverse' diets (consisting of four or more food groups); and while 15 per cent of children in the lowest income households achieved this marker, the figure for the richest households was 41 per cent.<sup>42</sup> This is still strikingly low even for richer households however, and indicates that demand for and availability of diverse foods is limiting dietary diversity, despite increased income.

There is therefore a link between poverty and access to diverse foods; but poverty does not explain the full extent of limited diversity in household food consumption or individual diets. There is also a question of availability of diverse foods on farms or in the market, and of consumer preferences for different foods and food groups. Zambian agricultural policy, reviewed below, has historically focussed more on producing staple grains and increasing farmer incomes than on making diverse foods available, accessible or desirable. This leads us to recommend several policy options for improving Zambian diets, reviewed in the final section.

# 4. ZAMBIAN POLICY, PROGRAMMES AND MARKETS

## National nutrition and agriculture policy

Zambia's Vision 2030 clearly articulates a vision for "a well-nourished and healthy population by 2030" with supporting goals and targets. In line with this vision, Zambia is a signatory to several international agreements. Zambia was one of the first signatories to the Scaling Up Nutrition (SUN) movement aiming to improve stunting rates; it has adopted the Comprehensive Africa Agriculture Development Plan compact, which aims among other things to improve food security and nutrition; it has signed up to the new universal Sustainable Development Goals, which include both nutrition and agriculture targets; and it has adopted the World Health Assembly targets committing the world to end malnutrition in all its forms.

The 2006 National Food and Nutrition Policy called for nutrition to be addressed through a multi-sectoral approach involving the health and agriculture sectors among others, and included a call for food diversification. Stemming from this policy, the 2011 National Food and Nutrition Strategic Plan lays out the requirements of the agriculture sector in improving diets, and the 2013 Most Critical Days Programme identifies the promotion of improved child feeding and diversification of maternal and child diets as priority areas.

The first National Agriculture Policy<sup>43</sup> mentions human nutrition three times, in relation to food processing, breeding for improved food quality, and fish production; the policy does not mention diets at all, yet improvement of diets is arguably the agriculture sector's most significant potential contribution to nutrition. The Second National Agriculture Policy (SNAP) of 2016 places the agriculture sector as a key driver of economic growth in Zambia.<sup>44</sup> The SNAP incorporated nutrition more fully into its mandate, including in its overarching vision, mentioning nutrition 12 times (though still not diets), and dedicating one of its 12 objectives to improving nutrition through the food and agriculture sector (Box 2). The SNAP explicitly calls for (but does not define) production diversity; however, the accompanying SNAP implementation plan<sup>45</sup> provides little detail on this element and has left out a number of measures that are indicated in the SNAP. For example, in the implementation plan the diversification of agricultural production is defined as "cultivation of crops other than maize such as rice, soya beans, groundnuts etc", with no specific mention of other potential measures for improving the diversity of diets, such as producing nutritious food groups like vegetables and fruits, bio-fortified crops or indigenous crops. In addition, the policy measures around

### Box 2. Measures in Zambian national agriculture policy: to promote food and nutrition security

1. Promote diversification of agricultural production and utilization (conduct training in food processing and preservation, increase crop diversification index)
2. Promote access to bio-fortified seed or vines for the production of nutrient-enhanced varieties
3. Promote on-farm agro-processing
4. Promote value addition in the agriculture sector
5. Promote on-farm storage of food commodities
6. Promote the preservation and utilization of nutrient rich food
7. Promote cultivation and consumption of indigenous crop varieties
8. Determine and reduce post-harvest losses (construct/rehabilitate silos, construct cooperative storage sheds, fumigation)
9. Promote nutrition education
10. Promote production and utilization of nutritious food.

Source: SNAP, 2016a

nutrition education and the utilisation of nutritious foods are not mentioned in the implementation plan. Therefore, written agriculture policy explicitly incorporates diversity and nutrition considerations, but the focus of the sector in practice remains on agriculture as an engine of economic development, and goals related to nutrition have fallen out of focus when it comes to implementation.

### Major food security programmes

The bulk of Zambia's agriculture policy consists of two major programmes focussed on food security through maize production: the Food Reserve Agency (FRA) and the Farmer Input Support Programme (FISP). FRA, set up in 1972 and amended in 1996 and 2005, buys maize from farmers at guaranteed prices and forms a strategic grain reserve to modulate national grain prices.<sup>46</sup> FRA builds on the idea of maize control boards, introduced in colonial times to limit maize production to approved farmers, and continued after independence to provide isolated rural areas with access to a market and the cash economy;<sup>47</sup> it is effectively a government output subsidy. The FISP programme was introduced as the Fertiliser Support Programme in 2002 to distribute inorganic fertilisers to farmer groups, and later renamed FISP when other inputs such as hybrid maize seed were included in the distribution. FISP is an input subsidy aimed at improving the asset base of small farmers, and promoting farming as a business for commercial smallholder farmers, as well as supporting on-farm production and local availability of maize to mitigate food insecurity. Assessments of FISP, however, have found that poorer farming households cannot access the programme, which therefore tends to benefit mainly wealthier farmers; and while yields have improved overall, FISP is not found to have fulfilled its food security, hunger reduction or asset improvement aims.<sup>48</sup>

Due in part to these negative findings, FISP has already begun to carry out reforms. It ran a pilot of an electronic voucher payment system in 13 districts in the 2015/16 agricultural season, which enabled recipients to choose from seed and fertiliser options available at local distributors and agro-dealers, and was expanded to 39 additional districts in 2016/17. However, only about 15 per cent of participating farmers redeemed the agricultural inputs voucher for items other than maize and fertiliser,<sup>49</sup> either because demand was low or inputs were not available for more diverse produce.

In addition to FISP and FRA, the Ministry of Community Development and Social Welfare implements the Food Security Pack, a social safety net programme targeting 'vulnerable but viable' small-scale farming households (those at a lower level than would benefit from FISP), and provides a separate but similar agricultural input package explicitly aimed at household food security. The government also started providing social cash transfers in 2014, when a pilot study found that the transfers could improve child nutrition, but only if households also

had access to clean water and if mothers were educated.<sup>50</sup> The government has an ambitious roll-out plan for scaling up social cash transfers to reach all districts by 2018, with potential impacts on food security and nutrition. Agriculture and community development programmes have therefore focused on reducing poverty and food insecurity to tackle hunger, but the major programmes reviewed above do not explicitly tackle malnutrition.

### Government and donor funding for agriculture and nutrition

FRA and FISP are allocated a large share of the agriculture sector budget. The FISP standard and e-voucher systems, and purchases for the national food reserve by the Ministry of Agriculture and Livestock (MAL), have a combined budget for 2017 of more than 2 billion Zambian kwacha (ZMW; approximately USD220 million),<sup>51</sup> which is 58 per cent of the ministry's total budget.<sup>52</sup> Some assessments calculate that up to 80 per cent of agriculture spending in recent years has been on these programmes; as a result, very little funding is available for MAL's core functions such as research and development, extension services, irrigation, livestock development, and rural infrastructure.<sup>53</sup> Due to negative findings on the efficiency and impact of both programmes, as well as fundamental ideological disagreement with the concept of agricultural subsidies, some financial donors are making their loans conditional on restructuring or removing FISP and FRA. For instance, in 2016 Zambia started negotiations with the International Monetary Fund for a USD 1.2 billion loan, which is conditional on restructuring the programmes.

The focus of the agriculture sector is therefore very much on food security, rather than nutrition as a broader definition. Less than 0.001% of the agriculture budget was allocated to nutrition activities in 2016.<sup>54</sup> There is little project funding for nutrition available from the agriculture budget, despite the inclusion of a nutrition objective in the 2016 Second National Agriculture Policy. Much of the nutrition work undertaken by this sector is funded by international donors, through the Scaling Up Nutrition programme.

By current estimates, around 0.049 per cent ( $\pm 30,000,000$  ZMW) of government spending was on nutrition interventions in the 2017 budget, largely under the health sector but including the agriculture sector.<sup>55</sup> This does not meet the USD30 per child recommended internationally for addressing nutrition, nor the USD48 million per year calculated by the World Bank as the cost to roll out 11 key nutrition-specific interventions in Zambia to full national coverage.<sup>56</sup> Most nutrition interventions, including programmes aiming to

**The focus of the agricultural sector is therefore very much on food security, rather than nutrition as a broader definition.**



diversify diets, are largely funded through international donors and non-governmental organisations; the total donor investment to basic nutrition in Zambia in 2014 was USD9.73 million, or USD3.4 per child under five – still not meeting estimated requirements, but dwarfing national investments.

Action on nutrition in Zambia is therefore largely internationally funded, while food security policy is largely nationally funded, showing a disconnect between the aims of a donor agenda and a domestic political agenda that extends to action on sustainable and diverse diets. The budget allocations reflect the fact that increasing income and food security is the government's top-line agenda item for agriculture, overshadowing the importance of diets or nutrition. This conceptual division allows food security to be conflated with staple crop production, as opposed to encouraging a comprehensive perspective, which considers the importance of diversity and brings in the concept of utilisation when considering food security.

### Role of the private sector

The agriculture and food sectors – while subject to national policy – are largely private sector-driven, from wholesalers and retailers to seed and input companies, down to farmers and consumers themselves. Farm households determine what crops they will sell to markets and what crops will be consumed at home, largely as a response to the food market environment and household requirements. Private companies can be involved in a myriad of ways, including the provision of technical expertise; distribution of agricultural inputs; post-harvest processing and distribution; and growing markets. Thus, it is important to understand how agricultural and dietary diversity looks from a private sector perspective.

In terms of inputs, seed demand and challenges in seed preservation are important considerations for the private sector in seed production. Farmers participating in the e-voucher programme may redeem the e-voucher for any agricultural item, but they are limited by what is available in the agro-dealer shop. Agro-dealers face several challenges with diversifying inputs beyond maize and fertiliser, as maize seed and fertiliser are often bought from the seed company on consignment, while in general, legume seeds and other inputs need to be bought with cash on delivery. The private sector could play an important role in supporting a diverse input supply; however, seed companies are profit-driven and hence currently concentrate primarily on hybrid seed maize with a large existing market, and vegetables seed targeting high-value markets.<sup>57</sup> Private sector involvement in legume seed markets is still small and poorly developed.

At the other end of the production chain, Zambia is known to have several barriers to farmers accessing markets to sell their produce beyond maize, including poor road

infrastructure and large geographic distances. In addition, a large number of semi-subsistence farmers do not belong to farmer co-operative groups, with a consequent lack of bargaining power. Market proximity has positive effects on dietary diversity in producer households, and these effects seem stronger than those of on-farm production diversity in some contexts; therefore for households with access to markets, facilitating the commercialisation of smallholder farms may be a better strategy to improve nutrition than promoting more diversified subsistence production.<sup>58</sup> Facilitating access to markets, where this is possible, has potential income gains for producers, but improvements in diets and nutrition are not automatic with increased income; diverse foods need to be available, affordable and desirable, and which household member controls the increased income has been found to be important in these nutrition decisions.<sup>59</sup>

The role of women as primary farmers of non-staple foods and leaders of food choice in households is recognised in many contexts.<sup>60</sup> Commercialising agriculture has benefits and risks, particularly to women farmers who also tend to have other household roles.<sup>61</sup> Commercialisation may increase household income, but the degree to which women have the ability to influence decisions about how to spend that income, or how much of the nutritious commodities will be used for consumption, will determine how much the diets of household members are improved. In addition, the impact of commercial activities on women's time commitments may further constrain the time required to feed and care for other household members. Linking to markets is therefore a long-term project with both gains and losses for sustainable improved diets, so for many subsistence and semi-subsistence farmers, diverse on-farm production needs to be supported in the short and medium term.

A 'value chain approach', based on food and agriculture systems, acknowledges the importance of private sector solutions in improving diets and nutrition. Value chain approaches for nutrition support or promote food supply chains that aim to increase the *nutritional* value of food along the chain from farm to plate, as well as its economic value. Value chain approaches promote both nutritious and commercially viable crops, and aim to help the food and agriculture sector to design programmes that respond to the needs of business as well as contributing to sustainable diets. The three conceptual pathways for improving dietary diversity through nutrition value chains are: 1) through increasing demand for and consumption of nutritious and diverse foods; 2) through increasing supply of and income from nutritious foods; and 3) through increasing nutrition value addition along the value chain.<sup>62</sup> While these are often catalysed by donor or government funds, they aim to create viable business models.

# 5. CONCLUSIONS AND RECOMMENDATIONS

The review above has examined the international evidence for and national realities of modern Zambia, to assess conceptual links between agriculture, diets and nutrition; the Zambian food and agriculture context; and the role of government policy and private sector business in dictating the availability and accessibility of diverse foods. This analysis has shown that lack of diversity is bad for diets, resulting in micronutrient deficiencies, child stunting and adult obesity; and bad for agriculture, resulting in a lack of resilience in food systems. It is likely that many farmers will continue to prefer to grow maize given persistently high rates of outright hunger in Zambia which cannot be ignored. But a move towards greater diversity alongside staple food production is a step towards improving nutrition. There is therefore a strong case for improving diversity in both food production and consumption.

If improving diversity is the answer, there are multiple routes to achieving this, acting at different scales, from large commercial agribusiness to smallholder homestead production; and at different timescales, from immediate 'quick wins' to longer-term social change. Below are several recommendations to bring Zambia closer to achieving sustainable diets for all. Each of these will require funds to be either added or redistributed from current allocations, which may be difficult in Zambia, economically and politically. However, returns on investment are likely to be high, with diverse agriculture creating more resilience and fewer losses to pests. Every US dollar investment in proven nutrition interventions should generate around USD18 in economic returns from improved health and productivity of the population.<sup>63</sup>

## **RECOMMENDATION 1. Invest in research and development**

### *To increase agricultural diversification within and across food groups*

Research and development plays an important role in fostering innovation, diversity and productivity in agriculture and is an important first step in longer policy change initiatives. The social rate of return for investments in agriculture research and development has been generally high.<sup>64</sup> The budget for crop diversification under Research and Development within the Ministry of Agriculture reached its highest at ZMW75,000 (approximately USD8,300) in 2014, and is non-existent for the year 2017.<sup>65</sup> There is need for increased investments in agricultural research and development, specifically in the area of improved seed for foods that are both nutritious and commercially viable, and in localised seed multiplication to improve availability.



### **RECOMMENDATION 2. Make extension services more responsive to improved diets and nutrition**

*Through improved training and gender-sensitivity in the agricultural workforce*

The Realigning Agriculture to Improve Nutrition (RAIN) project in Mumbwa showed that a package of community-based agricultural interventions had a significant attributable impact on several different dimensions of agricultural production, and the consequent availability of nutritious foods throughout the year.<sup>66</sup> Key in this programme were extension services targeted at women on diversifying agricultural production for both home consumption and markets. Access to extension advice related to crop diversification, such as minimum tillage crop rotations and mixed cropping, has a significant positive effect on crop diversification in Zambia.<sup>67</sup> There is need to include relevant nutrition knowledge in the curriculum of agricultural colleges; develop a standard training package for agriculture extension officers on nutrition-sensitive agriculture; increase the sensitivity of extension services to the requirements of women farmers, who generally produce non-staple crops; and increase the number of extension staff to cover more farmers.

### **RECOMMENDATION 3. Leverage the e-voucher system for agriculture and dietary diversity**

*By training agro-dealers, and ensuring a diverse supply of inputs for farmers*

The recently introduced e-voucher system that is gradually replacing FISP can unlock the potential for agricultural diversification. The e-voucher system has the potential to provide more choice of inputs for farmers to diversify production, but only where these are available from agro-dealers. There is need to link dealers with agricultural companies producing diverse legume and vegetable seed and other primary inputs, to ensure diverse input supply is available through dealerships. There may also be value in educating agro-dealers on the importance of crop diversification across and within food groups for both nutrition and agricultural resilience, as a method of passing this information on to farmers and generating demand for diverse inputs at all levels of the supply chain.

#### **RECOMMENDATION 4. Formulate deliberate strategies that support smallholders**

*By ensuring that food security programmes and input access are targeted to those who need them most*

The major agriculture programme, FISP, is intended to build farmers' asset base and to promote farming as a business for commercial smallholder farmers, rather than as a social protection programme.<sup>68</sup> There is therefore a need to increase support for those smallholder farmers who are more vulnerable to low yields, losses, hunger and malnutrition, especially female farmers and farmers in the lowest income groups. Targeted to these farmers, the social security programme investments towards the Food Security Pack should be explicitly oriented towards diverse inputs for improved diets, and the social cash transfer programme should include a nutrition education component to improve demand for nutritious foods and farming inputs.

#### **RECOMMENDATION 5. Increase consumer demand for diversity**

*To increase the purchase and production of diverse foods*

At the same time as increasing the availability of diverse agro-inputs for different farmer groups, there is need to increase demand from farmers for these inputs. Demand increases either when there is a market among consumers for the diverse foods produced, or when farming households change their own consumption patterns. Both require the provision of information and education to farmers and consumers on nutrition and the importance of diverse diets. This can occur through multiple routes, including health sector programmes (such as the government's infant feeding education programme and school feeding programme), and through agricultural extension. Creating markets for diverse local foods in urban and rural areas through better nutrition education is a longer-term route to increasing the links between supply and demand for diverse foods.

#### **RECOMMENDATION 6. Promote value chains for nutrition**

*To encourage nutrition and economic value addition along the food chain*

Between the production of food on the farm, and the consumption of food by consumers, is a chain of storage, distribution, processing, retail, and preparation. How these processes are undertaken affects the access, acceptability and nutritional quality of foods for the consumer. Current value chains in Zambia are built on historic demand for certain foods, and distorted by maize-centric government policy and spending that marginalises other foods. To redress the balance, explicit attention is required to the production, processing, and marketing of nutritious foods needed for diverse diets. Specific projects are needed to promote legumes, fruits and vegetables, in particular, to new sections of the population, to catalyse new markets and link supply and demand for foods that are high in both economic and nutritional value.

#### **RECOMMENDATION 7. Collect food procurement and consumption data**

*To better understand emerging dietary patterns*

Over the last decade, there have been considerable social, economic and demographic changes in Zambia that have impacted the food consumption patterns of both rural and urban populations. Food consumption means both what households buy, and what individuals eat. Representative food consumption data covering both household procurement (where households buy or obtain food) and individual diets (what different household members are eating) are critical to creating effective food security and nutrition policy and dietary guidelines, and for agricultural sector plans to respond to changes in demand. Therefore, to better understand current consumption patterns in Zambia, there is a need to study dietary consumption and food procurement, and to set up a mechanism for regular dietary surveillance.

# NOTES

- 1 Sitko, 2008.
- 2 Nyirenda and Musukwa, 2007.
- 3 Hivos, 2016.
- 4 Pachon et al., 2007.
- 5 FAO, 2015a.
- 6 Mofya-Mukuka and Musonda, 2016.
- 7 Central Statistical Office et al., 2014.
- 8 Central Statistical Office et al., 2014.
- 9 WHO, 2008
- 10 FAO, 2009.
- 11 Herforth and Harris, 2014; Headey et al., 2012.
- 12 IPES-Food, 2016.
- 13 Sitko, 2008.
- 14 Sitko, 2008; Chapoto et al., 2015.
- 15 MAL, 2016.
- 16 Chizuni, 1994.
- 17 Hivos, 2016.
- 18 Chilufya, 2017.
- 19 Lin, 2011.
- 20 Concern Worldwide, 2015.
- 21 Bioversity International, 2011.
- 22 Bioversity International, 2011.
- 23 FAO, 2016.
- 24 Harris, forthcoming.
- 25 Mofya-Mukuka and Hichaambwa, 2016.
- 26 Mofya-Mukuka and Hichaambwa, 2016.
- 27 Harris et al., 2016.
- 28 Kumar et al., 2015; Carletto et al., 2015.
- 29 Reardon et al., 2015.
- 30 Tschirley et al., 2015; Qaim et al., 2016.
- 31 Sitko, et al., 2011; Mulenga, 2013.
- 32 Harris, forthcoming.
- 33 World Bank, undated-b.
- 34 IFPRI, 2016.
- 35 Crush et al., 2011.
- 36 Crush et al., 2011.
- 37 Chisanga and Zulu-Mbata, 2017.
- 38 Chisanga and Zulu-Mbata, 2017.
- 39 Chisanga and Zulu-Mbata, 2017.
- 40 Ruel et al., 2013.
- 41 Central Statistical Office et al., 2014.
- 42 Central Statistical Office et al., 2014.
- 43 MAL, 2004.
- 44 MAL, 2016a.
- 45 MAL, 2016b.
- 46 Chapoto et al., 2015.
- 47 Sitko, 2008.
- 48 Chapoto et al., 2015.
- 49 Kuteya et al., 2016.
- 50 Seidenfeld, 2014.
- 51 CSO-SUN, 2017.
- 52 Chapoto and Chisanga, 2016.
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- 54 CSO-SUN, 2016.
- 55 CSO-SUN, 2017.
- 56 Subandoro, 2014.
- 57 Munyaka et al., 2015.
- 58 Qaim et al., 2016.
- 59 Herforth and Harris, 2014.
- 60 Johnston et al., 2015.
- 61 Aberman, et al., 2015.
- 62 Gelli et al., 2015.
- 63 IFPRI, 2015.
- 64 Alston, 2010.
- 65 CSO-SUN, 2017.
- 66 Harris et al., 2016.
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- 68 Siliya, 2017.

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