



RURAL DEVELOPMENT FOR A BETTER WORLD



Addressing ACP nutrition security

The key role of Agriculture

This Reader was prepared by

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Addressing ACP nutrition security: the key role of Agriculture

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INTERNATIONAL FOOD POLICY
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sustainable solutions for ending hunger and poverty

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1. Introduction

Food security is not only about the quantity of food which we consume, it is also about its quality and diversity. While food insecurity has been high on the political agenda since the food-price crisis of 2008, the issue of nutrition insecurity, which affects one billion people's health, has received less attention.

Malnutrition is an abnormal physiological condition caused by deficiencies, excesses or imbalances in energy, protein and/or other nutrients. *Undernutrition* often called "hidden hunger" is when the body contains lower than normal amounts of one or more nutrients, i.e. deficiencies in macronutrients and/or micronutrients). *Macronutrients* are nutrients that the body uses in relatively large amounts - proteins, carbohydrates, and fats. This is as opposed to *micronutrients*, which the body requires in smaller amounts, such as vitamins and minerals. Macronutrients provide calories to the body as well as performing other functions.

Malnutrition is either directly or indirectly responsible for approximately half of all deaths worldwide.² Poor nutrition and calorie deficiencies cause nearly one in three people to die prematurely or have disabilities (WHO). Each year about 10.9 million children younger than age five in developing countries die, and 60 percent of these deaths result from malnutrition and hunger-related diseases (WFP 2010). Moreover, millions of people suffer from serious vitamin and mineral deficiencies. Hunger and malnutrition have effects that last throughout the life cycle, with poorly

nourished children growing up to be less healthy and productive than they could be. Girls who do not get the nutrition they need become undernourished women who then give birth to the next generation of undernourished children.

While some people are getting too little food, others are getting too much of the wrong food. Diets centered on cheap, calorie-dense, nutrient-poor foods (including both "fast foods" and nutrient-poor staples) are deepening the emerging epidemic of obesity and chronic diseases in countries undergoing economic and nutrition transitions. Overweight affects more than 1 billion people globally, and obesity affects at least 300 million.

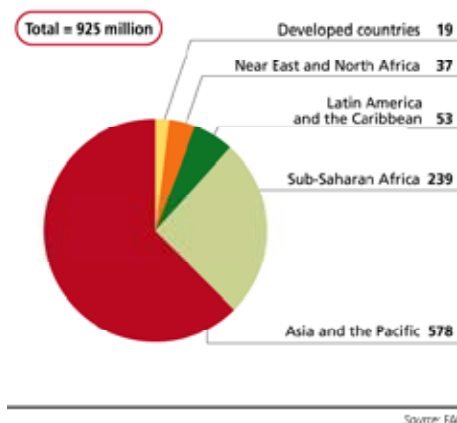
Agriculture plays a central role in improving food availability and quality, increasing incomes, supporting livelihoods and contributing to the overall economy³ and is thus a key factor in efforts to improve food and nutrition security⁴. Development of the agricultural sector is especially crucial to alleviating poverty in developing countries, where a large proportion of gross domestic product is generated within the primary sector by smallholders. Promoting and improving food-based systems not only ensures sustainable food and nutrition security, but improves diets combating micronutrient deficiencies. However, given the complex nature and the different causes of this phenomenon, interventions targeting the agricultural sector cannot alone tackle efficiently this problem. Given the multi-sectoral nature of

malnutrition, improving nutrition requires an integrated response from the relevant development sectors.

Bringing agriculture to bear on improving nutrition and health will require government leadership at all levels – from national to local. Policy-makers need to understand the complexity of factors contributing to fight malnutrition and commit to ensure food for all and safe food for all. Professionals from agriculture, nutrition, and health sectors need to engage together and to explain to a wider public the interactions and interdependency amongst those areas. Civil society, farmers and consumers groups need to strengthen their advocacy efforts while the donor community can support capacity building at all levels.

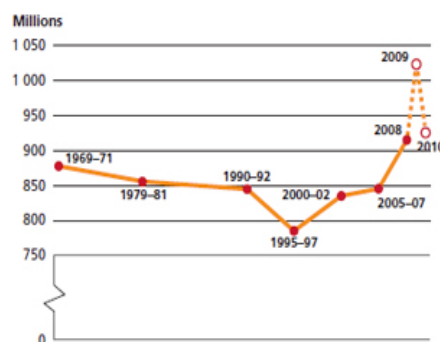
1.1. The current food and nutrition security situation

The most recent estimate, released in October 2010 by FAO⁵ says that 925 million people are undernourished. The number of hungry people has increased since 1995-97, though that number decreased during the past year. The overall increase has been due to three factors: the neglect of agriculture relevant to very poor people by governments and international agencies; the current worldwide economic crisis, and the significant increase of food prices in the last several years.



The highest prevalence of undernourishment, one in three persons, is in sub-Saharan Africa. The greatest absolute number of undernourishment is in Asia and the Pacific (578 million), followed by sub-Saharan Africa (239 million), Latin America and the Caribbean (53 million) and the Near East and North Africa (37 million)⁶. Overall, more than 2 billion people are deficient in micronutrients. Since 1990 life expectancy at birth has increased in all regions, largely as a result of

reductions in infant and child mortality. However, the gain in life expectancy has not been even, with Africa making the least progress. About 80% of the world's stunted children live in 20 countries. These are mostly in sub-Saharan Africa and South Asia.



Source: FAO, 2010 <http://www.fao.org/publications/sofi/en/>

Over half a million women die each year due to complications during pregnancy and birth. The vast majority of these deaths are preventable. Many believe that nutrition is a crucial element to prevent some causes⁷. But children are the most visible victims of undernutrition. In 2010, some 115 million children worldwide were underweight and 186 million children under five years of age were stunted⁸. Chronic undernutrition affects one in three children in developing countries. Undernutrition reduces GDP by at least 2-3%⁹.

Poor nutrition plays a role in at least half of the 10.9 million child deaths each year – five million deaths and undernutrition magnifies the effect of every disease. The estimated proportions of deaths in which undernutrition is an underlying cause are roughly similar for diarrhea (61%),

malaria (57%), pneumonia (52%), and measles (45%)¹⁰. Malnutrition can also be caused by diseases, such as the diseases that cause diarrhea, by reducing the body's ability to convert food into usable nutrients.

Undernutrition affects both the body's immunological and non-immunological defenses. As a result, it increases the incidence, severity, and duration of common childhood diseases, such as diarrhea, acute respiratory infections, and measles. The WHO Global Burden of Disease report ranks iron deficiency anemia as second among leading causes of disability. The most common cause of preventable mental retardation and brain damage, iodine deficiency takes a profound toll on health and productivity in affected countries. Likewise, poor diet quality plays a major role in the development of chronic diseases. Evidence is emerging that the added wrinkle that malnutrition suffered in the womb may lead to a predisposition to hypertension, coronary heart disease, and diabetes later in life¹¹.

1.2. Investing in nutrition is critical to achieve the MDGs

The first MDG calls for the eradication of extreme poverty and hunger by 2015. One of the indicators used to assess progress is the prevalence of children less than 5 years old who are underweight for their age. A second indicator is the prevalence of hunger in a population, that is, the proportion of the population whose dietary intake is below the minimum dietary energy requirement. High levels of undernourishment and subsequent



coping mechanisms have negative implications for both these indicators.

According to FAO¹² over the past 20 years, 22 countries have made encouraging progress on reducing undernourishment, and are likely to meet or exceed the hunger target for MDG 1 by 2015. Most of these countries are in East Asia and Latin America.¹³

In Africa some countries have made progress, with Ghana, Mozambique, Namibia and Nigeria all likely to achieve the hunger target in terms of undernourishment but not necessarily in terms of underweight.

Table 3, How investing in nutrition is critical to achieving the MDGs

Goal	Nutrition effect
Goal 1 Eradicate extreme poverty and hunger.	Malnutrition erodes human capital through irreversible and intergenerational effects on cognitive and physical development.
Goal 2 Achieve universal primary education.	Malnutrition affects the chances that a child will go to school, stay in school and perform well.
Goal 3 Promote gender equality and empower women.	Antifemale biases in access to food, health, and care resources may result in malnutrition, possibly reducing women's access to assets. Addressing malnutrition empowers women more than men.
Goal 4 Reduce child mortality.	Malnutrition is directly or indirectly associated with most child deaths and it is the main contributor to the burden of disease in the developing world.
Goal 5 Improve maternal health:	Maternal health is compromised by malnutrition, which is associated with most major risk factors for maternal mortality. Maternal stunting and iron and iodine deficiencies particularly pose serious problems.
Goal 6 Combat HIV/AIDS, malaria, and other diseases	Malnutrition may increase risk of HIV transmission, compromise antiretroviral therapy, and hasten the onset of full-blown AIDS and premature death. It increases the chances of tuberculosis infection, resulting in disease, and it also reduces malarial survival rates.

Source: Adapted from Gillespie and Haddad (2003)

However, challenges remain. Eighteen countries, mostly in Africa, have levels of hunger that are worse than they were in 1990.¹⁴ The percentage of undernourished people in the world began to increase in 2004 and total absolute numbers for undernourishment have been increasing slowly but steadily for over a decade¹⁵. As good nutrition is key to good health, cognitive development and productivity, slow progress on MDG 1 jeopardizes the achievement of the other MDGs. Better nutrition improves intellectual capacity and an adult's ability to access other types of assets that are essential for increases in labor productivity.

An adult who is more productive has a larger set of available livelihood options and can better cope with external shocks such as disease, unemployment, or natural disaster.¹⁶ A reduction in income poverty can lead to a reduction in malnutrition as greater incomes at the household level means that families can invest more in food consumption, access to clean water and good hygiene, effective healthcare, child care and investments in education..

1.3. Understanding the linkages between agriculture and nutrition

Agriculture plays a central role in increasing food availability and incomes, supporting livelihoods and contributing to the overall economy¹⁷ and is thus a key factor in efforts to improve food and nutrition security¹⁸. Agriculture is the primary source

of food to meet people's need for energy and essential nutrients.¹⁹

To get access to this food, people can produce it themselves or buy it. The agricultural system may help increase people's access to food by allowing them to produce more food, lowering food prices, raising farmers' incomes, and raising incomes among other rural people who benefit from a more prosperous agricultural sector. By improving their access to food, agriculture thus has the potential to greatly improve people's nutrition and health. At the same time, some agricultural conditions and practices can lead to disease and poor health for both farmers and consumers. Manual work in agriculture is physically demanding and as such, it may directly damage health: for example, the physical toll exacted by long hours spent tilling soil or bending over to transplant rice, places on the body.²⁰ Second, agricultural work exposes individuals to harmful pathogens such as those found in water-borne diseases or from zoonotic sources. Third, where agricultural production involves the use of chemical pesticides, exposure to these can be a threat to health.

How the links between agriculture and nutrition work on a local, national, and global scale depends partly on the physical, social, legal, economic, and governance settings in which they take place. They also depend on a household's resources of time, money, land and other assets, education, health, and nutrition. Anything that affects agriculture has the potential to affect nutrition, and anything that affects

nutrition has the potential to affect agriculture—for good or ill.²¹

Development of the agricultural sector is especially crucial to alleviating poverty in developing countries, where a large proportion of gross domestic product is generated within the primary sector by smallholders. Economic growth, which many assume naturally has a positive impact on nutritional status through increased incomes and food expenditures, has not translated into improved nutrition in a number of developing countries.²² For example, despite India's impressive economic growth in recent years—with gross domestic product (GD P) growing at an annual rate of about 7–10 percent—it is still home to approximately 42 percent of the world's undernourished children. The disconnect between growth and reduced undernutrition is often referred to as the “Asian enigma”.²³ The case of Tanzania studies by Karl Pauw²⁴ shows that growth performance has led to neither substantial reductions in poverty nor improvements in household's nutritional status. This has raised concerns about a possible decoupling of economic growth, poverty, and nutrition. Another cross-country study has shown that while nutrition-sensitive economic growth may well be a necessary condition for sustained reductions in malnutrition in low income countries, economic growth is not a sufficient condition for nutritional improvements.²⁵

A number of studies have found that growth originating from agriculture is often more effective at reducing poverty than growth in other sectors,



such as industry and services (Christiaensen, Demery, and Kühl 2006; de Janvry and Sadoulet 2009; Ravallion, Chen, and Sangraula 2007; Nin Pratt and Diao 2008).²⁶ Growth in the agricultural sector promotes overall economic development mainly through backward and forward links in production and consumption between agriculture and the rest of the economy. Furthermore, the poor participate more in growth from the agricultural sector, not only because of the continued rural nature of poverty—with approximately three-quarters of the developing world's poor living in rural areas (Ravallion, Chen, and Sangraula 2007)—but also because the sector typically accounts for a large share of the poor's income, expenditures, and employment in many developing countries. Outside of India, agricultural growth appears to lead to larger reductions in stunting than nonagricultural growth, although the impact of agricultural growth is conditional upon the size of the sector.²⁷

Ways in which agriculture can sustainably contribute to improving dietary diversity and nutrition outcomes include support for agricultural extension services that offer communities information and improved inputs; integrated agro-forestry systems that reduce deforestation and promote harvesting of nutrient-rich forest products; aquaculture and small livestock ventures that include indigenous as well as farmed species; education and social marketing strategies that strengthen local food systems and promote cultivation and consumption of local micronutrient rich foods;

biofortification via research and development programmes that breed plants and livestock selectively to enhance nutritional quality; and reduction of post-harvest losses via improved handling, preservation, storage, preparation and processing techniques²⁸. Growth strategies should be designed with a nutritional lens and take into account what type of sector and subsectoral practices and policies can enhance nutrition. Agriculture growth strategies, for example, could contribute to increasing demand for and access to nutritious foods along the entire value chain. Value-chain approaches are already used in international development with the objective of enhancing the livelihoods of food producers but they rarely consider diet quality and nutrition.²⁹ Nutrition-sensitive value chains can be built through various interventions, including consumer knowledge and awareness campaigns that increase demand for nutrient-rich foods and new tools that improve the nutritional value of foods along the value chain.³⁰ Poor farmers will benefit if placed in a position where they can appropriate a greater amount of the returns accruing from the chain, particularly in light in the differentiation strategies pursued by global agribusiness (KIT 2010). Recent work has begun to identify how such value-chain approaches could be improved with regard to their consideration of gender, the environment, and some of the non-income dimensions of poverty (e.g., lack of access to public services). For example, with the aim of supporting value-chain approaches that work better for women, Gammage (2009) developed a gender-sensitive form of value chain analysis that identifies how many men and women are

involved in the different activities in the chain and how the different marketing activities are targeted to different genders.³¹

Improving production practices for nutrition security

Improving the capacity of smallholder production systems should be a priority in many developing countries as domestic food production occurs predominately through small-scale farming. Changes in agricultural production can result in the introduction of new foods into diets. At the farm level, the introduction of new crops as a result of innovations in crop breeding (biofortified foods being an excellent example) has the potential to improve both health and nutrition.³²

Homestead food production is still an underutilized strategy. Evidence indicates that even small-scale homestead production of micronutrient-rich foods, when combined with nutrition education, can have impact greater than its income effects. Homestead production systems offer the potential to improve nutrition for periurban and agricultural laborer households, as well as small farmers.³³

At the policy level, provision of livelihood support, creation of social safety-nets and an explicit focus on maternal and child health are essential to improving the food and nutrition security. Making improved nutrition outcomes central to national development, protecting and expanding smallholder rights, increasing incentives to produce and market micronutrient-rich foods, prioritizing the needs of poor net

consumers, and mainstreaming food and nutrition security concerns into policy frameworks and development agendas increase programme efficacy as well as chances for scaling-up.³⁴

At the same time, it should be noted that production practices can lead to increased marginalization of smallholders who are unable to acquire the technology or economies of scale to compete on global markets. In its 2009 report, the International Assessment of Agricultural Knowledge, Science and Technology for Development (IAASTD) took stock of the state of global agriculture and concluded that improving access of the rural low-income groups, namely landless labourers and smallholders, to food, land, water, seeds and improved technologies was essential to ensuring sustainable food security. The report also found that investments in agricultural knowledge, science and technology were needed to maintain productivity in ways that protect the natural resource base and ecological provisioning of agricultural systems. These conclusions both point towards the need for increased investment in small-scale agriculture, small-scale irrigation, food processing and other strategies that empower poor subsistence farmers and encourage environmental stewardship. Sustainable agriculture is important not only for ensuring the economic welfare of smallholder and other vulnerable groups; it is also linked to improving dietary diversity and nutrition outcomes.

Women's status in nutrition and food security

Women are key players in food systems. In Sub-Saharan Africa women produce up to 70 percent of the food that their households consume and sell³⁵. The link between health and productivity is particularly important for women due to their role in food production, food preparation, and child care. Yet women farmers face a series of constraints that limit their potential as agricultural producers and their control of the resources. The constraints they face include weak land rights, limited access resources, lack of equipment and appropriate technology, limited contact with agricultural extension, lack of access to credit, and lower levels of education.³⁶ All of these constraints substantially lower the productivity of women farmers affecting the entire households.

A number of studies have found that children's nutrition is higher when women have more control over household resources. For example, evidence³⁷ clearly shows that women's higher status – as measured by women's relative decision-making power and the degree of equality between women and men—is a significant and positive determinant of children's nutritional status. In many parts of the world, women are more likely to spend the income they control on food, healthcare, and education of their children.³⁸ Increasing household income does not necessarily improve the nutritional and health status of women and children when that income is controlled by men. Empirical evidence shows that increasing

women's control over land, physical assets, and financial assets serves to raise agricultural productivity, improve child health and nutrition, and increase expenditures on education, contributing to overall poverty reduction. Furthermore, households in which women have more resources often spend more on household and child nutrition—improving diet quantity and quality—than male-dominated households³⁹.

Another example shows that, holding income constant, members of female-headed households in Rwanda and The Gambia consumed 377 and 322 more calories daily (per adult equivalent), respectively, than those of male-headed households⁴⁰. Evidence from Brazil shows that the effect of women's income on nutrition is four to eight times that of men's income⁴¹. Studies in Côte d'Ivoire and Ethiopia found that women's income and assets brought into marriage, respectively, have a positive effect on food expenditures, whereas men's income increased expenditures on clothing, alcohol, and cigarettes⁴². In fact, low-income, female-headed households often exhibit better nutrition than higher-income male-headed households⁴³. However, while agricultural growth that benefits women can lead to improved household and child nutritional status through higher incomes among women, it can also have a negative impact on nutrition by changing time and labor allocation patterns, reducing women's time for childcare and the quality of food provided by the mother.



2. Current agriculture, food and nutrition challenges

2.1. Factors affecting food and nutrition security

HIV/AIDS and the Importance of Adequate Food

HIV/AIDS has an increasing impact on a nutritional needs, and the risk of malnutrition increases greatly during its development⁴⁴. The disease causes an energy and macronutrient deficit and malnutrition, in turn, accelerates the disease's development⁴⁵. The frequency of opportunistic infections, of which tuberculosis is the most common, the subsequent reduced food intake and further weakening of the immune system significantly reduce the period before full AIDS develops. Reduced food intake also reduces the intake of vitamins or micronutrients.

Providing medicines is not enough – adequate food and nutrition are essential elements of treatment: recent reports show that in health programmes medicines are of little or no use without adequate food and nutrition, especially that there is still far from universal access to antiretroviral treatment, therefore adequate food becomes even more important.⁴⁶

Demographic challenges

Population growth affects food and nutrition security. The current world population of close to 7 billion is projected to reach 10.1 billion in the next ninety years, reaching 9.3 billion by the middle of this century⁴⁷. Whereas the populations of both the low-fertility countries and the intermediate-fertility countries are

projected to peak before the end of the century (reaching a maximum around 2030 at 3.1 billion) that of the high-fertility countries would continue to increase during the whole period (reaching a peak around 2065 at 3.8 billion)⁴⁸. These high rates of population growth increase the probability of food deficits, especially for countries where yield gaps are wide and/or where food imports constitute a considerable proportion of domestic food supply. This is of particular concern in sub-Saharan Africa, which has the lowest yields in the world, one third of the global average, and where 90% of production growth over the past 20 years has been the result of expansion of the area cultivated⁴⁹.

In 2009, the proportion of the global population living in urban areas surpassed those living in rural areas. Projections indicate that by 2050 the majority of the global population (just over 5 billion people) will be living in the urban areas of countries that are currently considered developing, with a third of the global population living in rural areas⁵⁰. Rising incomes and rapid urbanization, particularly in Asia, are creating changes in the composition of global food demand.⁵¹ Volatile food prices and rising unemployment exacerbate the problem. For many urban populations facing food insecurity, an important source of food is urban and periurban agriculture. While urban and periurban agriculture has great potential to increase both total energy and nutrient intake, there are also major health hazards associated with its practice⁵². These include contamination of crops from air

pollution and industrial effluents, and the risk of infectious diseases posed both by keeping livestock and by using biological wastes as fertilizers.

Rural Infrastructure

Research shows close links between investment in infrastructure –including roads, water, sanitation, and electricity– with growth in agricultural productivity and poverty reduction. Infrastructure is positively related to better health and nutrition through a variety of channels⁵³. Infrastructure can promote income growth by raising agricultural productivity, lowering production and transaction costs, and facilitating increased access to, availability of, and consumption of food among larger segments of the population. Rural transport, for instance, is important for the livelihoods of the rural poor, with inefficient transport systems hampering development in rural areas, both by raising the costs and effectiveness of inputs in the production process and by delaying the sale of harvested crops. Recent evidence from India shows that the impact of income growth on malnutrition is substantially smaller when infrastructure is incorporated, implying that a fair share of what has been attributed to the impact of income growth on nutrition is actually due to investments in infrastructure.⁵⁴ Infrastructure also improves access to more and better health, water, and sanitation services. The provision of infrastructure—including safe drinking water, health facilities, and sanitation—in developing countries such as India, Peru, and Sudan has been shown to reduce the incidence of stunting and underweight⁵⁵. Evidence shows that improved sanitation is a statistically

significant determinant of child undernutrition⁵⁶.

The impact of volatile food prices on poverty and malnutrition

A few years after the 2007–08 food crisis, the prices of basic food items are again rising rapidly, fueling new concerns about the food security of poor people.⁵⁷ The international prices of maize and wheat have almost doubled between June 2010 and mid-March 2011, and the global prices of dairy products have also risen. High food inflation is affecting many developing countries, including those home to large numbers of poor people. For example, food inflation rose to 10 percent in China and 18 percent in India between December 2009 and December 2010, mostly driven by higher prices of meat, fish, eggs, dairy, vegetables, and fruits. The increase in food prices has led to a deepening of poverty for many of the 1.2 billion people who were already living below the extreme poverty line of \$1.25 a day, and who spend a large share of their incomes on food⁵⁸. The increase in food prices since mid-June 2010 has led to an estimated 44 million net addition to the number of the global poor⁵⁹. At the regional level, there are context-specific measures of poverty changes.

People living in developing countries have a lower ability to cope with such shocks and resort to eating less and consuming poorer diets, which can have long-term nutritional consequences. For instance, at the height of the 2008 crisis, poor families most frequently responded to higher food prices by replacing animal-source foods, fruits, vegetables and other micronutrient-

rich foods with cheaper high carbohydrate staples. When families are forced to reduce meal frequency and total quantity of food consumed, risk increases further⁶⁰.

The Climate change impact on nutrition

Climate change is threatening the lives and livelihoods of these communities, eroding their resilience and undermining opportunities for sustainable development. Each year natural disasters affect the lives and livelihoods of more than 250 million people worldwide, and this number could rise up to 375 million a year by 2015.⁶¹ Undernutrition has not received the attention it merits, considering that determinants of undernutrition, which relate to food, health, sanitation, water and care practices, are directly affected by climate change. The IPCC⁶² notes that undernutrition linked to extreme climatic events may be one of the most important consequences of climate change. Seasonality represents an important source of stress in the lives and livelihoods of poor rural communities⁶³ and lead to more livelihood insecurity, seasonal hunger and undernutrition. Climate change induces various types of stresses on livelihoods, resulting in less food being produced or less money to buy food, and the loss of local biodiversity which provides essential food and medicine. Significantly negative impacts of climate change on food security could occur as early as 2030 for several crops and regions, with the most severe effects projected for South Asia and Southern Africa⁶⁴. The frequency and severity of production shortfalls are projected to increase due to climate change, thereby

increasing food prices even further⁶⁵. The world's poorest people will bear the brunt of the effects of climate change, especially if the world follows a path of low income growth and high population growth.⁶⁶

Safe and reliable access to clean water and good sanitary conditions are essential for good nutrition. Water resources are predicted to be strongly impacted by climate change and hundreds of millions of people risk being exposed to a growing scarcity of water⁶⁷. By 2025, 1.8 billion people will live in countries or regions suffering from a shortage of water⁶⁸. Climate change-related alterations in rainfall, surface water availability and water quality will impact on the incidence of water-related diseases⁶⁹.

2.2. Changing diets and food consumption trends

Diets evolve over time, being influenced by income, prices, individual preferences and beliefs, cultural traditions, as well as geographical, environmental, and social factors. Income growth and rapid urbanization in developing countries is driving strong growth in per capita and total meat consumption, leading to strong growth in the feed consumption of cereals, particularly maize. At the same time, growth in per capita meat and cereal consumption in developed countries has slowed dramatically as these countries have reached very high levels of meat consumption in the past decades. Food consumption growth largely determines the pace at which supply growth has to also evolve to keep up with the



domestic and export demand for agricultural goods. Little research has been conducted on the impact of changing consumption patterns over time on the future outlook of the world agricultural economy, and the implications of these consumption changes on nutrition and food security⁷⁰.

Trends in the availability of dietary energy

Food consumption expressed in kilocalories (kcal) per capita per day is a key variable used for measuring and evaluating the evolution of the global and regional food situation. Recent analysis shows that dietary energy measured in kcals per capita per day has been steadily increasing on a worldwide basis; availability of calories per capita from the mid-1960s to the late 1990s increased globally by approximately 450 kcal per capita per day and by over 600 kcal per capita per day in developing countries.

This change has not, however, been equal across regions. The per capita supply of calories has remained almost stagnant in sub-Saharan Africa and has recently fallen in the countries in economic transition. In contrast, the per capita supply of energy has risen dramatically in East Asia and in the Near East/North Africa region (by over 700 kcal per capita per day). Globally, the share of dietary energy supplied by cereals appears to have remained relatively stable over time, representing about 50% of dietary energy supply. Recently, however, subtle changes appear to be taking place. A closer analysis of the dietary energy intake shows a decrease in developing countries, where the share of energy

derived from cereals has fallen from 60% to 54% in a period of only 10 years. Much of this downwards trend is attributable to cereals, particularly wheat and rice, becoming less preferred foods in middle-income countries such as Brazil and China, a pattern likely to continue over the next 30 years or so.⁷¹

Trends in the availability and consumption of animal products

There has been an increasing pressure on the livestock sector to meet the growing demand for high-value animal protein. The world's livestock sector is growing at an unprecedented rate and the driving force behind this enormous surge is a combination of population growth, rising incomes and urbanization. Annual meat production is projected to increase from 218 million tonnes in 1997--1999 to 376 million tonnes by 2030. Urbanization is a major driving force influencing global demand for livestock products.

Compared with the less diversified diets of the rural communities, city dwellers have a varied diet rich in animal proteins and fats, and characterized by higher consumption of meat, poultry, milk and other dairy products. As diets become richer and more diverse, the high-value protein that the livestock sector offers improves the nutrition of the vast majority of the world. Livestock products not only provide high-value protein but are also important sources of a wide range of essential micronutrients, in particular minerals such as iron and zinc, and vitamins such as vitamin A. For the large majority of people in the world, livestock products remain a desired food for nutritional value and taste.

Excessive consumption of animal products in some countries however, lead to excessive intakes of fat.⁷²

Trends in the availability and consumption of fish

The total food fish supply and hence consumption has been growing at a rate of 3.6% per year since 1961, while the world's population has been expanding at 1.8% per year. The proteins derived from fish, crustaceans and molluscs account for between 13.8% and 16.5% of the animal protein intake of the human population. The per capita availability of fish and fishery products has therefore nearly doubled in 40 years, outpacing population growth. As well as income-related variations, the role of fish in nutrition shows marked continental, regional and national differences. In industrialized countries, where diets generally contain a more diversified range of animal proteins, a rise in per capita provision from 19.7 kg to 27.7 kg seems to have occurred. This represents a growth rate close to 1% per year. In this group of countries, fish contributed an increasing share of total protein intake until 1989 (accounting for between 6.5% and 8.5%), but since then its importance has gradually declined and, in 1997, its percentage contribution was back to the level prevailing in the mid-1980s. In the early 1960s, per capita fish supply in low-income food-deficit countries was, on average, only 30% of that of the richest countries. This gap has been gradually reduced, such that in 1997, average fish consumption in these countries was 70% of that of the more affluent economies. Despite the relatively low consumption by weight in low-income food-deficit countries, the contribution of fish to total animal protein intake is

considerable (nearly 20%). Over the past four decades, however, the share of fish proteins in animal proteins has declined slightly, because of faster growth in the consumption of other animal products.⁷³

Trends in the availability and consumption of fruits and vegetables

Consumption of fruits and vegetables plays a vital role in providing a diversified and nutritious diet. A low consumption in many regions of the developing world is, however, a persistent phenomenon, confirmed by the findings of food consumption surveys. At present, only a small and negligible minority of the world's population consumes the generally recommended high average intake of fruits and vegetables. Global trends in the production and supply of vegetables indicate that the current production and consumption vary widely among regions. In 2000, the global annual average per capita vegetable supply was 102 kg, with the highest level in Asia (116 kg), and the lowest levels in South America (48 kg) and Africa (52 kg).

Nutrition transition and the double burden of malnutrition

Trends in undernourishment are complicated by the nutrition transition in many developing countries⁷⁴ characterized by a shift away from diets based on staples, legumes, and fruits and vegetables, and towards more globalized intake patterns that include increased quantities of animal source foods, sugars, fats. Nutrition transition is also associated with increased intake of processed, calorie-dense, nutrient-poor foods.⁷⁵ At household level, rising incomes, increased female labour force participation,

increased exposure to mass media, and increasingly sedentary work patterns encourage consumption of convenient processed foods, which are easy to prepare and to consume⁷⁶. Such diets may be inadequate in micronutrients but high in sodium, sugar and saturated or trans fat, excessive amounts of which are associated with increased risk of non-communicable diseases⁷⁷

Conditions such as obesity that have traditionally been associated with cultures of plenty are increasing in developing countries. For the first time in history, the number of overweight people rivals the number of underweight worldwide. In Colombia, 41 percent of the population is overweight; in Brazil, 36 percent. In China, the share of overweight adults jumped by more than half between 1989 and 1992. In Namibia, 21 percent of women are overweight; in Zimbabwe, more than 23 percent. Although often considered a symbol of wealth and abundance, obesity is usually a sign of poor nutrition. As populations move from rural to urban environments, diets change and lifestyles become more sedentary. Diets of legumes, grains and roots give way to those higher in fat and sugar. This leads to obesity, and with it increased risk of heart disease, hypertension, stroke, diabetes and certain cancers.

The best approach to finding positive synergies between agriculture and nutrition may depend on a country's position in the dietary transition— from a diet low in both calories and micronutrients (Stage One) to a diet that provides adequate basic energy for most people but an inadequate balance of nutrients (Stage Two)

to an affluent diet that begins to provide excessive calorie energy (Stage Three). As societies move through this dietary transition, the relative importance of government and the most important functions of government will change.⁷⁸



3. Linking nutrition with agriculture and benefiting from agricultural research

3.1. Technology and innovation

The growth of agricultural technology has been impressive during the past 25 years. Developments that carry particularly important implications for food availability and patterns of food demand and consumption are plant breeding—focused mainly on increasing yield and productivity, but more recently on increasing crop nutrient content—and technologies related to food processing and marketing⁷⁹.

Agricultural technology has long focused on plant breeding and varietal improvements designed to raise productivity and yields. In the past 50 years, technological change has led to spectacular outcomes, such as the Green Revolution in wheat and rice and the broad acceptance of single-cross hybrids in maize⁸⁰.

Technology and the introduction of new food products

Agricultural technologies can affect the nutritional properties of foods by increasing micronutrient content.

There is growing interest in the role agriculture should play in improving nutrition, in particular by paying more attention to the nutritional quality of food. The Copenhagen Consensus has ranked vitamin A and zinc supplements for children and fortification of food with iron and iodine as numbers one and three, respectively, in its solutions to the most important human challenges.

Improve Nutrition through Biofortification

Food fortification refers to the addition of micronutrients to processed foods. In many situations, this can lead to relatively rapid improvements in the micronutrient status of a population, and at a very reasonable cost. However, an obvious requirement is that the fortified food(s) needs to be consumed in adequate amounts by a large proportion of the target individuals in a population.

Biofortification is a scientific method for improving the nutritional value of foods already consumed by those suffering from hidden hunger. Scientists first breed crops whose edible portions (seed, tuber, or roots, for example) have improved nutritional value. Malnourished communities receive these biofortified crops to grow and eat. When consumed regularly, biofortified foods can contribute to body stores of micronutrients throughout the life cycle. This strategy should contribute to the overall reduction of micronutrient deficiencies in a population, but it is not expected to treat micronutrient deficiencies or eliminate them in all population groups.

Advantages and Limitations of Biofortification

Dietary diversity is the ultimate long-term solution to minimizing hidden hunger. This will require substantial increases in income for the poor so they are able to afford more nutritious non staple foods such as vegetables, fruits, and animal products. Biofortification can be effective in reducing hidden hunger as part of a strategy that

includes dietary diversification and other interventions such as supplementation and commercial fortification. Biofortification has advantages when applied in the context of the poor in developing countries. It targets the poor who eat large amounts of food staples daily and it targets rural areas where it is estimated that 75 percent of the poor live mostly as subsistence or smallholder farmers, or landless laborers. These populations rely largely on cheaper and more widely available staple foods such as rice or maize for sustenance. Despite urbanization and income growth associated with globalization, diets of the rural poor will continue to be heavily based on staple foods like cereals and tuber crops in many regions⁸¹. Expected increases in food prices, exacerbated by climate change, are likely to increase this reliance on staple foods.

Ex ante research that examined the cost effectiveness of a variety of staple crops biofortified with provitamin A, iron, and zinc in 12 countries in Africa, Asia, and Latin America found that biofortification could be highly cost-effective, especially in Asia and Africa⁸². This strategy relies on foods people already eat habitually, it is sustainable. Seeds, roots, and tubers can usually be saved by farmers and shared with others in their communities. Once the high-nutrition trait is bred into the crops, it is fixed, and the biofortified crops can be grown to deliver better nutrition year after year—without recurring costs.

Promising as it is, biofortification faces limitations and challenges⁸³. First, biofortification requires a

paradigm shift. Agricultural scientists need to add nutrition objectives to their breeding programs, in addition to standard goals such as productivity and disease resistance. Biofortification will be widely adopted only when proponents show these new foods improve nutrition.

Most biofortified crops are still in the development. However, one biofortified staple food crop that has been successfully released is the orange (or orange-fleshed) sweet potato⁸⁴. The amounts of nutrients that can be bred into these crops are generally much lower than can be provided through fortification and supplementation. However, by providing 30–50 percent of the daily nutrient requirement, biofortified crops can significantly improve public health in countries where hidden hunger is widespread.

Supplementation

Supplementation is the term used to describe the provision of relatively large doses of micronutrients, usually in the form of pills, capsules or syrups. It has the advantage of being capable of supplying an optimal amount of a specific nutrient or nutrients, in a highly absorbable form, and is often the fastest way to control deficiency in individuals or population groups that have been identified as being deficient. In developing countries, supplementation programmes have been widely used to provide iron and folic acid to pregnant women, and vitamin A to infants, children under 5 years of age and postpartum women. Because a single high-dose vitamin A supplement improves vitamin A stores for about 4–6 months, supplementation two or three times a year is usually adequate.

However, in the case of the more water-soluble vitamins and minerals, supplements need to be consumed more frequently. Supplementation usually requires the procurement and purchase of micronutrients in a relatively expensive pre-packaged form, an effective distribution system and a high degree of consumer compliance (especially if supplements need to be consumed on a long-term basis). A lack of supplies and poor compliance are consistently reported by many supplementation programme managers as being the main barriers to success.⁸⁵

Five key products used by WFP to improve beneficiaries' nutritional intake:⁸⁶

Fortified Blended Foods (FBFs): are blends of partially precooked and milled cereals, soya, beans, pulses fortified with micronutrients (vitamins and minerals). Special formulations may contain vegetable oil or milk powder. Corn Soya Blend (CSB) is the main blended food distributed by WFP but Wheat Soya Blend (WSB) is also sometimes used. FBFs are designed to provide protein supplements.

Ready-to-Use Foods (RUFs): RUFs are better suited to meet the nutritional needs of young and moderate malnourished children than FBFs. RUFs distributed by WFP may contain vegetable fat, dry skimmed milk, malt dextrin, sugar and whey. They are used mostly in emergency operations or at the beginning of a WFP intervention for prevention or treatment of moderate malnutrition. RUFs are to be used in addition to breast milk and other food for children (6 to 59 months) which are

at high risk of developing malnutrition due to severe food insecurity.

High Energy Biscuits (HEBs): They are wheat-based biscuits which provide 450kcal with a minimum of 10 grams and max of 15 grams of protein per 100 grams, fortified in vitamin and minerals. They are used in the first days of emergency when cooking facilities are scarce. Easy to distribute and provide a quick solution to improve the level of nutrition.

Micronutrient Powder or "Sprinkles":

It is a tasteless powder containing the recommended daily intake of 16 vitamins and mineral for one person. It can be sprinkled onto home-prepared food after cooking just before eating. It is useful when fortification of cereal flour cannot be implemented or when it is inadequate for specific groups.

Compressed food bars: Bars of compressed food, composed of baked wheat flour, vegetable fat, sugars, soya protein concentrate and malt extract. They are used in disaster relief operation when local food can't be distributed or prepared.

Increasing the diversity of foods consumed

Increasing dietary diversity means increasing both the quantity and the range of micronutrient-rich foods consumed. In practice, this requires the implementation of programmes that improve the availability and consumption of, and access to, different types of micronutrient-rich foods (such as animal products, fruits and vegetables) in adequate quantities, especially among those



who at risk for, or vulnerable to, micronutrient malnutrition. In poorer communities, attention also needs to be paid to ensuring that dietary intakes of oils and fats are adequate for enhancing the absorption of the limited supplies of micronutrients.

Increasing dietary diversity is the preferred way of improving the nutrition of a population because it has the potential to improve the intake of many food constituents – not just micronutrients – simultaneously. Ongoing research suggests that micronutrient-rich foods also provide a range of antioxidants and probiotic substances that are important for protection against selected non communicable diseases and for enhancing immune function. However, as a strategy for combating micronutrient malnutrition, increasing dietary diversity is not without its limitations, the main one being the need for behaviour change and for education about how certain foods provide essential micronutrients and other nutritive substances. A lack of resources for producing and purchasing higher quality foods can sometimes present a barrier to achieving greater dietary diversity, especially in the case of poorer populations. The importance of animal source foods for dietary quality is increasingly being recognized, and innovative approaches to increase their production and consumption in poorer regions of the world are currently being explored. Efforts are also underway to help poorer communities identify, domesticate and cultivate traditional and wild micronutrient-rich foods as a simple and affordable means of satisfying micronutrient needs.

For infants, ensuring a diet of breast milk is an effective way of preventing micronutrient deficiencies. In much of the developing world, breast milk is the main source of micronutrients during the first year of life (with the exception of iron). Exclusive breastfeeding for the first 6 months of life and continuation into the second year should thus be promoted. Moreover, all lactating women should be encouraged to consume a healthful and varied diet so that adequate levels of micronutrients are secreted in their milk. After the age of 6 months, it is important that the complementary foods provided to breast-fed infants are as diverse and as rich in micronutrients as possible.

3.2. Marketing systems and enhancing nutrition along the value chain

The past 20 years have seen substantial change in the ways that food is marketed from farm-to-plate. An important development has been the rise of domestic and international marketing systems controlled by private actors rather than state marketing mechanisms.

Limited availability, economic constraints, lack of knowledge and information, and related lack of demand for nutritious foods are critical factors that limit poor population's access to nutritious (nutrient-rich) foods⁸⁷ and to diets of adequate quality. The agricultural sector could help address inadequate access to micronutrient rich foods by contributing to income generation of at risk groups, and making nutritious foods more accessible (available

and affordable), of higher nutritional quality, and more acceptable.

There is a need to focus more on what happens from production of food, to its consumption and eventual disposal. One way of addressing these issues is through the adoption of “value chain” approaches which are already used as development strategies to enhance the livelihoods of food producers, but they have rarely been used explicitly as a tool to achieve nutritional goals, and previously were not sensitive to nutritional concerns⁸⁸.

Value-chain analysis can be used to assess why foods are or are not available in specific communities, why foods cost what they do, and how the nutrient quality of foods changes through the chain. It involves analyzing all parts of the supply chain for food, which by definition is comprised of all the processes and actors that take a food from its production on the farm—including the inputs into that production—to the fork of consumer, and to its disposal as waste, and then looking at what value and where is valued is added by different activities and actors along the chain. Once problems are identified, value chain approaches can be used to design and implement solutions to increase the availability, affordability, and quality of nutritious foods⁸⁹. Since value-chain concepts explicitly recognize that it is the coordination among the actors that enhances the ability of businesses or sectors to create value, they also encourage the type of coordinated, cross-sectoral approaches that are critically needed to address malnutrition.

It is also important to recognize, however, that there are some significant potential limitations to applying value-chain concepts to achieve nutrition goals. The focus of value chain development so far has been on “adding value” in the chain, often in ways that make products more expensive for consumers. There may be less scope to add value to products that are targeted to poor consumers. Another potential limitation is that value-chain approaches involve consumers only as end users, not as actors in the value chain, and consider “value” from an economic, rather than a nutritional, perspective. Value chains also focus on single food commodities, whereas a healthy and high-quality diet consists of a combination of different foods.

Globalization and urbanization are altering how agriculture interacts with nutrition. Earlier efforts to improve the links between agriculture and nutrition focused on production. Today agricultural markets play a more important role in determining food availability and access—a shift reinforced by the role of urbanization in increasing the ratio of market consumers to market producers. One example of this shift concerns horticultural products. Production of fruits and vegetables has increased over recent years, yet inadequate consumption remains a problem worldwide. This gap exists partly because of failures of the market supply chain, such as postharvest losses and lack of market access by small producers, which constrain access and availability. To help address micronutrient deficiencies and chronic diseases, the horticultural and health sectors

therefore need to focus not only on production, but also on leveraging and adapting aspects of the market supply chain to make fruits and vegetables more available and affordable for poor households, while also ensuring small producers’ access to markets. This challenge applies to the global supply chains linking fruit and vegetable producers in Africa and Latin America to consumers in Europe and North America, as well as to smaller local markets throughout the developing world⁹⁰.

The greater market orientation of food production and consumption has increased the bidirectional links between agriculture and nutrition: agriculture still affects nutrition, but food and nutritional demands increasingly affect agriculture. It is a twofold process. First, the increasing importance of the cash economy arising from globalization and urbanization is increasing the power of consumers in the marketplace. Second, the rise of the food-consuming industries (processors, retailers, restaurants) is subordinating the power of agricultural producers, especially smallholders. In China, for example, rising incomes, urbanization, and population growth have rapidly increased consumer demand for meat. Demand from supermarkets and restaurants is now growing even faster and includes new demands for volume and specific quality attributes. This situation affects traditional backyard producers of pork (the dominant meat), who have trouble responding to such demands, and large-scale industrial producers, whose share of pork production is rising despite associated negative environmental and health impacts. The challenge for the agricultural sector is to

respond to the increasing power of consumers and the food-consuming industries without leaving behind smaller, poorer farmers. At the same time, as diets change, the challenge for the health sector is to encourage consumers—and the food-consuming industries—to demand nutritious foods from agriculture. As past experience has shown, more income and greater market orientation is not always associated with good nutrition—a lesson reinforced by the rise of obesity and chronic diseases.

3.3. Information, education, communication and capacity-building

It is an established fact that two of the root causes of malnutrition are the limited access to foods required for an adequate diet and the limited knowledge about food and nutrition among caregivers in poor households. To be adequately nourished, individuals need to have access to sufficient and good quality food and they need an understanding of what constitutes a good diet for health, as well as the skills and motivation to make good food choices.

Capacity building in nutrition education is essential to strengthen national, provincial and local institutions’ abilities to provide simple training on basic topics related to food and nutrition in vulnerable communities. Although efforts to improve dietary diversity in several ACP regions are underway, it is difficult to implement them due to lack of trained personnel at the local level. The dearth of



qualified personnel at every level - national, district, municipal and local - is therefore possibly the biggest challenge to operationalization of nutritional strategies in ACP countries.⁹¹

Another issue is the lack of multi-sectoral and cross-disciplinary knowledge and training. In the public sector, capacity building is limited by sectoral divisions in budgeting, personnel management, programming and even terminology. To promote greater cross-sectoral action for agriculture, nutrition, and health, policy champions play an important role in advocating for this approach. Community and other decentralized efforts can provide important incentives for agriculturalists to contribute to efforts to improve health and nutrition. Communities' development needs rarely fit neatly into particular sectoral competencies, but rather require contributions from multiple sectors. Community demands for government assistance in addressing a problem thus provide an immediate incentive for cross-sectoral action.⁹²

The international community should provide nutrition information materials, technical guidelines and tools for use by nutrition professionals, trainers and educators that promotes a multi-sectoral understanding of malnutrition. Moreover, programmes should be put in place in order to train national staff in innovative nutrition education methods as well as activities aiming at building capacities for the assessment of factors that determine dietary patterns and food choices. A special emphasis should be placed on the development of

locally appropriate dietary guidance for different age and population groups as well as on the development of strategies that strengthen existing desirable practices, focusing on dietary behavioural changes and on consumption diversification in order to enable households to access a variety of healthy foods that empower individuals to feed themselves with dignity. In particular, nutrition education should promote the enrichment/enhancement of menus through improved patterns of preparation and consumption of local foods that are culturally acceptable and nutritious.⁹³

Nutrition education is key in the promotion of healthy diets. Labels that contain information about nutrition, health, and production methods allows consumers to make more informed purchases based on their concerns—be they regarding the humane treatment of animals, the number of calories, or the availability of micronutrients⁹⁴. Education about additives/preservatives and proper processing, packing, and storage procedures is also needed. The uniform and diligent implementation of food safety standards could empower consumers with the information they need to come to educated conclusions about which food types pose greater risk to their health.

Education is a proven strategy at both ends of the nutrition spectrum. In countries where undernutrition is prevalent, it is lower among the better educated; likewise for countries where overnutrition problems predominate, the better educated have less prevalence of overweight.

3.4. Building an evidence-base: Research, evaluation, case studies

In the past, agriculture and nutrition policies tend to operate in silos. However, there are a few examples of agriculture policies and programs, implemented locally and nationally by a variety of actors that specifically aimed to improve human nutrition. Compiling and learning from these program interventions, evaluation, and case studies helps to build an evidence-base for the importance of multi-sectoral programming. In addition, it provides key lessons about successes and non-successes for policy-makers, researchers, and others working directly with these issues.

Reducing Malnutrition in Malawi⁹⁵

Concern Malawi is piloting a community based programme, Positive Deviance Hearth (PD Hearth), which aims to reduce the number of malnourished children under the age of five. PD Hearth is based on the idea that solutions to community problems already exist within the community.

In conjunction with the Ministry of Health and the Ministry of Agriculture and Food Security, the PD Hearth programme was set up in Ligobwa village, Nsanje district, since a nutrition assessment revealed that there was a malnutrition rate of 47% among children under five years of age. To establish why there was such a high rate of malnutrition in the village, and find solutions to this, Concern arranged and facilitated

focus group discussions with all members of the community. It soon appeared very little education had been provided about nutrition, good hygiene practices, HIV and AIDS and the importance of monitoring the growth of their children. In order to address this, Concern staff trained members of the community to be volunteers. These volunteers are now conducting all of the practical and information sessions in the village.

One way of addressing the malnutrition problems faced by the community is to teach parents and caregivers to cook nutritious meals with locally available produce. Cooking demonstrations were held. As well as showing the community how to prepare porridge based on the main staple of maize. A porridge based on sweet potatoes has also been developed ensuring the community has the knowledge to diversify when one of the main ingredients is scarce. In addition to the cooking demonstrations, volunteers routinely carried out home visits, giving additional support in preparing nutritious meals for each family in the programme. The Village Health Committee and volunteers have been conducting monthly growth monitoring sessions, where the children in the community are weighed and measured. Parents and caregivers are now able to monitor the progress of their children and identify health or malnutrition problems earlier. This limits the amount of children developing more severe and acute health and nutrition problems.

Information sessions have been held with the community to discuss key issues such as hygiene, breastfeeding

and HIV and AIDS. These discussions have opened the door to previously ignored or feared subjects, and promoted a sense of ownership and responsibility for those living in Ligobwa. Some women in the village have devised songs which contain messages about HIV, nutrition and breastfeeding.

The prevalence of malnourished children has now reduced from 47% to 27%.

Better Diets in Zambia⁹⁶

A recent diet study in Zambia's Luapula Valley found serious seasonal hunger and lack of foods essential to healthy growth. Nearly 60 percent of children under five were stunted. One of the children was seven-year-old Mumba Mwansa. While his diet in the dry season was better, during the wet season he subsisted mainly on root crops, mangoes and a relish of vegetables and groundnut flour. A seven year-old boy needs about 1,800 calories a day, but his diet on many days provided fewer than 1,200 calories. One year later, a cooperative project between FAO and the Zambian Government has made a big difference. Mumba's parents have received improved seed varieties and have joined a self-help group, which has enabled them to purchase higher-yielding varieties and learn improved agricultural techniques. As a result, food supplies are more consistent year-round, and the family's harvest now provides a small surplus to sell.

Diversifying Diets with Fruit and Vegetables⁹⁷

Expanding the existing use of indigenous vegetables can be a very important means of improving

family nutrition. Integrated packages of vegetable seeds that provide a balanced source of micronutrients for families year round from only 100 m² of land have been developed by the Asian Vegetable Research and Development Center (AVRDC) for different regions of the developing world. These "healthy gardening kits" are a central feature of ongoing farmer training programs in Africa, and over 35,000 such kits have been distributed through humanitarian agencies to the victims of major disasters in Africa and Asia since 2000. They include seeds of locally adapted varieties of nutrient-rich, fast-growing vegetables and technical information in local languages on vegetable production, food preparation, and preservation methods. Vegetables have been selected that are commonly grown in many tropical and subtropical less-developed countries, are nutritious, hardy, fast-growing with low input requirements, are and relatively free of pests and diseases. Many of these are indigenous vegetables.

Orange Sweet Potato: An Emerging Success Story

Varieties of orange sweet potato (OSP) with very high levels of vitamin A have been conventionally bred to combat vitamin A deficiency in regions of Africa where sweet potato is a staple food. Studies have shown OSP improves the vitamin A status in young African children. Beginning in 2007, pilot programs successfully disseminated OSP to more than 24,000 households in Uganda and Mozambique. The programs cultivated areas devoted to OSP production, and vitamin A intakes for young children, older children, and women increased



significantly as a result of the project intervention⁹⁸.

Helen Keller International: Homestead Food Production and Nutrition Education⁹⁹

Over 20 years ago, Helen Keller International (HKI) designed, tested and scaled up an innovative home gardening model, which had the objective of increasing the production and consumption of micronutrient rich vegetables and fruits to address deficiencies in Vitamin A and iron especially in young children and women. The program has since been adapted and expanded within Bangladesh as well as to Nepal, Cambodia, and the Philippines. Since the program first launched, over 5 million people have been directly reached. Based on a 3-year project cycle, HKI provides technical assistance to government field workers and staff of local NGOs to introduce poor gardeners (primarily women) to environmentally sound techniques to increase year-round production of foods rich in micronutrients. Evaluation results have shown that HKI's HFP programs increase year-round production of nutritious crops and animal based foods, improve dietary diversity, and increase income (especially under control of women), as well as increase female empowerment in family decision-making¹⁰⁰.

Role of Animal Source Foods: ENAM Experience in Ghana¹⁰¹

The ENAM project in Ghana was a community-based intervention to increase the use of animal source foods in young children's diets in rural Ghana. The planning and execution of the intervention was

in collaboration with health and agriculture partners in universities, governmental and nongovernmental agencies, and the private sector. Carried out in six rural communities, the program consisted of microcredit loans to support individual income-generating activities, weekly group meetings for entrepreneurship training, young child nutrition education, and collection of money for loan repayment and individual savings. Overall the research showed that by increasing the profitability of small businesses, rural women increased their purchasing power, and with more money and expanded nutrition knowledge, they decreased household food insecurity and improved the quality of their children's diets and their children's nutritional status.

4. Nutrition governance: Strengthening political commitment

4.1. Global initiatives

a) The United Nation Structure

The Food and Agricultural Organisation (FAO)

The World Food Summit declarations in 1996, 2002 and 2009 stressed the efforts to achieve the realization of the right to adequate food in the context of national food security. The 1996 World Food Summit definition of food security creates the space for increased collaboration between agriculture and nutrition. Food security is one of the three pillars of good nutrition, along with good care and good health. “Food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life.”

Focusing on the distinctive relationship between agriculture, food and nutrition, FAO works to protect, promote and improve food-based systems to ensure sustainable food and nutrition security, improve diets, combat micronutrient deficiencies, and raise levels of nutrition, and in so doing, achieve the nutrition-related Millennium Development Goals (MDGs). FAO is committed to assisting countries to develop a rights-based approach to food and nutrition security and assists member states at all levels, be it policy assistance, capacity building of local institutions or support to field interventions.¹⁰²

FAO also provides direct support to vulnerable households, which complements the health based interventions geared to malnourished individuals: diversification of

homestead food production; improved food storage and processing to increase the shelf life of foods produced and facilitate preparation and consumption; reliable access to bio-energy for cooking; and time and labour-saving interventions to allow women carry out both their productive and reproductive tasks.¹⁰³

The World Food Programme (WFP)

Under an agreement with UNICEF, WFP has the mandate to address moderate malnutrition. UNICEF focuses on severe malnutrition. WFP does its part by providing food through programmes which supplement the food households already have with nutritious products such as fortified blended foods or Ready-to-Use Foods. By treating moderate malnutrition, WFP tries to prevent children from slipping into severe malnutrition. In many emergency settings, for every child suffering from severe acute malnutrition, there are eight or ten suffering from moderate malnutrition.

In recent years, new ready-to-use therapeutic foods (RUTFs) for severely malnourished children have been developed. The progress in foods for severe malnutrition has worked as a catalyst for the development of special foods for other forms of malnutrition. In this context, WFP has been improving the quality and diversity of the food products it uses. WFP is working with partners in the private sector, universities, UN and NGOs to develop and assess the effectiveness of innovative products. Treating micronutrient (vitamin and mineral) deficiencies is an area of emphasis.

The World Health Organisation (WHO)

The WHO, through its department on nutrition, works with Member States and partners to identify, implement and scale-up interventions, particularly for the most vulnerable, and starting from the earliest stages of development. Strategies include helping to develop sound food and nutrition policies in countries with the greatest burden of malnutrition; monitoring global trends in nutrition to inform decision-making; providing scientific advice for actions to intervene; and leading global collaboration to improve nutritional health.¹⁰⁴ WHO provides global leadership on nutritional standards and guidance. The World Health Assembly in 2010 called on WHO to update and consolidate all such advice, and create new measures where needed, to help countries and all others involved in nutrition to provide appropriate nutritional support to people in need, particularly infants, young children and women. The WHO Nutrition Guidance Expert Advisory Group (NUGAG) is working to update this guidance, particularly in the areas of micronutrients, diet and health, nutrition in the life course and under-nutrition.

Establishing a Global Network of Institutions for Scientific Advice on Nutrition was part of WHO's effort in strengthening its role for providing scientific advice on nutrition and developing evidence-informed policy and programme guidance. It is especially important to harmonize the methods for assessing evidence and concepts for both scientific purposes and for policy purposes. The main aim of the Global



Network of Institutions, therefore, is to bring together major public institutions which develop diet- and nutrition-related guidelines in order to facilitate synergies and avoid duplication of work in this area.¹⁰⁵

The United Nation System Standing Committee (UNSCN)

Created in 1977, the UNSCN intends to promote cooperation among UN agencies and partner organizations in support of community, national, regional, and international efforts to end malnutrition in all of its forms in this generation. It aims at doing this by refining the direction, increasing the scale and strengthening the coherence and impact of actions against malnutrition worldwide, and raise awareness of nutrition problems and mobilize commitment to solve them at global, regional and national levels.¹⁰⁶ In order to implement the mandate, an Action Plan is defined every 5 years in order to organize strategic interventions across five broad cross-cutting areas of activity: advocacy, communication and partnership building; assessment, monitoring and evaluation; development of integrated approaches, the mainstreaming of human rights and identifying key scientific and operational gaps.

b) Global Initiatives from other Development Actors

IFPRI Strategy toward Food and Nutrition Security¹⁰⁷

In 2003, IFPRI created its first Strategy toward Food and Nutrition Security. As a “living document,” it was updated in 2005 and 2007 to reflect global and institutional developments. The strategy is guided by IFPRI’s vision of a world free of hunger and malnutrition, and

its Mission to provide policy solutions that reduce poverty and end hunger and malnutrition.

The cornerstones of IFPRI’s work are research, policy communications, and capacity strengthening for policy and research. Based on the priority-setting criteria mentioned above, IFPRI groups nine research themes under three overarching focus areas. In doing so, IFPRI takes a systems perspective regarding the policies affecting food and agriculture. IFPRI’s priority research themes are interlinked. As such, they are pursued not in isolation but as components of an integrated research program. Policy-communications and capacity-strengthening activities are crosscutting; they are therefore linked to and embedded in the research agenda in addition to being key elements of achieving impact in the follow up to the research.

The various focus areas look at:

- Efficient and Fair Functioning of Global and National Food and Agriculture Systems

This area focuses on policies that address constraints to achieving food and nutrition security and that support more efficient functioning of the global and national food, nutrition, and agriculture systems, including policies that promote the inclusion of low-income countries, improve the food and nutrition security of poor people, enhance the pro-poor functioning of supply chains from producers to consumers, and support the sustainable management of natural resources.

- Effective Strategies and Governance at the Global, Regional, and National Levels

This area focuses on policies that improve global, national, and local governance, and enhance political participation in, and institutions for, the development of pro-poor food, nutrition, and agricultural policies and related services.

- Enhancing Pro-poor Food and Agriculture System Innovations

This area focuses on policies that foster scientific and institutional innovation and technology use of benefit to poor people in developing countries.

IFPRI will also take a lead role in a new research programs currently being developed by the Consultative Group for International Agricultural Research (CGIAR). CGIAR Research Program 4, Agriculture for improved nutrition and health, will be led by IFPRI in close collaboration with the International Livestock Research Institute (ILRI) and other CG centers and other partners. CRP 4 will work to accelerate progress in improving the nutrition and health of poor people by shaping agriculture and food systems affecting those in marginal environments and those experiencing the impacts of agriculture intensification.¹⁰⁸

The Bill & Melinda Gates Foundation’s Nutrition Strategy

The Bill and Melinda Gates Foundation has developed a plan to help reduce death and disability due to micronutrient deficiencies and to prevent undernutrition in children

age 0 to 24 months in developing countries. The idea behind is global nutrition equity—when undernutrition related mortality and morbidity, cognitive function, and productivity measures in developing countries are indistinguishable from those of wealthy nations. The strategy is organized upon several areas of intervention:¹⁰⁹

- Reduce micronutrient deficiencies through population-based strategies:
- Reduce undernutrition in children 0 to 24 months through targeted interventions
- Ensure effective and comprehensive nutrition solutions by building leadership and integrated country programs
- Collaborate with agricultural development efforts

Global Alliance for Improved Nutrition (GAIN)

The goal of GAIN's Nutrition Program is to develop and deliver high quality population-based and targeted programs that will contribute to GAIN's target of reaching 1 billion people. Population-based programs deliver staple foods and condiments fortified with vitamins and minerals to large populations through market-based approaches. GAIN's National Food Fortification Program and the GAIN-UNICEF Universal Salt Iodization Partnership Project are population-based programs. Targeted programs deliver fortified food products, including complementary foods and supplements, to specific population groups including infants and young children, pregnant women and

nursing mothers, school children, people suffering from infectious diseases, remote rural populations, refugees or displaced peoples as well as those seriously affected by the economic crisis. The Infant and Young Child Nutrition Program and the Nutrition and Infectious Diseases Program are targeted programs. All GAIN programs are supported by the GAIN premix Facility (GPF). GPF provides services related to the procurement and certification of premix, a commercially prepared blend of vitamins and minerals used to fortify staple foods, to food fortification projects around the world.¹¹⁰

4.2. Regional initiatives: African, Caribbean and Pacific

a) African continent nutritional challenges

In the African Continent, the food and nutrition situation has deteriorated further in recent years. Underlying causes at household and family levels include inadequate access to food, health services, water and sanitation as well as inappropriate maternal and child caring practices. In addition, conflicts and natural disasters and the HIV/AIDS pandemic have destroyed people's asset base and livelihood strategies. The major nutritional problems include protein energy malnutrition which is widespread especially amongst children under the age of 5, children aged 6-9 years and women in the reproductive age group. The prevalence of low birth weight in Sub-Saharan Africa ranges from 11-52%, and, even worse, still 30-40% of children under 5 years

of age are stunted, 17% of them seriously. An estimated 200 million people in Sub-Saharan Africa are chronically malnourished and an estimated 33 million people in Africa consume less than 2100 calories per day. Furthermore 36 million children in Africa are undernourished, according to the latest estimates from UNICEF. Amongst adults, 4.5-40.6% of women of childbearing age are underweight.¹¹¹

Micronutrient deficiencies of particular concern in the region are Iodine Deficiency Disorders (IDD), vitamin A deficiency and iron deficiency anemia. An estimated 10-40% of the population in Africa had IDD, and an estimated 25% have vitamin A deficiency. Overall, 600,000 children under 5 years die annually in Africa because of vitamin A deficiency which also puts at risk about 100 million people in at least 20 countries mostly in the drier parts of the continent. The prevalence of iron deficiency anemia in young children and women of childbearing age is 50% and 60 % respectively. The main nutritional cause of Anemia is iron or iron/phosphate deficiency, particularly due to poor iron absorption from cereal-based diets. Iodine Deficiency Disorders (IDD) is widespread in Africa, especially in remote mountainous areas. At least 150 million people are at risk in 43 countries. IDD is mainly attributable to iodine deficiency in the soil, foods and the water in endemic areas. IDD affects the development of children at all stages from fetal life to adulthood and it is associated with impairment of mental and intellectual functions in both children and adults. In addition to these traditional nutrition problems, the region is now



having to grapple with diet related chronic disease disorders such as diabetes, obesity, cardiovascular diseases which impact largely on the productive adult population between 40-70years old. These conditions have increased dramatically as a result of changes in diet, life-styles and rapid urbanization. These problems are likely to become a major public health concern if the current trends are allowed to continue.¹¹²

In this context, the *African Regional and Nutrition Strategy* was prepared and presented at the International Conference on Nutrition (ICN) in December 1992 in Rome. The strategy took into account the main causes of the nutrition situation and set out a Plan of Action for the implementation at national, regional and international level. In June 1993, the Assembly of Heads of State and Government endorsed the document and urged Member States to mobilize and allocate adequate domestic resources towards achieving the objectives of the strategy. Most Member States used the ARNS to draft their own National Plans of Action on Nutrition (NPAN) based on individual country's socio-economic circumstances. Some Member States made serious efforts to implement their national strategies and by the mid 1990 nutrition situation, especially among children and women, had improved. However, due to the general stagnation or decline of most African economies, poverty rates accelerated, health systems deteriorated, and agricultural performance - especially food production - became worse. Furthermore, diseases increased, civil conflicts erupted in many parts of

the continent and droughts became more frequent. During the same period, HIV/AIDS became pandemic on the continent. All these factors helped to reverse all gains made in to improve nutrition. Against this background, the 1993-2003 ARNS had to be reviewed. The African Regional Nutrition Strategy 2005-2015 was adopted by the Conference of African Ministers of Health, held in Gaborone, Botswana, in October 2005. It was subsequently adopted by the Summit of the Heads of States of the African Union (AU) in January 2006 in Sudan (AU 2006). The main purpose of the 2005-2015 ARNS was to emphasize that nutrition is a basic input in poverty alleviation strategies and in the achievement of the Millennium Development Goals (MDGs). Thus the new review incorporates information about the role of nutrition in disease prevention.¹¹³

The *objectives* of the ARNS focus on some key areas: (i) increasing awareness among national governments in the Region, regional international development partners on the nature and magnitude of nutrition problems in Africa and their implications for the continent; (ii) advocating for renewed attention and commitment by Member States, in the wake of the worsening nutrition status of the most vulnerable groups; (iii) stimulating action at the national and regional level in order to improve nutrition outcomes by providing guidance on strategic areas; (iv) providing a framework of action on nutrition that takes into account the emerging issues of HIV/AIDS, diet-related chronic disease, the resurgence of Tuberculosis and

Malaria; (v) reducing protein-energy malnutrition in children under 5 by half and iron deficiency anemia in pregnant women by one third, and to virtually eliminate iodine and vitamin A deficiencies; (vi) reducing the prevalence of low birth weights (below 2.5kg) to less than 10%; (vii) developing programmes for the prevention of diet-related non communicable diseases in one third of the African population; (viii) addressing the nutritional requirements of people leaving with HIV/AIDS; (viii) defining mechanisms for collaboration and cooperation among the various actors concerned with food and nutrition problems at national, regional and international levels.

Implementation Challenges

Countries in the region face many challenges in order to address their nutrition problems such as the absence of a policy framework and institutional capacity to plan, implement and monitor sustainable nutrition programmes that respond to the multi-sectoral dimensions of nutrition problems; Inadequate technical capacity; Communities' capacity to respond appropriately has been compromised by the caring demands of other diseases, especially HIV/AIDS pandemic but also the resurgence of Tuberculosis and Malaria. Accessing adequate resources to support nutrition programmes is a challenge in the context of drastic cuts to the social sectors. A major problem remains the disproportionate amounts of the health budgets being absorbed by curative services, at the expense of preventive strategies such as nutrition.

The Pan-African Nutrition Initiative (PANI) was developed under the umbrella of the New Partnership for African Development (NEPAD), a programme of the African Union. CAADP Pillar 3 aims to increase food supply, address nutritional security and improve responses to food emergencies across the region by raising smallholder productivity and improving responses to food emergencies. Leading African and international food and nutrition experts met in July 2010, prior to the 15th African Union Summit in Kampala, Uganda, under the theme: “Africa must feed itself. No child should go to bed hungry. Reduce child stunting by 50 percent in the next five years and beyond”. Discussions centred on four programmatic themes: maternal, infant and child nutrition; home-grown school feeding; dietary diversity and food fortification; and biofortification. These are all seen as key mechanisms to advance food and nutritional security and agricultural development in Africa.

b) The Caribbean region

In the Caribbean, the Special Meeting of the Council for Trade and Economic Development (COTED) Agriculture, held in Grenada in October 2010, endorsed the ‘Regional Food and Nutrition Security Policy and Action Plan’. This provides a comprehensive framework to ensure that the region has an adequate, stable and nutritious supply of food. There is an urgency to establish food and nutritional goals so that the agriculture and food systems can deliver adequate and nutritionally appropriate quantities of food,

especially to low income and vulnerable groups.

The transition to obesity and chronic diseases is characterized by a shift away from diets based on locally grown indigenous staples (grains, starchy roots), locally grown fruits, vegetables, legumes, and limited foods from animal origin, to diets that are more varied and energy-dense, consisting of foods that are more processed (including processed beverages), more of animal origin, more added sugars and fats, and often more alcohol.

The evidence from food balance sheet data shows that for the Caribbean region:

- Energy from fats and sugars has exceeded the recommended population goals from as early as the 1960s and has increased consistently up to the present.
- Imports of both fats and sugar have been increasing over the years.
- While the contribution of fruits and vegetables has been increasing since the 1960s, consumption remains well below the recommended population goals. In addition the contribution of imports continues to outstrip that of local production.

Nutritional goals must be established so that the region’s agricultural and food systems can deliver adequate and nutritionally appropriate quantities of food, especially to the poor and marginalized groups of the society. There is urgency on the demand side to improve access to, and distribution of, adequate and

healthful food through efficient marketing channels and through availability of income¹¹⁴.

c) The Pacific Region

Pacific populations are at great risk of malnutrition, food-borne diseases and non-communicable diseases (NCDs). More than 50% of adults are overweight in most Pacific countries, and in some of these countries, over 40% of the population suffers from diabetes. Up to 80% of adults in the Pacific consume less than the WHO recommended five or more servings of fruit and vegetables each day. At the inaugural Pacific Food Summit in Port Vila, Vanuatu, held in April 2010, 170 experts from more than 21 Pacific countries, representing governments, the private sector, NGOs, faith-based groups and development agencies, endorsed the region’s ambitious multi-sectoral Framework for Action for Food Security¹¹⁵. Its aim is to provide an over-arching strategic plan that guides Pacific countries to move towards ensuring that all people have physical, social and economic access to sufficient, safe and nutritious food.

Traditionally, Pacific Islands achieved food security through sustainable agricultural and fishing practices and a reliance on local food staples such as roots and tubers, bananas and breadfruits. More recently, imported foods have helped contribute to food security by meeting a growing demand for more and a greater variety of foods. However, changes in both the supply and demand of food pose an increasing threat to food security, which is reflected in the health of Pacific populations.



Challenges related to Health¹¹⁶

Unhealthy foods and eating patterns are a major factor contributing to food-related chronic disease and death (mortality) in the Pacific. Consumption of high-fat, energy-dense food contributes to obesity. The people living in the Pacific have some of the highest prevalence rates of obesity in the world, with rates of 40% and higher in many countries. Levels of hypertension are also high throughout the Pacific and obesity and hypertension are major risk factors for diabetes, heart disease, stroke and cancer.

Less noticeable, but equally of concern, are vitamin and mineral deficiencies arising from heavy consumption of poor quality food and very low consumption of fruits and vegetables.

The Framework for Action on Food Security in the Pacific

In this context, in order to tackle the growing burden of poor food security in Pacific island countries, the Pacific Food Summit, held in Port Vila, Vanuatu in 2010, brought together more than 170 delegates from Pacific island countries and territories, as well as Australia and New Zealand, to agree on a Framework for Action on Food Security.¹¹⁷ The vision that came out of the meeting was that all people in the Pacific have physical, social and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life. The guiding principles include:

- Committing to a coordinated multi-sectoral approach

- Recognition of food security as a human right:
- Recognition of food security as a critical development issue:
- The adoption of sustainable solutions that build self-reliance and empowerment
- Respecting and valuing indigenous systems and culture

4.3. Selected national cases

There remains limited knowledge about what kind of development, either nutrition-specific strategies or broad economic and social strategies have the greatest impact on reducing child malnutrition and what is the role economic growth in these changes. Learning from other countries experiences is critical for learning lessons and developing successful initiatives. According to Headey (2011), in the short-term, targeted nutrition programs (e.g. food supplements, nutrition training) can have high returns without economic and social developments. However, in the long-term, a pro-nutrition growth strategy is undoubtedly the best means of sustainably eradicating malnutrition. This is because rising national incomes provide the resources to make sustained investments in health, education, and infrastructure, whilst rising household incomes also improve food security and reduce fertility rates (along with female education).¹¹⁸

Country case studies show this diversity of experiences, both successes and non-successes.

Ethiopia: Ethiopia has the highest rates of malnutrition in Sub-Saharan Africa. Until recently, the broad multi-sectoral factors contributing to malnutrition had been insufficiently emphasized, with the focus placed on addressing food security as the primary means to address nutritional insecurity. To address these, in February 2008, the Government of Ethiopia launched its first ever National Nutrition Strategy (NNS) thereby achieving a major step forward in its efforts to tackle persistent malnutrition in the country. Chronic malnutrition among children in Ethiopia remains very high 47% and at periods during the year, prevalence of acute malnutrition escalates to emergency levels. Micronutrient deficiencies are rife, nearly one-third of women are undernourished and approximately 35 million people in the country are undernourished. Progress has been made in Ethiopia to reduce child malnutrition; underweight prevalence has decreased by approximately 0.5 percentage points between 2000 and 2005. However, the proportion of underweight children in the country would need to reduce by more than 2 percentage points per year to achieve MDG 1 by 2015. Malnutrition in Ethiopia is the underlying cause of 57% of child deaths and thus failing to address this problem will also hold back progress towards reaching MDG 4 to reduce child mortality. The draft NNS was formulated during 2005/2006 in consultation with various stakeholders in the country and with technical support from UNICEF and IFPRI. The situation analysis done to inform the strategy highlighted the importance of taking a multi-sectoral approach to

addressing malnutrition. As a result, the NNS brings together various vertical and uncoordinated programs into one comprehensive sector-wide approach, led by the government with one coordination framework. Although nutrition is recognized in the NNS as being multi-sectoral, the overall responsibility for coordinating the strategy has been given to the Federal Ministry of Health (FMOH).¹¹⁹

Tanzania: Although Sub-Saharan Africa experienced unprecedented economic growth in recent decades, this did not always translate into less poverty or improved nutrition. The Tanzanian economy is one example of a country that failed to reap the benefits of sustained rapid growth. National gross domestic product (GDP) grew at 6.6 percent per year during 1998–2007, while agricultural growth, often regarded as instrumental in lowering poverty rates in agrarian-based developing countries, averaged a respectable 4.4 percent during the period. Yet, between 2001 and 2007, Tanzania's poverty rate only fell from 35.7 to 33.6 percent, while the share of the population consuming insufficient calories declined marginally from 25.0 to 23.6 percent¹²⁰.

Questions arise about why rapid growth did not translate into reductions in malnutrition and poverty, and more specifically, the specific role of agricultural growth in reducing these rates. After an examination of recent production trends, Pauw and Thurlow (2011) found that although the agricultural sector as a whole grew rapidly during 1998–2007 (at 4.4 percent per year), growth had been volatile, and the source of this growth has

been concentrated among a few crops¹²¹. The best-performing crops tended to be grown by large-scale, commercial farmers, isolated to specific geographic locations, and also export-oriented.

Thus, the structure of agricultural growth, which favor large scale, export-oriented production, did not impact poor farmers. In order to reduce malnutrition, Pauw and Thurlow (2011) recommend accelerating agricultural growth in additional subsectors, which will benefit rural and urban household by increasing food availability as well as economic well-being. They also advise increasing production of key calorie-laden food crops, such as maize, to reduce malnutrition

Brazil: Political leadership from the top has also been key to Brazil's widely credited multi-sector *Zero Hunger (Fome Zero)* strategy, launched in January 2003. This initiative has grown to include 30 programs and activities involving more than 10 ministries plus participation by state and municipal governments as well as civil society.

As of 2006, Brazil had used this program to reduce the nation's undernourished population from 17 million to 11.9 million (FAO 2009). Presidential leadership made the difference for multi-sector effectiveness in Brazil. Upon taking office in 2003, President Luiz Inacio Lula da Silva announced that he would consider his life's mission fulfilled if every Brazilian were able to have three meals a day by the end of his administration. To coordinate the *Fome Zero* program he created an entirely new Special

Ministry for Food Security and Fight Against Hunger (MESA). He also created a special advisory body within the President's office, plus a National Food Security Council (CON SEA) to serve as a policy advisory body. This body comprised representatives of the government, churches, trade unions, NGOs, and business organizations, with the nongovernmental members of this Council actually holding a two-thirds majority. In fact, the most important component of *Fome Zero's* success may have been the President's decision to launch it outside of existing ministerial structures. Rather than trying to institutionalize cross-sector perspectives within existing ministries, the Office of the President designed and launched the *Fome Zero* initiative outside of traditional administrative channels.

Fome Zero has required a significant outlay of public resources. For example, the strategy initially included a US\$400 million conditional cash transfer (Food Card) program to supplement the income of poor families to buy more food (the cash transfers were conditioned on school attendance and health checkups); a US\$130 million program to purchase food from family farmers (PAA); a US\$65 million health and nutrition program for the elderly, children, and nursing mothers to address illnesses caused by vitamin and micronutrient deficiencies; an expanded school feeding program; a program to monitor food intake; a food and nutrition education program; and a food supply and distribution program targeting low-income populations in larger cities. Implementation was managed at the state level through



Coordinating Committees and Food and Nutrition Councils subordinate to the governor, and at the municipal level through Management Committees where civil society again held a two-thirds majority, plus by local Food and Nutrition Security Councils. By September 2009, these programs had grown dramatically. Family Grants benefitting 12.4 million families replaced Food Cards at a cost to the state of US\$6.5 billion.

4.4. Multi-sectoral approach: Integrating nutrition into agricultural policies¹²²

With agriculture being the source of income and livelihood for 70 to 80% of people suffering from hunger in developing countries, it is clear that sustainable reductions in poverty, food insecurity and undernutrition cannot be obtained without special attention to the development of the agriculture sector and the involvement of local, national, and regional policymakers in these countries.

Therefore firstly, it is imperative to recognize the distinctive relationship between agriculture, food and nutrition. Promoting and improving food-based systems not only ensures sustainable food and nutrition security, but improves diets combating micronutrient deficiencies.

However, given the complex nature and the different causes of this phenomenon, interventions targeting the agricultural sector cannot alone tackle efficiently this problem.

It is important to complete this approach with interventions toward diversification of homestead food production, improved food storage and processing to increase the shelf life of foods, and time and labour-saving interventions to allow women carry out both their productive and family tasks, new economic and employment opportunities, and education and training. Headey (2011) also raises this point, showing that nutrition-oriented strategies alone are beneficial in the short-term. For long-term, significant, and sustainable impacts, a “pro-nutrition” growth strategy should be adopted, which couples nutrition and health strategies with economic, agricultural and social development strategies¹²³.

Micronutrient-rich foods, such as animal source foods, fruits and vegetables, and also oils and fats in areas where the energy density of the food is insufficient, are particularly important. Finally, food-based interventions should be systematically combined with appropriate nutrition education at community level and capacity building of local institutions, in order to improve dietary habits and feeding practices, especially of infants and young children, and ensure appropriate and safe handling and preparation of foods.

Given the multi-sectoral nature of malnutrition, improving nutrition requires an integrated response from the relevant development sectors. Nutrition strategies eventually combine community geared interventions (as most households in vulnerable communities will share similar food supply or information

constraints) with livelihood support to the poorest households.

5. The way forward: Addressing policy and action gaps

Following the IFPRI 2020 Conference *Leveraging Agriculture for Improving Nutrition and Health*, IFPRI developed a way forward statement for some first steps addressing policy and action gaps in bringing agriculture to bear on improving nutrition and health¹²⁴.

First, fill the knowledge gaps, which includes investing in research, evaluation and education systems that integrate all three sectors and promoting government leadership and know-ledge building at all levels—from national to local.

Policy-makers need to understand the complexity of factors contributing to fight malnutrition and commit to ensure food for all and safe food for all¹²⁵. The importance of nutrition is not always recognized and understood in all arenas; therefore, it is essential that policymakers draw on tools, such as nutrition “branding” and promote policy champions. In addition, specialists in the field also need incentives to devote their time and resources to multi-sectoral collaboration.

A second step is mitigating hard, or in other words, designing interventions that reduce nutrition and health risks, and creating health and nutrition programs that also contribute to agricultural productivity.

Thirdly, seek out and scale up innovative solutions, which includes scaling up successful interventions, designing program with multi-sectoral benefits, incorporate nutrition into the value chain, using all available levers, and increasing consumers’ nutrition literacy and knowledge of dietary choices.

Finally, create an environment in which cooperation can thrive, by developing cross-sectoral partnerships and mutual accountability mechanisms, correcting market failures, and using communication and advocacy tools. Professionals from agriculture, nutrition, and health sectors need to engage together and to explain to a wider public the interactions and interdependency amongst those areas. Civil society, farmers and consumers groups need to strengthen their advocacy efforts while the donor community can support capacity building at all levels

Investing in rural public goods key to fight malnutrition

A look at successful episodes in fighting malnutrition reveals that for low-income countries, rapid economic growth is a necessary condition for reducing malnutrition – but not a sufficient one. Supporting investments in rural education, agricultural research and extension, health and infrastructure (roads, communications, markets, irrigation) are found to have high returns¹²⁶.

In many cases fighting chronic under-nutrition is not just a health issue as it is linked to poverty due also to lack to significant public investment in crucial infrastructure, especially in rural areas, such as farm-to-market roads, water, and electrical power, health and education services. Low farm productivity will lead to low incomes, which likely will have an adverse impact on nutrition and health status. In Africa, 70 percent of all rural citizens live more than a 30 minute walk from the nearest all-weather road.

African governments repeatedly pledge to increase rural public goods investments, but they often fail to deliver fully on the pledge. In 2003, at an African Union meeting in Maputo, Africa’s heads of government pledged to increase their share of the national public budget that went to the agricultural sector to at least 10 percent by 2008. However, a survey of 45 countries in the region by IFPRI found that only 8 of those countries met the pledge (Fan, Omilola, and Lambert 2009).

Weak support from the donor community is another reason rural public goods have recently been undersupplied in Africa. Between 1978 and 2006, the share of World Bank lending that went to agricultural development fell from 30 percent to 8 percent. Bilateral donors also decreased their funding to African agriculture after the 1980s. Between 1980 and 2003 the aggregate value of all bilateral agricultural development assistance from all rich countries to all poor countries fell by 64 percent. The United States’ official development assistance to agriculture in Africa fell by 85 percent between the 1980s and 2006. Food grain production per capita was declining in Africa and the number of undernourished citizens was roughly doubling, yet the donor community was failing to provide support for the fundamental investments needed in the African countryside (Chicago Council on Global Affairs 2009)¹²⁷.

Improving nutrition in a sustainable way requires a focus on the global context in which undernutrition occurs. Significant and sustained improvements in maternal and child

Addressing ACP nutrition security

nutrition can be achieved only if, in addition to targeting the immediate causes of undernutrition, programs and policies also incorporate actions to address the underlying determinants of undernutrition. These underlying causes include poverty, food insecurity, low education, inadequate maternal and child care, gender inequality, and the lack of access to high-quality health care, hygiene, and sanitation services.

Examples of programs that combine short-route and long-route interventions include agricultural interventions (such as programs promoting homestead food production), conditional cash-transfer programs, and credit-with education programs. All three types of programs aim at alleviating poverty and food insecurity. They usually target women in order to promote gender equity and empower women by giving them training, skills, or financial resources that they control. Many of these programs also incorporate direct nutrition interventions such as education and behavior change communication to improve infant and young child feeding practices; distribution of specially formulated (or fortified) foods for pregnant or lactating women, infants, and young children; and direct linkages with the health system or requirements that households make regular preventive health care visits in order to receive the program benefits (as in the case of conditional cash-transfer programs)¹²⁸.

Alliances and partnerships can lead to a more effective collaboration between the main partners involved nutrition security and in the efforts of upscaling and financing successful research findings.



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Full report

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Développement et Coopération
EuropeAid*

http://ec.europa.eu/europeaid/index_fr.htm

ECHO - European Commission-
Humanitarian Aid and Civil Protection

http://ec.europa.eu/echo/index_en.htm

*Commission Européenne-Direction
Général Aide Humanitaire et
Protection Civile*

http://ec.europa.eu/echo/index_fr.htm

GMFS - Global Monitoring for Food
Security

<http://www.gmfs.info/>

*GMFS -Surveillance Globale sur la
Sécurité Alimentaire*

<http://www.gmfs.info/fr/index.html>

European Parliament

European Parliament – Committee on
Development

<http://www.europarl.europa.eu/activities/committees/homeCom.do?language=EN&body=DEVE>

*Parlement Européen – Comité
Développement*

<http://www.europarl.europa.eu/activities/committees/homeCom.do?sessionId=2BOB15C610AA75156276381888A9AF21.node2?language=FR&body=DEVE>

ACP and Bilateral Organizations

African Union

www.africa-union.org
<http://www.au.int/fr/>

Caribbean Food and Nutrition
Institute (CFNI)

<http://www.caricom.org/jsp/community/cfni.jsp?menu=community>

Secretariat of the Pacific Community

<http://www.spc.int/>
<http://www.spc.int/fr.html>

CTA

<http://www.cta.int/>
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United Nations Organizations

UN High-Level Task Force on the
Global Food Security Crisis

<http://www.un.org/issues/food/taskforce/>

UN Special Rapporteur on the right
to food

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UNECA- The United Nations
Economic Commission for Africa

<http://www.uneca.org/>

*CEA-Commission Economique pour
l'Afrique*

http://www.uneca.org/fr/fr_main.htm

UNDP-United Nations Development
Programme

<http://www.undp.org/>

*PNUD-Programme des Nations Unies
pour le développement*

<http://www.undp.org/french/>

UNESCAP-United Nations Economic
and Social Commissions for Asia &
the Pacific

<http://www.unescap.org/>

UNSCN- United Nations System
Standing Committee on Nutrition

<http://www.unscn.org/>

FAO, Global Forum on Food Security
and Nutrition (FSN)

http://km.fao.org/fsn/fsn_home/en/?no_cache=1&L=1

*FAO, Forum global sur la sécurité
alimentaire et la nutrition*

http://km.fao.org/fsn/fsn-home/fr/?no_cache=1

FAO, Hunger portal

<http://www.fao.org/hunger/en/>

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FAO, Faim

<http://www.fao.org/hunger/hunger-home/fr/>

FAO, The Right to Food portal

<http://www.fao.org/righttofood/>
http://www.fao.org/righttofood/index_fr.htm

World Bank - Food crisis portal

<http://www.worldbank.org/html/extdr/foodprices/>

World Food Programme

<http://www.wfp.org/>

Programme Alimentaire Mondial

<http://fr.wfp.org/>

World Health Organization

<http://www.who.int/en/>

Organisation mondiale de la Santé

<http://www.who.int/fr/index.html>

World Health Organization- Nutrition for Health and Development

<http://www.who.int/nutrition/en/>

NGOs, Think Tank and Networks

ActionAid

<http://www.actionaid.org/>

Action against Hunger

<http://www.actionagainsthunger.org/>

Action contre la Faim

<http://www.actioncontrelafaim.org/>

Alliance Against Hunger and Malnutrition

<http://www.theaahm.org/home/en/>

Alliance contre la faim et la malnutrition

<http://www.theaahm.org/accueil/fr/>

Bread for the World Institute

<http://www.bread.org/institute/>

OXFAM

<http://www.oxfam.org/en>
<http://www.oxfam.org/fr>

Research Organisations

CIRAD

<http://www.cirad.fr/>

CGIAR-Consultative Group on International Agriculture Research

<http://www.cgiar.org>

CGIAR-Groupe Consultatif pour la Recherche Agricole Internationale

<http://www.cgiar.org/languages/lang-french.htm>

FARA-Forum for Agriculture Research in Africa

<http://www.fara-africa.org/>

FARA-Forum pour la recherche agricole en Afrique

<http://fr.fara-africa.org>

HarvestPlus Program

<http://www.harvestplus.org/>

IIAASTD-International Assessment of Agricultural Knowledge, Science and Technology for Development

<http://www.agassessment.org>

IFAD - International Fund for Agricultural Development

<http://www.ifad.org/>

IFPRI-International Food Policy Research Institute

<http://www.ifpri.org/34>

IFPRI-Institut International de Recherche sur les Politiques Alimentaires

<http://www.ifpri.org/french>

INRA - French National Institute for Agricultural Research

<http://www.international.inra.fr/>

ODI - Food portal

<http://www.odi.org.uk/themes/food/index.asp>



Glossary

Anemia

Is a condition in which the number of red blood cells or their oxygen-carrying capacity is insufficient to meet physiologic needs, which vary by age, sex, altitude, smoking, and pregnancy status. Iron deficiency is thought to be the most common cause of anaemia globally, although other conditions, such as folate, vitamin B12 and vitamin A deficiencies, chronic inflammation, parasitic infections, and inherited disorders can all cause anaemia.

Antiviral

Antiviral drugs are used for treating viral infections. They do not kill the viruses but impede their development by suppressing their ability to multiply and reproduce. Specific antivirals are designed for specific viruses. Antivirals are currently available for viral infections such as herpes, HIV, hepatitis B and C, and influenza.

Body mass index

Body weight in kilograms divided by height in (BMI) meters squared (kg/m^2). This is used as an index of "fatness." Both high BMI (overweight, BMI greater than 25) and low BMI (thinness, BMI less than 18.5) are considered inadequate.

Child underweight

Weight-for-age <-2 standard deviations (SDs) from the WHO child growth standards median, cut-off point for public health problem $\geq 10\%$ of population affected

Child stunting

Height-for-age <-2 SDs from the

WHO child growth standards median; cutoff point for public health problem $\geq 20\%$ of population affected

Child overweight

Weight-for-height > 2 SDs from the WHO child growth standards median

Child obesity

Weight for height >3 SDs; note in some countries overweight and obesity in children are measured using BMI centiles for age

Early initiation of breastfeeding

Proportion of children born in the last 24 months who were put to the breast within one hour of birth food security relates to the family level

Food security

Exists 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 preferences for an active and healthy life. The four pillars of food security are availability, access, utilization and stability.

Food shortages

Refers to exceptional shortfall in aggregated supplies or a local deficit as a result of crop failures, natural disasters, interruptions of imports, disruption of distribution, excessive post-harvest losses, other bottlenecks and/or increased demand for food arising from population movements within the country or an influx of refugees. This information is gathered by FAQ as part of its global early warning system on food and agriculture.

Global acute malnutrition (wasting)

Weight-for-height of -2 z scores or more below the median of the World Health Organization's child growth standards (includes moderate wasting and severe wasting, i.e. moderate acute malnutrition and severe acute malnutrition).

Hunger

The body's way of signaling that it is running short of food and needs to eat something. Hunger can lead to malnutrition

Iodine deficiency

Is the greatest cause of preventable brain damage in childhood which is the primary motivation behind the current worldwide drive to eliminate it. The main factor responsible for iodine deficiency is a low dietary supply of iodine. Iodine deficiency is considered to be a public health problem in populations of school-age children where the median

Infant mortality rate (IMR)

Number of deaths of infants under one year of age per 1,000 live births for a given year

Low birth weight

Weight at birth of $<2500\text{g}$ (5.5 pounds)

Malnutrition in all its forms

Is defined as all forms of poor nutrition. It relates to imbalances in energy, and specific macro and micronutrients- as well as in dietary patterns. Conventionally, the emphasis has been in relation to inadequacy, but it also applies to excess intake or inappropriate

dietary patterns. Malnutrition occurs when the supply of essential macro- and micronutrients does not meet or exceeds the metabolic demands for nutrients. These metabolic demands vary with age and other physiological conditions and are also affected by environmental conditions including poor hygiene and sanitation that lead to food- as well as water-borne diarrhoea.

Moderate malnutrition (underweight)

Weight-for-age between -2 and -3 z scores below the median of the WHO child growth standards.

Multiple micronutrient powders

Sachets containing a blend of vitamins and minerals in powder form, which can be added to foods at home. They are intended to prevent and treat micronutrient deficiencies.

Nutrition security

Exists when food security is combined with a sanitary environment, adequate health services and proper care and feeding practices to ensure a healthy life for all household members.

Nutrition surveillance systems

Data collection systems which, on an on-going basis, systematically collect, analyse, interpret and disseminate data on food- and nutrition-related outcomes, i.e. anthropometric indices for use in the planning, implementation and evaluation of nutrition action programmes.

Obesity

Excessive body fat content; commonly measured by BMI. The international reference for classifying an individual as obese is a BMI greater than 30.

Overweight

Excess weight relative to height; commonly measured by BMI among adults (see above). The international reference for adults is as follows: • 25–29.99 for grade I (overweight). • 30–39.99 for grade II (obese). • > 40 for grade III. For children, overweight is measured as weight for- height two z-scores above the international reference.

Protein energy malnutrition

A form of malnutrition measured not by how much food is eaten but by physical measurements of the body - weight or height - and age

Ready-to-use therapeutic foods

High-energy, fortified, ready-to-eat foods suitable for the treatment of children with severe acute malnutrition.

Severe acute malnutrition (severe wasting)

Weight-for-height of -3 z scores or more below the median of the WHO child growth standards

Undernutrition

Malnutrition related to all forms of inadequate food and nutrient intake or excessive losses

Under 5 mortality rate (U5MR):

Number of deaths of children under 5 years of age per 1,000 live births for a given year

Underweight

Measured by comparing the weight-for-age of a child with a reference population of well nourished and healthy children. It is estimated that the deaths of 3.7 million children aged less than five are associated with the underweight status of the children themselves or their mothers

Vitamin A deficiency

Can be defined clinically or sub-clinically. The prevalence of the population with serum retinol below 0.70 $\mu\text{mol/l}$ can be used to assess the severity of vitamin A deficiency in most age groups, as a public health problem. Vitamin A deficiency as a public health problem requiring intervention when at least one of two specifications is met: 1) The prevalence of low serum retinol is within the range specified AND another biological indicator of vitamin A status (including night blindness, breast milk retinol, relative dose response, modified dose response, or conjunctival impression cytology) also indicates widespread deficiency; and/or 2) the prevalence of low serum retinol indicates widespread deficiency and at least four demographic and ecologic risk factors are met.



Acronyms

AFSI	L'Aquila Food Security Initiative
ARNS	African Regional Nutrition Strategy
AU	African Union
AVRDC	Asian Vegetable Research and Development Center
BMI	Body mass index
CFS	Committee on World Food Security
GFATM	Global Fund to Fight AIDS, Tuberculosis and Malaria
CGIAR	Consultative Group on International Agricultural Research
CRC	Convention on the Rights of the Child
DALYs	Disability-adjusted life years
DPAS	WHO Global Strategy on Diet, Physical Activity and Health
EU	European Union
FAFS	Framework for African Food Security
FARA	Forum for Agricultural Research in Africa
FAO	Food and Agriculture Organization of the United Nations
GAIN	Global Alliance for Improved Nutrition
GAM	Global Acute Malnutrition
GFCPI	Global Food Consumption Price Index
GHI	Global Hunger Index
GPFSAN	Global Partnership on Food Security and Nutrition
HIV	Human Immunodeficiency Virus
HLTF	UN High Level Task Force
ICCIDD	International Council for the Control of Iodine Deficiency Disorder
ICGS	International Child Growth Standard
IDD	Iodine deficiency disorders
IFAD	International Fund for Agricultural Development
IFPRI	International Food Policy Research Institute
LYCN	Infant and young child nutrition
LBW	Low birth weight

Addressing ACP nutrition security

MAM	Moderate Acute Malnutrition
MCH	Maternal and Child Health
MDGs	Millennium Development Goals
NCD	Non communicable disease
NEPAD	New Partnership for Africa's Development
NGOs	Non-governmental organizations
PANI	Pan African Nutrition Initiative
PHC	Primary Health Care
PICT	Pacific Island Countries and Territories
PRSPs	Poverty Reduction Strategy Papers
RUTF	Ready-to-Use Therapeutic Food
SAM	Severe Acute Malnutrition
SCN UN	Standing Committee on Nutrition
SFP	Supplementary Feeding Programme
SSA	Sub-Saharan Africa
SUN	Scaling Up Nutrition
UN	United Nations
UNECA	United Nations Economic Commission for Africa
UNDP	United Nations Development Programme
UNESCO	Organization United Nations Educational Scientific and Cultural
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
VAD	Vitamin A deficiency
VITAA	Vitamin A for Africa
VITAL	Vitamin A Field Support Project
WB	World Bank
WFP	World Food Programme
WFS	World Food Summit
WHO	World Health Organization



Footnotes

- ¹ This Reader is not intended to exhaustively cover the issue of Nutrition and Agriculture in ACP countries but to provide some background information and selected information resources, focusing on the implications for rural development.
- In February 2011, the International Food Policy Research Institute (IFPRI) organised a major conference on *'Leveraging Agriculture for Improving Nutrition and Health'* in New Delhi, India. The Conference examined the latest research on the links between health, agriculture and nutrition. This Reader uses an extensive part of IFPRI's recent work on the subject.
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