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Programmes and interventions for the implementation of the Programme of Action of the International Conference on Population and Development in the context of population, food security, nutrition and sustainable development

Report of the Secretary-General

Summary

The present report has been prepared to inform the Commission's deliberations on population, food security, nutrition and sustainable development. More than 50 years of nutrition research has identified human requirements for optimal nutrition, and the interventions needed to ensure access to healthy diets for all, and corresponding Sustainable Development Goal targets. Highly effective investments include nutrition for the maternal-infant dyad, promotion of breastfeeding, fortification of foods, taxation and regulatory measures, and school-based feeding. Integration of nutrition within universal health coverage offers the potential to greatly expand nutrition coverage and boost health outcomes. Ending malnutrition in all its forms, including the hidden hunger of nutrient deficiency, requires national commitments to invest at scale.

Simultaneously, the rising epidemic of obesity and overweight requires urgent action by many stakeholders. Mild or intermittent food insecurity appears to increase obesity and overweight, compounding health risks for populations most vulnerable to food insecurity. Policy interventions are urgently needed to increase the share of total consumption composed of nutritious foods and beverages; promising evidence suggests that media campaigns, better nourishment in public institutions, fiscal measures and restrictions on food and beverage marketing all warrant wider consideration.

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Core challenges of food security are sustainable production and distribution, and protecting the populations most vulnerable owing to conflict, humanitarian crisis, climate or economic shocks. Food production has increased significantly over the past 50 years, but at the cost of land degradation, biodiversity loss and pollution, especially where there has been unregulated use of pesticides and fertilizers. Recent United Nations recommendations on microbicide use should be widely adopted, and there is urgent need to promote sustainable agricultural practices in order to protect the long-term resilience of agriculture for future populations.

I. Introduction

1. The Programme of Action of the International Conference on Population and Development endorsed a vision of integrated development anchored on: principles of non-discrimination and equality; the centrality of health, education and women's empowerment to sustainable development; and the collective need for environmental sustainability. These ideals underpin the 2030 Agenda for Sustainable Development, the corresponding Sustainable Development Goals and the United Nations Framework Convention on Climate Change.

2. Food and nutrition are foundations of human development, as reflected within regional and global development agendas, within the mandates of multiple United Nations agencies and by the establishment of unique United Nations bodies[1] devoted to food security. The Programme of Action prescribed that measures should be taken to strengthen food, nutrition and agricultural policies and programmes and fair trade relations, with special attention paid to the creation and strengthening of food security at all levels. In the context of the Sustainable Development Goals, food is a common thread linking the economic, social and environmental dimensions of all 17 Goals, and the United Nations has endorsed the Framework for Action adopted by 164 Member States at the Second International Conference on Nutrition[2] and declared the United Nations Decade of Action on Nutrition (2016–2025).

3. The economic costs of malnutrition are staggering, costing society an estimated $3.5 trillion per year, with overweight and obesity alone costing $500 billion per year. Costs are incurred through increased health-care costs, impaired learning, poor school performance and compromised adult labour productivity. At the individual level, adult earnings are reduced by 2.4 per cent for every 1 per cent loss in potential attained height,[3] a marker of nutritional status.

4. Attaining the Sustainable Development Goal targets to end hunger and achieve food security (Goal 2), attain good health and well-being (Goal 3), eradicate poverty (Goal 1), conserve and use marine and land resources sustainably (Goals 14 and 15) and mitigate the impact of climate change (Goal 13) remain a daunting task at a time when an estimated 822 million people worldwide are undernourished,[4] nearly 2 billion adults are facing overweight or obesity[5] and approximately 650 million live in conditions of extreme poverty. The world produces adequate food for all and has sound empirical knowledge about the requirements for optimal nutrition. The double burden of malnutrition – undernutrition and hidden hunger, overweight and obesity and diet-related noncommunicable diseases – remains however among the leading causes of death and disability globally and continues to threaten the survival, growth and development of children, young people, economies and nations.

5. Food security, nutrition and climate change are inextricably linked. Efforts to assure nutrition and food security for all will require coordinated, evidence-based policies to improve all four pillars of food security – availability, access, utilization and stability – and more assertive measures to address climate change. Technological

[1] Such as the Food and Agriculture Organization of the United Nations (FAO) and the World Food Programme (WFP).

[2] FAO and World Health Organization (WHO), "The second International Conference on Nutrition: committing to a future free of malnutrition", 2014. Available at www.fao.org/3/a-i4465e.pdf.

[3] Global Panel on Agriculture and Food Systems for Nutrition, "The cost of malnutrition: why policy action is urgent", Technical Brief, No. 3 (London, 2016).

[4] FAO and others, *The State of Food Security and Nutrition in the World 2019: Safeguarding against Economic Slowdowns and Downturns* (Rome, 2019).

[5] See www.who.int/news-room/fact-sheets/detail/obesity-and-overweight.

innovation can play a valuable role in these efforts, but coordinated political leadership is crucial.

6. In the context of the fifty-third session of the Commission on Population and Development, the present report highlights global and regional interventions to address food security and nutrition and areas of greater research need. The report should be regarded as a companion piece to the report of the Secretary-General (E/CN.9/2020/2).

II. Nutrition, population and sustainable development

A. Impact of undernutrition on growth, health and development

7. In today's world, hunger is caused by poverty and inequality, not scarcity. Nonetheless, diets lacking adequate nutrition are a leading contributor to deaths worldwide, as malnutrition heightens risk for both infectious and non-communicable diseases.[6] Suboptimal diet is responsible for more deaths than any other behavioural, environmental or occupational risk globally, including tobacco smoking. Malnutrition exists in multiple forms: undernutrition, as stunting or wasting, overweight and obesity; and hidden hunger or micronutrient deficiencies. Globally, at least one in three (almost 200 million) children under 5 years of age is undernourished or underweight and one in two (around 340 million) suffers from hidden hunger due to deficiencies in vitamins and other essential nutrients. Africa and Asia account for more than 9 out of 10 stunted children and over 9 out of 10 wasted children.

8. Rates of overweight and obesity have increased sharply worldwide, with a tenfold increase in the number of obese children and adolescents from 1975 to 2016.[7] The prevalence of adult obesity has nearly tripled over the same period, with approximately 2 billion adults now overweight or obese, contributing to 4 million deaths per year and the loss of 120 million healthy years of life worldwide.[8]

9. The highest burden of all forms of malnutrition is shouldered by the poorest communities. Gender inequality and other forms of discrimination further impact individual food security and access to nutrients. Population ageing also raises new challenges for assuring optimal nutrition throughout the life cycle.

10. Multiple forms of malnutrition can co-exist within the same country, household and even within an individual. A normal body mass index, for example, does not protect against micronutrient deficiencies, which can reflect poor diet quality. Globally, the problem of malnutrition is clearly shifting from one dominated by undernutrition to a more complex burden of malnutrition, including unhealthy eating.

11. Micronutrients are essential to healthy growth and development and have enabled life-saving interventions. For example, since vitamin A supplementation was found to significantly reduce all-cause mortality among children, the World Health Organization (WHO) has recommended provision of vitamin A to all infants and children aged 6 to 59 months where vitamin A is deficient. Micronutrient deficiencies can also be addressed through food fortification, whereby micronutrients are added to staple foods. To date, 140 countries have mandated iodization of salt, 86 countries

[6] Global Burden of Disease 2017 Diet Collaborators, "Health effects of dietary risks in 195 countries, 1990–2017: a systematic analysis for the Global Burden of Disease Study 2017", *The Lancet*, vol. 393, No. 10184 (May 2019).

[7] WHO, "New global estimates of child and adolescent obesity released on World Obesity Day", 10 October 2017.

[8] Global Burden of Disease 2015 Obesity Collaborators, "Health effects of overweight and obesity in 195 countries over 25 years", *New England Journal of Medicine*, vol. 377 (2017).

have mandated the fortification of at least one staple cereal flour and 49 countries have mandated the fortification of edible oils.

B. A fair start for all: universal nutrition during pregnancy and childhood

12. The interlinkages of nutrition, food security and reproductive health are striking. Undernutrition in pregnancy increases the risks of obstructed labour, premature births, low-birth-weight babies, and postpartum haemorrhage. Nearly 15 per cent of babies born in 2015 were of low birth weight and more likely to die during their first month of life; those who survived face lifelong consequences, including a higher risk of stunted growth, risks for cognitive development, and adult-onset conditions such as obesity and diabetes.[9] Chronic undernutrition delays maturation and extends the adolescent growth period, overlapping with pregnancy where child marriage and early childbearing remain in force. Early pregnancy in a young undernourished female negatively impacts her own growth, and short intervals between births worsen pregnancy outcomes.

13. Developmental demands of the fetus increase micronutrient requirements and the risk for deficiencies that affect maternal and newborn health and mortality. In 2016, one in three women of reproductive age (15–49 years) was anaemic, increasing the risk for haemorrhage, the leading cause of maternal death (23 per cent of total deaths). As compared with North America and Europe, the anaemia prevalence rate in Africa and Asia is more than double. In areas of moderate to high malaria transmission, the risk of maternal anaemia is much higher, compounding the risk of fetal growth retardation, low birth weight and low weight for age. Child marriage and early pregnancies lead to added risks: initial pregnancy has a higher malaria parasite load, and the younger a mother, the worse her nutritional preconditions for pregnancy. In malaria-endemic regions, iron supplementation and presumptive curative treatment of malaria among pregnant women, followed by preventive treatment, is a cost-effective intervention: when implemented as part of routine antenatal care it significantly reduces maternal anaemia, and increases infant birthweights and reduces stunting. The global prevalence of maternal anaemia could be reduced by one-third to one half if action were taken to support focused, large-scale programmes.[10]

14. The development and economic losses associated with malnutrition are largely preventable. Adequate investments should be made in proven interventions, in particular during the crucial 1,000-day window of pregnancy and the first two years of life. Lack of universal access to optimal nutrition among girls, pregnant women and infants can be traced to shortfalls in financing and political commitments, to gender discriminatory norms and practices, including the failure to avoid forced and early marriage, and unmet need for family planning. In 2012, the World Health Assembly endorsed the Comprehensive Implementation Plan on Maternal, Infant and Young Child Nutrition,[11] highlighting the need for a multifaceted, multisectoral, life-course approach to address the burden of malnutrition globally.

15. Maternal health and nutrition interventions are highly cost-effective, yielding permanent and inalienable benefits. Where underweight is prevalent, balanced energy-protein supplementation for pregnant women who are undernourished promotes gestational weight gain and improved birth outcomes.[11] Antenatal micronutrient

[9] See https://data.unicef.org/topic/nutrition/low-birthweight/.

[10] Tina G. Sanghvi, Philip W. J. Harvey and Emily Wainwright, “Maternal iron-folic acid supplementation programmes: evidence of impact and implementation”, *Food and Nutrition Bulletin*, vol. 31, No. 2 (June 2010).

[11] WHO, document WHO/NMH/NHD/14.1.

supplementation is a low-cost and feasible way to improve birth outcomes, which in turn reduces stunting risk, low birthweight and small-for-gestational-age births.[12] The United Nations Children's Fund (UNICEF) multiple micronutrient preparation supplement contains 14 micronutrients at levels appropriate for daily intake during pregnancy.

16. After birth, maternal nutrition is crucial, as breastfeeding underpins child nutrition through its wide-ranging benefits for a child's immunity, brain and microbiome development, and for reduction of non-communicable diseases later in life. Breastfed children perform better on intelligence tests, are less likely to be overweight or obese, and are less prone to diabetes later in life. Women who breastfeed also have a reduced risk of breast and ovarian cancers, overweight/obesity, type 2 diabetes and hypertension.[13] Globally, nearly three out of five infants are not exclusively breastfed for the recommended six months.[14] Teenage mothers face unique challenges to breastfeeding, with less experience in infant feeding, and unplanned pregnancy is associated with poorer breastfeeding practice. Laws to protect, promote and support breastfeeding are inadequate. Only 39 countries have laws that enact all provisions of the International Code of Marketing of Breast-milk Substitutes. The duration of paid maternity leave promotes breastfeeding, as returning to work is associated with early interruption of breastfeeding. Evidence suggests that mass media campaigns are important for increasing national breastfeeding rates.

17. Interventions that ensure adequate nutrition for children aged 6–24 months significantly improve weight and height z-scores. School feeding programmes can measurably improve nutrition and reduce stunting among school-aged children in food-insecure populations.[15] School breakfast programmes, in particular, provide significant nutritional benefits,[16] with net fiscal benefits from $206 million to $3.1 billion.[17] Social protection programmes can support healthy eating and promote dietary diversity. Community management for the treatment of severe acute malnutrition has improved survival rates and is highly cost effective. It empowers families to treat the condition at home with ready-to-use therapeutic foods, and local production of such foods can lower costs. Management of severe acute malnutrition is among the 10 highest-impact nutritional interventions to reduce child mortality.[18]

18. Nutrition interventions should also target older persons, who may experience malnutrition due to loss of appetite, decrease in the body's ability to process food, social isolation or depression, household discrimination or limited ability to shop and prepare food. Evidence from Finland shows that dietary counselling can improve nutritional status among community-dwelling older persons, even if it is not

[12] Emily C. Keats and others, "Multiple-micronutrient supplementation for women during pregnancy", *Cochrane Database of Systematic Reviews*, vol. 3, No. 4CD004905 (2019).

[13] Ranadip Chowdhury and others, "Breastfeeding and maternal health outcomes: a systematic review and meta-analysis", *Acta Paediatrica*, vol. 104, No. S4647 (December 2015).

[14] United Nations Children's Fund (UNICEF), *The State of the World's Children 2019: Children, Food and Nutrition – Growing well in a Changing World* (New York, 2019).

[15] Zohra S. Lassi and others, "Impact of education and provision of complementary feeding on growth and morbidity in children less than 2 years of age in developing countries: a systematic review", *BMC Public Health*, vol. 13, No. 3 (September 2013).

[16] Philip M. Gleason and Allison Hedley Dodd, "School breakfast programme but not school lunch programme participation is associated with lower body mass index", *Journal of the Academy of Nutrition and Dietetics*, vol. 109, No. 2 (February 2009).

[17] Rachel Nugent and others, "Economic effects of the double burden of malnutrition", *The Lancet*, Double Burden of Malnutrition Series, vol. 395, No. 10218 (December 2019).

[18] Zulfiqar A. Bhutta and others, "Evidence-based interventions for improvement of maternal and child nutrition: what can be done and at what cost?", *The Lancet*, vol. 382, No. 9890 (August 2013).

accompanied by nutritional supplements.[19] Emerging interventions range from direct provision of meals, food enhancements to improve absorption, supplementation and community support.

C. Global rise of unhealthy diets and new patterns of disease

19. Food production, marketing and broader social changes over the past 50 years have shifted global dietary patterns to those characterized by increased consumption of foods high in energy, fats, free sugars and salt/sodium, and inadequate intake of fruits, vegetables and dietary fibre. These changes have led to a rising global epidemic of overweight and obesity, which now contributes to 4 million deaths globally.[20]

20. Since 1975, there has been a tenfold increase in overweight and obesity among children and adolescents, in particular in countries with a high burden of communicable, maternal, and nutritional conditions, contributing to type 2 diabetes, asthma, sleeping disorders, liver disease and the psychological consequences of low self-esteem. Childhood overweight and obesity often persist into adulthood, resulting in increased risk of adult type 2 diabetes, cardiovascular disease and cancer.

21. Promoting a significant shift away from unhealthy diets towards more nutritious dietary patterns requires the involvement of multiple sectors and stakeholders, including government, and the public and private sectors. The regulatory environment around school feeding is key to limiting exposure to high-calorie and low-nutrient foods, and to ensuring the adoption of healthy eating habits early in life. Access to safe piped drinking water in schools is crucial, providing a healthy alternative to sugar-sweetened beverages.

22. Governments can support programmes to promote healthy dietary habits or to discourage unhealthy habits. In developed countries, vouchers for fruit and vegetable purchases have increased such consumption. Taxes on sugar-sweetened beverages – a policy lever used to discourage excessive consumption[21] – have been enacted in 73 countries. Education about healthy diets is necessary but not sufficient, since consumers make choices based also on taste, price and exposure to advertising. In low-income and middle-income countries, behaviour change communication programmes have been tested to promote healthier dietary habits,[22] but more research is needed on effective consumer messaging. WHO “best buys” for cost-effective interventions to ameliorate unhealthy diets[23] include behaviour change communication and front-of-pack labelling; elimination of industrial trans-fats; taxation on sugar-sweetened beverages; reduction of salt intake through reformulation; and provision of lower salt options in public institutions.

23. Influencing public demand for healthy diets depends on food-based dietary guidelines that address inadequate intake of some food groups, while reducing excess consumption of others. Currently, 91 of the 193 States Members of the United Nations have such guidelines, among the 54 African Member States, only 7 do. Food-based

[19] Irma Nykänen I. and others, “Effects of individual dietary counselling as part of a comprehensive geriatric assessment (CGA) on nutritional status: a population-based intervention study”, *Journal of Nutrition, Health and Ageing*, vol. 18, No. 1 (January 2014).

[20] Global Burden of Disease 2015 Obesity Collaborators, “Health effects of overweight and obesity in 195 countries over 25 years”.

[21] Hunt Allcott, Benjamin B. Lockwood and Dmitry Taubinsky, “Should we tax sugar-sweetened beverages? An overview of theory and evidence”, *Journal of Economic Perspectives*, vol. 33, No. 3 (Summer 2019).

[22] Marie T. Ruel, Agnes R. Quisumbing and Mysbah Balagamwala, “Nutrition-sensitive agriculture: what have we learned so far?”, *Global Food Security*, vol. 17 (June 2018).

[23] WHO, document WHO/NMH/NVI/17.9.

dietary guidelines should also consider long-term dietary sustainability in the light of climate change. The Continental Nutrition Accountability Scorecard for Africa brings an additional governance and accountability mechanism, targeting heads of State and finance ministers for commitments made to agriculture development and nutrition.

D. Nutrition and universal health coverage

24. Good nutrition is fundamental to achieving the right to health. No country can achieve universal health coverage without investing in nutrition, and good nutrition cannot be achieved without universal health coverage. Suboptimal diets are the single largest driver of morbidity and mortality in the world, more than tobacco smoking or hypertension.[24] Despite continuous improvements in economic development, rates of malnutrition remain unacceptably high. One reason is that nutrition has not been systematically addressed within health systems, and the rise in unhealthy diets has undermined other health gains. Mainstreaming a package of nutrition interventions within universal health coverage offers a cost-effective means to improve lifetime health.

25. Governments have the opportunity to accelerate fulfilment of the Programme of Action of the International Conference on Population and Development, Sustainable Development Goal targets, goals of the United Nations Decade of Action on Nutrition, and universal health coverage itself, by developing and funding nationally tailored nutrition actions within universal health coverage. A suite of ready-to-scale nutrition interventions of proven effectiveness is available.[25] Such interventions are highly cost-effective, with $1 invested in nutrition yielding estimated returns ranging between $4 and $35. Nutrition interventions offer particularly valuable health benefits to the poorest households and communities, for whom intergenerational health implications can be extreme.

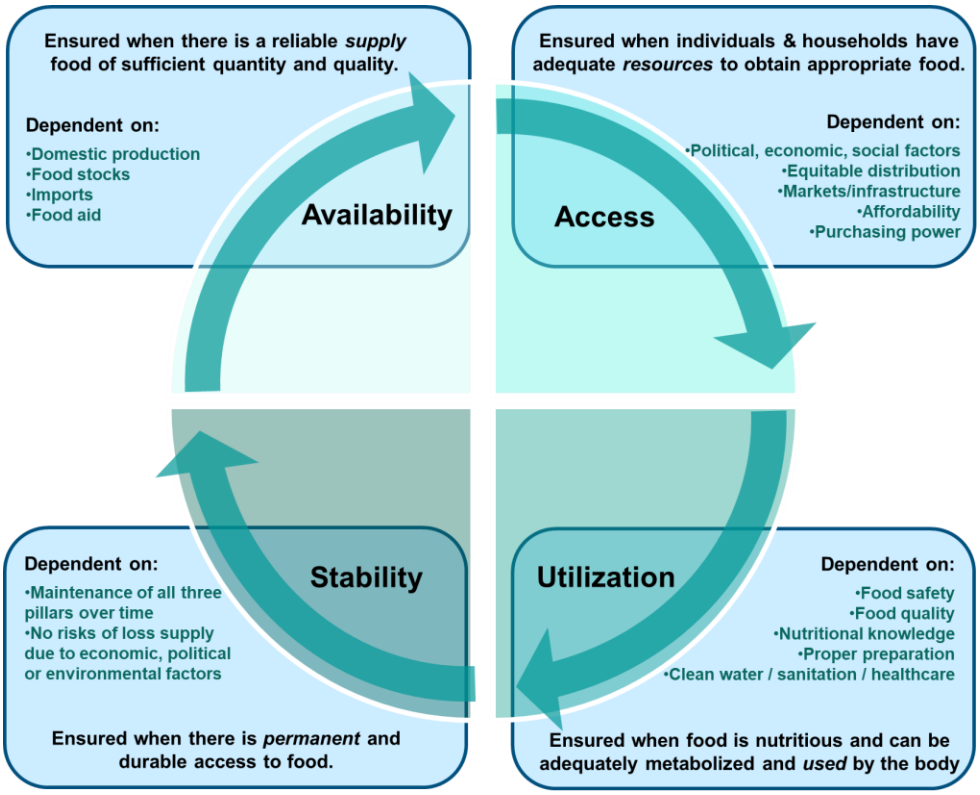
III. Food security and population well-being

26. While poverty and the percentage of people who lack adequate food have declined since the turn of the century, the number of people who are food insecure and undernourished, as well as overweight and obese, has risen. Food insecurity refers to a lack of consistent access to food, which diminishes dietary quality, disrupts normal eating patterns, and coincides with eating patterns that heighten the risk of overweight and obesity. Components of food security include availability, access, utilization and stability (see figure I).

[24] Global Burden of Disease 2017 Diet Collaborators. “Health effects of dietary risks in 195 countries, 1990–2017”.

[25] Meera Shekar and others, *An Investment Framework for Nutrition: Reaching the Global Targets for Stunting, Anemia, Breastfeeding, and Wasting* (Washington, D.C., World Bank, 2017).

Figure I
Components of food security



Source: Food and Agriculture Organization of the United Nations.

Availability

27. While global food production should be sufficient for all, distribution limits availability, and current agricultural trends risk future productivity. The proportion of global land being used for human activity including agriculture has increased significantly over the past 50 years. Currently food production occupies 50 per cent of the Earth's habitable land, and accounts for 70 per cent of freshwater consumption.[26] The corresponding loss of natural ecosystems has had "unprecedented" negative effects on global biodiversity,[27] destroying habitats that harboured wild genetic relatives of current food crops, which are important or the long-term resilience of agriculture. An estimated $577 billion in annual global crops are currently at risk from pollinator loss alone.

28. While the land area devoted to agriculture has expanded, the diversity of cultivated field crops has actually declined. In many parts of the world, biodiverse agricultural landscapes have been, or are being, replaced by large areas of monoculture. Of more than 6,000 plant species cultivated for food production, just nine (sugar cane, maize, rice, wheat, potatoes, soybeans, oil palm fruit, sugar beet and cassava) account for 66 per cent of total crop production and fewer than 200 contribute significantly to food production globally, regionally or nationally.[28]

[26] United Nations Environment Programme, *Global Environmental Outlook: GEO-6 – Healthy Planet, Healthy People* (Nairobi, 2019).
[27] Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services, "Nature's dangerous decline 'unprecedented' species extinction rates 'accelerating'", media release, 2019.
[28] FAO, *The State of the World's Biodiversity for Food and Agriculture* (Rome, 2019).

29. Urgent policy investment is needed to guide a crop framework focused on achieving global goals for nutrition and long-term food security. Numerous interventions are under way to promote greater biodiversity, soil health, and sustainable agriculture, and some are moving to scale. “Save and grow” practices, such as low-tillage farming, water-efficient cropping and ecology-friendly pest management have been successfully applied to crops such as rice, cassava and other staples, with smallholder farmers as primary drivers. The implementation of the zero-tillage on the Indo-Gangetic Plain set a precedent for farms keeping soil covers for higher yields and less fuel use.

30. To assure distribution while reducing the environmental impact of global food transport, national policy interventions must engage both large agriculture and smallholders. More than 80 per cent of the approximately 600 million family farms (representing more than 2.5 billion people) worldwide are smaller than 2 hectares, and in low-income and middle-income countries, a significant share of food consumed by the poor is produced locally by smallholders.[29]

31. Forests are a source of food, medicine and fuel for more than 1 billion people, and sustain a range of industries. However, native forest cover has declined by approximately 6 per cent since 1990; the Brazilian Amazon alone lost 22,827 km^2 of forest between 2015 and 2018. Forest loss results in biodiversity loss, release of carbon dioxide into the atmosphere, loss of livelihoods for rural communities and land degradation. Successful reversal of such trends is possible. The successful re-greening of the Sahel in Burkina Faso used agroforestry to rehabilitate arid landscapes into productive land. In the Niger in the 1980s, farmers experimented with low-cost ways of reproducing and generating trees and shrubs that provide food, fuel and fodder, and 1.25 million trees have been added every year.[30]

32. Nearly 3.2 billion people receive 20 per cent of their daily animal protein intake from fish, yet in 2015 the United Nations estimated that 33 per cent of marine fish stocks were being harvested at unsustainable levels, an increase from 10 per cent in 1974. Marine plastic pollution has increased tenfold since 1980, and the ability of oceans to provide food for future generations is at risk. Innovative management of fisheries can improve sustainability. The sixth Global Environment Outlook highlighted the Territorial Use Rights for Fishing policy of Chile to encourage sustainable fishing of abalone by reducing overfishing, encouraging stewardship and offering communities sanctioning mechanisms to hold them accountable.[31]

33. Many policy tools affecting food availability show evidence of success, including better animal husbandry and health, improved water management, better land governance and pesticide and fertilizer regulations. Government-to-Government policy exchange is encouraged, along with more research on sustainable agricultural practices, including strategies for soil restoration, increasing crop nutrient density and carbon capture.

34. Access is the principal channel through which the fragility of the household economy and national economic shocks can lead to food insecurity. More than 96 million people in 33 countries who suffered from acute food insecurity in 2018 lived in places where the economy was undergoing economic shocks. High food prices pose a threat to agricultural markets and food security, especially among those

[29] International Fund for Agricultural Development, *Rural Development Report 2016: Fostering Inclusive Rural Transformation* (Rome, 2016).

[30] David J. Spielman and Rajul Pandya-Lorch, eds., *Millions Fed: Proven Successes in Agricultural Development*, International Food Policy Research Institute (Washington, D.C., 2009), p. 55.

[31] James E. Wilen, José Cancino and Hirotsugu Uchida, “The economics of territorial use rights fisheries, or TURFs”, *Review of Environmental Economics and Policy*, vol. 6, No. 2 (Summer 2012).

most economically vulnerable. Despite the decline in world food prices in the past decade, one in four countries in Africa and Western Asia, and one in five in Central and Southern Asia, experienced high food prices in 2016 and 2017. Landlocked developing countries were particularly prone to high food prices, with about one third of countries affected during the same period.[32]

35. Healthy utilization of food depends on food safety; avoiding food contamination from production, post-harvest, and/or storage practices; and limiting food waste. Globally, nearly 420,000 people die annually from contaminated food, 30 per cent of whom are children under 5, with the highest death rates in sub-Saharan Africa and Asia.[33] The Framework for Action includes a set of five recommended policy actions on food safety and antimicrobial resistance.[34] Aflatoxins, a contaminate of grains, cause 5 to 30 per cent of all liver cancer in the world and are associated with growth retardation and immunosuppression.[35] Control of aflatoxin requires awareness education and the mainstreaming of good regulatory practice. In Nigeria, the introduction of an adapted biocontrol product called Aflasafe, using native fungi, decreased aflatoxin contamination of maize and groundnut by 70 to 95 per cent.[36]

36. The extensive use of antimicrobials in livestock and aquaculture is of serious concern given the global threat of antimicrobial resistance for animals and humans. Antibiotic use in agriculture and aquaculture for growth promotion and disease prevention are increasingly identified with human health risks. The report to the Secretary-General by the Inter Agency Coordination Group on Anti-Microbial Resistance in April 2019 calls on Member States to phase out the use of antimicrobials for growth promotion in livestock farming, according to guidance from the Tripartite agencies (Food and Agriculture Organization of the United Nations (FAO), World Organization for Animal Health and WHO) and the Codex Alimentarius, starting with an immediate end to the use of those on the WHO list of critically important antimicrobials for human medicine.[37] Sustainable animal husbandry practices can reduce infections and dependence on antibiotics, and monitoring of antimicrobial use (and that of fertilizers and pesticides), should be part of government or civil society monitoring of agricultural practice. For Africa, such monitoring is recommended as part of the Comprehensive Africa Agriculture Development Programme.

37. While many countries have established national laws and practices in an effort to reduce pesticide harm, levels of protection vary significantly. Without standardized, stringent regulations on the production, sale and acceptable levels of pesticides, severe health effects will continue to affect agricultural workers, their children and poor communities in countries with weak regulatory systems. In some low-income countries, pesticide poisoning exceeds deaths from infectious diseases. Pesticides containing industrial chemicals and organic pollutants are associated with endocrine disruption, infertility, pregnancy loss, pre-term delivery and congenital

[32] FAO, FAO Food Price Index, available at www.fao.org/worldfoodsituation/foodpricesindex/en/.

[33] WHO, *WHO Estimates of the Global Burden of Foodborne Diseases: Foodborne Disease Burden Epidemiology Reference Group 2007–2015* (Geneva, 2015).

[34] See FAO, document ICN2 2014/3 Corr.1.

[35] See www.aflatoxinpartnership.org.

[36] Ranajit Bandyopadhyay and others, "'Ground-truthing' efficacy of biological control for aflatoxin mitigation in farmers' fields in Nigeria: from field trials to commercial usage, a 10-year study", *Frontiers in Microbiology*, vol. 10, No. 2528 (November 2019).

[37] See www.who.int/foodsafety/areas_work/antimicrobial-resistance/cia/en/.

abnormalities.[38] Early-life exposure to pesticides can affect the quality of sperm across multiple generations of men.[39]

38. Finally, about 14 per cent of the world's food is lost before reaching the retail level, and a variable proportion of highly perishable products (14–37 per cent of animal products, 9–20 per cent of fruits and vegetables) are wasted after retail.[40] Pioneering cities have developed food strategies and food policy councils to coordinate food distribution and reduce waste, and more multisectoral and cross-government approaches are needed to simultaneously reduce waste and increase access to fresh and nutritious foods.

39. Stability is affected by exposure to new sociocultural food traditions, on environmental change and changes in availability and access. Despite enormous variety in national food systems and cultures, the past five decades have seen global trends towards greater meat consumption, higher sugar intake, greater intake of highly processed foods and more saturated fat in global average diets.

40. Policy experiments to reverse these trends remain fragmented, but many policy cases suggest high returns on investment. Particularly cost-effective are dietary interventions focused on the mother-child dyad, and those undertaken in schools. The public sector can use large public institutions, such as schools or hospitals, to improve food stability. In Brazil, for example, the Government used a public acquisition programme to simultaneously link a school feeding programme and advocacy for local farmers to grow more nutritious foods, under its Zero Hunger initiative, whereby 30 per cent of all purchases for school feeding come from smallholder agriculture.[41] The World Food Programme (WFP) has promoted home-grown school feeding interventions in Africa, incorporating nutrition as a goal. Private sector promotion of healthier eating can enhance productivity and job satisfaction, for example, where businesses provide on-site meals for workers.

41. Human geography is changing quickly, making new demands on food stability. With more than half of the world's population living in urban areas, decisions on how to nourish growing urban populations will have major consequences for food security. Peri-urban agriculture will likely need to play a larger role in the nourishment of urban populations, if they are to simultaneously reduce food transport. To address the problem of unhealthy urban diets, the Milan Urban Food Policy Pact, signed by 98 cities around the world, aims to "develop sustainable food systems that are inclusive, resilient, safe and diverse", to provide nutritious and affordable food to all people.[42] Other city-level actions include school-based advocacy and learning, the promotion of urban farming and support for a wide distribution of local farmers markets.

42. Recognizing that cities and countries vary considerably in food systems, the Fill the Nutrient Gap tool used by WFP helps to assess nutritional status and identify public barriers to following a healthy diet. Broader use of such assessments is warranted, with results used to coordinate multisectoral policies for assuring stable and reliable access to nutritious foods for all.

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[38] Lesa A. Thompson and Wageh S. Darwish, "Environmental chemical contaminants in food: review of a global problem", *Journal of Toxicology* (2019).

[39] Maryse Lessard and others, "Prenatal exposure to environmentally-relevant contaminants perturbs male reproductive parameters across multiple generations that are partially protected by folic acid supplementation", *Scientific Reports*, vol. 9, No. 13829 (2019).

[40] FAO, *The State of Food and Agriculture 2019: Moving Forward on Food Loss and Waster Reduction* (Rome, 2019).

[41] Emilie Sidaner, Daniel Balaban and Luciene Burlandy, "The Brazilian school feeding programme: an example of an integrated programme in support of food and nutrition security", *Public Health Nutrition*, vol. 16, No. 6 (June 2013).

[42] See www.milanurbanfoodpolicypact.org.

A. Who is most food insecure?

43. The highest rates of poverty, hunger, and child stunting are found in low-income countries, with the largest absolute numbers of hungry children and those affected by stunting (149 million) living in Asia. Children living in poverty are the most likely to be underfed and malnourished and experience stunting. However, disparities in stunting within countries vary considerably: there is an elevenfold difference in stunting between the richest and the poorest children in Peru, while closer to fivefold differences in Bolivia (Plurinational State of), Gabon, Honduras and Jordan.[43]

44. On every continent, the prevalence of food insecurity is higher among women. As primary caregivers, women play a crucial role in child feeding, yet they face gender-based violence and harmful practices, intrahousehold discrimination, restrictions to their education and employment opportunities and gender-biased laws that limit their access to land ownership and financing. Women are disproportionately represented among landless populations facing food insecurity.

45. Socially excluded and marginalized groups face greater risk of malnutrition. Globally, nearly 370 million indigenous people endure harsh environmental and socioeconomic conditions. The rate of stunting among Brazilian indigenous groups in 2013 was two to five times higher than that among non-indigenous groups.[44] Children in the most disadvantaged ethnic groups in low-income and middle-income countries have on average 2.8 times the rate of stunting and 6 times the rate of wasting compared with their more advantaged peers.[45] Disability can be both a cause and consequence of malnutrition; stigma around disability can result in newborns not being breastfed or children being given less nutritious or smaller portions of food.

46. The Government of Brazil is addressing marginalization and food insecurity by mainstreaming hunger eradication within the Fome Zero programme and its flagship conditional cash transfer programme, The Bolsa Família programme, which has reduced extreme poverty by 25 per cent since 2004. Although an increasing number of studies have stressed the positive role of cash transfer programmes for increasing access to food and health care, the evidence to date on child nutrition is mixed on whether cash transfer positively impacts growth-related outcomes among children.[46]

47. Geographical remoteness also determines whether a family or person has access to essential foods, health care and nutrition services. Stunting rates among the poorest urban populations can be as high or higher than rates among poor rural children, but two-thirds of the world's stunted children live in rural areas.[47] Compared with their urban counterparts, children living in rural areas of Burundi, Honduras and Mali were twice as likely to be stunted.[48]

48. Many urban residents experience steep inequalities in food security. Rural-to-urban migration is creating "hidden cities" of extremely poor urban populations,

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[43] Marie Rumsby and Katherine Richards, *Unequal Portions: Ending Malnutrition for Every Last Child* (London, Save the Children, 2016).

[44] Bernardo Horta and others, "Nutritional status of indigenous children: findings from the First National Survey of Indigenous People's Health and Nutrition in Brazil" *International Journal of Equity in Health*, vol. 12 (2013).

[45] Rumsby and Richards, *Unequal Portions*.

[46] Richard de Groot and others, "Cash transfers and child nutrition: pathways and impacts", *Development Policy Review*, vol. 35, No. 5 (September 2017).

[47] Marie Ruel, James Garrett and Sivan Yosef, "Food security and nutrition: growing cities, new challenges", in International Food Policy Research Institute, *2017 Global Food Policy Report* (Washington, D.C., 2017).

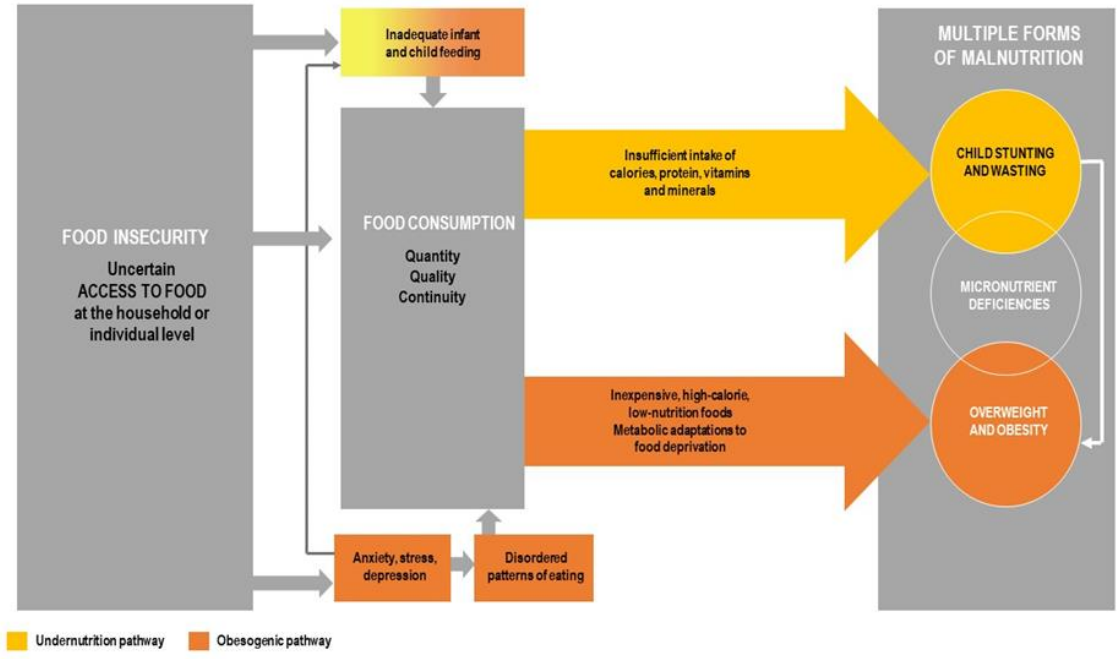
[48] UNICEF, WHO and World Bank, Joint Child Malnutrition Estimates 2019 Edition database. Available at www.who.int/nutgrowthdb/jme-2019-key-findings.pdf?ua=1.

including over 800 million people living in slum conditions who are particularly vulnerable to financial crises or food price hikes. For people who remain in rural and remote areas with poor infrastructure, physical access to a healthy diversity of foods may also be limited and compounded by climate and seasonal fluctuations that threaten food security.

49. Shifts in consumption towards foods high in sugar, salt and fats are happening fastest in urban areas of low-income and middle-income countries.[49] Poor urban residents face challenges in finding a variety of affordable, fresh and nutritious foods, and many either live in "food deserts" where there is little or no access to food, or in "food swamps" where there is an abundance of high-calorie, low-nutrient, processed foods.

50. People experiencing food insecurity shift from nutrient-rich foods towards more energy-dense but nutrient-poor foods. The greater affordability of highly processed, energy-dense, low-nutrient foods is what links food insecurity with obesity, in particular in low-income and middle-income countries where such foods are widely available, cheaper than nutritious foods[50] and aggressively marketed (see figure II).

Figure II
Pathways from inadequate food access to multiple forms of malnutrition



Source: FAO, International Fund for Agricultural Development (IFAD), UNICEF, WFP and WHO, *The State of Food Security and Nutrition in the World 2018: Building climate resilience for food security and nutrition* (2018).

51. Conflict and insecurity, climate shocks and economic turbulence are common drivers of food insecurity, exacerbating nutritional risks and often leading to an increase in acute malnutrition in emergencies. Women go hungry more often than men in times of crisis, even if they are pregnant or nursing. The prevalence of stunting increases in

[49] Ruel, Garrett and Yosef, "Food security and nutrition".
[50] Vasanti S. Malik and others, "Sugar-sweetened beverages, obesity, type 2 diabetes mellitus, and cardiovascular disease risk", *Circulation*, vol. 121, No. 11 (March 2010).

protracted humanitarian crises, while rates of wasting typically remain high, [51] indicating the need for solutions addressing both acute and long-term malnutrition.

52. Food insecurity also impacts human mobility and migration.[51] Countries with the highest levels of food insecurity and armed conflict have the highest outward migration of refugees, and food insecurity itself increases the likelihood and intensity of armed conflicts.

53. A comprehensive approach is needed to prevent the deterioration of nutrition in times of crisis and to sustain nutrition-related gains over the longer term. Conditional cash transfers show promise in increasing vulnerable people's access to nutritious foods, but strategies must ensure that cash transfers are used to purchase nutritious food. In Bangladesh, support provided through e-vouchers combined with nutrition education provides a double-duty intervention that promotes healthy eating.[52]

B. Food systems, young people and demographic change

54. Ageing of the agricultural labour force is a trend in many parts of the world. The global average age of farmers is now about 60, yet countries with the highest proportions of young people also depend heavily on agriculture. The transformation of the rural economy will influence both the scale and kinds of opportunities available to young people, women and others facing underemployment. Constrained access to land, finance, markets and mentoring hinders young people, in particular young women, from securing opportunities within modern agriculture. Many local and State programmes are therefore drawing young people into youth farmer networks, agricultural entrepreneurship initiatives and programmes offering subsidies, credit, mentoring and knowledge exchange among farmers of all ages.

55. Scarcity and inequities in the distribution of agricultural land are increasing with rural population growth, in particular in sub-Saharan Africa, confining people within "poverty traps" on degraded lands. Population growth is linked to the shrinking size of most smallholder farms, and can be effectively addressed by expanding access to voluntary family planning, education for women and girls and child survival.

56. Some challenges are greatest for young women. Food insecurity and poverty can lead families to resort to child, early or forced marriage to ease financial pressure, have fewer mouths to feed and place a daughter in a more secure household. In countries where child, early or forced marriage is already common, economic shocks are often accompanied by rising incidence. Young brides and their children experience higher rates of malnutrition than those who marry later, lower levels of educational attainment and less access to agricultural training or resources. Agriculture programmes can target those already in early marriages to ensure that they benefit from agricultural training opportunities, and Governments can aggressively discourage child, early or forced marriage.

57. The *Agrifood Youth Employment and Engagement Study* indicates that expanding investments in the sub-Saharan Africa agricultural sector will be critical to generate higher-paying jobs in the next decade – both on and off the farm – for the large rural youth population.[53] With an eye on sustainability, FAO and local authorities in Tanzania introduced youth-targeted training in organic farming. Young trainees returned to their

[51] World Food Programme, *At the Root of Exodus: Food Security, Conflict and International Migration* (2017).

[52] FAO and others, *The State of Food Security and Nutrition in the World 2019.*

[53] Andrea Allen and others, *Agrifood Youth Employment and Engagement Study* (Michigan State University, 2016).

communities, trained their peers, raised awareness of organic agriculture and found local markets for their produce, including the booming hotel industry.

58. Women play important roles as producers and sellers of food, managers of natural resources and caretakers of household nutrition and food security. Agriculture employs 60 per cent of the total female working population in South Asia.[54] However, many women in farming do not work their own land, but are in agricultural wage labour with unreliable incomes, pervasive sexual harassment and poor working conditions. Gender inequalities across the farming sector can be extreme, with women responsible for much smallholder production but far less likely than men to have rights over land and water resources.

59. Lack of data contributes to inappropriate and shallow targeting of women in agricultural projects, which may reach women but not empower them.[55] Ultimately, land ownership is crucial for women to safeguard their rights, innovate for sustainable productivity and invest in ways that benefit children and households.

IV. Sustainability and adaptation to climate change

60. Progressive changes in the global food system over the past 50 years have increased productivity, but at the cost of exacerbating land degradation, which now directly affects 1.3 to 3.2 billion people, mostly in developing countries. Unsustainable land management practices have increased freshwater use, biodiversity loss and pollution, in particular in farming systems that make heavy and/or poorly managed use of chemical pesticides, fertilizers and antibiotics. Habitat loss is degrading pollinator services (more than 80 per cent of all crops depend on insect pollination), and land degradation is decreasing crop yields and the nutrient density of food.

61. Incentives within the national or global food system can change both what is produced and how it flows through value chains. However, government spending on agriculture in relation to its contribution to the economy fell between 2001 and 2017. Globally, the agriculture orientation index – the share of government expenditure to agriculture divided by the share of gross domestic product from agriculture – fell from 0.42 in 2001 to 0.26 in 2017.[56]

62. The interaction between climate change and the food system is complex. The food system is the single largest direct and indirect driver of climate change, contributing 21 to 37 per cent of greenhouse gas emissions. In relative terms, animal source foods are the major contributor of greenhouse gas emissions, accounting for 37 to 66 per cent of the total food system emissions, with cattle production being the main contributor.[57]

63. However, climate shocks are an emerging and important determinant of food insecurity (see figure III). In 2017, nearly 124 million people in 51 countries and territories faced “crisis” levels of acute food insecurity, and more than three quarters of them were also affected by climate change shocks.[57]

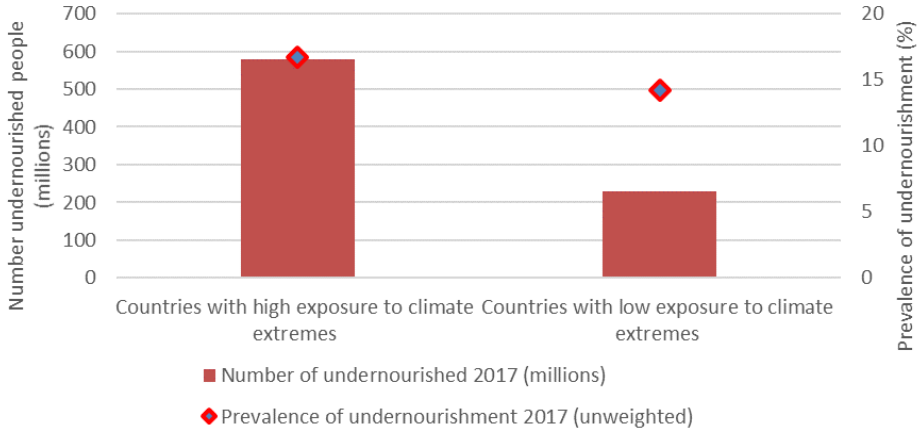
[54] International Labour Organization, ILOSTAT database (2016), available at https://ilostat.ilo.org/.

[55] See Agnes R. Quisumbing and Ruth Suseela Meinzen-Dick, eds., *Empowering Women to Achieve Food Security* (International Food and Policy Research Institute, 2001).

[56] See, *The Sustainable Development Goals Report 2019* (United Nations publications, Sales No. E.19.I.6).

[57] Cheikh Mbow and Cynthia Rosenzweig, “Food security”, in Intergovernmental Panel on Climate Change, *Climate Change and Land: an IPCC Special Report on Climate Change, Desertification, Land Degradation, Sustainable Land Management, Food Security, and Greenhouse Gas Fluxes in Terrestrial Ecosystems* (Geneva, 2019).

Figure III
Higher prevalence and number of undernourished people in countries with high exposure to climate extremes



Source: FAO, IFAD, UNICEF, WFP and WHO, *The State of Food Security and Nutrition in the World 2018: Building Climate Resilience for Food Security and Nutrition*.

64. Food and agricultural systems will need to change profoundly if humanity is to adopt healthy diets based on food grown in ways that are sustainable and resilient in the face of climate change. Changes are required in food production, the food environment, and consumer behaviour.

65. Climate change will alter the distribution of pests and diseases affecting food quality, and rising temperatures and water scarcity may limit the extent to which irrigation expansion can counter climate threats to crop yields. It will be necessary to adapt production practices to reduce soil degradation and water use, while improving the quality of diets for better nutrition and health. Promising initiatives include plant diversification programmes to increase soil health, crop yields and nutrient density in farming households; and conservation agriculture and no tillage practices to optimize crop production, retain organic matter and nutrients in the soil and offer more carbon sequestration.[58] If farmers receive incentives, and perceive long-term benefits, many adopt new technologies and conservation agriculture techniques, even with lower expected short-term returns relative to conventional cropping methods.

66. Evidence suggests that land tenure among smallholder farmers can increase investments in sustainability. When land rights were secured in Rwanda, investments in soil conservation increased.[59] In Africa, where 90 per cent of land tenure is informal, large-scale measures based on pilot experiments have been identified by the World Bank which could leverage land tenure improvement for $4.5 billion.[60] Conditional cash transfers can promote the adoption of more sustainable practices; in Uganda, such transfers reduced forest cover loss.[61] Ideally, the positive effects of cash transfer

[58] Antonella Vastola and others, "A comparative multidimensional evaluation of conservation agriculture systems: a case study from a Mediterranean area of Southern Italy", *Land Use Policy*, vol. 68 (November 2017).

[59] Daniel Ayalew Ali and others, "Environmental and gender impacts of land tenure regularization in Africa: pilot evidence from Rwanda", *Journal of Development Economics*, vol. 110 (September 2014).

[60] See Frank F. K. Byamugisha, *Securing Africa's Land for Shared Prosperity: A Program to Scale Up Reforms and Investments*, Africa Development Forum Series (Washington, D.C., World Bank, 2013).

[61] Seema Jayachandran and others, "Cash for carbon: a randomized trial of payments for ecosystem services to reduce deforestation", *Science*, vol. 357, No. 6348 (July 2017).

programmes continue when the payments stop, from the adoption of new practices. In Colombia, for example, farmers who had been incentivized to adopt more sustainable pastoral practices for four years continued to do so long after payments ended.[62]

67. Recent developments on biofortification demonstrate the possibility to breed more nutrient dense foods, to counter projected reductions in nutrient content due to soil degradation. High vitamin A maize and cassava, high iron beans and zinc millet have been bred without reduced productivity, and in some cases actually increased productivity and disease resistance. Biofortified crops are being introduced in the Democratic Republic of the Congo, Nigeria, Rwanda, Uganda and Zambia, among other countries.

68. The EAT-Lancet Commission on Food, Planet, Health recently catalysed an important debate on a healthy reference diet within planetary boundaries. Dietary changes consisting of plant-based foods, such as coarse grains, legumes, fruits and vegetables, nuts and seeds and limited animal-sourced food produced, can reduce greenhouse gas emissions and improve public health.[63] While the overall consumption of meat and other animal source foods strain the natural resource base, in low-income and middle-income countries livestock-derived foods remain critical to meeting the nutrient intakes of many pregnant and lactating women, infants and young children.

69. Local food systems are essential for sustainability. Reducing the global transport emissions is challenging because the demand to move goods around the world is growing. Comparisons between regionalized food systems (whereby urban food and animal feed demands are fulfilled by produce from the nearest possible surroundings) and globalized food systems (where the demands are randomly met form the global pool of producer areas) suggest that regionalized food systems would halve the current level of emissions from food transport, while exclusively global systems would increase emissions by a factor of four.[64]

70. Food waste reduction reduces greenhouse gas emissions and environmental degradation by decreasing the land area needed for food production. Food loss and waste contributed around 10 per cent of the total anthropogenic greenhouse gas emissions in 2010–2016.[65] Technology and better agricultural practices can minimize wastage by increasing the productivity of higher-value agricultural products,[66] and better storage and distribution infrastructure, reducing post-harvest losses.

71. Finally, recent policy recommendations for food security in the context of climate change emphasize the need for Governments and development actors to respond more holistically to the long-term health of agriculture, in the light of climate change. Multi-sector partnerships can promote integrated planning and policy choices. New research and innovations are needed to adapt agricultural practices to climate change, but many interventions are available for Governments to review, adopt and test at scale.

[62] Stefano Pagiola, Jordi Honey Rosés and Jaume Freire González, “Evaluation of the permanence of land use change induced by payments for environmental services in Quindío, Colombia”, *Plos One*, vol. 11, No. 3 (March 2016).

[63] Walter Willett and others, “Food in the Anthropocene: the EAT-Lancet Commission on healthy diets from sustainable food systems”, *The Lancet*, vol. 393, No. 10170 (February 2019).

[64] Steffen Kriewald and others, “Hungry cities: how local food self-sufficiency relates to climate change, diets, and urbanization”, *Environmental Research Letters*, vol. 14, No. 9 (September 2019).

[65] Intergovernmental Panel on Climate Change, *Climate Change and Land*.

[66] Christopher Barrett and others, “Smallholder participation in contract farming: comparative evidence from five countries”, *World Development*, vol. 40, No. 4 (2012), pp. 715–730.

V. Recommendations

72. **Member States are called upon to recognize that, with six years remaining in the United Nations Decade of Action on Nutrition, accelerated action is required to achieve the global goals of eradicating hunger and preventing malnutrition in all its forms, and Governments should capitalize on a wide range of readily available, well-proven and cost-effective nutrition interventions and scale up implementation.**

73. **Governments and development partners are encouraged to make the necessary commitments to assure universal nutrition support for all pregnant women, mother-infant dyads and schoolchildren in all contexts, and to adopt policies that protect, promote and support breastfeeding.**

74. **Governments are encouraged to recognize the special nutritional needs among young pregnant women and to take steps to interrupt the intergenerational cycle of malnutrition and poverty by ending child marriage, discouraging early childbearing and ensuring that all young women have the opportunity to grow into adulthood before starting a family.**

75. **Governments and development partners are encouraged to mainstream nutrition in national health-care systems and improve nutrition training among health workers.**

76. **Member States are encouraged to urgently address the rise of unhealthy eating and the corresponding epidemic of overweight and obesity, and to generate and share knowledge on the impact of different interventions, including behaviour change communication, fiscal and regulatory measures, public procurement of nutritious foods, better nourishment in public institutions and restrictions on the marketing of foods and non-alcoholic beverages to children, among others.**

77. **Member States are encouraged to support social protection and humanitarian programmes aimed at ensuring food security and nutrition for highly vulnerable populations, including those enduring humanitarian crises, climate or economic shocks.**

78. **Member States are called upon to transform food systems using climate-smart and sustainable agricultural practices that simultaneously promote biodiversity, sustainable agriculture and nutrient density. Wherever possible, nutrition intervention programmes should promote local sustainable food production.**

79. **Member States are encouraged to take measures to work on a comprehensive, binding treaty to regulate hazardous pesticide use worldwide and to phase out the use of antimicrobials for animal growth promotion, consistent with guidance from the Tripartite agencies (FAO, World Organization for Animal Health and WHO) and the Codex Alimentarius.**

80. **Without investments in knowledge, it is not possible to build an effective global investment case for achieving the requisite transformation of food systems for sustainable agriculture, a prerequisite for achieving Sustainable Development Goal 2. Member States are encouraged to prioritize, support and share critical areas of research on improving nutrition and sustainable agriculture through a food systems lens and on improving surveillance and the evaluation of national trials and innovative practices, and to expand the global knowledge sector on scalable strategies for delivering nutrition and food security for all.**