

## Drought Food And Agriculture Organization

This year's edition provides new estimates of the percentage of the world's food lost from production up to the retail level. It suggests that identifying and understanding critical loss points in specific supply chains – where considerable potential exists for reducing food losses – is crucial to deciding on appropriate measures. It also provides some guiding principles for interventions based on the objectives being pursued through food loss and waste reductions, be they in improved economic efficiency, food security and nutrition, or environmental sustainability.

This paper examines the impacts of the El Niño during the 2015/2016 season on maize productivity and income in rural Zambia. The analysis aims at identifying whether and how sustainable land management (SLM) practices and livelihood diversification strategies have contributed to moderate the impacts of such a weather shock. The analysis was conducted using a specifically designed survey called the El Niño Impact Assessment Survey (ENIAS), which is combined with the 2015 wave of the Rural Agricultural Livelihoods Surveys (RALS), as well as high resolution rainfall data from the Africa Rainfall Climatology version 2 (ARC2). This unique, integrated data set provides an opportunity to understand the impacts of shocks like El Niño that are expected to get more frequent and severe in Zambia, as well as understand the agricultural practices and livelihood strategies that can buffer household production and welfare from the impacts of such shocks to drive policy recommendations. Results show that households affected by the drought experienced a decrease in maize yield by around 20 percent, as well as a reduction in income up to 37 percent, all else equal. Practices that moderated the impact of the drought included livestock diversification, income diversification, and the adoption of agro-forestry. Interestingly, the use of minimum soil disturbance was not effective in moderating the yield and income effects of the drought. Policies to support livestock sector development, agroforestry adoption, and off-farm diversification should be prioritized as effective drought resiliency strategies in Zambia.

By 2050, we will have ten billion mouths to feed in a world profoundly altered by environmental change. How will we meet this challenge? In *How to Feed the World*, a diverse group of experts from Purdue University break down this crucial question by tackling big issues one-by-one. Covering population, water, land, climate change, technology, food systems, trade, food waste and loss, health, social buy-in, communication, and equal access to food, the book reveals a complex web of challenges. Contributors unite from different perspectives and disciplines, ranging from agronomy and hydrology to economics. The resulting collection is an accessible but wide-ranging look at the modern food system.

The State of the World's Land and Water Resources for Food and Agriculture is FAO's first flagship publication on the global status of land and water resources. It is an 'advocacy' report, to be published every three to five years, and targeted at senior level decision makers in agriculture as well as in other sectors. SOLAW is aimed at sensitizing its target audience on the status of land resources at global and regional levels and FAO's viewpoint on appropriate recommendations for policy formulation. SOLAW focuses on these key dimensions of analysis: (i) quantity, quality of land and water resources, (ii) the rate of use and sustainable management of these resources in the context of relevant socio-economic driving factors and concerns, including food security and poverty, and climate change. This is the first time that a global, baseline status report on land and water resources has been made. It is based on several global spatial databases (e.g. land suitability for agriculture, land use and management, land and water degradation and depletion) for which FAO is the world-recognized data source. Topical and emerging issues on land and water are dealt with in an integrated rather than sectoral manner. The implications of the status and trends are used to advocate remedial interventions which are tailored to major farming systems within different geographic regions.

The conference was organised to identify, describe, discuss and promote actions that will assist farmers to improve water-use efficiency in rainfed agriculture and drought-proof their systems. The publication contains an analytical summary of the conference discussions, abstracts of papers submitted during the conference and discussion papers prepared to introduce the different topics. The full document is included on the accompanying CD-ROM.

The impact of drought in agriculture is one of the most complex natural hazards to predict and mitigate. It carries a constant risk for most smallholder farmers around the world. According to studies conducted by the Food and Agriculture Organization of the United Nations (FAO), 83 percent of all damages and losses caused globally by drought between 2006 and 2016 have been absorbed by agriculture, putting a good part of the world population at risk of food insecurity. The guide aims to guide governments and other relevant actors in the development of early warning - early actions on agricultural drought plans that must be implemented before a drought event has significant impacts and causes damages and losses that could eventually become a disaster. The manual complements other instruments used at global and local levels to develop EWEA on agricultural and response plans related to drought.

The report assesses the occurrence and impacts of drought, the current policies underlying drought management as well as the mitigation measures and responses adopted in Central Asia and Turkey, with a focus on Agriculture Sector. It is part of a series of similar studies carried out in different regions and countries of the world, with the objective of shedding light on drought effects, sensitizing policy-makers for the much needed paradigm shift to pro-active drought management planning and providing guidance for the development of such policies. The studies are carried out by FAO, in collaboration with the Water for Food Institute, University of Nebraska-Lincoln, USA, as a direct contribution to FAO's Strategic Objective "Increasing the resilience of livelihoods to threats and crises".

This year's report presents evidence that the absolute number of people who suffer from hunger continues to slowly increase. The report also highlights that food insecurity is more than just hunger. For the first time, the report provides evidence that many people in the world, even if not hungry, experience moderate food insecurity as they face uncertainties about their ability to obtain food and are forced to compromise on the quality and/or quantity of the food they consume. This phenomenon is observed globally, not only in low- and middle-income countries but also in high income countries. The report also shows that the world is not on track to meet global nutrition targets, including those on low birthweight and on reducing stunting among children under five years. Moreover, overweight and obesity continue to increase in all regions, particularly among school-age children and adults. The report stresses that no region is exempt from the epidemic of overweight and obesity, underscoring the necessity of multifaceted, multisectoral approaches to halt and reverse these worrying trends. In light of the fragile state of the world economy, the report presents new evidence confirming that hunger has been on the rise for many countries where the economy has slowed down or contracted.

Unpacking the links between economic slowdowns and downturns and food insecurity and malnutrition, the report contends that the effects of the former on the latter can only be offset by addressing the root causes of hunger and malnutrition: poverty, inequality and marginalization.

This publication demonstrates the benefits of neglected and underutilized species, including amaranth, sorghum and cowpea, and their potential contribution to achieving Zero Hunger in South and Southeast Asia.

Global climate studies show that not only temperatures are increasing and precipitation levels are becoming more varied, all projections indicate these trends will continue. It is therefore imperative that we understand changes in climate over agricultural areas and their impacts on agriculture production and food security. This study presents new analysis on the impact of changing climate on agriculture and food security, by examining the evidence on recent climate variability and extremes over agricultural areas and the impact of these on agriculture and food security. It shows that more countries are exposed to increasing climate variability and extremes and the frequency (the number of years exposed in a five-year period) and intensity (the number of types of climate extremes in a five-year period) of exposure over agricultural areas have increased. The findings of this study are compelling and bring urgency to the fact that climate variability and extremes are proliferating and intensifying and are contributing to a rise in global hunger. The world's 2.5 billion small-scale farmers, herders, fishers, and forest-dependent people, who derive their food and income from renewable natural resources, are most at risk and affected. Actions to strengthen the resilience of livelihoods and food systems to climate variability and extremes urgently need to be scaled up and accelerated.

"During El Niño episodes the normal patterns of tropical precipitation and atmospheric circulation become disrupted triggering extreme climate events around the globe: droughts, floods and affecting the intensity and frequency of hurricanes. Disasters create poverty traps that increase the prevalence of food insecurity and malnutrition. Agriculture is one of the main sectors of the economy that could be severely affected by El Niño event. FAO monitors the El Niño-Southern Oscillation (ENSO) phenomenon, among other weather related hazards, with a special focus on the potential impacts on the agricultural sector. The objective of this study is to enhance our understanding the El Niño phenomenon using FAO's Agricultural Stress Index System (ASIS). This study is carried out under the auspices of the new FAO Strategic Framework, for the Strategic Objective 5 "Increase the resilience of livelihoods to threats and crises." The study outcomes are expected to enhance further discussions on our understanding of the El Niño Phenomenon and add to the growing literature. This would in turn improve effective early warning capabilities of FAO and partners to issue and trigger timely disaster risk reduction measures."--Resource description page (viewed March 9, 2015).

Does receiving information on potential adverse weather conditions induce adaptive responses by smallholders? Do market institutions ease constraints to adaptation of these practices? This report examines these questions using a unique panel dataset of Zambian smallholder households collected before and after 2015/16 El Niño Southern Oscillation event. The analysis finds that farmers receiving drought-related seasonal forecasts are more likely to integrate drought tolerant crops into their cropping systems and to acquire improved maize seed varieties. These farmers, on average, are found to apply double the quantity of improved maize seeds than farmers residing in the same zones but not receiving weather information. Larger and more competitive private output markets function as enablers of smallholder adaptive responses to seasonal forecast information, as farmers with improved market access are more likely to shift toward drought resilient technologies than farmers with low output market access. Three policy recommendations emerge from the findings. First, while seasonal forecast information can induce adaptive responses by farmers, there is the need of improving access to this information, particularly for households in remote areas or limited asset ownership. Second, targeting voucher-based farmer input support programs based on seasonal forecast information can enable the crowding in of private investments in these regions and increase the adaptive responses of farmers, particularly resource constrained farmers. Finally, this analysis suggests that policies that incentivize private investment in agricultural markets should be considered within the broader framework of smallholder climate adaptation and resilience in Zambia. This includes strategies to improve agricultural trade predictability

The impacts of increasing climatic variability and change are global concerns but in Bangladesh, where large numbers of people are chronically exposed and vulnerable to a range of natural hazards, they are particularly critical. This resource book, *Climate variability and change: adaptation to drought in Bangladesh*, has been tested and prepared as a reference and guide for further training and capacity building of agricultural extension workers and development professionals to deal with climate change impacts and adaptation, using the example of drought-prone areas of Bangladesh. It also presents suggestions for a three-day training course that would be readily adaptable for any areas of Bangladesh affected by climate-related risks. The information presented on climate change adaptation would enable participants to prepare, demonstrate and implement location-specific adaptation practices and, thus, to improve the adaptive capacity of rural livelihoods to climate change in agriculture and allied sectors.

The eastern Africa sub-region has experienced recurrent drought and other climate-related impacts, with damaging effects on agriculture, food security and development. This report discusses institutional improvements for addressing disaster risks and presents options to strengthen the climate resilience of the agriculture and food sectors.

Soil organic matter - the product of on-site biological decomposition - affects the chemical and physical properties of the soil and its overall health. Its composition and breakdown rate affect: the soil structure and porosity; the water infiltration rate and moisture holding capacity of soils; the diversity and biological activity of soil organisms; and plant nutrient availability. This document concentrates on the organic matter dynamics of cropping soils and discusses the circumstances that deplete organic matter and their negative outcomes. It then moves on to more proactive solutions. It reviews a "basket" of practices in order to show how they can increase organic matter content and discusses the land and cropping benefits that then accrue.--Publisher's description.

The FAO Disaster Risk Reduction for Food and Nutrition Security Framework Programme aims to provide strategic direction to the

implementation of disaster risk reduction measures in member countries across the agricultural-related sectors in line with the Hyogo Framework for Action and its five priority areas. In addition, it provides a summary of discussions by thematic area covering the 3 key topics of water consumption, crop water productivity, and drought management. One of the main objectives of the workshop was to develop an Operational Work Plan based on the main recommendations made by each country following the discussions addressing the 3 key topics. In this report, the recommendations are made for each country based on their priorities and needs, and constitute the basis for consultations between the relevant institutions on the country level towards the elaboration of a comprehensive national work plan to be implemented into specific actions.

The rural poor, who are the most vulnerable, are likely to be disproportionately affected. The report assesses the occurrence and impacts of drought, the current policies underlying drought management as well as the mitigation measures and responses adopted in the Near East and North Africa region, with a focus on the Agriculture Sector. It is the third of a series of similar studies carried out in different regions and countries of the world, with the objective of shedding light on drought effects, sensitizing policy-makers for the much needed paradigm shift to pro-active drought management planning and providing guidance for the development of such policies. The studies are carried out by FAO, in collaboration with the Water for Food Institute, University of Nebraska-Lincoln, USA, as a direct contribution to FAO's Strategic Objective "increasing the resilience of livelihoods to disasters" and Strategic Objective "make agriculture, forestry and fisheries more productive and sustainable".

Recurrent droughts in Ethiopia have been contributing to chronic food insecurity, deterioration of livelihoods and weakening capacity of communities to withstand future shocks. Following the 2011 food crisis in the Horn of Africa, 'building resilience' became a priority agenda for the international community to move from the division of emergency and development programming to a more holistic and complementary approach for addressing the root cause of disaster risk and vulnerability factors of recurrent drought. The project, implemented by FAO between 2015 and 2019, aimed to support and reinforce existing coordination mechanisms at the regional states and zonal administration levels and enhance linkages between short-term humanitarian interventions and long term development initiatives. The evaluation found that the project was highly relevant to the current context in Ethiopia, where preparedness and longer-term resilience have become priority areas of focus for all actors in humanitarian and development initiatives. Resilience coordination mechanisms have been strengthened at regional levels. However, the sustainability of these efforts will depend on the commitment of Government and partners to continue strengthening the existing coordination mechanisms and their ability to convene development partners.

On top of a decade of exacerbated disaster loss, exceptional global heat, retreating ice and rising sea levels, humanity and our food security face a range of new and unprecedented hazards, such as megafires, extreme weather events, desert locust swarms of magnitudes previously unseen, and the COVID-19 pandemic. Agriculture underpins the livelihoods of over 2.5 billion people – most of them in low-income developing countries – and remains a key driver of development. At no other point in history has agriculture been faced with such an array of familiar and unfamiliar risks, interacting in a hyperconnected world and a precipitously changing landscape. And agriculture continues to absorb a disproportionate share of the damage and loss wrought by disasters. Their growing frequency and intensity, along with the systemic nature of risk, are upending people's lives, devastating livelihoods, and jeopardizing our entire food system. This report makes a powerful case for investing in resilience and disaster risk reduction – especially data gathering and analysis for evidence informed action – to ensure agriculture's crucial role in achieving the future we want.

This emergency response plan represents cumulative steps taken since September 2018 to protect and restore agricultural production, incomes and assets, while enhancing nutritious and diversified diets of the most vulnerable farming and agropastoral households affected by the drought conditions and other compounding shocks in the countries at highest risk. Aligned to the FAO 2018–2021 Resilience Strategy for Southern Africa, and informed by the relevant recommendations from the SADC Regional Vulnerability Assessment and Analysis Programme Meetings, the overarching aim of the plan is to contribute to resilient agriculture-based livelihoods that enhance food security and nutrition in the face of more frequent and intense weather extremes.

Unless action is taken now to make agriculture more sustainable, productive and resilient, climate change impacts will seriously compromise food production in countries and regions that are already highly food-insecure. The Paris Agreement, adopted in December 2015, represents a new beginning in the global effort to stabilize the climate before it is too late. It recognizes the importance of food security in the international response to climate change, as reflected by many countries prominent focus on the agriculture sector in their planned contributions to adaptation and mitigation. To help put those plans into action, this report identifies strategies, financing opportunities, and data and information needs. It also describes transformative policies and institutions that can overcome barriers to implementation. The State of Food and Agriculture is produced annually. Each edition contains an overview of the current global agricultural situation, as well as more in-depth coverage of a topical theme."

Most countries in the Near East and North Africa saw a steady improvement in food security and nutrition up to the beginning of the decade. Food production was rising and undernourishment and poverty were receding. However, the situation has deteriorated since 2012, largely driven by increasing conflicts and protracted crises as well as water scarcity and climate change.

Accessibility to clean and sufficient water resources for agriculture is key in feeding the steadily increasing world population in a sustainable manner. Nature-Based Solutions (NBS) offer a promising contribution to enhance availability

and quality of water for productive purposes and human consumption, while simultaneously striving to preserve the integrity and intrinsic value of the ecosystems. Implementing successful NBS for water management, however, is not an easy task, since many ecosystems are already severely degraded and exploited beyond their regenerative capacity. Furthermore, ecosystems are large and complex and the many stakeholders involved may have conflicting interests. Hence, implementation of NBS requires a structured and comprehensive approach that starts with the valuation of the services provided by the ecosystem. The whole set of use and non-use values, in monetary terms, provides a factual basis to guide the implementation of NBS, which is ideally based on transdisciplinary principles, i.e. complemented with scientific and case-specific knowledge of the ecosystem in an adaptive decision-making process that involves the relevant stakeholders. This discussion paper evaluated twenty-one NBS case studies using a non-representative sample, to learn from successful and failed experiences and to identify possible causalities among factors that characterize the implementation of NBS. The case studies give a minor role to valuation of ecosystem services, an area for which the literature is still developing guidance. Less successful water management projects tend to suffer from inadequate factual and scientific basis and uncoordinated or insufficient stakeholder involvement and lack of long term planning. Successful case studies point to satisfactory understanding of the functioning of ecosystems and importance of multi-stakeholder platforms, well-identified funding schemes, realistic monitoring and evaluation systems and endurance of its promoters. New evidence this year corroborates the rise in world hunger observed in this report last year, sending a warning that more action is needed if we aspire to end world hunger and malnutrition in all its forms by 2030. Updated estimates show the number of people who suffer from hunger has been growing over the past three years, returning to prevailing levels from almost a decade ago. Although progress continues to be made in reducing child stunting, over 22 percent of children under five years of age are still affected. Other forms of malnutrition are also growing: adult obesity continues to increase in countries irrespective of their income levels, and many countries are coping with multiple forms of malnutrition at the same time – overweight and obesity, as well as anaemia in women, and child stunting and wasting.

This year's edition of the Africa Regional Overview of Food Security and Nutrition reports that after a prolonged decline hunger appears to be on the rise. In sub-Saharan Africa there were about 224 million undernourished people in sub-Saharan Africa in 2016, up from 200 million in 2015. In many countries, the worsening situation in 2015 and 2016 can be attributed to adverse climatic conditions, often linked to the El Niño phenomenon, resulting in poor harvests and the loss of livestock. Conflict, sometimes in combination with drought or floods, also contributed to severe food insecurity in several countries. Lower commodity prices and a difficult global economic environment have furthermore contributed to the worsening food security situation. The worrying trend in undernourishment is not yet reflected in the series of indicators referring to nutritional outcomes in the region, with the prevalence of stunting and wasting for children under the age of five continuing to decline gradually. However, progress towards the World Health Assembly global nutrition targets has been generally poor. While a relatively large proportion of countries are on track to meeting the target for overweight in children, the rates for adult obesity are soaring in all regions and are especially high in Southern Africa. The report also finds that across the board, countries have developed and are developing policy frameworks and investment plans that are aligned, or efforts are being made to align them, with the goals of the Malabo Declaration and SDG 2. Through CAADP, policy processes are coherent, and this initiative has raised the profile of agriculture and heavily influenced agricultural policy at regional and national levels. However, the worrying trends in undernourishment underline the need for even greater efforts to achieve the SDG 2 by 2030. The thematic part of the report focuses on the food security and nutrition–conflict nexus. Conflict is not only an increasingly important cause of food insecurity and malnutrition but food insecurity and malnutrition can also become conflict multipliers. Addressing the causes of conflicts and supporting food security and livelihoods can help build resilience to conflict and contribute to sustaining peace. Agricultural droughts affect whole societies, leading to higher food costs, threatened economies, and even famine. In order to mitigate such effects, researchers must first be able to monitor them, and then predict them; however no book currently focuses on accurate monitoring or prediction of these devastating kinds of droughts. To fill this void, the editors of Monitoring and Predicting Agricultural Drought have assembled a team of expert contributors from all continents to make a global study, describing biometeorological models and monitoring methods for agricultural droughts. These models and methods note the relationships between precipitation, soil moisture, and crop yields, using data gathered from conventional and remote sensing techniques. The coverage of the book includes probabilistic models and techniques used in America, Europe and the former USSR, Africa, Asia, and Australia, and it concludes with coverage of climate change and resultant shifts in agricultural productivity, drought early warning systems, and famine mitigation. This will be an essential collection for those who must advise governments or international organizations on the current scope, likelihood, and impact of agricultural droughts. Sponsored by the World Meteorological Organization

The In Brief version of the FAO flagship publication, In Brief to The State of Food and Agriculture 2020, contains the key messages and main points from the publication and is aimed at the media, policy makers and a more general public.

During the 2015–2016 agricultural season, Southern Africa experienced intense drought due to one of the strongest El Niño events in 50 years. With 70 percent of the population reliant on agriculture, El Niño had a direct impact on food security and caused loss of income across crop and livestock value chains. FAO activated a corporate surge support and launched its Southern Africa El Niño Response Plan, appealing for USD 109 million to support government efforts to rebuild and fortify agricultural livelihoods, restoring agricultural production, incomes and assets and increasing household access to nutritious food. FAO country teams translated the regional plan into tailored intervention packages on the ground. But while agro-meteorological and early-warning alerts were timely, they did not trigger early action. The evaluation calls on FAO to initiate a systematic approach to adaptive programming, to conduct an in-depth analysis of the factors that slowed delivery in Southern Africa, to expand on the targeting of different groups, so as to meet the needs of farmers with varying degrees of vulnerability, and to bolster learning, information-sharing and advocacy efforts across countries.

Edible insects have always been a part of human diets, but in some societies there remains a degree of disdain and disgust for their consumption. Insects offer a significant opportunity to merge traditional knowledge and modern science to improve human food security worldwide. This publication describes the contribution of insects to food security and examines future prospects for raising insects at a commercial scale to improve food and feed production, diversify diets, and support livelihoods in both developing and developed countries. Edible insects are a promising alternative to the conventional production of meat, either for direct human consumption or for indirect use as feedstock. This publication will boost awareness of the many valuable roles that insects play in sustaining nature and human life, and it will stimulate debate on the expansion of the use of insects as food and feed.

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