## NUTRITION, AGRICULTURE AND COVID-19 NEXUS:

FOOD SYSTEMS FOR HEALTHIER DIETS

#### **FREE Webinar**

"How to transition to nutrition-sensitive and sustainable food systems"









Ву

Tonderayi "Tonde" Matsungo

BSc, MPhil, PhD

tmatsungo@gmail.com

+263 783 530 428

#### PRESENTATION OUTLINE

- Background
  - Food systems summit
    - Action tracks
- What is the impact of covid-19 on the food systems transformation agenda?
- Summary
- Bibliography

#### BACKGROUND

- In 2021 the UN (SG Antonio Guterres) will convene a Food Systems Summit @People's summit @Solutions summit as
  - Part of the Decade of Action to achieve the SDGs by 2030
  - Multisectoral transformation towards healthier, sustainable and equitable food systems <u>"leaving No person or place behind"</u>
  - Guided by five Action Tracks



Dr. Agnes Kalibata is the Special Envoy for the Summit



The Summit will only be effective at setting out the pathway to 2030 if we successfully leverage the collective knowledge and experience of the broadest possible cross-section of the population.

UN Special Envoy Dr. Agnes Kalibata

A paper from the Scientific Group of the UN Food Systems Summit

March 5, 2021

#### FOOD SYSTEMS

DEFINITION, CONCEPT AND APPLICATION FOR THE UN FOOD SYSTEMS SUMMIT

by
Joachim von Braun\*, Kaosar Afsana\*\*, Louise O. Fresco\*\*,
Mohamed Hassan\*\*, Maximo Torero\*\*\*

(The authors are Chair\* and Vice-Chairs\*\*, and an Ex-Officio member\*\*\* of the Scientific Group)

A Food System comprises of various activities and actors in food value chains involved in transforming inputs into outcomes. A <u>sustainable food</u> <u>system</u> should ensure food and nutrition security, environmental quality and well-being (World Food System Center, 2013)

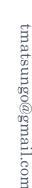
> The Scientific Group for the UN Food Systems Summit https://sc-fss2021.org/

#### 2. A GENERAL FOOD SYSTEMS CONCEPT

#### Theory and Criteria

A practical definition of food systems should meet two essential criteria:

- it should be suitable for the purpose at hand, which is to support the global and national collective efforts to bring about positive change in food systems, by accelerating progress on meeting the 2030 Agenda and the SDGs; and
- it should be sufficiently precise to define the domains for policy and programmatic priorities, and it should be sufficiently general to not exclude any aspects of the economic, social, and environmental dimensions of sustainability.

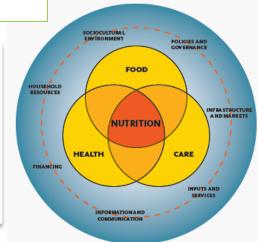


#### FOOD SYSTEM ELEMENTS

Figure 1: The food system in the context of other systems (positive systems concept)
Source: Adapted from InterAcademy Partnership (2018) and von Braun (2017).



 A food system includes, is shaped by, and interacts with environmental, social, political and economic conditions and realities which determine how it can function



tmatsungo@gmail.com

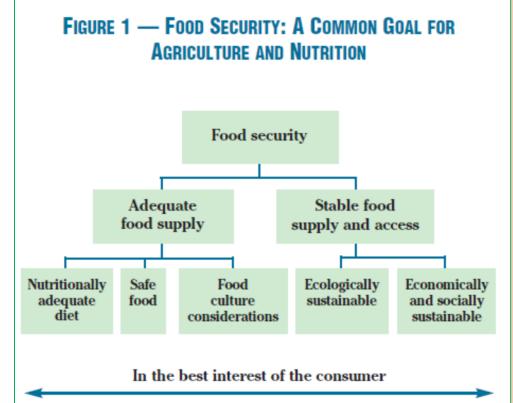
#### GLOBAL REALITIES

- Our planet both humans and the natural world –faced four global crises:
  - 1. Climate change,
  - 2. Biodiversity loss,
  - 3. Environmental degradation, &
  - 4. **Dual burden of malnutrition** co existence of hunger, nutrient deficiencies, and over-nutrition (obesity)
  - 5. Then COVID-19 pandemic happened
- Food systems are both a victim and culprit:
  - "As Victim" —climate change, is driving down productivity of agricultural systems around the world. The COVID-19 dimension?
  - "As a culprit" agriculture and related land uses accounting for 23% percent of human greenhouse gas emissions and a major driver of habitat and biodiversity loss.

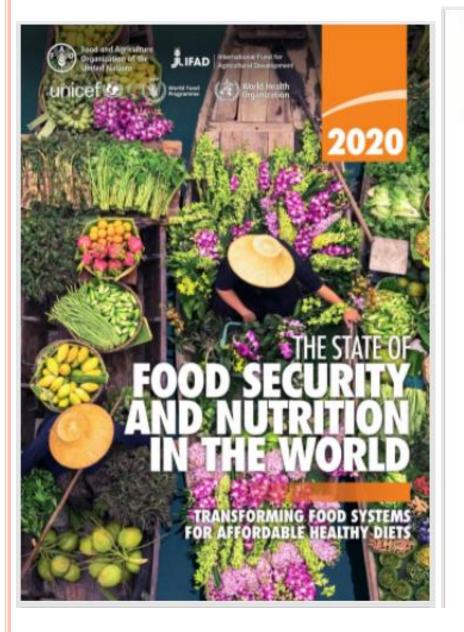
## FOOD SECURITY & FOOD SYSTEMS TRANSFORMATION

- A food systems has many domains including:
  - growing, producing, storing, transporting, processing, marketing, retailing, and preparing food
- Food system transformation to support impacts on hunger, malnutrition, health, biodiversity, greenhouse gas (GHG) emissions, nature, livelihoods and resilience





How can we come up with the big moon-shots for food system transformation? I prefer to talk about pathways to food system transformation, pathways that will be different for each member state because there is no one size fits all.



#### CONTENTS

FOREWORD	VIII
METHODOLOGY	N)
ACKNOWLEDGEMENTS	308
ACRONYMS AND ABBREVIATIONS	xly
KEY MESSAGES	mvi
EXECUTIVE SUMMARY	xxiii
PART 1	
FOOD SECURITY AND NUTRITION AROUND THE WORLD IN 2020	
1.1 Progress towards hunger and	
food insecurity targets.	3
1.2 Progress towards global nutrition targets	26
1.3 The critical link between food security	
and nutrition outcomes: food consumption and	
diet quality	40
1.4 Conclusions	60
PART 2	
TRANSFORMING FOOD SYSTEMS TO DELIVER AFFORDABLE HEALTHY DIETS FOR ALL	63
2.1 The cast and affordability of healthy diets	-
around the world	65
2.2 The hidden health and environmental costs	
of what we ear	93
2.3 What is driving the cast of nutritious foods?	115
2.4 Policies to reduce the cost of nutritious foods	
and ensure affordability of healthy diets	138

AMMEXES	163
ANOREX 1A Statistical tables to Part 1	164
AMPLEX 18  Methodological notes for the food security and nutrition indicators.	190
AMMEX 2 Methodologies Fort 1	202
ARREX 3 Description, data and methodology of Section 2.1	214
ANNEX 4  National load-based dietary guidelines (FBOGs) used to compute the cost of a healthy diet	231
Additional tables and figures to Section 2.1	236
ARREX 6 Definition of country groups	241
Description, data and methodology of Section 2.2	242
ASMEX 8 Health and climate-change costs related to dietary risks	248
ARMEX 9 Glossory	253
HOTES	258

# 2021 GLOBAL REPORT ON FOOD CRISES JOINT ANALYSIS FOR BETTER DECISIONS

The magnitude and severity of food crises worsened in 2020 as protracted conflict, the economic fallout of COVID-19 and weather extremes exacerbated pre-existing fragilities. Forecasts point to a grim outlook for 2021, with the threat of Famine persisting in some of the world's worst food crises.

#### **Contents**

- "By the end of 2020, the global goal of achieving 'zero hunger' by 2030 seemed increasingly out of reach.
- This follows another annual rise in the numbers of acutely food-insecure people in need of urgent food, nutrition and livelihood assistance."

FOREWORD	2
GRFC 2021 IN BRIEF	
Acknowledgements	5
How to use this report	6
Acronyms	7
1. GLOBAL OVERVIEW OF FOOD CRISES.	9
Introduction.	
The GRFC 2021 methodology at a glance	11
Global food crises overview, 2020	14
Major drivers of global food crises in 2020	22
Food crises forecast for 2021	25
Table of acute food insecurity estimates, 2019-2021	29
2. REGIONAL OVERVIEWS OF FOOD CRISES	33
Central and Southern Africa	
East Africa	
West Africa and the Sahel (incorporating Cameroon and Libya)	
Central America and Haiti	
Eurasia – Eastern Europe, Middle East and South Asia	
3. COUNTRY-LEVEL OVERVIEWS OF MAJOR FOOD CRISES	0.0
Afghanistan	
•	
Angola	
Burkina Faso	
Burundi	
Cameroon.	
Central African Republic	
Chad	
Democratic Republic of the Congo.	
Democratic Republic of the Congo.	130

Eswatini	.13
Ethiopia	.14
Guatemala	.14
Haiti	.15
Honduras	.15
Kenya	.16
Lesotho	.16
Madagascar	.17
Malawi	.17
Mali	.18
Mozambique	.18
Niger	.19
Nigeria (15 states and Federal Capital Territory)	.19
Pakistan (Khyber Pakhtunkhwa)	.20
Palestine	.20
Sierra Leone.	.21
Somalia	.21
South Sudan	.22
Sudan	.23
Syrian Arab Republic	.23
Uganda	.24
United Republic of Tanzania	.24
Yemen	.25
Zambia	.25
Zimbabwe	.26
TECHNICAL NOTES.	26
BIBLIOGRAPHY	.28

JOINT ANALYSIS FOR BETTER DECISIONS

IN BRIEF





























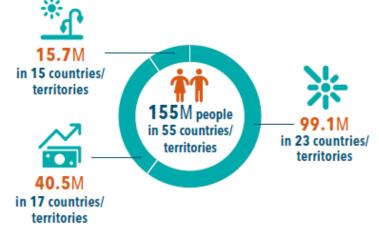




Global Network against Food Crises

- The 2021 GRFC highlights the remarkably high severity and numbers of people in Crisis or worse (IPC/CH Phase 3 or above)
- This is driven by persistent conflict, pre-existing and <u>COVID-19</u>-related economic shocks, and weather extremes.

Numbers of people in Crisis or worse (IPC/CH Phase 3 or above) or equivalent by key driver in 2020







Weather extremes



Global Nutrition Report Retweeted



Global Network Against Food Crises @fightfoodcrises  $\cdot$  May 5

Conflict, climate change and COVID-19 impacts on rising acute food insecurity. The poorest continue bearing the burden of global challenges.

How can we transform agri-food systems so that no one is left behind? Joint Statement to #Fightfoodcrises — bit.ly/3el0caB

tmatsungo@gmail.com

## WHAT IS THE IMPACT OF COVID-19 ON THE FOOD SYSTEMS TRANSFORMATION AGENDA?



#### AGRA - Growing Africa's Agriculture @AGRAAlliance · May 5

Farmers are facing reduced availability and/or higher prices of inputs, services and labour, which compounds the challenges they were facing even before the pandemic.

Learn more about the impact Covid-19 is having on food systems resilience here bit.ly/3tbYxZ1.



12

#### ACTION TRACKS IN THE FOOD SYSTEMS



#### **Action Track 1**

Ensure access to safe and nutritious food for all

1. Enabling people to be well nourished and healthy



#### **Action Track 2**

Shift to sustainable consumption patterns

2. Promoting and creating demand for healthy and sustainable diets, reducing waste



#### **Action Track 3**

Boost nature-positive production

3. Acting on climate change, reducing emissions and regenerating and protecting ecosystems and reducing food loss and energy usage, without undermining health or nutritious diets



#### **Action Track 4**

Advance equitable livelihoods

4. Raising incomes, distributing risk, expanding inclusion, creating jobs



#### **Action Track 5**

Build resilience to vulnerabilities, shocks and stress

5. Ensuring the continued functionality of healthy and sustainable food systems



#### COVID-19 AND FOOD ACCESS

#### FIGURE 3 | The impact of COVID-19 food system dynamics on the six dimensions of food security Loss of jobs & income Higher food prices · Disruption of school meal programmes · Curtailing of safety nets or diminished access to them · Closure of proximity and informal markets Comorbidities Access · Increase in food losses & waste · Supply chain disruptions · Increase in packaging and plastic waste · Labour shortages · Decreased attention to climate change and Sustainability Availability Closure of high-risk processing plants environmental issues Closure of restaurants and food stalls · Social and economic losses affecting food Shift to lower risk crops system viability Security & · Loss of jobs & affiliation to unions · Supply chains disruptions · Weakened power of farmers' and · Uncertainty on markets & inputs access Stability producers' organization · Price volatility Loss of economic and social empowerment Export restrictions · Inability to meet and organize · Inequality in ICT access · Temporary restrictions of rights to Utilization demonstrate and organize · Shift to cheaper / less healthy diets Shift towards processed and shelf stable food Link between malnutrition and COVID-19

 More than any other dimension of food security, food access has arguably been the most affected by the COVID-19 crisis

#### AGRA-COVID-19 AND FOOD SYSTEMS 1

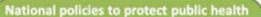




Sub-Saharan Africa

A SYNTHESIS OF EVIDENCE

#### Figure 1: Covid-19 impact pathways on food systems in SSA



- · Lockdowns and mobility restrictions
- Social distancing requirements
- Market closures
- Border closures / heightened border clearance protocols

#### Global economic contraction

- Price of food imports and agricultural inputs
- · Demand and price of agricultural exports
- Decline in international remittances
- Decline in tourism

#### National agricultural / trade / fiscal policies

- Agricultural input subsidies
- Price controls (food or nonfood)
- Import tax waivers

#### National social protection measures

- · Cash and in-kind transfers
- · Labor market interventions
- Social insurance

Food systems within sub-Saharan Africa

#### National economic contraction and macroeconomic stress

- Decline in purchasing power
- · Decline in domestic demand for agricultural products
- Smaller public sector budgets

#### Direct health impacts

 Morbidity and mortality among food system actors

#### Trade restrictions of trading partners

· Availability and price of food imports or agricultural inputs

14

#### Table 1: Evidence of impacts of Covid-19 and associated policy responses on food systems in SSA

#### Domestic Food Value Chains

#### Agricultural inputs

 Some evidence of decline in supply, increase in prices, and reduction in domestic purchasing power among potential buyers.

#### Producers and agricultural production

- Some evidence of disruption to agricultural production, especially where farmers were limited by mobility restrictions.
- Mixed evidence regarding labour availability.
- Some evidence of fewer traders/buyers and lower farmgate prices.
- Volatility in agricultural prices due to mobility restrictions, producing both winners and losers.

#### Trade, transport, processing, and storage

- Evidence of decline in transportation options and increase in transport costs due to mobility restrictions.
- Roadblocks extend the time spent in transport, which is especially detrimental to perishable products.
- Evidence of difficulties in moving food between farm, processor, port, and market, affecting food supply and retail prices.

#### Wholesalers and retailers

- Evidence of difficulties sourcing food due to high prices or few suppliers.
- Closures of, or restrictions on, informal markets lead to massive income disruptions for retailers and food vendors.
- Decline in business due to social distancing requirements or restrictions on non-economic activity that reduced foot traffic.

#### Regional (intra-African) and international food trade

#### Trade flows

 Evidence of declines (and/or volatility) in regional trade due to heightened border clearance protocols and road congestion at border crossings.

#### Impacts on traders

 Loss of livelihoods for informal cross-border traders where such trade was prohibited.

#### Prices of imports and exports

- Some evidence of price increases for imported food items.
- Mixed evidence regarding price effects for exports traded internationally, with some reports of price declines and other evidence of price stability.

#### Food and nutrition security

#### Availability

- Mostly stable availability of staple foods
- Reduced availability of specific items, particularly imported foods, perishable foods, and animalsourced foods.

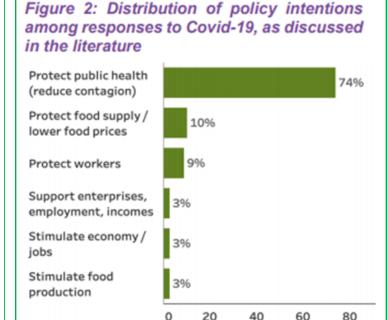
#### Dietary quality

 Evidence that households have shifted from more nutritious and expensive foods, such as vegetables and dairy products, toward cheaper foods.

#### Access

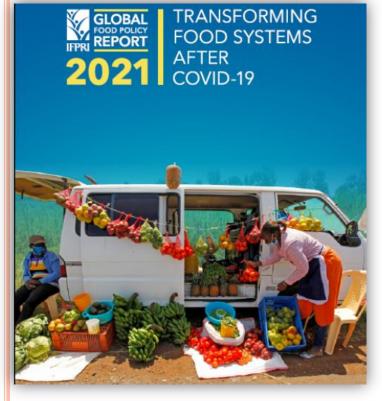
- Reduced economic access due to reduced income and increased food retail prices.
- Reduced physical access due to bans or restrictions on informal markets or street vending.
- Reduced social access due to the covariate nature of the Covid-19 shock, which disrupted informal safety nets.
- Reduced frequency and quantity of consumption.

# AGRA-COVID-19 AND FOOD SYSTEMS 2



15

Share of policies (%)



#### **Contents**

FOREWORD		3
ACKNOWLE	DGMENTS	5
CHAPTER 1	Beyond the Pandemic: Transforming Food Systems after COVID-19.  Johan Swinnen, John McDermott, and Sivan Yosef	6
	Financing the Transformation to Healthy, Sustainable, and Equitable Food Systems  Eugenio Díaz-Bonilla, Johan Swinnen, and Rob Vos	. 20
CHAPTER 2	Resilience: From Policy Responses to Resilient Policy Systems  John McDermott, Danielle Resnick, and Nichola Naylor	. 24
CHAPTER 3	<b>Nutrition:</b> Transforming Food Systems to Achieve Healthy Diets for All.  Marie Ruel and Inge D. Brouwer	. 36
CHAPTER 4	Natural Resources and Environment: Governance for Nature-Positive Food Systems  Ruth Meinzen-Dick, Claudia Ringler, Wei Zhang, and Channing Arndt	. 44
CHAPTER 5	Toward Inclusive Food Systems: Pandemics, Vulnerable Groups, and the Role of Social Protection  Neha Kumar, Agnes Quisumbing, Aulo Gelli, Ugo Gentilini, and Sara Shapleigh	. 54
CHAPTER 6	Food Supply Chains: Business Resilience, Innovation, and Adaptation Thomas Reardon and Rob Vos	. 64

REGIONAL D	AL DEVELOPMENTS 74	
	Africa Samuel Benin, Kwaw Andam, and John Ulimwengu	76
	Middle East and North Africa Kibrom Abay, Clemens Breisinger, Dalia Elsabbagh, Hosam Ibrahim, Ahmed Kamaly, and Mariam Raouf	81
	Central Asia Kamiljon Akramov, Roman Romashkin, and Jarilkasin Ilyasov	86
	South Asia	91
	East and Southeast Asia Kevin Chen and Yue Zhan	97
	Latin America and the Caribbean	02

"It is imperative that food systems start contributing not only to providing enough calories to feed the world, but also to supporting achievement of high-quality diets that promote optimal health and nutrition, all while having a small environmental footprint and supporting livelihoods."

### What is the impact of covid-19 on the food systems transformation agenda?

- COVID-19 has affected national & global food systems thus derailing progress towards
   SDGs 2030 agenda
- Lessons and momentum from the world's response to the COVID-19 pandemic can be leveraged to stir food system transformation
- The IFPRI 2021 Global Food Policy Report explores the <u>impacts of the pandemic and</u> <u>government policy responses</u> to date, particularly for the poor and disadvantaged,
  - Implications on food system transformation to be healthy, resilient, efficient, sustainable, and inclusive
- IFPRI's & partners discussed the report's findings and its implications for Africa's food systems transformation efforts in the context of COVID-19
- In 2021 a high-level governmental and ministerial panel will discuss the themes developed in the report
  - What are the initiatives of national and regional partners in the context of transforming food systems in the post-COVID-19 era?



#### **CHAPTER 1**

#### **Beyond the Pandemic**

Transforming Food Systems after COVID-19

#### JOHAN SWINNEN, JOHN McDERMOTT, AND SIVAN YOSEF

Johan Swinnen is director general of the International Food Policy Research Institute (IFPRI), Washington, DC. John McDermott is director of the CGIAR Research Program on Agriculture for Nutrition and Health, IFPRI, Washington, DC. Sivan Yosef is a senior program manager in the Director General's Office, IFPRI, Washington, DC.

# Food System Transformation Goals Food System Transformation Goals Food System Transformation Goals

**Source:** Based on S. Fan et al., "Food Systems for Human and Planetary Health: Economic Perspectives and Challenges," Food System Economics (forthcoming)

#### **KEY MESSAGES**

- Before the onset of the coronavirus pandemic, our food systems already faced serious challenges in achieving equitable access to healthy, nutritious food for all; environmental sustainability; and resilience to shocks. COVID-19 has put the world further behind in reaching the UN Sustainable Development Goals (SDGs).
- COVID-19 caused widespread loss of livelihoods and incomes, threatening the food security, health, and nutrition of poor and marginalized people around the world. Countries implemented a variety of measures to mitigate these impacts, including expanded social protection; but some impacts will be long-lasting.
- Food system transformation must be pursued to regain this lost ground and achieve the SDGs by 2030.
- Yet the pandemic and associated policy responses exposed weaknesses and inequalities within food systems, including among different world regions, rural and urban communities, rich and poor populations, and disadvantaged groups such as women.

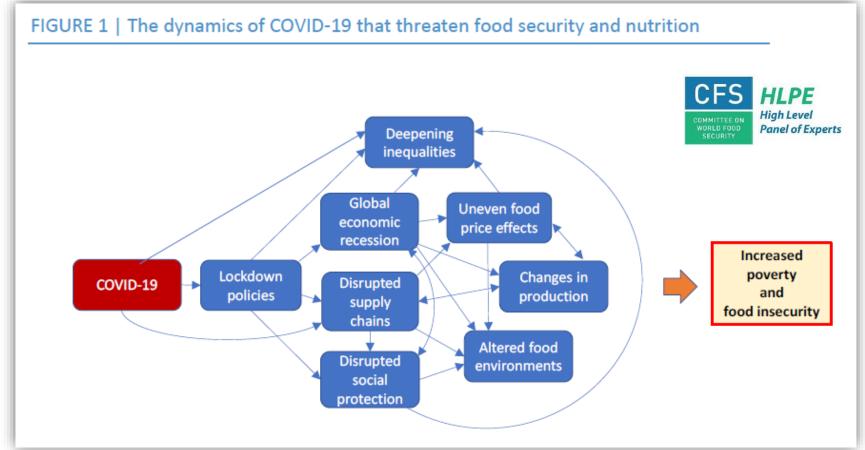
- Some food systems and sectors were more resilient than others, depending on their structure, governance, and roles of the public and private sector.
- 2020 offered lessons, innovations, and opportunities that can help make food systems more resilient to future shocks and more inclusive, efficient, sustainable, and healthy.

#### RECOMMENDATIONS

- Seize the opportunities opened by the pandemic including growing momentum and lessons learned – to transform food systems to be resilient, healthy, efficient, sustainable, and inclusive.
- Use global events planned for 2021 including UNFSS, COP26, and the Nutrition for Growth Summit – to put food system transformation prominently on the development agenda.
- Increase resilience for all food system actors through actions that limit the frequency and severity of shocks,

18

#### COVID-19 AND FOOD SECURITY: CONCEPTUAL FRAMEWORK



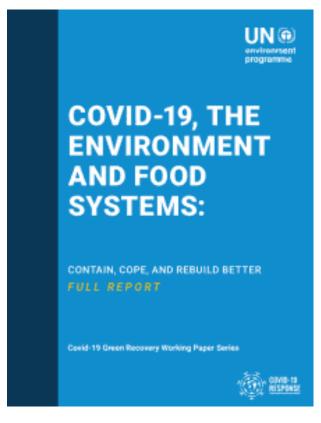
- overlapping and reinforcing dynamics have emerged that are affecting food systems and food security and nutrition:
  - disruptions to food supply chains; loss of income and livelihoods; a widening of inequality; disruptions to social protection programmes; altered food environments; and uneven food prices



- Indigenous populations are at high risk from COVID-19
  - because of factors such discrimination, social exclusion, land dispossession, and a high prevalence of multiple forms of malnutrition.
- Climate change is compounding many of these causes of health inequities
  - undermining coping mechanisms that are traditionally used to manage extreme events such as pandemics, and disrupting food systems and local diets.
- Addressing underlying structural inequities and strengthening Indigenous knowledge systems offer opportunities for building resilience
  - to compound socioecological shocks, including climate effects and pandemics like COVID-19.

    tmatsungo@gmail.com

20



The COVID-19
 pandemic is
 increasing poverty
 and threatening
 food security

- This paper analyzes impacts from COVID-19 at the nexus of food systems and the environment.
- Recommendations for governments and partners to promote the <u>resilience and</u> <u>sustainability of food systems</u> through policies and investments that:
  - Account for environmental thresholds and trade-offs;
  - Promote food security and healthy diets;
  - 3. Enhance and protect rural livelihoods;
  - 4. Address the <u>inequalities and injustices</u> that have emerged as the world grapples with <u>COVID-19 pandemic</u>

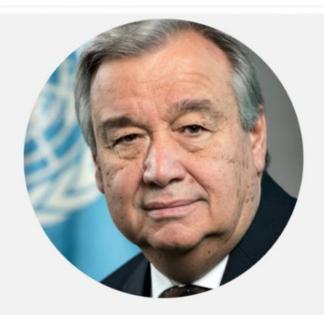
#### MULTI-SECTORAL NATURE OF MALNUTRITION

"Research suggests that the nutritional context is more complex than previously thought and overundernutrition in individuals and populations present, most prominently, the emergence of the "dual burden" of not a particular challenge The ability to address this dual burden requires a systems approach that is inclusive of all agencies and stakeholders throughout the chain including effective and integrated interactions among health, agricultural, and economic systems."

>>>>(p. 101, Vélez et al. 2014)

- The pandemic has highlighted the importance of food security in times of shocks and crises
  - COCID-19 has exposed interconnected weaknesses of food, social and economic systems
  - Lockdowns disrupt food production and food-related logistics and services, posing a challenge for the ability of the system to provide sufficient, affordable, and nutritious food for everyone
  - The consequences affect the poorest and most vulnerable members in communities
- Building food systems that are resilient to shocks such as the COVID-19 pandemic requires collective action along the entire agri-food chain, including policymakers "Multi-23" sectoral Systems Approach"

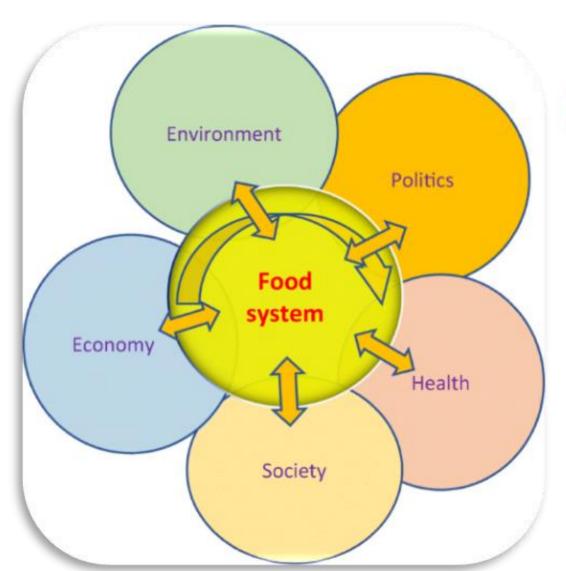
tmatsungo@gmail.com



66

It is unacceptable that hunger is on the rise at a time when the world wastes more than 1 billion tonnes of food every year. It is time to change how we produce and consume, including to reduce greenhouse emissions. Transforming food systems is crucial for delivering all the Sustainable Development Goals. As a human family, a world free of hunger is our imperative.

- Secretary-General António Guterres







Diet, Health, & Prosperity for All



#### FURTHER READING

- International Food Policy Research Institute. 2021. 2021 Global Food Policy Report: Transforming Food Systems after COVID-19. Washington, DC: International Food Policy Research Institute.
   <a href="https://doi.org/10.2499/9780896293991">https://doi.org/10.2499/9780896293991</a>
- Zavaleta-Cortijo, C., Ford, J.D., Arotoma-Rojas, I., Lwasa, S., Lancha-Rucoba, G., García, P.J.,
   Miranda, J.J., Namanya, D.B., New, M., Wright, C.J. and Berrang-Ford, L., 2020. Climate change and
   COVID-19: reinforcing Indigenous food systems. The Lancet Planetary Health, 4(9), pp.e381-e382.
- FAO, IFAD, UNICEF, WFP and WHO. 2020. The State of Food Security and Nutrition in the World 2020. Transforming food systems for affordable healthy diets. Rome, FAO. https://doi.org/10.4060/ca9692en
- FSIN and Global Network Against Food Crises. 2021. Global Report on Food Crises 2021. Rome.
   <a href="http://https://www.fsinplatform.org/sites/default/files/resources/files/GRFC2021.pdf">http://https://www.fsinplatform.org/sites/default/files/resources/files/GRFC2021.pdf</a>
- Joachim von Braun, Kaosar Afsana, Louise Fresco, Mohamed Hassan, Maximo Torero
- Publisher (2020). Food Systems Definition, Concepts and Application for the UN Food Systems
   Summit. The Scientific Group for the UN Food Systems Summit.
   <a href="https://www.un.org/sites/un2.un.org/files/food systems concept paper scientific group draft decc-20-2020.pdf">https://www.un.org/sites/un2.un.org/files/food systems concept paper scientific group draft decc-20-2020.pdf</a>
- Vélez L.F., M. Sanitato, S. Barry, M. Alilio, F. Apfel, G. Coe, A. Garcia, M. Kaufman, J. Klein, V. Kutlesic, L. Meadowcrof, W. Nilsen, G. O'Sullivan, S. Peterson, D. Raiten & S. Vorkoper. 2014. The Role of Health Systems and Policy in Producing Behavior and Social Change to Enhance Child Survival and Development in Low- and Middle-Income Countries: An Examination of the Evidence. 26 Journal of Health Communication: International Perspectives 19 (sup 1): 89-121

#### FURTHER READING CONTI...

- World Food System Center. World Food System Center, Annual Report 2013.
- FAO (2014). Nutrition Sensitive Agriculture Fact Sheet, http://www.fao.org/3/as601e/as601e.pdf
- SPRING. (2015). A Systems Thinking and Action for Nutrition: A Working Paper. Arlington, VA: USAID/ Strengthening Partnerships, Results, and Innovations in Nutrition Globally (SPRING) Project.
- Bakalis, S., Valdramidis, V., Argyropoulos, D., Ahrne, L., Chen, J., Cullen, P.J., Cummins, E., Datta, A.K., Emmanouilidis, C., Foster, T. and Fryer, P., 2020. How COVID-19 changed our food systems and food
- security paradigms. Current Research in Food Science.

  United National Environment Programme (2020). Covid-19, the Environment, and Food Systems:

  Contain, Cope, and Rebuild Better. Geneva. <a href="https://www.unep.org/resources/report/covid19-environment-and-food-systems-contain-cope-and-rebuild-better">https://www.unep.org/resources/report/covid19-environment-and-food-systems-contain-cope-and-rebuild-better</a>

  Européen Commission Page: Publications on COVID-19 and Food and Nutrition Security. Available at:

  <a href="https://knowledge4policy.ec.europa.eu/global-food-nutrition-security/publications-covid-19-fo
- security en