COMMITTEE ON AGRICULTURE

Twenty-eighth Session

18 - 22 July 2022

The Future of Food and Agriculture – Drivers and triggers for transformation

Executive Summary

This document discusses the FAO corporate report *The future of food and agriculture – Drivers and triggers for transformation (FOFA-DTT)*, its purpose, scope, structure, and analysis.

*FOFA-DTT* consolidates the findings of the Corporate Strategic Foresight Exercise (CSFE) 2020-21, which provided the conceptual basis of the report and further contributed to guide the FAO Strategic Framework 2022-31 (SF).¹

The CSFE and the resulting *FOFA-DTT* report are multidisciplinary in nature and involve all technical divisions and Decentralized Offices (DOs).

The *FOFA-DTT* report consists of three parts:

Part 1: *Drivers of agrifood systems*. It provides a deep dive into the different drivers of transformation, identified by the CSFE with the support of all technical divisions across the Organization, and also highlighted in the SF.

Part 2: *Alternative scenarios for agrifood systems*. It provides narratives of possible agrifood systems’ futures that build upon the ones provided in the FAO report *The future of food and agriculture - Alternative pathways to 2050 (FOFA-2050)*² and other key global foresight exercises, as well as on the contributions received during an external expert consultation (EEC), whereby the selection of scenarios were discussed and validated.

Part 3: *Triggers, challenges, opportunities and strategic options*. It outlines possible key triggers of transformative changes, and strategic options for moving agrifood systems towards sustainability.

The *FOFA-DTT* report provides qualitative narratives of possible futures that have, however, been informed by quantitative information presented in a web-based dashboard.


Documents can be consulted at www.fao.org
NJ008
Suggested action by the Committee

The Committee is invited to:

- acknowledge FAO’s efforts to think and act strategically through corporate forward-looking exercises of global nature such as the Corporate Strategic Foresight Exercise (CSFE) 2020-21 and corporate reports on the Future of Food and Agriculture (FOFA);
- welcome the presentation and launch of the report The Future of Food and Agriculture – Drivers and triggers of transformation (FOFA-DTT);
- acknowledge the multidisciplinary nature of corporate foresight exercises such as the CSFE 2020-21 and FOFA reports;
- recommend that FAO, with the Committee on Agriculture (COAG)’s support, reinforces its strategic foresight studies, including new global quantitative analysis of possible alternative futures, with contributions from all technical divisions, and in collaboration with the United Nations (UN) High-Level Committee on Programmes Strategic Foresight Network and other UN system and international bodies;
- invite FAO to systematically share strategic foresight and global perspectives findings through FOFA reports, web-based data-sharing devices and other forms of information-sharing tools; and
- recommend Members to use FAO’s foresight products to inform national development strategies for sustainable agrifood systems, and to further support FAO in their dissemination and in generating substantive policy dialogues on critical issues that emanate from these products.

Queries on the substantive content of the document may be addressed to:

Mr Máximo Torero Cullen
Chief Economist
Tel: +39 06 570 50869
I. The FOFA-DTT report in the Corporate Strategic Foresight process 2020-21

1. This document discusses the corporate report *The future of food and agriculture – Drivers and triggers for transformation*, its purpose, scope, structure, and analysis.

2. FOFA-DTT consolidates the findings of the Corporate Strategic Foresight Exercise (CSFE) carried out in 2020 and 2021. The CSFE was aimed at:
   a. accelerating strategic thinking to strengthen FAO’s capacity and effectiveness in supporting agrifood systems transformation and in providing strategy, policy, and investment implementation support at all levels to achieve Agenda 2030;
   b. informing the FAO Strategic Framework 2022-31 (SF) at different stages of its preparation by providing an analysis of important drivers of the future of agrifood systems, key triggers for transformation, and challenges and opportunities ahead, to achieve the overall sustainability of these systems;
   c. encouraging strategic thinking at country level, to the benefit of country-level development strategies and related implementation, and of corporate country-level activities such as the Hand-in-Hand Initiative; and
   d. sharing knowledge and visions with the development community at all levels regarding challenges, threats, and opportunities to move agrifood systems towards efficiency, inclusivity, resilience and sustainability.

3. The CSFE and the ensuing FOFA-DTT report address fundamental questions about the long-term sustainability of agrifood systems: will agrifood systems be able to meet the needs of a global expanding population, while the pressure on natural resources intensifies, greenhouse gas (GHG) emissions increase, and climate change raises unprecedented concerns? Will future socio-economic and environmental settings warrant universal access to safe, sufficient, and nutritious food? These questions and the significant implied trade-offs are not new, but the current conditions in which they are revisited are, especially after the COVID-19 pandemic exposed the fragilities of past developmental achievements.

4. Stimulated by these questions, the CSFE mobilized significant internal and external expertise by means of: an internal expert consultation (IEC), that engaged more than 40 FAO experts and Decentralized Offices; a staff sample survey (SSS), that involved circa 300 randomly selected FAO staff; a *call-for-papers*, addressed to all technical divisions; and an external expert consultation (EEC), that engaged representatives from civil society, academia, media, the United Nations (UN) High-Level Committee on Programmes (HCLP) Informal Strategic Foresight Network, of which FAO is an active member, and the United Nations Educational, Scientific and Cultural Organization (UNESCO)’s Futures Literacy Team, which coordinates this UN network.

5. The findings of the CSFE, which are reflected in the FOFA-DTT report, not only nurtured the preparation of the SF, but also benefitted from it (see Figure 1).

---

3 See the site: *The future of food and agriculture*.

4 These contributions are reflected in the SF, Section B, paragraphs 24-41; Table 1: Critical drivers of agrifood systems and related trends; and related annex on pages 31-36. The CSFE was implemented in synergy with the SF process, with mutual relationships and continuous interactions between the teams in charge of the two processes.

5 See the site: *HCLP Informal Strategic Foresight Network*
6. The FOFA-DTT report contributes to the strategic thinking required within FAO to look forward and responds to a renewed interest in strategic foresight within the UN system. It draws upon previous forward-looking exercises documented in the FAO reports *The future of food and agriculture – Trends and challenges (FOFA-TAC)*,\(^6\) which provided the conceptual backbone to the *FAO Medium Term Plan 2018-21*\(^7\) and *The future of food and agriculture – Alternative pathways to 2050 (FOFA 2050)*,\(^8\) which provided quantitative, long-term projections for food and agriculture.

7. The FOFA-DTT report consists of three parts: *Drivers of agrifood systems*, *Alternative scenarios for agrifood systems* and *Triggers, challenges, opportunities and strategic options*. It provides qualitative narratives of possible futures that have, however, been informed by quantitative information presented in a web-based dashboard. The next sections briefly outline the three parts of the report (see Figure 2).

---

**Figure 1. Corporate Strategic Foresight Exercise and the new Strategic Framework: synergies.**


---

**Figure 2. Structure and content of the corporate flagship report FOFA-DTT.**


---


II. Drivers of agrifood systems (Part 1)

8. Part 1 of the *FOFA-DTT* report discusses 18 interconnected socio-economic and environmental drivers and the related trends that can shape the future of agrifood systems (see Table 1). A systemic approach is used to analyse their recent trends and patterns (see Figure 3). This part articulates the fundamental questions on agrifood systems’ sustainability in some ensuing research questions relevant to each driver. These questions begin to guide the understanding of possible future patterns of agrifood systems.

9. Given the changing circumstances and the proximity to 2030, *FOFA-DTT*, compared to similar previous FAO reports, puts more emphasis on aspects such as: cross-country interdependencies; big data generation, control, and ownership; uncertainties at all levels; increasing food prices; science and innovation; capital and information intensification of agrifood production processes; market concentration; and epidemics and degradation of ecosystems. It also addresses what are increasingly more evident trade-offs in sustainable development (see Table 3). Overall, Part 1 highlights that, under the influence of the 18 drivers, almost all core activities of agrifood systems – primary production, processing, distribution, consumption, disposal, etc. – and their interactions with socio-economic and environmental systems present critical aspects, weaknesses and pitfalls that must be considered.

Table 1: Critical drivers of agrifood systems and related trends

<table>
<thead>
<tr>
<th>A. Systemic (overarching) drivers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. <strong>Population dynamics and urbanization.</strong> A recent UN report on megatrends states that “Between 2020 and 2050, globally, the portion of people living in urban areas will shift from 53 per cent to 70 per cent”(^1), with implications for agrifood systems.</td>
</tr>
<tr>
<td>2. <strong>Economic growth, structural transformation and macro-economic outlook</strong> may not always be conducive to the inclusive economic transformation of societies. The United Nations Conference on Trade and Development (UNCTAD) has acknowledged that “If the current policy stances continue, […] as labour shares across the world continue on their decreasing path, household spending will weaken, further reducing the incentive to invest in productive activities.”(^ii)</td>
</tr>
<tr>
<td>3. <strong>Cross-country interdependencies</strong> tie together agrifood systems globally with both positive impacts and drawbacks. For instance, the <em>SOFI 2019</em> report states “Eighty percent of the countries (52 out of 65) with a rise in hunger during recent economic slowdowns and downturns are countries whose economies are highly dependent on primary commodities for export and/or import.”(^iii)</td>
</tr>
<tr>
<td>4. <strong>Big data generation, control, use and ownership</strong> enable real-time innovative technologies and decision-making in agriculture, but also raise some concerns because “a few players have come to dominate large shares of the market” and “big data platforms that are able to amass extraordinary amounts of information on consumer behaviour and preferences.”(^iv)</td>
</tr>
<tr>
<td>5. <strong>Geopolitical instability and increasing conflicts,</strong> which include resource- and energy-based conflicts, undermine food security and nutrition. The <em>SOFI 2017</em> report, for instance, highlights that the vast majority of the chronically food insecure and malnourished people live in countries affected by conflicts.(^v)</td>
</tr>
<tr>
<td>6. <strong>Uncertainties</strong> materialize in sudden occurrences that are unpredictable, the COVID-19 pandemic being a point in case. As per the <em>FOFA-2050</em> report, “The future of food and agriculture faces uncertainties that […] revolve around different factors, including population growth, dietary choices, technological progress, income distribution, the state of natural resources, climate change, the sustainability of peace.”(^vi)</td>
</tr>
</tbody>
</table>
Table 1 (continued)

<table>
<thead>
<tr>
<th>B. Drivers directly affecting food access and livelihoods</th>
</tr>
</thead>
</table>
| 7. Rural and urban poverty, with a high proportion of rural people living in poverty or extreme poverty. The number of food insecure people is increasing and malnourishment is widespread because, as stated in SOFI 2020 “the cost of a healthy diet is much higher than the international [extreme] poverty line.”

| 8. Inequalities in income, job opportunities, access to assets, and basic services, which tend to affect women relatively more, as well as inequalities in the way the fiscal burden affects people. The International Monetary Fund (IMF) and the Organisation for Economic Co-operation and Development (OECD) have highlighted that increased inequality can erode social cohesion, lead to political polarization and ultimately lower economic growth.

| 9. Food prices, despite the fact that they fail to capture the full social and environmental costs of food, are in real terms higher than in the 1980s and 1990s. |

<table>
<thead>
<tr>
<th>C. Drivers directly affecting food and agricultural production and distribution processes</th>
</tr>
</thead>
</table>
| 10. Innovation and science including biotechnologies, digitalization and systemic approaches (e.g. agroecology, conservation and organic agriculture) open interesting avenues for agrifood systems, but also pose challenges, as highlighted in a recent report of the UN Secretary General.

| 11. Public investment in agrifood systems, which is often insufficient, decreased significantly in the last 15 years, as shown by the FAO Agriculture Orientation Index (AOI) for Government Expenditures.

| 12. Capital and information intensity of production is increasing in agriculture due to mechanization and digitalization, which lowers labour demand. At the same time, a traditional absorber of agricultural labour in excess such as the manufacturing sector is itself undergoing the same intensification.

| 13. Input and output market concentration poses a challenge for the resilience and equitability of agrifood systems. A recent UNCTAD report highlights that “increased market concentration and rising mark-ups have become commonplace across many sectors and economies, with rent-seeking behaviour dominating at the top of the corporate food chain”.

| 14. Consumption and nutrition patterns are shaped by consumer behaviour and, for them to become more sustainable, changes in global governance are needed. For instance, “Carbon labelling could help shape consumer preferences, [but] would require an internationally recognized approach in setting the related standards”.

<table>
<thead>
<tr>
<th>D. Drivers regarding environmental systems</th>
</tr>
</thead>
</table>
| 15. Scarcity and degradation of natural resources. The GEO-6 report of the United Nations Environment Programme (UNEP) states that “Inefficient or unsustainable farming systems are often associated with environmental and soil degradation and biodiversity loss and an increase in crop specialization and distribution can raise the risk of poor harvests.”

| 16. Epidemics and degradation of ecosystems may increase due to the encroaching of agriculture in forests, antimicrobial resistance, and the production and consumption of animal products. According to a report by UNEP and the International Livestock Research Institute (ILRI) “The pathogens originate in animals, and the emergence or spillover of the diseases they cause in humans is usually the result of human actions, such as intensifying livestock production or degrading and fragmenting ecosystems”.

| 17. Climate change is affecting agrifood systems and natural resources. However, as stated in a recent International Panel on Climate Change (IPCC) report, “an estimated 23% of total anthropogenic greenhouse gas emissions (2007-2016) derive from Agriculture, Forestry and Other Land Use (AFOLU)”.

---

9 As measured by the real FAO Food Price Index (FFPI). The FFPI is a measure of the monthly change in international prices of a basket of food commodities. It consists of the average of five commodity group price indices weighted by the average export shares of each of the groups over 2014-2016.

18. The Blue Economy, noting that the development of economic activities related to the fisheries and aquaculture sector is increasing globally. A recent IPCC report highlights the important role for sustainable ocean industries to reduce GHG emissions and adapt to climate change.\textsuperscript{11}

III. Alternative scenarios for agrifood systems (Part 2)

10. FOFADTT recognizes that concurring factors increasingly interact to generate multiple risks and challenges for agrifood systems’ performance. However, transformative opportunities may also arise, depending on the capacities of all key actors (e.g. private sector, civil society, media and intermediate social bodies, such as consumers’ associations and trade unions, etc.) to identify and exploit them.

11. The interplay between the different drivers presented in Part 1, possible changes in individual and collective behaviours, the materialization of natural events, risks and uncertainties, and the influence of public strategies and policies may interact in different ways, thus generating radically different potential futures in the medium- and long-term. The fundamental questions about the sustainability of agrifood systems will receive different answers depending on each of these potential futures.

12. In this regard, FOFADTT proposes four scenarios in Part 2 characterized by different qualitative narratives (see Table 2). Each scenario emphasizes or deemphasizes selected weak signals, which are current events or existing phenomena that may eventually reveal key features of possible medium- to long-term futures.\textsuperscript{11}

Table 2. Alternative medium- to long-term scenarios for agrifood systems

<table>
<thead>
<tr>
<th>More of the same (MOS)</th>
<th>Reacting to overcome events, crises, and social pressure and doing just enough to avoid systemic collapse led to a worsening in sustainability and the living conditions of many people.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adjusted future (ADF)</td>
<td>Some moves towards a sustainable future were triggered in an attempt to comply with Agenda 2030. Some improvements were made, although without achieving sustainability and systemic resilience.</td>
</tr>
<tr>
<td>Race to the bottom (RAB)</td>
<td>Inadequate incentives prompted decisions that led the world to the worst version of itself, with costly consequences for many people.</td>
</tr>
<tr>
<td>Trading-off for Sustainability (TOS)</td>
<td>Awareness, education, social commitment, responsibility, and participation shifted development paradigms and changed power relations in most countries and worldwide, leading to fair but widespread and resilient wellbeing.</td>
</tr>
</tbody>
</table>


13. The number of futures chosen is somehow arbitrary, as it happens in all scenario-based foresight exercises. However, two guiding criteria were applied to select the four scenarios: a) scenarios are diversified enough to highlight how trade-offs emerging along alternative development patterns could be differently addressed and balanced (see Table 3); and, b) the number of scenarios is easily manageable, thus useful to support strategic thinking and inform multistakeholder decision-making processes.

\textsuperscript{11} The term weak signals is used in foresight studies, having been borrowed from Strategic Early Warning Systems (SEWS), and it refers to signs detected in the reality that could lead to strategic surprises, i.e. events with the potential to jeopardize an organization’s strategy.
Table 3. Trade-offs arising in achieving Agenda 2030 and longer-term sustainable development

<table>
<thead>
<tr>
<th>Examples of selected conflicting objectives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Achieving sustainable yields (by internalizing social and environmental costs)</td>
</tr>
<tr>
<td>Increasing agrifood output</td>
</tr>
<tr>
<td>Achieving sustainable yields</td>
</tr>
<tr>
<td>Increasing employment</td>
</tr>
<tr>
<td>Innovating technologies</td>
</tr>
<tr>
<td>Increasing foreign exchange inflows from few exports</td>
</tr>
<tr>
<td>Increasing food availability</td>
</tr>
<tr>
<td>Funding social protection schemes</td>
</tr>
<tr>
<td>Achieving food security</td>
</tr>
<tr>
<td>...</td>
</tr>
</tbody>
</table>


**IV. Triggers, challenges, opportunities and strategic options (Part 3)**

14. Transformative changes are needed to achieve a most desirable future or at least to avoid the most undesirable ones. To bring such changes in line with Agenda 2030 and the corporate aspirational *four betters (better production, better nutrition, a better environment and a better life)*, a thorough and sound diagnosis of current agrifood systems is needed, and theories (and practices) of change have to be designed.

15. In Part 3 of the *FOFA-DTT* report provides a more thorough analysis of the “priority triggers”– or areas of development with transformative potential to move away from “business as usual”– that were initially proposed in the SF. These triggers have the potential to influence all drivers and channels that link the various elements of agrifood systems with other systems (see Figure 3).
These triggers, whose proper consideration deserves more focus, institutional push, skills and fit-for-purpose organizations, comprise:

a) institutions and governance. Much stronger, more transparent and accountable institutions and governance, including adaptive and effective regulatory governance, are required both within and outside agrifood systems;

b) consumer awareness. Different choices regarding quantity, safety, nutritional content, social and environmental footprint of food to consume and waste may trigger completely different agrifood systems’ outcomes. Demand-side policies and provision of general public goods, such as education and transparent information, may promote critical thinking and awareness, and become an important component of policy packages aimed at sustainable development;

c) income and wealth distribution. Considering that few people and countries appropriate large portions of global wealth and incomes, reducing between- and within-country inequalities is necessary to eradicate food insecurity and malnutrition, particularly if food prices will further
increase, and even more so if they were to effectively internalize social and environmental externalities. This may also unlock investments and new income-generating processes; and innovative technologies. Producing more with the same or less resources, reducing the risks of epidemics and pandemics, increasing transparency in transactions, creating new earning opportunities and boosting the overall technical progress, while promoting social inclusion, will not be attainable without technological innovative solutions accessible to all.

17. These triggers are expected to interact and generate systemic impacts on agrifood systems. The SF identifies some of these triggers as accelerators (e.g. innovation and technology) or complements (e.g. governance and institutions). FOFA-DTT takes a step further to articulate the proposed triggers by means of selected strategic options (broad sets of policy orientations), aimed at influencing agrifood systems’ patterns.

18. This part builds upon FAO Regional Conferences’ reports, FAO flagship reports, and contributions from other United Nations exercises, such as the UN Food Systems Summit preparation and follow-up, the sixth assessment report (AR6) of the Intergovernmental Panel on Climate Change (IPCC), and recent foresight exercises of the UN High-Level Committee on Programmes (HLCP), among others.

---