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FAO REGIONAL CONFERENCE FOR LATIN AMERICA AND THE CARIBBEAN

Thirty-eighth Session

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Foresight drivers and triggers relevant for Latin America and the Caribbean

Executive Summary

Responding to calls by the 28th Session of the Committee on Agriculture and other governing bodies, FAO is currently engaged in foresight exercises for the transformation of agrifood systems at all levels. This information note outlines the findings to date of the Regional Foresight Exercise (RFE) for sustainable and resilient agrifood systems, ongoing in the Latin America and the Caribbean region, and elicits further engagement of Members and other regional stakeholders in strategic foresight to support decision making processes.

Agrifood systems in the region face short- and long-term challenges and opportunities. Within the conceptual and methodological framework established by the recently published FAO flagship report *The future of food and agriculture – Drivers and triggers for transformation* (FOFA-DTT), regional experts are analysing selected priority drivers (driving forces) of agrifood systems to detect signals of possible future trends, outline alternative future scenarios, identify global priority areas or "triggers for transformation" and strategic options to activate such triggers.

The different economic growth patterns in the various subregions signal that future significant intra- and inter-regional dependencies may materialize, with implications for agrifood systems both in origin and destination countries. Concurrently, climate change and the degradation of natural resources and ecosystems, including oceans, highlight the emerging trade-off between rapid economic growth and intergenerational equity. On the demand side, the increasing prevalence of obesity in the region signals that the future outcomes of agrifood systems could vary depending on the prevailing consumption patterns.

If the neglect of public investment continues, innovative production approaches may be more unlikely to materialize, while differences of per capita income, savings and investment potential may further exacerbate the different capital-intensities of agriculture across countries. Concurrently, though, emerging agroecological practices that trade off physical with human capital and other innovative approaches may signal a possible future change of paradigm in agricultural practices. On a global scale, the ongoing conflicts such as the wars in Ukraine and the Middle East stress the trade-off between efficiency, brought by specialization, and resilience, implied by diversification of activities and income sources. This trade-off is particularly important for countries in the region that are increasingly relying on imports for their food supplies.

Documents can be consulted at www.fao.org

The RFE builds on four global long-term alternative scenarios of possible futures presented in FOFA-DTT, to provide more region-nuanced narratives. To move future agrifood systems towards a scenario of sustainability and resilience, FAO has identified, four "triggers for transformation", to be targeted by suitable strategies, policies and behavioural changes: (i) Institutions and governance; (ii) Consumer (citizen) awareness; (iii) Income and wealth distribution; and (iv) Innovative technologies and approaches.

Preliminary RFE findings emerged about the regional nuances of these triggers, to be further articulated at country level for high-income countries (HICs) and lower-middle-income countries (LMICs). Middle-income countries are at a crossroads. They may follow the unsustainable development paradigm adopted by HICs, thus largely contributing to further degrading natural resources, exacerbating climate change and leading to ungovernable inequalities such as the FOFA-DTT paradigmatic "Race to the Bottom" (RAB) scenario. Alternatively, particularly if HICs set a good example, they may adopt innovative development paradigms towards more sustainable alternative futures such as the paradigmatic "Trading off for Sustainability" (TOS) scenario.

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I.   SHORT- AND LONG-TERM CHALLENGES FACING COUNTRIES IN THE REGION

1.   Short-termism and political economy dynamics have undermined tax revenues and fiscal space, inclusive growth and investment in innovation. An ageing population and claims to grant workers' rights, a measure intended to curb inequalities, could increase labour costs and accelerate robotization and automatization, with significant structural impacts. This could increase or decrease inequality, depending on the prevailing impacts. Inequality, a prominent feature in the Latin America and the Caribbean region (LAC), has been exacerbated by volatile economic growth, an ageing population, low public investment and inefficient wealth redistribution.

2.   Geopolitical and geoeconomic tensions, growing inequalities, ecosystems degradation and climate change may force a trade-off between short-term efficiency and longer-term resilience, emphasizing the need for reliance on own production processes and favouring reshoring. Such shifts could potentially impact trade and investment flows. To make progress towards sustainability, decarbonizing economies may require substantial investment.

3.   LAC subregions suffer from either export or import commodity-dependence, which adds on to macroeconomic volatility. This negatively affects food prices and incomes, impoverishing food security and nutrition. Changes in global value chains may impact domestic prices of goods in the region, including food, and factors of production, while global shocks may increase the cost of servicing external debt and importing food and agricultural inputs.

4.   The worsening of the exchange rates has impacted food prices, particularly in food-importing countries. Long-lasting debt may widen divergence between the region and high-income countries (HICs). Smaller economies are particularly exposed to debt distress[1] and are being impacted by the effects of global monetary policy change and the evolution of interest rates.

5.   Civil society groups may have the potential to stimulate and complement governments' action. Adopting circular economy approaches in agriculture, incorporating Indigenous Peoples' knowledge;

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[1] See International Monetary Fund's list of debt distress status, as of 30 November 2023: LIC DSA Comprehensive List_2023_November_COM(37).xlsm - Read-Only (imf.org).

shifting consumption towards less resource-intensive and more nutritious foods; and enhancing regional cooperation are possible pathways forward.

6.   Extreme weather events, including droughts and floods, disrupt lives and economies. In South America, the Amazon rainforest, a vital carbon sink, and Andean glaciers, critical for fresh water supply, are rapidly shrinking, affecting ecosystems and water security. In turn, Mesoamerica's agriculture grapples with a severe and long-lasting drought. The tourism-dependent Caribbean faces hurricanes and ecosystem-threatening marine heatwaves. Small islands and coastal areas are highly vulnerable to sea-level rise. Caribbean countries have the highest debt-GDP (gross domestic product) ratio in the region due to the increasing frequency of costly natural disasters, including hurricanes and tropical storms.

7.   Regarding agriculture, climate change is already reinforcing the degradation of ecosystems and the loss of soil fertility and biodiversity due to prevailing monoculture, erosion, high use of pesticides, and untaxed environmental costs is raising serious concerns.

8.   Amid these challenges, it becomes crucial to transition from short-termism towards a more strategic long-term approach.

I.1.   Background to the Regional Strategic Foresight Exercise

9.   Responding to calls by the 28th Session of the Committee on Agriculture to reinforce strategic foresight capacities, FAO is engaged in foresight exercises to transform agrifood systems. In this endeavour, the Organization benefits from the conceptual and methodological framework established by the recent FAO report *The future of food and agriculture – Drivers and triggers for transformation* (FOFA-DTT),[2] based on the Corporate Strategic Foresight Exercise 2020–2022. This approach underscores the complementarity of qualitative and quantitative foresight; therefore, FAO is strengthening its quantitative analysis and modelling capacities to support Members to better anticipate future scenarios for strategic decision-making.

10.   In this context, the Regional Office for Latin America and the Caribbean (RLC), together with the FAO Subregional Offices, is engaged in a Regional Foresight Exercise (RFE) on the future of agrifood systems, supported by the FAO Foresight Network (FFN).

11.   The RFE aims to: (i) develop regional and subregional strategic visions to move agrifood systems towards sustainability and resilience; (ii) support United Nations Common Country Assessments and FAO Country Programming Frameworks; and (iii) enhance institutional capacities on strategic foresight exercises at all levels.

12.   The RFE provides a granular assessment of regional linkages among agrifood, socioeconomic and environmental systems (Figure 1), through a stepwise analytical process that considers:

(a)   key drivers (driving forces) of agrifood systems;
(b)   weak signals of possible futures;[3]
(c)   scenario narratives for alternative futures based on weak signals;
(d)   triggers for transformation – priority focus areas that could transform agrifood systems; and
(e)   strategic options and policies to activate key triggers for transformation.

13.   This note outlines current RFE findings and elicits further engagement of Members and other regional stakeholders in strategic foresight.

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[2] https://www.fao.org/3/cc0959en/cc0959en.pdf
[3] The term "weak signals" in future studies, borrowed from Strategic Early Warning Systems, refers to events that could magnify to determine the future, or shrink and become irrelevant.

Figure 1
Agrifood systems: key drivers, activities, outcomes, and triggers for transformation
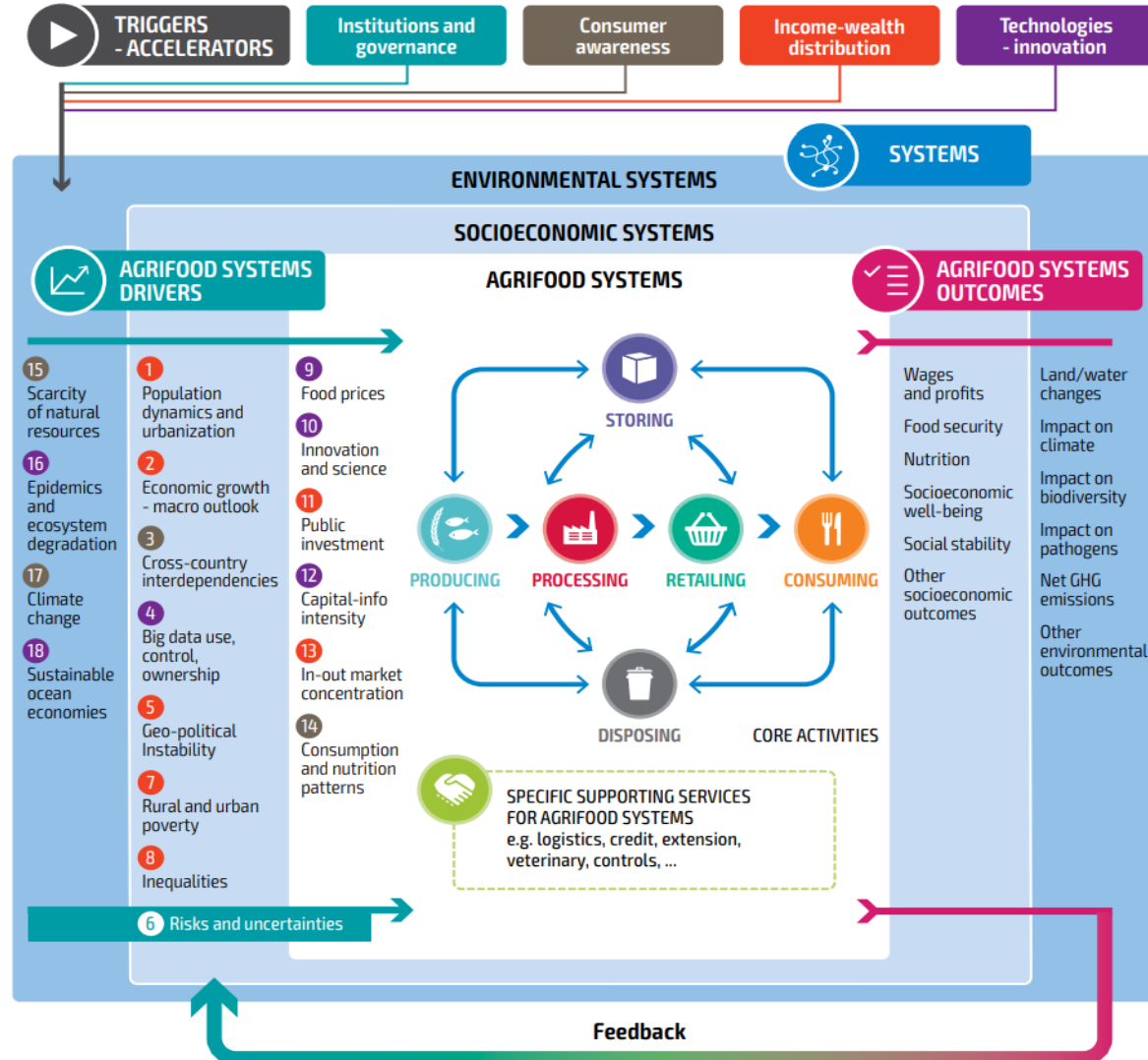
Note: Agrifood systems (white box at the centre) operate within broader socioeconomic and environmental systems (light blue and dark blue boxes). Drivers (left-hand side) influence agrifood systems' outcomes (right-hand side). Triggers for transformation (top) affect agrifood systems through their impacts on drivers.
Source: FAO. 2022. *The future of food and agriculture – Drivers and triggers for transformation.*[4] Rome, based on F4F Model.[5]

I.2.   Drivers of agrifood systems in the region

14.   Through various consultations, among 18 global drivers of agrifood systems analysed in the FOFA-DTT, regional experts identified priority drivers at regional and subregional level[6] (Table **1**).

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[4] https://www.fao.org/3/cc0959en/cc0959en.pdf
[5] https://foresight4food.net/food-systems-model/
[6] The analyses of the Latin America and Caribbean region in the RFE are carried out aggregated low- and middle-income countries at subregional level. The three subregions considered are: South America, comprising

Table 1
Priority drivers of the agrifood systems in LAC, Mesoamerica and the Caribbean.

Driver	Title	LAC	Mesoamerica	Caribbean
1	Population dynamics and urbanization	Medium	Medium	Medium
2	**Economic growth and macroeconomic stability**	High	High	Medium
3	Cross-country interdependencies	High	Medium	High
4	Big data	Medium	Low	Low
5	Geopolitical instability and conflicts	Medium	High	Medium
6	Risks and uncertainties	Low	Low	Low
7	**Rural and urban poverty**	High	High	Medium
8	**Inequalities**	High	Medium	High
9	Food prices	Medium	Medium	Low
10	Innovation and science	Low	Low	Low
11	Investment in agrifood systems	Medium	Medium	Low
12	Capital and information intensity of production	Low	Low	Low
13	Market concentration	Medium	Medium	Medium
14	Consumption and nutrition patterns	Low	Medium	Medium
15	Scarcity and degradation of natural resources	Medium	Medium	Medium
16	Epidemics and degradation of ecosystems	Medium	Low	Low
17	**Climate change**	High	High	High
18	Sustainable ocean economies	Medium	Low	Medium

Importance:
- High
- Medium
- Low

Source: FAO. 2024. *Regional Foresight Report for Latin America and the Caribbean*. Draft. Unpublished.

15.   The priority drivers are (2) economic growth, structural transformation and macroeconomic stability; (7 and 8) rural and urban poverty and inequalities; and (17) climate change. In addition, population dynamics, geopolitical instability, cross country interdependencies, investment in agrifood systems, consumption and nutrition patterns and natural resources were highlighted.

Argentina, Bolivia (Plurinational State of), Brazil, Colombia, Ecuador, Paraguay, Peru and Venezuela (Bolivarian Republic of); Mesoamerica, comprising Costa Rica, Cuba, Dominican Republic, El Salvador, Guatemala, Honduras, Mexico and Nicaragua; and the Caribbean, comprising Belize, Dominica, Grenada, Haiti, Jamaica, Saint Lucia, Saint Vincent and the Grenadines and Suriname. Regional high-income countries are aggregated with other high-income countries globally. The list of countries included in the subregional aggregates is provided in the FOFA Data Dashboard. While the main inputs for the region were obtained through consultations at the Regional Office (RLC), subregional specificities were highlighted during meetings facilitated by the subregional offices of Mesoamerica and the Caribbean (SLM and SLC, respectively).

I.3. Selected key drivers and related weak signals

16.   To complement experts' opinions and identify "weak signals" of possible futures, these drivers, their trends and interactions were analysed at regional and subregional level. The FOFA Data Dashboard facilitated the quantitative analyses. Preliminary key findings are summarised below.[7]

Economic growth, structural transformation and macroeconomic stability

17.   Sluggish post-commodity-boom economic growth, combined with a growing population, has resulted in low growth of per capita gross domestic product (GDP), undermining convergence with HICs (Figure 2). The subregions present differences in divergence with HICs, which can be explained by their different economic structures, resource availability, and current challenges.

18.   The region is a major global producer and exporter of agricultural products. In South America and Mesoamerica, economic structure is oriented towards export-led commodity sectors and economic growth has been traditionally connected to the evolution of commodity prices. The Caribbean's growth, however, is limited by its low economic diversification, heavily reliant on tourism, high debt, and a high dependence on imported food. Both net agrifood exporters and importers are highly vulnerable to climate and agricultural shocks.

Figure 2
Proportion of GDP per capita relative to high income countries (1990–2022)
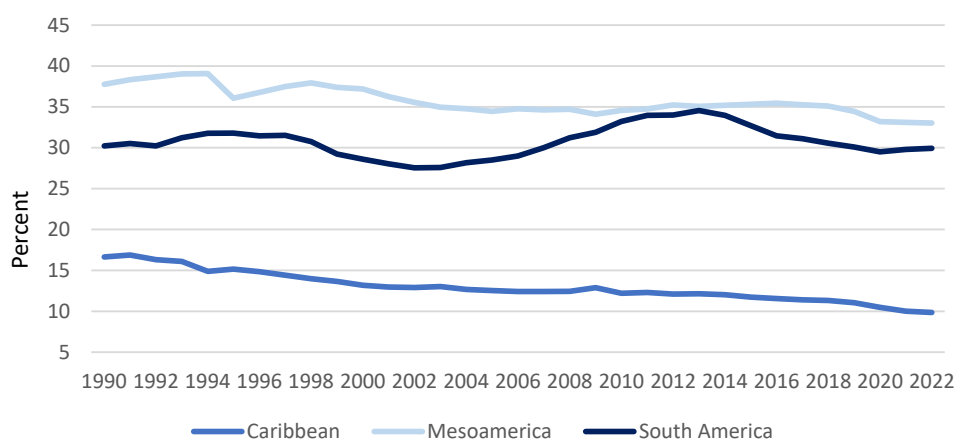
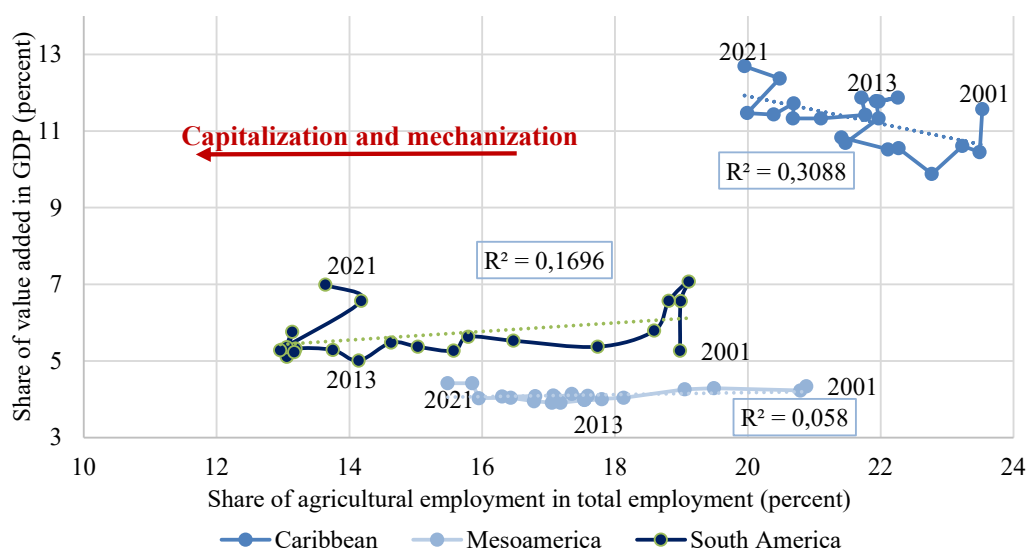*Note:* Regional and subregional aggregates exclude HICs.
Source: Authors' elaboration based on World Bank – *World Development Indicators*, accessed through the FOFA Data Dashboard.

19.   Agricultural employment decreased as workers transitioned to manufacturing and services - particularly, tourism in the Caribbean. Higher income countries such as Chile and Uruguay aligned agricultural employment rates with those of HICs, while for the rest of LAC countries agricultural labour is still significant (Figure 3). The share of agricultural value-added in GDP has grown over the last ten years. Since 2013 and, in particular in Southern Cone countries, there was a "re-primarization" of the economy.[8] The slowdown in employment was driven by mechanization and capitalization.

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[7] This information note portrays selected preliminary examples of drivers analysed. Full analyses are to be provided in the Regional Foresight Report under preparation as part of the RFE.
[8] "Re-primarization" has been highlighted in different publications such as: OECD/CAF/ECLAC (2018), *Latin American Economic Outlook 2018: Rethinking Institutions for Development,* OECD Publishing, Paris. In: http://dx.doi.org/10.1787/leo-2018-en; and Ocampo, J.A. (2017). *Commodity-led development in Latin America.* In *Alternative pathways to sustainable development: Lessons from Latin America* (pp. 51-76). Brill Nijhoff, https://journals.openedition.org/poldev/2354.

Figure 3
Share of agricultural value-added in GDP and share of agricultural employment (2001–2021)


Note: Dotted lines represent linear regressions. R^2 refers to the coefficients of determination related to the linear trends, ranges between 0 and 1. R^2 is obtained regressing by the share of agricultural employment in total employment on the share of agricultural value added. Regional and subregional aggregates exclude HICs.
Source: Authors' elaboration. Employment based on ILOSTAT; value added (agriculture, forestry and fishing) and GDP based on FAOSTAT, accessed through the FOFA Data Dashboard.

20.   LAC reports very low economy-wide investment-to-GDP ratios. Similarly, agriculture fixed capital formation has also stagnated (Figure **4**), correlating closely with commodity prices.

Figure 4
Agricultural gross fixed capital formation per unit of agricultural value added (1995–2021)
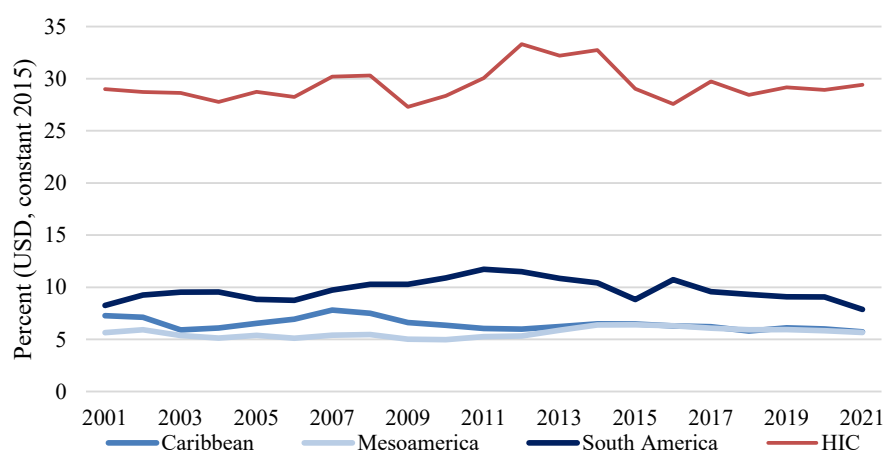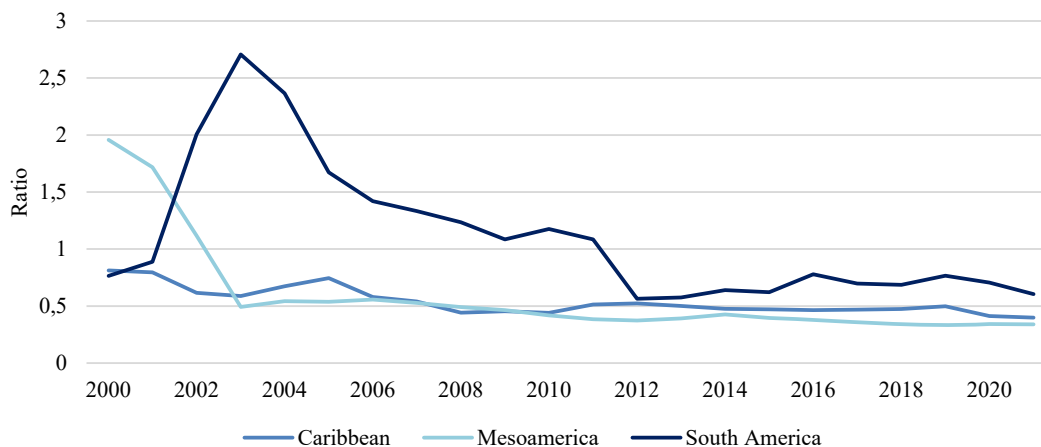

Note: Subregional aggregates exclude HICs. HIC is the aggregation of all high-income countries globally.
Source: Authors' elaboration based on FAOSTAT, accessed through the FOFA Data Dashboard.

21.   In all subregions, financing is crucial for agrifood systems investments. The share of agricultural credit and the ratio between investment and credit decreased, indicating a decreasing proportion of credit dedicated to investment (Figure 5). Additionally, the agriculture orientation index in credit is declining (Figure **6**).
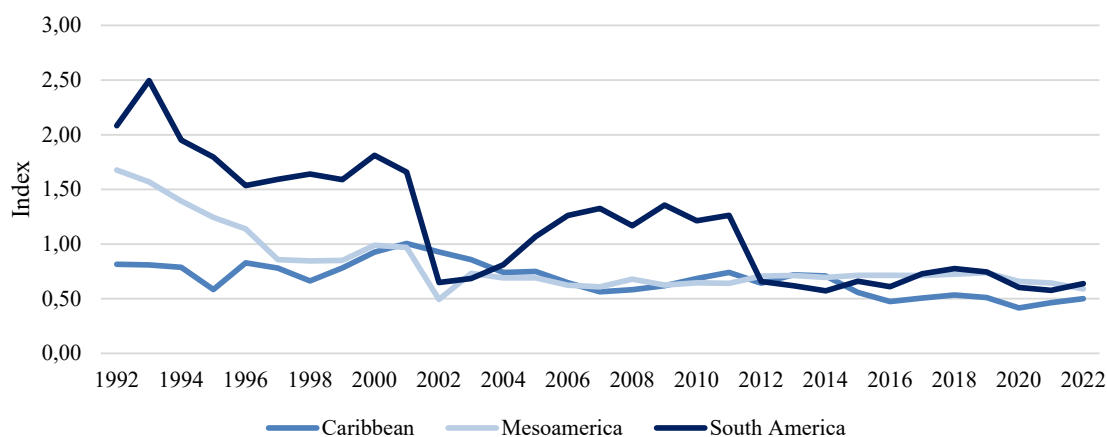
Figure 5
Ratio between investment in agriculture and credit to agriculture (2000–2021)

Note: Regional and subregional aggregates exclude HICs. Regional HICs are aggregated with other HICs globally. The ratio is calculated using data expressed in nominal current US dollars.
Source: Authors' elaboration based on FAOSTAT, accessed through the FOFA Data Dashboard.

Figure 6
Agriculture orientation index for credit (1991–2021)

Note: Regional and subregional aggregates exclude HICs. Regional HICs are aggregated with other HICs globally. The Agriculture Orientation Index (AOI) for Credit is defined as the Agricultural Credit Share of Total Credit, divided by the Agriculture Share of GDP, where Agriculture refers to the agriculture, forestry, fishing and hunting sectors.
*Source*: Authors' elaboration based on FAOSTAT, accessed through the FOFA Data Dashboard.

22.   **Weak signals of possible futures**. Slow economic growth and GDP per capita might hinder the transition to more sustainable agrifood systems if this limits the fiscal space to fund public research and prevents private investment from shifting towards sustainable technologies, while geopolitical shocks and increasing climate change could further undermine inclusive and sustainable development strategies. The significant rise in the last ten years of the share of agriculture value added suggests a possible revival of agriculture, seemingly being achieved with less employment. Part of the workers transitioned to manufacturing and service sectors but this could also feed further international migrations.

Cross-country interdependencies

23.   While the modest economic growth, social tensions and inequalities in income distribution feed intra- and interregional migrations, the lack of structural transformation engenders the increasing reliance on agriculture and low export diversification. These are some factors that originate high cross-country interdependencies within and outside the region. LAC, and specifically South America, reports a booming surplus in the agricultural trade balance, mainly since the early 2000s (Figure 7) In South America, indeed, agricultural exports are an increasing share of total exports (Figure 8). On the other hand, Caribbean countries are increasingly dependent on agrifood imports,[9] which exposes them to a higher degree of vulnerability as they must divert foreign exchange resources to pay for growing and more expensive food imports.

Figure 7
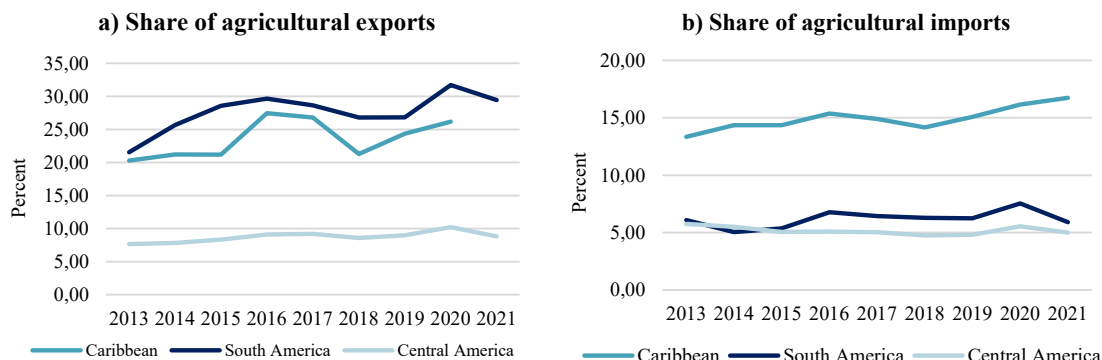**Agriculture trade balance as a share of GDP (1990–2020)**
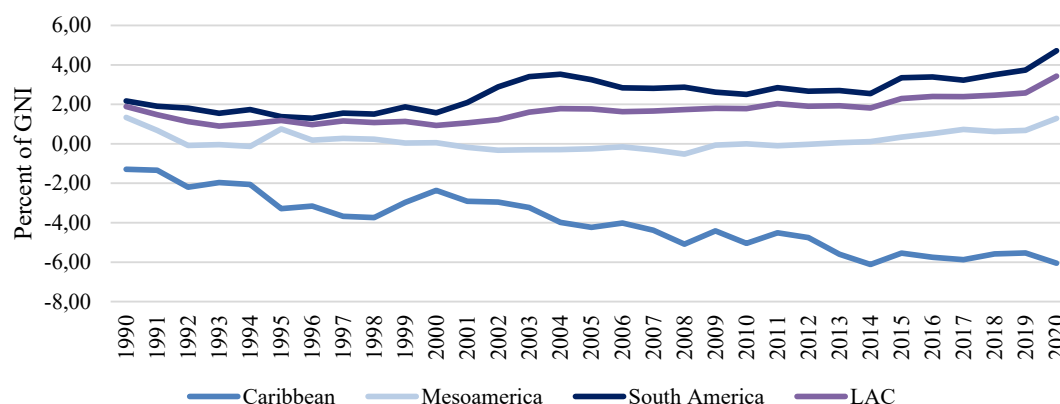
Note: Regional and subregional aggregates exclude HICs. Regional HICs are aggregated with other HICs globally. Net exports are computed as the difference between exports and imports both expressed as current USD; they are scaled by gross national income at current USD.
Source: Authors' elaboration based on FAOSTAT, accessed through the FOFA Data Dashboard; OECD (2024) *Consumer Price Database*.

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[9] According to calculations from the World Integrated Trade Solution (World Bank) and the Observatory of Economic Complexity (OEC) data for 2021, even though the United States of America has been a traditionally important trading partner, currently almost half of the Caribbean Community (CARICOM)'s agrifood products are imported from LAC countries.

Figure 8
Share of (a) agricultural exports and (b) imports on total exports and imports (2013–2021)


Note: Regional and subregional aggregates exclude HICs. Regional HICs are aggregated with other HICs globally. Shares are calculated using data expressed in nominal values.
Source: Authors' elaboration based on FAOSTAT, accessed through the FOFA Data Dashboard.

24.   The Region exports low value-added primary products, which are processed abroad and then reimported in the region. The increasing concentration of trading partners is concerning, as important trade flow changes have occurred over the past decades (Figure 9). Asian countries, especially China, have become an increasingly important destination for LAC agricultural exports.

Figure 9
Evolution of LAC agricultural exports by country of destination (1995–2017)
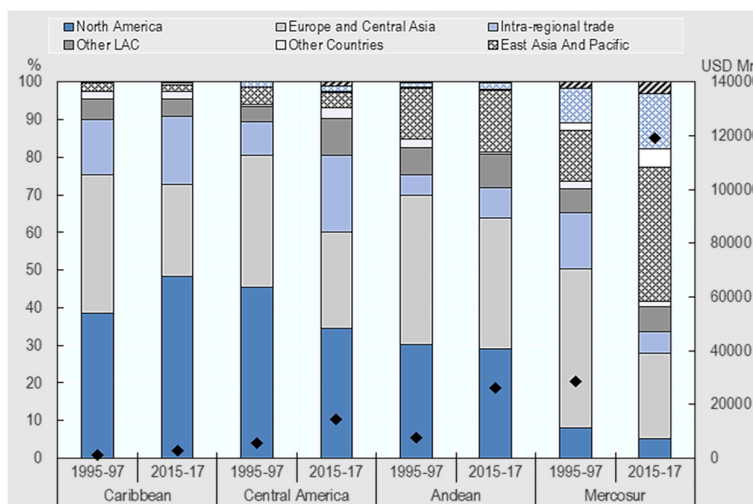
Note: Regions refer to World Bank definitions, i.e. North America comprises Bermuda, Canada and the United States of America. Intra-regional trade refers to trade within the region. "Other LAC" is the LAC region less the region defined in the x-axis.
*Source*: OECD-FAO. 2018. *OECD-FAO Agricultural Outlook 2018–2027*.
https://doi.org/10.1787/agr_outlook_2018-en

Historically, LAC countries have experienced international boom-and-bust capital flows cycles (Figure 10), turning economies increasingly dependent on foreign financial flows and especially short-term flows. The growing debt stock originates capital account interdependencies with other regions of the world (*Source*: Authors' elaboration based on CEPALSTAT, accessed through the FOFA Data Dashboard.

25.   **Figure 11**Figure 11), especially in the Caribbean, the most indebted subregion.

Figure 10
Foreign Capital Net capital inflows and major events, Current USD (1980–2022)
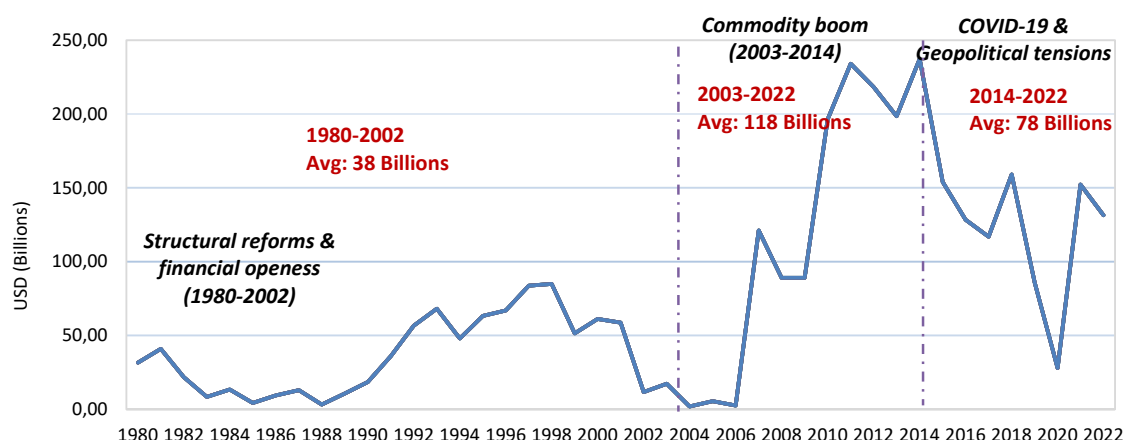
Note: Regional aggregates exclude HICs. HICs is the aggregation of all high-income countries globally.
Source: Authors' elaboration based on CEPALSTAT, accessed through the FOFA Data Dashboard.

Figure 11
External debt as a share of gross national income (1970–2021)
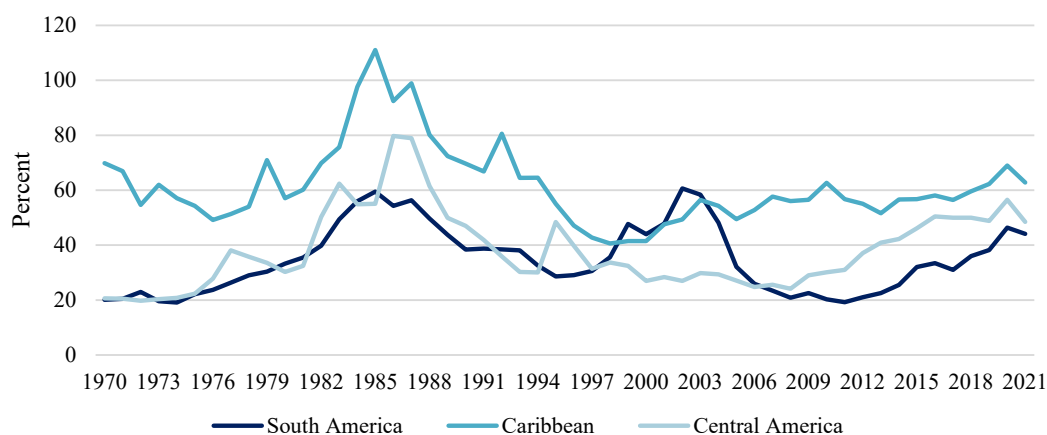
Note: Regional and subregional aggregates exclude HICs. Regional HICs are aggregated with other HICs globally. The ratio is calculated using data expressed in nominal values.
Source: Authors' elaboration based on the World Bank, accessed through the FOFA Data Dashboard.

26.   In Mesoamerica and the Caribbean, remittances are an important source of financing, providing support for private consumption and investment. However, reliance on migration flows and host countries' economic conditions underscores remittances' role as a factor in cross-country interdependencies.

27.   **Weak signals of possible futures.** Due to LAC's reliance on specific exports and key trading partners, global shocks could directly impact export and overall growth. Given the urgency for sustainable value chains, exports may be constrained by new policies for environmental requirements adopted by commodity consumer countries, such as the European Regulation on Deforestation-free products introduced in 2023 by the European Commission and the Regulation on Forest Risk Commodities (FRC) regime, introduced by the United Kingdom of Great Britain and Northern Ireland through the Environment Act 2021. In the Caribbean, low growth and inflation in major exporting countries could raise food prices and increase vulnerability. Remittances may be affected by poor labour conditions, informal markets, violence and climate change, potentially driving additional migration and economic dependency for Mesoamerica and the Caribbean.

Climate change

28.   Throughout the region, there is evidence of the cumulative effects of climate change on reduced crop yields, changing rainfall patterns, exacerbation of extreme effects causing considerable economic damage.[10]

29.   In Mesoamerica, droughts have reduced crop yields, including maize, a fundamental crop for food security. The Caribbean has faced considerable economic damage due to more frequent natural disasters; those extreme events led to food shortages and price increases, mainly affecting the most vulnerable populations. In South and Mesoamerica, variations in climate conditions impacted the quality and quantity of production export crops, such as coffee and soybeans, affecting the competitiveness of these products in the global market.

30.   Regional economic systems heavily rely on fossil fuels. Land use change, especially deforestation for agriculture and livestock production, remains the prevalent greenhouse gas emission factor in agrifood systems. LAC is the region where most pesticides are used[11], posing a threat to biodiversity. Across the region agricultural practices vary significantly, which may indicate that sustainable innovations are not widespread.

31.   **Weak signals of possible futures.** To face growing demand for agricultural products, the region may heavily rely on pesticides and deforestation. Climate change impacts – in crop productions, floods, droughts, rainfall patterns, frequency of natural disasters – may well continue. Higher public investment for mitigation and adaptation measures in agriculture is all but ensured.

Poverty reduction, inequalities and nutrition

32.   Poverty rates declined consistently in the last decades, although improvements stopped in recent years (Figure 12). The region remains in a structural trap of low growth and high levels of poverty with the highest rates of inequality globally.

Figure 12
Poverty rates in Latin America and the Caribbean (1985–2021)
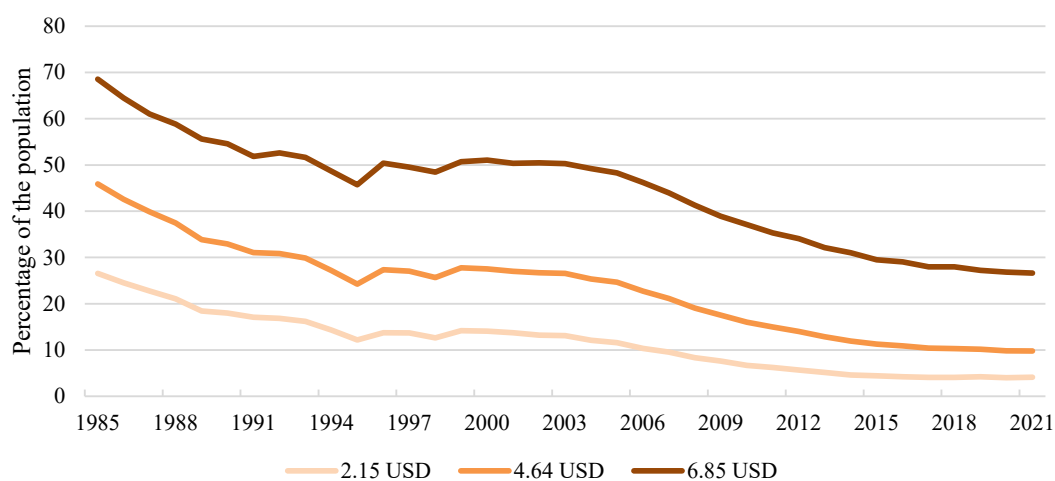
Note: Regional and subregional aggregates exclude HICs. Regional HICs are aggregated with other HICs globally. Data for most of the Caribbean countries are not available.
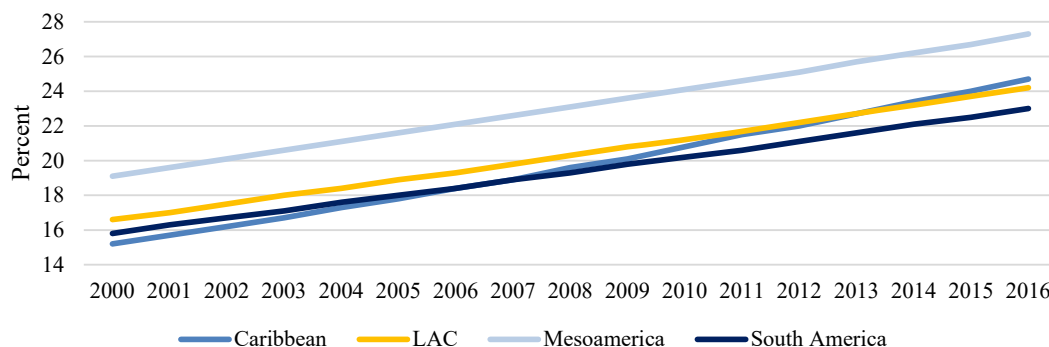Source: World Bank – World Development Indicators. 2023. Accessed through the FOFA Data Dashboard.

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[10] Economic Commission for Latin America and the Caribbean (ECLAC). *The economics of climate change in Latin America and the Caribbean, 2023: financing needs and policy tools for the transition to low-carbon and climate-resilient economies* (LC/TS.2023/154), Santiago, 2023.
[11] FAO. 2022. Pesticides use, pesticides trade and pesticides indicators – Global, regional and country trends, 1990–2020. FAOSTAT Analytical Briefs, no. 46. Rome. https://doi.org/10.4060/cc0918en

33.   Hunger affected 6.5 percent of the regional population in 2023. However, in the Caribbean this figure nearly triples. Moreover, the region has witnessed a concerning rise in overweight and obesity rates among both children and adults (Figure 13), surpassing global averages, and has the highest healthy diet costs worldwide. Food insecurity disproportionately impacts women due to persistent gender gaps in employment, *inter alia*.

Figure 13
Obesity in adult population (2000–2016)

Note: Regional and subregional aggregates exclude high-income countries (HICs). Regional HICs are aggregated with other HICs globally. Data for most of the Caribbean countries were not available. *Source*: World Bank. *World Development Indicators - 2023*. Accessed through the FOFA Data Dashboard.[12]

34.   **Weak signals of possible futures.** Given the low level of job creation, the widespread informality in the labour market and the high and persistent inequalities, further reductions in poverty and food insecurity might be difficult to achieve. All forms of malnutrition may persist in the absence of significant transformations of economic, social and agrifood systems, while obesity and its inherent costs may gain importance through time.

I.4.   Alternative future scenarios for agrifood systems

35.   The RFE builds on the four FAO global long-term alternative scenarios for the future of agrifood, socioeconomic and environmental systems, to provide more nuanced narratives of possible futures that highlight key regional specificities.[13] The four RFE scenarios, that portray a retrospective view to be intended as paradigmatic of a virtually infinite set of possible futures, are summarized below (Table 2)

Table 2
Retrospective narratives of alternative scenarios for agrifood systems

More of the same (MOS). Countries faced economic fluctuations, prioritising short-term actions, often driven by private interests. Nationalism and resource conflicts hindered progress, exacerbated by weak citizen empowerment and fragmented regional cooperation. Volatile food prices persisted amid global disasters and conflicts, while drug trafficking kept influencing power relations and decision-making. Gender disparities slowly improved, yet unemployment rates persisted. Climate change affected food production and fuelled rural-urban migration, while natural resources further deteriorated. Afro-descendant communities and Indigenous Peoples lacked tailored policies and ancestral knowledge was progressively dispersed. Diets continued to be unhealthy, increasing obesity and non-communicable diseases. Limited technology access further marginalized vulnerable populations,

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[12] FAO, IFAD, PAHO, UNICEF & WFP. 2023. *Latin America and the Caribbean – Regional Overview of Food Security and Nutrition 2023: Statistics and trends.* Santiago. https://doi.org/10.4060/cc8514en
[13] "Long-term" in this context refers to years from 2030 up to 2100.

exacerbating poverty, inequality and food security as the population aged. All in all, the limited efforts implemented by government and civil society led to degradation of agrifood systems sustainability and to poor living conditions for a large number of people, thus increasing the long-run likelihood of systemic failures.

Adjusted future (AFU). Governance of socioeconomic systems improved slightly, although multi-sector efforts were uncoordinated. Economic development was fragile, due to the increasing use of unsustainable technology, not associated to sufficient investments in research and development (R&D). Fiscal policies were better designed, but their implementation remained challenging. Disparities in food availability improved, with the southern cone thriving while the Caribbean faced constraints. Budget allocation for climate emergencies increased, preventing investments. Mitigation and adaptation measures were implemented, but not in an integrated manner, limiting their impact. Risk awareness drove moderate investments but favoured mostly large producers. Artificial intelligence (AI) spread, but increased unemployment. Although social programs gained relevance, full coverage was not achieved. Young people were encouraged to engage in the agribusiness sector to enhance generational replacement, yet insufficiently. Overall, while the wellbeing of populations somehow increased in the short-medium run, the lack of substantial transformations hindered these achievements in the long run.

Race to the bottom (RAB). Elites concentrated power, pushed political agendas to further their interests. Stronger, worsened governance and exacerbated poverty, inequalities, violence and hunger. Political polarization led to territorial conflicts, hindering inter-country collaboration. Countries engaged in a race for energy and natural resources. Economic weakening led to greater fiscal deficits, hindering socioeconomic development. Increasing adverse weather events caused poverty, famine, infrastructure destruction, epidemics and irreversible environmental degradation, triggering migration and water conflicts. Violence over land and resources intensified. Agrifood systems collapsed due to unsustainable production and lack of generational replacement, resulting in nutrient-deficient food and widespread food insecurity. Nutrition relied on supplements, creating new dependencies. Investment and technology excluded small producers, while the brain-drain limited progress. Only multinational corporations had access to AI, which generated competitive advantages and eliminated small farmers from the value chains. Poor health and low education affected labour. Minorities lost rights and gender violence soared. All considered, gravely ill-incentivized decisions led the world to the worst version of itself and almost irreversible consequences for a very large number of people and ecosystems.

Trading off for sustainability (TOS). Transformed geopolitics and power dynamics redefined the development paradigm focusing on sustainable agrifood systems. Society embraced inclusiveness, through strengthened inter-institutional cooperation and governance, while rent-seeking behaviours are mostly avoided. Decision-making expanded beyond economics, promoting gender equity and narrowing educational gaps. Short term political convenience is traded for long term policy development agendas. Multilateral organizations aided geopolitical balance, favouring rights-based approaches over capital accumulation. Countries adopted integrated economic models emphasizing environmental conservation and the transition to a low-carbon economy. Promoting nutritious food and climate-resilient integrated agricultural practices ensured food security, nevertheless agricultural enterprises, in particular agri-export multinationals, rethink their business models. Food prices considered externalities, but consumers give up overconsumption patterns. Public investments and R&D were financed through fiscal reforms implying also more taxes on higher income percentiles. Poverty was redefined, decoupling it from material possessions. Healthy diets became more affordable, despite prices reflecting the true cost of food, thanks to a more equitable income distribution. Indigenous Peoples and afro-descendant populations participated equally in decision-making, with recognized tenure rights. Overall, unsustainable and ill-incentivized decisions were traded off for inclusiveness, resilience and sustainability of agrifood, socioeconomic and environmental systems (see section VII).

I.5.   Triggers for transformation and strategic options

To move agrifood systems towards sustainability and resilience, FAO has identified four priority areas, or "triggers for transformation*",* to be targeted by strategies, policies and behavioural changes: (i) institutions and governance; (ii) consumer (citizen) awareness; (iii) income and wealth distribution; and (iv) innovative technologies and approaches (Figure 1 top part). Given their transformative potential, these triggers are expected to spread impacts throughout the systems. Depending on whether they are then activated, the future could align with one of the four paradigmatic scenarios (Table 3) and the FAO inspirational "Four Betters" – Better Production, Better Nutrition, Better Environment and Better Life – could materialize or dissipate (Figure 14).

Table 3.
Triggers for transformation under alternative scenarios

	Institutions and Governance	Consumer (citizen) awareness	Income and wealth distribution	Innovative technologies and approaches
More of the Same (MOS)	Weak governance of global issues; roles of public and private confused.	Piecemeal approaches of few groups have limited or no impacts on transformation.	Inequalities, hunger, extreme poverty not tackled; HICs and LICs diverge.	Within the current paradigm (large scale, labour saving) CC 2100: 3+
Adjusted Future (AFU)	Selective pursuit of Agenda 2030; private bodies cover public functions.	Segmented pressure groups focus on well-being of selected societal layers/LICs.	Voluntarist actions to combat most striking situations; weak fiscal systems.	Mostly within the current paradigm; small-scale survives. CC 2100: 3-
Race to the Bottom (RAB)	Short-termism, dismantlement of rules; government collusion with elites.	Green-social washing fools consumers; citizens irrelevant in all systems.	No taxes, no services - "stratified societies"; exacerbated poverty in HICs and LMICs.	Extractive economies based on exhaustible resources dominate. CC 2100: 4+
Trading off for Sustainability (TOS)	Global governance of global phenomena; power distributed; roles well defined.	Consumers give up final consumption to invest in transformation; HICs give room to LICs in resource use.	Efficient fiscal system, new metrics for well-being adopted; less leakages from LICs.	Effective strategies for "circular" economies dominate. CC 2100: 2-

Note: CC 2100: 3+ means Scenario compatible with an increase in the average global temperature by 2100 due to climate change above 3 degrees Celsius compared to the pre-industrial period. Analogously, 3-, 4+ and 2-, mean, respectively: below 3, above 4 and below 2 degrees Celsius.
Source: Based on FAO. 2022. *The future of food and agriculture – Drivers and triggers for transformation*. Rome.[14]

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[14] https://www.fao.org/3/cc0959en/cc0959en.pdf

Figure 14
Scenario pathways and public strategies and policies to trigger transformation.
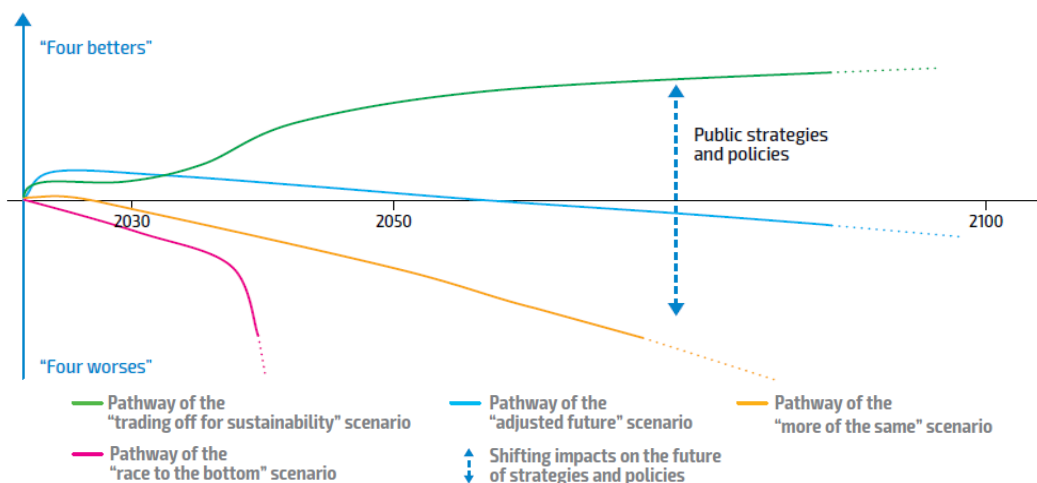
Source: FAO. 2022. *The future of food and agriculture – Drivers and triggers for transformation*. Rome.[15]

36.   The preliminary findings obtained through the Regional Expert Consultations regarding regional nuances of these triggers and challenges to their implementation, to be further articulated at country level, are briefly outlined below:[16]

(a) ***Institutions and governance***. Strategic options involve fostering partnerships among institutions, companies, and civil society; and reducing political barriers for regional integration and responsible governance of inclusive tenure rights. It is key to reduce risks associated to decarbonization, incentivising countries that produce and trade strategic minerals with low carbon technologies; and facilitate the transition of nations dependent on oil revenues. Investments in targeted infrastructure would help in addressing sea-level rise in coastal erosion, and in protecting marine and aquatic ecosystems.

(b) ***Consumer (citizen) awareness***. Education for consumer awareness and youth engagement is vital. Long-term strategies envisage curriculum changes to promote critical thinking and healthy food choices. Additionally, it is advisable to conduct campaigns on specific topics such as food labelling and direct purchase from farmers.

(c) ***Income and wealth distribution***. Key measures include reformulating fiscal policies; enhancing inclusion and resilience through social protection programmes; promoting employment and incentivising rural women and youth; facilitating financial and crop insurance mechanisms; linking the agrifood sector to other sectors such as tourism, health and energy; and developing infrastructure to support local markets. Digital and emerging economic activities present opportunities for this transformation.

(d) ***Innovative technologies and approaches***. Strategic options include enhancing rural information and communications systems to increase access to science and innovations to small and medium enterprises and small farmers; supporting mobile-based innovations such as real-time price and market information, weather forecasting, pest and disease detection; supporting precision and nutrition-sensitive agriculture; and increasing research and innovation, along with incentives for climate-smart agriculture, agroecology and regenerative agriculture.

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[15] https://www.fao.org/3/cc0959en/cc0959en.pdf
[16] Strategic options, policies and investments to activate these triggers at global level are reported in part 3 of FAO, 2022. *The future of food and agriculture – Drivers and triggers of transformation*. Rome. In: https://www.fao.org/3/cc0959en/cc0959en.pdf

I.6. Trade-offs along transformative patterns

37.   In addressing the transformation of agrifood systems, win-win solutions would be ideal. However, most likely "trade-offs" – potentially conflicting objectives – will likely need balancing, as emerged during the RFE Expert Consultations. Examples include the possible trade-off between reducing greenhouse gases to mitigate climate change and achieving other Sustainable Development Goals (SDG) targets, such as zero hunger, as envisaged in the TOS scenario. Trade-offs are expected to be considered in initiatives at all levels, as articulated in FAO's *Achieving SDG 2 without breaching the 1.5°C threshold: A global roadmap* (Box 1).

Box 1
Achieving SDG 2 without breaching the 1.5 C threshold: A global roadmap

FAO's Global Roadmap[17] to achieve Sustainable Development Goal (SDG) 2 without breaking the 1.5°C threshold involves a process that spans three years, starting with the Conference of the Parties (COP) 28 in 2023 with a global vision of the limits of agrifood systems today and a diagnosis of what has not worked so far in transforming agrifood systems. It then moves from a global vision implying theories and practices of change at global level to the identification of actions required at regional level and related costing and financing options (thanks to quantitative modelling) to be discussed at COP 29. It ends by establishing country action plans and funding and monitoring mechanisms at country level, by the time COP 30 takes place. It also examines how to integrate technical assistance into strategies while supporting sustainable investment plans.

The Global Roadmap presents 120 actions, divided into ten domains of actions, and associated with 20 global milestones aimed to track progress in the right direction. Put together, they show a consistent pathway, starting from today's situation and pivoting quickly towards a trajectory similar to the FOFA's *Adjusted Future* scenario, before accelerating transformation to converge towards a *Trading Off Sustainability* scenario. In 2024, the global roadmap will be adapted to the regional context, building on the work initiated by the Regional Foresight Exercise (RFE).[18]

38.   Along their development pathway, middle-income countries are at a crossroads. They may follow the unsustainable development paradigm adopted by HICs, thus largely contributing to further degrading natural resources and exacerbating climate change and increasing inequalities (see the paradigmatic RAB scenario). Alternatively, they may adopt innovative development paradigms towards more sustainable alternative futures (as the paradigmatic TOS scenario).

39.   National governments are instrumental in steering agrifood systems towards sustainability, yet their efforts cannot exist in isolation due to the supranational nature of the challenges ahead, such as international conflicts, governance of global finance, trade and multinational corporations, climate change, biodiversity loss, and resource depletion. These issues underscore the need for extensive international cooperation and support.

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[17] https://www.fao.org/3/cc9113en/cc9113en.pdf
[18] See more details at https://www.fao.org/interactive/sdg2-roadmap/en/