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# Industrial policy solutions for LDCs: How industrialization strengthens food security

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## Abstract

Despite their heterogeneity, least developed countries (LDCs) face some similar challenges, with food security ranking high on the policy agenda. Poly-crisis including climate change, global pandemics, conflicts and trade disputes exacerbate food insecurity and malnutrition. A robust food industry can contribute to mitigating these challenges while driving the much-needed structural transformation in these countries. Industrial policy has the potential of significantly reducing hunger in LDCs through industrial policy interventions focused on 1) building productive capabilities; 2) shaping agro-industry value chains, and 3) regulating and guiding markets. Successful implementation requires adequate funding, highlighting the need for increased support from the international community to enhance LDCs' fiscal capacity.

## Key Messages

- 1.** Industrial policy is the key catalyst for reducing hunger in LDCs.
- 2.** Food insecurity can be turned into an opportunity for achieving much-needed structural transformation.
- 3.** Fiscal gaps in LDCs can be bridged through international support for finance and technology.

## Hunger in the developing world: different countries, same problem

Least Developed Countries (LDCs) are low-income countries with severe structural impediments to sustainable development. They are a heterogeneous group consisting of 46 countries, primarily in Africa (33) and Asia (9), but also in the Caribbean (1) and the Pacific (3). Each LDC faces unique challenges influenced by its geographic location, resources, history and population size. Despite their differences, LDCs share some common features: agriculture is a major sector in their economy, both in terms of share of gross domestic product (GDP) and employment. LDCs' agricultural sectors are characterized by low productivity and limited value addition. This is due to several constraints in agricultural production, such as infrastructural bottlenecks, limited technology adoption and diffusion, lack of productive capabilities and skills, underdeveloped food systems and lack of competitive markets. Hence, despite having large agricultural sectors, LDCs still face a high degree of food insecurity.<sup>2</sup>

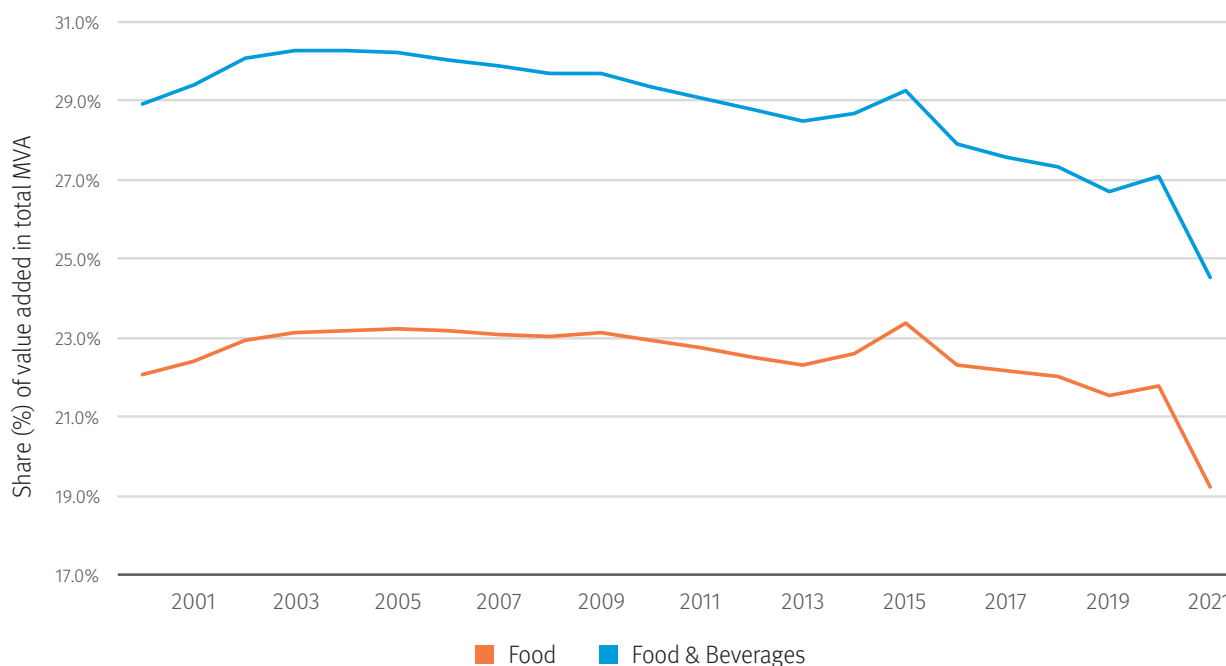
Addressing food insecurity requires adopting technologies and organizational processes in agriculture and developing agro-industries<sup>3</sup> to achieve increased output and value addition. Historically, countries that successfully transformed their agro-industries implemented a wide range of industrial policies<sup>4</sup>, including extension services and skills development, technology transfer programmes, sector-specific infrastructure and agro-industrial parks development. Moreover, achieving Sustainable Development Goal (SDG) 2: Zero Hunger is intricately linked to the realization of SDG9: Build resilient infrastructure, promote sustainable industrialization and foster innovation. Thus, transforming agro-industries is a prerequisite for addressing food insecurity, increasing LDCs' resilience amid poly-crises and for unleashing their industrialization potential.

## Poly-crises: Food insecurity, climate change and geopolitics

The prevalence of moderate or severe food insecurity in LDCs has risen from 50.4 per cent (2014–2016) to 59.3 per cent (2020–2022).<sup>5</sup> Whereas low agricultural productivity is one aspect of the food security problem<sup>6</sup>, another is LDCs' limited ability to increase production and value addition in agro-industries. This is reflected in the decreasing share of food and beverages in LDCs' total manufacturing value added. It decreased from 29 per cent in 2000 to 24.5 per cent in 2021 (Figure 1). The share of beverages also decreased but food products determined the pattern.

Consequently, LDCs play a limited role in regional and global value chains that are increasingly demanding higher quality and compliance to higher standards. Agri-food systems depend on the productive capabilities of farms, processing firms, institutions and the local and global environment in which they operate. They are highly vulnerable to global shocks and disruptions, especially in LDCs where impacts of such shocks are amplified due to LDCs' limited resources and weak resilience. Moreover, all 46 LDCs are net food importers<sup>7</sup>, i.e. price

FIG. 1: IMPORTANCE OF FOOD AND BEVERAGE SECTOR IN LDCs



Source: UNIDO estimates, based on 28 LDCs

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fluctuations on international markets can further affect food security in LDCs. Related to weak resilience, countries with a limited industrial base<sup>8</sup> have been disproportionately impacted by crises such as the COVID-19 pandemic.

The conflict in Ukraine has heightened food insecurity, as half of LDCs' wheat imports come from Russia or Ukraine.<sup>9</sup> Trade disputes and conflicts have also reduced the availability (and have increased the price) of key inputs such as fertilizers, which has had a negative impact on productivity. In some LDCs, input prices were already higher than the global market price before the Ukraine conflict due to lack of market competition in key segments of the global value chain.<sup>10</sup> Furthermore, concentration in meat production and trade, as well as in animal feed constituents such

as soybeans and maize also affects food markets, value capture and the agro-industry's overall sustainability.<sup>11</sup>

Climate change drives extreme weather variability, with severe impacts on agri-food production. LDCs, which rely on traditional production techniques (e.g. rain-fed agriculture), are the most exposed, heavily affecting their productivity and amplifying scarcity due to lack of storage facilities for potential surplus. Record-breaking global temperatures have been measured even during La Niña years, indicating a long-term warming trend, which will likely shift geographic patterns of food production and countries' comparative advantages.

The agro-industry is also an important contributor to greenhouse gas (GHG) emissions: food supply is estimated to contribute to around one-third of GHG emissions. These are primarily associated with meat and dairy production, and related animal feed and land use changes.<sup>12-13</sup> Although climate change is a major challenge for LDCs, it can also open new opportunities towards the development of more sustainable practices in the agro-industries and synergistic solutions involving several industries, partnerships and actors.

## Poly-opportunities: Manufacturing agrarian change towards sustainable high-value agri-food in LDCs

The mutually reinforcing and ‘synergistic’ relationship between agriculture and manufacturing industries, which is key to countries’ structural transformation<sup>14</sup>, is weak in many LDCs. This is because both agriculture and manufacturing are underdeveloped; in other cases, industrialization has moved along a pathway that is largely unrelated to agro-industries, while in countries exporting cash crops, investments in value chain upgrading have been limited, with few incentives to move away from traditional production technologies.

The lack of domestic processing and value addition activities has not created demand for investments in domestic production technologies and services, even though agriculture requires local adaptations of technology with significant scope for indigenous innovation.<sup>15</sup> The fact that agriculture still largely consists of subsistence farming and low-volume output also means that industries could not develop. The few industries that operate in LDCs depend on high volume imports of commodities to operate at efficient scale. Agri-food imports in many LDCs largely take place through informal channels, e.g. smuggling, meaning domestic agro-industries face unfair competition. Domestic value chains are also often controlled by actors who extract rents by creating scarcity in the domestic market by regulating storage facilities and logistics.<sup>16</sup>

Despite these challenges, LDCs have poly-opportunities in industries. Yet capturing these opportunities requires ‘manufacturing agrarian change’<sup>17</sup> to turn the food industry into a high value, technology- and innovation-intensive industry. The wider availability of production and processing technologies at a lower price has enabled technological upgrading and innovation. Digitalization has also increased the industry’s scope for value addition and sustainable practices. The introduction of innovative

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technologies can improve key agri-food processes such as water resource management; precision agriculture and feeding can reduce the need for synthetic crop inputs; business model innovation focused on on-farm storage capacity, logistics, packaging and cold chains can enhance the longevity and value of produce. The diffusion of such technologies can increase sectoral productivity while triggering demand for domestic supply of maintenance services and manufacturing technologies; in turn, domestic firms that produce these technologies can innovate by adapting them to each country’s unique soil and weather conditions.

As climate change is redesigning the world of production and trade, LDCs with abundant natural endowments can become global hubs for sustainable agri-food value chains. Within these value chains, LDCs can gain a competitive advantage in processed and fresh foods, depending on market demand. Meeting stricter product and process standards will become a pre-condition for agri-food exports. Consequently, agri-business can improve LDCs’ competitive position and tap into market opportunities by forming cluster networks. Collectively, they can achieve more economies of scale, obtain bulk purchase inputs, or share equipment and technologies. While opportunities are opening up, there is now a need more than ever to implement industrial policies that will shape competitive agro-industries for the present and future.

**BOX 1.**

Championing policy changes for the sustainable growth of Liberia's cocoa sector

EU legislation on sustainability due diligence and deforestation-linked commodities is a call to action for Liberian cocoa stakeholders, prompting UNIDO to raise awareness, build institutional capacities and facilitate local partnerships. Addressing persistent sustainability concerns within Liberia's cocoa industry, including child labour, deforestation and inadequate farmer income is paramount. UNIDO convened public and private stakeholders to assess the imminent challenges. Drawing on insights from Ghana's experience, the aim was to facilitate a discussion among national stakeholders, charting a

strategic roadmap to develop Liberia's national traceability system. UNIDO is also promoting the professionalization of Liberian cooperatives, enhancing their record-keeping and traceability measures. These certification schemes, aligned with emerging market standards, serve as risk mitigation tools for international buyers. UNIDO supported the certification of two Liberian cocoa cooperatives, comprising 1,026 farmers, in meeting organic requirements—an acknowledgement of their commitment to producing high quality, organic cocoa.

## Unlocking growth: How industrial policy can boost LDCs' food security and productive transformation

'Manufacturing agrarian change' in LDCs calls for well-designed and aligned industrial policy packages.<sup>18</sup> Policy alignment across policy interventions spans from technology diffusion measures to extension services and skills training; from infrastructure development and land management to specialized development credit; from competitive access to markets and inputs to linkage incentive development, and can unlock opportunities in agri-businesses. Achieving food security can be a powerful driver and policy objective around which different government institutions and

stakeholders could collaborate. Increasing food security can be an opportunity to transform the economic structure and reduce inequality. Policy prioritization is also essential, given that some developments are preconditions for others. Prioritization also implies some degree of targeting, given that different agri-food products have product-specific needs in terms of technology, skills and infrastructure development. For example, exporting fresh flowers or fruit depends on cold chains, which are less relevant for domestically processed and packaged products.<sup>19</sup>

Fifteen industrial policy measures for food security and productive transformation in LDCs have been identified across three key areas.

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### Building productive capabilities



1. Promote diffusion and adoption of technologies (including digital) and sustainable practices in food processing **through targeted extension services and demonstration projects;**
2. Promote access to infra-technologies (e.g. testing and measurement facilities, scientific databases, feasibility studies, biotech laboratories, product development and market intelligence services) **through public technology intermediaries** (e.g. Embrapa in Brazil);
3. Promote innovation in closely interconnected industries (e.g. green packaging, green ammonia production) through **grants and procurement contracts;**
4. Encourage investment in agro-industry through **grants or concessional finance;**
5. Develop on-the-job skills training at the firm and farm level through **ring-fenced skills levies and training partnerships;**

### Shaping agro-industry value chains



6. Provide access to **reliable transport, energy supply and storage facilities;**
7. Drive SME collaboration to achieve collective efficiencies through **cluster initiatives;**
8. Support scaling up firms and nurture mid-size firm development by **matching firms with international buyers;**
9. Reach economies of scale and leverage agglomeration economies through the **development of agro-industrial parks;**
10. Foster linkages between agriculture and agro-processing through **investment incentives and targeted trade policy** (e.g. export taxes, import tariffs, standards enforcement, fighting smuggling);

### Governing and shaping markets



11. Ensure that agri-businesses have access to affordable credit and financial services via **specialized development banks;**
12. Attract quality FDI and leverage their technology and global market access **via local content or export value addition requirements, technology transfer agreements, joint ventures and supplier matching and development incentives;**
13. Promote competition in agri-food markets and related ones both upstream (inputs) and downstream (supermarkets) **through market inquiries and competition policy enforcement;**
14. Ensure that locally produced food is safe and meets international market requirements through **standardization services and enforcement of food quality standards;**
15. Promote regional value chain development by supporting regional integration, mutually beneficial cooperation and trade potential complementarities via **bilateral and multilateral trade agreements** (e.g. AfCFTA).

## International solutions: what works and what is missing?

Food insecurity is a growing concern among multilateral organizations with repeated warnings of a global food crisis. While large advanced and emerging economies have made increasing use of industrial policy, the agro-industry has been overlooked, partially because governments have been responding to crises ex post rather than focusing on preventing them. Lessons can be learned from the COVID-19 pandemic and the ensuing investments in the health-industrial ecosystem to increase resilience. We have also learned that technology transfer should not be limited. Many LDCs have significant opportunities to develop their agri-food systems and leverage them for broader structural transformation. Technology transfers and partnerships are important for all countries to prevent future food crises, and technology transfer programmes aimed at the twin goals of developing agro-industries and making them sustainable and fit for the future should receive more attention.

Many industrial policy instruments we have identified cannot be implemented in LDCs given their limited fiscal and financing capability, and the increasing unsustainability of their debt. LDCs' debt stocks have continued to rise and gradually shift towards more costly and riskier instruments, such as short-term,

private and commercial debt, which have raised debt service and potential costs of renegotiation.<sup>20</sup> Between 2011 and 2019, LDCs' debt service tripled from USD 10 billion to 33 billion. In 2021 and 2022, their debt position was further exacerbated by COVID-19 and 20 LDCs were found either in debt distress or at high risk of debt distress. Debt relief must be prioritized and freed resources ring-fenced to support investments in sustainable productive development, with agri-food systems as a central target.

Financial support and technology transfer are only effective if LDCs have access to international export markets. Product and process standards now shape global markets and can be used as non-tariff barriers. Meeting these standards can be both a threat for producers (excluding them from profitable markets) and an opportunity (offering the potential to enter high-margin markets). The problem is that these standards are unilaterally implemented and modified by the buying party and country. This poses potential threats to firms in LDCs whose upgrading, and investment efforts can be undermined by new standards.<sup>21</sup> LDCs should receive targeted technology support to avoid falling behind against a moving target ('red queen effect').

## Endnotes

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<sup>2</sup>According to FAO, a person is considered food insecure when they lack regular access to enough safe and nutritious food for normal growth and development and an active and healthy life. This may be due to unavailability of food and/or insufficient resources to obtain food. This Policy Brief focuses on the supply of food.

<sup>3</sup>Agro-industries refer to subsectors in manufacturing that use agricultural inputs together with inputs from other sectors and process these into food and beverage products. The agri-food system refers to the entire value chain spanning from the farm to the finished food product.

<sup>4</sup>Chang, Ha-Joon (2009) Rethinking public policy in agriculture: lessons from history, distant and recent. *Journal of Peasant Studies*, 36(3):477-515.

<sup>5</sup>FAO (2023): *The State of Food Security and Nutrition in the World 2023. Urbanization, agrifood systems transformation and healthy diets across the rural–urban continuum*. Rome: FAO.

<sup>6</sup>UNCTAD (2015): *The Least Developed Countries Report 2015*. Geneva: UNCTAD.

<sup>7</sup>Vickers, Brendan / Ali, Salamat / Balchin, Neil (2022): [The expanding threat to food security in least developed countries](#). *OECD Development Matters*. 05/07/2022.

<sup>8</sup>UNIDO (2022) *Industrial Development Report 2022*, United Nations Industrial Development Organization. Vienna, Austria.

<sup>9</sup>Vickers, Brendan / Ali, Salamat / Balchin, Neil (2022): [The expanding threat to food security in least developed countries](#). *OECD Development Matters*. 05/07/2022.

<sup>10</sup>Roberts, Simon (2023) *Competition, trade, and sustainability in agriculture and food markets in Africa*. *Oxford Review of Economic Policy*, 39(1):147-161.

<sup>11</sup>Robert, Simon / das Nair, Reena / Andreoni, Antonio (2023) *Rethinking Markets for Food Systems Transformation in Southern Africa: A Just Transition*. Presidential Climate Commission South Africa.

<sup>12</sup>IPCC (2022), *Assessment Report no 6, Working Group III*.

<sup>13</sup>Robert, Simon / das Nair, Reena / Andreoni, Antonio (2023) *Rethinking Markets for Food Systems Transformation in Southern Africa: A Just Transition*. Presidential Climate Commission South Africa.

<sup>14</sup>Kay, C. (2009) *Development strategies and rural development: exploring synergies, eradicating poverty*. *Journal of Peasant Studies*, 36(1):103-137.

<sup>15</sup>Andreoni, Antonio (2011) *Manufacturing agrarian change. Agricultural production, intersectoral learning and technological capabilities*. DRUID Working papers, 11-13.

<sup>16</sup>Andreoni, Antonio / Mushi, Deo / Therkildsen, Ole (2020) *The Political Economy of ‘Scarcity’ in East Africa: a case study of sugar production, smuggling and trade in Tanzania*. ACE Working paper, 31.

<sup>17</sup>Andreoni, Antonio (2011) *Manufacturing agrarian change. Agricultural production, intersectoral learning and technological capabilities*. DRUID Working papers, 11-13.

<sup>18</sup>Andreoni, Antonio / Chang, Ha-Joon (2019) *The Political economy of industrial policy: Structural interdependencies, policy alignment and conflict management*. *Structural Change and Economic Dynamics*, 48:136-150.

<sup>19</sup>Chang, Ha-Joon / Andreoni, Antonio (2020) *Industrial Policy in the 21<sup>st</sup> Century*. *Development and Change*, 51(2):324-351.

<sup>20</sup>UNCTAD (2022) [Soaring debt burden jeopardizes recovery of least developed countries](#).

<sup>21</sup>Roberts, Simon / Andreoni, Antonio / Shingie Chisoro (2022) [South African citrus: new EU rules are unjust and punitive](#). *The Conversation*.





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