Chapter 18

FINANCING
From Supporting Agricultural Production to Transforming Food Systems

Eugenio Díaz-Bonilla

Eugenio Díaz-Bonilla is a special advisor to the Inter-American Institute for Cooperation on Agriculture (IICA) and a visiting senior research fellow, Director General's Office, IFPRI.

Key messages

- Theory, research, and practice on the financing of agriculture and food production and consumption have evolved over the past 50 years, from a focus on primary production toward a broader conception of food systems financing.
- Under this broad conception, financial flows that support investment and development in agriculture and food systems include consumer spending, food systems operators' spending, international development funds, national budgets, and banks and capital markets.
- The recent shift toward food systems approaches has expanded the objectives of financing to include environmental and social objectives, and led to new institutional arrangements and instruments for financing.
- Those financing approaches include expansion and better use of international development funds (including the International Monetary Fund's Special Drawing Rights), blended public–private finance, thematic bonds, efforts to improve fiscal conditions in developing countries, and new roles for central, public, and multilateral banks.

A combination of approaches will be needed to finance food systems, and research and policy analysis must inform these choices:

- **Designing and implementing national programs.** Food systems transformation will require integrated national operational programs, including options for optimizing and repurposing public budgets, in general. Policy research can contribute to developing quantifiable objectives,

estimated costs, budget analysis, and appropriate institutional and financing arrangements.

- **Implementing policy interventions for consumption and production.** National programs will require adequate macroeconomic policies, regulations, and incentives to shape spending by consumers and the operations of economic actors in food systems.
- **Using international development funds strategically.** These funds can help mobilize other financial flows, especially if they are well coordinated by adequate national programs.
- **Mobilizing funds from banking systems and capital markets.** To reorient lending toward agriculture, rural development, and food systems transformation goals, researchers can help design improved regulations, instruments, and operations for the banking system and to support the development of a robust pipeline for capital investments, including leveraging technologies by CGIAR Centers and national partners.

Policy debates in low- and middle-income countries (LMICs) have long focused on the financing of agricultural and food production and, for the poor and vulnerable, consumption. Over the past 50 years, both theory and practice have evolved around what to finance—and how to do it—driven by changes in the role of agriculture in supporting economic growth and rural development and in the perceptions of what constituted the most critical food and nutrition problems in LMICs. This evolution progressed from financing investments in primary agricultural production for increasing the food supply (mainly defined in terms of calories) toward a more complex understanding of agrifood demand and supply issues, along with a broader view of what financing means in the context of food systems.

This chapter provides a historical review, examines some key financial challenges in LMIC agrifood systems, and describes related policy research, highlighting many of IFPRI's contributions as the Institute completes 50 years. Looking to the future, the chapter discusses possible policy options, and related research topics, to mobilize the financing needed to achieve food systems transformation that will support economic growth and employment and lead to greater sustainability, poverty reduction, equity, food security, and nutrition.

This chapter employs a broad notion of "financing" that considers six flows of funds (following Díaz-Bonilla et al. 2021; Díaz-Bonilla 2021a)

(Box 18.1, Figure B18.1). These are consumption expenditures (flow 1 in the figure); financial flows of operators within food value-chain systems (flow 2); international development funds (including multilateral, bilateral, and philanthropic) (flow 3); national government budgets (flow 4); banking systems (flow 5); and capital markets (flow 6). These different flows originate with different actors and decision-makers, are channeled through specific operational or institutional mechanisms, may use different financial instruments, and have specific recipients whose behavior will affect outcomes. Thus, the public and private actions needed to reorient and scale up financing for food systems activities may vary by type of flow and require separate considerations for the within-flow components (that is, originators, institutions, and operational mechanisms, instruments, and recipients). Box 18.1 presents a more detailed description of the flows, including preliminary estimates of the global monetary values involved.

Evolving views on what to finance and how

Financing of primary agricultural production within import-substitution industrialization strategies

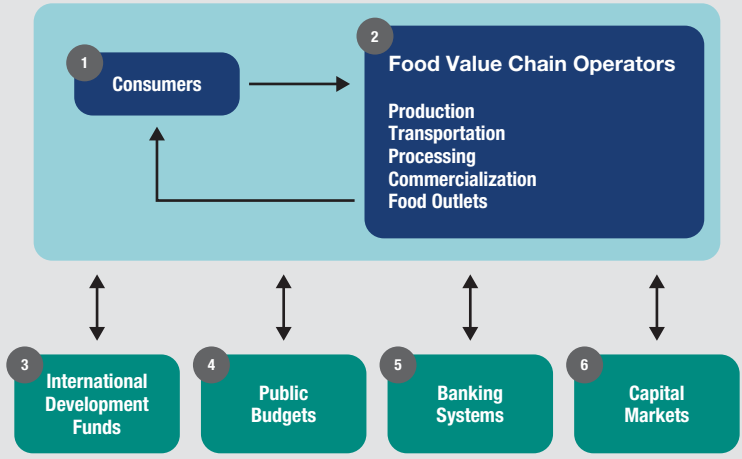
In the post–World War II era, standard development thinking expected the agriculture sector to support industrialization by transferring labor, supplying cheap food and raw materials, expanding exports to generate foreign currency, and providing savings to finance investments in the industrial sector and public infrastructure, an approach known as import-substitution industrialization (see Chapter 3) (Johnston and Mellor 1961). While the overall approach implied a tax on agriculture to assist industrial development, governments also implemented a mix of compensatory interventions to ensure a supply of cheap food and agricultural exports. With some funding from international development funds, many LMIC governments created agrarian reform entities and national agricultural research institutes and also supported public and parastatal enterprises operating in agricultural input and product markets, with varied impact on net financial flows to the agriculture sector (flows 3 and 4).

Another key policy intervention aimed to promote agricultural production operated through the banking system (flow 5), which historically has been the central focus of debates on financing. A typical program used loans from central banks ("rediscounts") and/or loans from international development institutions channeled to public agricultural banks. Those public banks, in turn, provided loans to farmers on concessional terms, including subsidized interest

BOX 18.1 Financial flows

The broad view of the financial transactions in food systems includes six flows, based on the financial flows used by social accounting matrices (SAMs) for whole economic systems (Pyatt and Round 1985). SAMs highlight the fact that there is no "free money"—that is, reallocating or scaling up funds for one activity implies reducing funds for other activities, with general equilibrium effects. Including consumer and other internal food system flows in our framework, rather than just the external flows often considered by financing discussions, acknowledges the enormous size and influence of these flows on food systems investment and development. This broad conception of financial flows is also consistent with the Paris Agreement's objective to align all financial flows with climate change mitigation, adaptation, and resilience (Article 2, paragraph 1c), which guides the estimates of climate funding conducted by the United Nations Framework Convention on Climate Change (UNFCCC 2021). The UN Food Systems Summit hub is working to estimate the value of some of these flows, starting with international development funds (IDF) and public expenditures.

FIGURE B18.1 Flow of funds for food systems



Source: Díaz-Bonilla (2021a) and Díaz-Bonilla et al. (2021).

FOOD EXPENDITURES by consumers (flow 1) are estimated at about U$10 to $14 trillion globally during recent years (see for instance, Díaz-Bonilla 2023a, 2023b). These expenditures are the sales of food systems operators across the value chain, who range from small-scale farmers and rural laborers to input suppliers, processors, transport operators, retailers, and food-service providers to large supermarkets and food outlets. Flow 1 is thus the main source of **operators' current expenditures, investments, and profits or savings** (flow 2). Flows 1 and 2 correspond to actors internal to food systems. This financing is supplemented by the four other flows operated by actors whose main activities are external to food systems.

INTERNATIONAL DEVELOPMENT FUNDS (IDF) (flow 3) include financial flows from multilateral financial and technical cooperation organizations, bilateral aid agencies, and philanthropic groups. IDF is the smallest of the flows, with average annual disbursements of about $12 billion (current value) for agriculture, forestry, and fishing (AFF) from 2015 to 2020. Estimates for all IDF-funded mitigation and adaptation activities in agriculture, forestry, land use, and natural resource management (AFOLU), a category that overlaps with AFF, averaged only about $9.1 billion for 2017–2018. Multilateral climate funds, such as the Global Environment Facility and the Green Climate Fund, provided just $3 billion annually for all sectors in 2017–2018, of which less than $0.8 billion was for AFOLU.

NATIONAL GOVERNMENT BUDGETS, including expenditures and revenues, are a large external flow (flow 4). For the 2015–2019 period, LMICs had average expenditures of more than $8 trillion (but excluding China, only $5 trillion), of which about $400 billion *each* was for AFF and social safety nets for the poor (or, excluding China, about $125 billion and $260 billion, respectively). There are no estimates for overall expenditures on food systems.

BANK LOANS (flow 5) in LMICs (excluding China) are estimated at only $87 billion on average for 2015–2019, of which $9.5 billion was for AFF (Díaz-Bonilla 2021a, 2023a, and 2023b). There are no estimates for food systems.

CAPITAL MARKETS (flow 6) include a variety of investors (such as pension funds, impact investors, and venture capitalists), institutional mechanisms, and financial instruments (including different equity, bond, project lending, and hybrid instruments). Capital markets differ from banking systems in that they act as an intermediary for savings and investments and offer risk management instruments, but do not provide check deposit and payment services. The largest share of capital market investments is made in high-income countries, and the amounts oriented toward agriculture and food systems transformation are small (see Díaz-Bonilla 2023a, 2023b).

rates, for specific agricultural products and on the condition that they apply Green Revolution technologies (improved seeds, fertilizers, and other inputs) (see Chapter 17).

These public credit programs were part of a general development approach relying on directed and subsidized financing and interest rate caps, which was criticized as "financial repression," with negative impacts on growth and a tendency to foster corruption (Adams et al. 1984; McKinnon 1973; World Bank 1986). It was argued that low repayment rates undermined the banking system and led to fiscally unsustainable subsidies to farmers and banks. At the same time, interest rate ceilings discouraged rural savings and the development of financial instruments such as savings deposits for rural families. By tying loans to specific inputs, investments, or crops, these programs limited farmers' flexibility in responding to market opportunities. They also appeared to primarily benefit large farmers and had negative macroeconomic consequences as well: when financed through money creation by the central bank, these programs could contribute to inflation, as happened in Brazil in the 1970s (World Bank 1986); and when the subsidies were paid from the public budget, they increased the fiscal deficit, consequently either driving up inflation or expanding public debt. In both cases, banks would then become more dependent on government support, creating a potentially vicious cycle of rising deficits and inflation.

Integrated rural development: Focus on poverty and geographic regions

The realization that the production-focused development approach was not reducing widespread rural poverty led to a shift toward investment programs focused on the accumulation of human and physical capital by the rural poor (Chenery et al. 1974).[1] In the late 1970s and 1980s, the World Bank along with most multilateral development banks (flow 3) promoted integrated rural development (IRD) programs, and many LMICs adopted this approach, reorienting government expenditures (flow 4) and banking operations (flow 5) to support these programs. The IRD programs aimed to transcend the narrow focus of supporting *agricultural production*, which tended to favor more modern and commercial farms, by shifting to *agricultural producers*—with emphasis on poor and small-scale farmers. The programs also expanded the focus

1 Redistributing *investments* was considered better than the alternatives of redistributing *incomes* to the poor for consumption (which was deemed not fiscally sustainable) or redistributing *assets* such as land (which faced strong political resistance) (see Chenery et al. 1974).

beyond the farm to rural areas where the poor live, recognizing the need for public investments in infrastructure and services such as health and education (Yudelman 1976).

Soon after IFPRI's creation, researchers began critically analyzing the IRD approach. For instance, it was argued that IRD programs could not reduce rural poverty because of their narrow focus on primary agricultural production (Ahmed 1977). At least two additional components were needed: support to non-agricultural rural enterprises to generate employment and expansion of public sector work programs for landless workers, who were even poorer than the small-scale farmers targeted by the IRD programs.

By the 1990s, the IRD programs were also criticized on other grounds, including the complex inter-agency arrangements needed to implement their various productive, infrastructure, and social components, which hampered their execution (World Bank 1988). These critiques are relevant to the current discussions about the implementation of broad food systems programs, which face even more complex problems of institutional coordination. A more general concern was that IRD programs were undertaken within the framework of import-substitution strategies, which were shown to constrain agricultural production despite compensatory public interventions to support farmers.

Structural adjustment and financial liberalization

Criticisms of import-substitution strategies had emerged early in the 1970s, emphasizing the negative impacts on growth and poverty of protecting capital-intensive industrialization (Balassa et al. 1971; Little et al. 1970). It was argued that those problems could not be resolved simply by improving agriculture sector policies or reallocating investments to the poor through IRD programs. Rather, a rethinking of development strategies was needed: LMICs should take advantage of opportunities in international trade and let markets operate more freely by eliminating major government interventions. IFPRI contributed to this debate with a series of analyses, some conducted jointly with the World Bank, arguing that protectionist trade and macroeconomic policies had tilted price incentives against the agriculture sector, impairing its growth (Bautista and Valdés 1993; Krueger et al. 1988).[2] For investments in the agriculture sector to be effective in reducing poverty, the damaging macroeconomic and trade policies had to be changed first.

2 One of the policy studies by the World Bank and IFPRI was provocatively titled *The Plundering of Agriculture in Developing Countries* (Schiff and Valdés 1994).

While these analyses drew attention to the limitations of import substitution, it took a series of global crises to force a change in development strategies. The oil price shocks of the 1970s led to high inflation that was countered with punishingly high interest rates in the United States and other major economies, leading to global recessions in 1980 and 1982, the collapse of commodity prices in the mid-1980s, and a debt crisis in many LMICs. In response, the World Bank and other multilateral development banks (flow 3) reduced financing for productive sectors, including agriculture,[3] in the 1980s and 1990s, and shifted their lending to structural adjustment programs (for general economic policies) and sector adjustment programs, including agriculture (see also Chapter 3).

The World Bank's agriculture sector adjustment programs were conditional on policy changes that included the elimination or scaling down of public sector agricultural agencies (flow 4), with the expectation that the private sector would step in. As part of those programs, many public agricultural banks (flow 5) were restructured or eliminated during the 1990s, primarily in Latin America and Africa, although some continued operating, particularly in Asia (Díaz-Bonilla 2015). In addition, lending from banking systems (flow 5) to agriculture dropped in the 1990s in Latin America and Africa, regions that had closed many public agricultural banks (Giehleret al. 2005). However, in Asia, which had opted to restructure those banks (with successful examples such as the Bank Rakyat Indonesia), lending to the agriculture sector was broadly maintained.[4]

At the same time, deteriorating public sector finances led to cuts in government expenditures (flow 4), including support for agriculture. The declines were most pronounced in Latin America and the Caribbean and in sub-Saharan Africa, where the ratio of agricultural expenditures to agricultural GDP in the 1990s dropped to 55–57 percent of the levels in the previous decade. Smaller declines occurred in other regions (Díaz-Bonilla 2015).

An evaluation of the new policies in Africa, conducted by IFPRI, found that the structural and sectoral adjustment programs led to the elimination of some inefficient and contradictory public sector interventions (Kherallah et al. 2002). But when public institutions that had provided credit, technical

3 The World Bank's agricultural lending, including for IRD, declined from about US$5 billion (in constant 2001 US dollars) and some 30 percent of total World Bank lending in the late 1970s and first half of the 1980s to about $1.5 billion and 7 percent of total lending by the early 2000s (Lipton and Paarlberg 1990). Similar declines occurred in other multilateral institutions and bilateral donors (a longer discussion is found in Díaz-Bonilla 2015).

4 A more detailed discussion of public banks in different regions is found in Díaz-Bonilla (2015).

assistance, and other key inputs to agricultural production were dismantled, private sector institutions that could provide similar services and inputs often failed to emerge, with negative impacts on agriculture.

Another line of research at IFPRI focused on the impacts on growth, productivity, and poverty reduction of different types of public expenditures. A detailed review of studies (Mogues et al. 2012) aimed to answer those questions. It showed that aggregate public spending for agriculture appeared to have relatively modest impacts on rural welfare, agricultural and economic growth, and poverty reduction. This was due to the mixture high- and low-payoff budget items—while some public expenditures including agricultural R&D and infrastructure showed substantial positive returns for agricultural productivity, growth, and poverty reduction, others did not. However, the ranking of the different expenditures varied by country, and some showed declining results over time. The policy recommendation drawn from this review was to analyze the impacts of the different components of public expenditures in each country context, and then reallocate funds to those with higher payoffs, which this research helped to identify (see also Fan 2008).

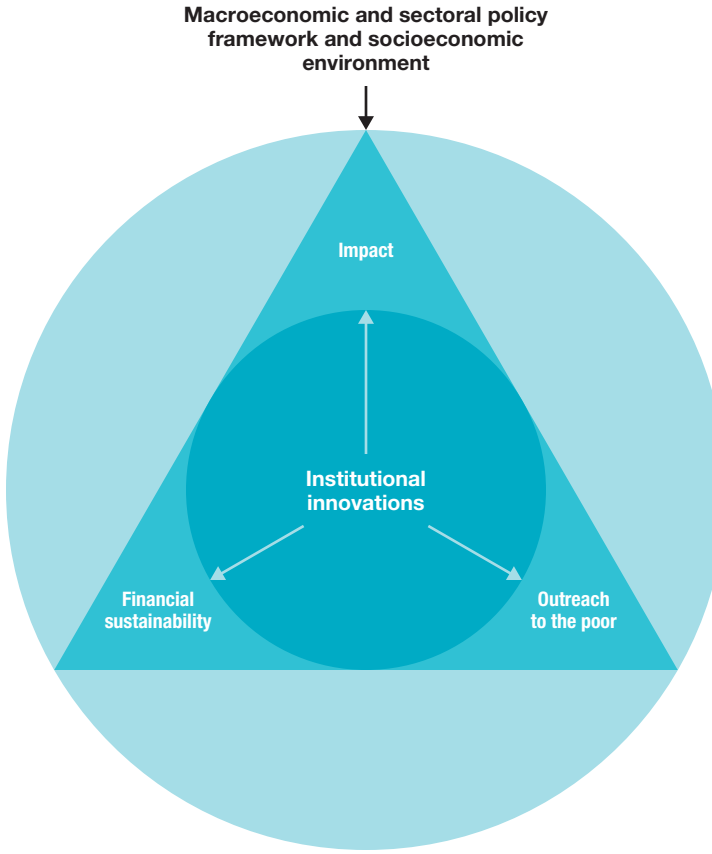
Other developments in financial flows during the 1980s and 1990s

While public expenditures and bank lending for food and agriculture were being reduced, other forms of financing were emerging—to support both small producers and enterprises and poor consumers and to support value chain development.

Microcredit. In 1983, the Grameen Bank, the world's first microcredit institution, was created in Bangladesh to offer small loans (part of flow 5), a new financial approach to fighting poverty. Microcredit institutions lend small amounts with few formal requirements, relying on community or reputational guarantees and allowing poor people to continue borrowing if they stay current on their payments. As this model was rapidly adopted in other LMICs, IFPRI established a multicountry research program on microcredit—Rural Finance Policies for Food Security for the Poor (1993–2001)—which introduced the idea of the triangle of microfinance (Figure 18.1) (Zeller and Meyer 2002). The triangle's three sides—financial sustainability of the microlenders, scope of coverage, and welfare impacts on the poor— illustrated the importance of maintaining balance and evaluating potential trade-offs across those three areas.

Along with other studies, this work showed that the poor need more than just loans for productive purposes; they also need broader financial services

FIGURE 18.1 The triangle of microfinance



Source: Zellner and Meyer (2002).

to cope with the volatility of incomes and food consumption, protect human capital, and manage risk. It also highlighted the importance of adequate pricing of financial services, unlike the traditional approach built on (unsustainable) subsidized interest rates. Particularly for microcredit, it was argued that individual guarantees, rather than groups offering reciprocal guarantees, are often the most effective approach, and that, given the fungibility of credit, such guarantees need to be backed by the borrower's whole livelihood, not just the specific project being financed. This research also showed that although microcredit helped to improve some welfare indicators for the poor, it was not a silver bullet to address poverty, especially for the very poor, for

whom allowable loans were too small to make a difference. Moreover, microcredit was not necessarily a viable solution for small-scale farmers if lending was linked to seasonal productive activities that could not accommodate the continuous repayment schedules of microcredit. An impact evaluation of IFPRI's research on microcredit found that it had a positive impact on the sector by demonstrating microcredit's effectiveness and promoting best practices (Alwang and Puhazhendhi 2002).

Microcredit was also part of a new paradigm of lending for agriculture that focused on creating a sustainable financial sector and financial institutions; treated borrowers and savers as clients rather than beneficiaries; developed financial products specifically for the rural population (not only loans but also deposits to help with payments and to manage risks through savings); and priced products and services to cover costs and risks, ensuring sustainability of the financial institutions.[5]

Cash transfers and safety nets. Cash transfer and safety net programs can support consumption and production expenditures within food systems (see Chapter 12). In the second half of the 1990s, Mexico and Brazil began providing cash transfers to poor households (flow 4 financing going mainly to flow 1), in a marked shift away from the costly universal food subsidies that were widely implemented following food price shocks in the 1970s.[6] Women are prioritized as recipients of cash transfers, as these programs aim to break the intergenerational transfer of poverty within families by building human capital in the young. The programs are often implemented with specific conditionalities, such as school attendance requirements and regular health checkups for children. Cash transfer programs appear to generate positive local growth-multiplier effects in poor communities through cash inflows that support local economic activity. IFPRI's research helped to inform the design of these programs, including their focus on women, and contributed to their short- and long-term sustainability (Behrman 2010).

Since these programs were first instituted in Latin America, they have been adopted in many developing regions as part of more sophisticated safety nets

5 Díaz-Bonilla (2015) includes a longer comparison of the "old" and "new" paradigms of agricultural finance through the banking system, based on the sources mentioned there.

6 IFPRI conducted a large study of those food subsidy programs in 13 LMICs in Africa, Asia, and Latin America from 1978 to 1986 (Pinstrup-Andersen, ed. 1988) (see Chapter 11). The case studies showed that many programs had important fiscal costs: for instance, it was estimated that in 1980–1981, Egyptian food subsidies were 20 percent of current expenditures and 7 percent of GDP. Universal food programs also had high fiscal costs in Bangladesh, China, Mexico, Peru, Sri Lanka, and Zambia, among others; the research also showed that well-targeted subsidy programs for the poor, such as in Colombia, were fiscally more sustainable.

designed to combat chronic poverty and hunger. These include nutritional programs for women and children, school lunches, food-for-work programs, and other interventions (all part of flow 4 and financing flow 1) (see Chapters 11, 12, and 23). These safety nets can also be scaled up and expanded when crises occur, such as natural disasters or the recent pandemic. For subsistence farmers, cash transfers coupled with support for productive and environmental activities may be a better way to address poverty and livelihood problems than either subsidized credit schemes or microcredit (that is, flow 4 replaces flow 5 to support the productive activities of small farmers in flow 2; see also Box 18.3).

Agricultural value chains. As primary food and agricultural products were increasingly incorporated into more complex food systems that included packaging, transportation, processing, marketing, and distribution, agricultural value chains became a focus of policy analysis and practice (see Chapter 7). Research began to explore supply-chain and value-chain lending as a means of financing small-scale farmers and small and medium enterprises (SMEs). In value chain–based schemes, international development funding and/or bank loans go to agrifood operators (traders, processors, supermarkets, and input and equipment suppliers) (from external flow(s) 3 and/or 5 to flow 2), which then on-lend to farmers (an intra-flow 2 operation) (de Brauw and Swinnen 2023). This innovation—along with contract farming, which serves as a guarantee allowing farmers to borrow from banks—has helped expand financing to agricultural and food production.

Foreign direct investments. During the 1990s and 2000s, economic liberalization and the growing demand for convenience foods and food consumption outside the home, which accompanied urbanization and women's greater participation in the labor force, led to increases in foreign direct investment (FDI) in food systems (part of flow 2), first in Latin America and later in other regions (see Chapter 7). For instance, annual inflows of FDI into food, beverage, and tobacco operations increased in Africa from US$14 billion (in constant 2015 US dollars) in the 1990s to about $50 billion in the 2010s, and in Latin America from $63 billion to $240 billion over the same period. Although there is no comparable quantitative data prior to 1990, the food industry experienced several waves of transformation, as the dismantling of public sector enterprises in the 1980s and 1990s, along with other economic and demographic changes, eventually led to a further expansion of private sector operators. Many of these have been multinational firms, such as agro-industry processors, supermarkets, and more recently, food outlets, including restaurants and fast-food chains (see Chapter 7) (Barrett et al. 2022; Reardon and Timmer 2012).

Together these developments underscored an obvious fact: most financing for agricultural production and food systems occurs as flows within value chain operations, and most of these flows depend on consumer expenditures (see Box 18.1).

Food systems as the focus of financing—the current approach

The concept of "food systems" has existed for some time, with various definitions, but the current conceptualization and its place in the policy agenda is largely the result of a series of developments that began with the United Nations' approval of the 2030 Agenda Sustainable Development Goals (SDGs) in 2015.[7] The 2019 United Nations conference identified agrifood systems as a priority area for achieving the SDGs, and in 2021, countries participating in the United Nations Food Systems Summit (UNFSS) presented "national pathways" for the transformation of their food systems, thus helping advance the 2030 Agenda.[8]

A parallel development with implications for agriculture and food systems was the 2015 Paris Agreement on climate change, which committed all signatory countries to prepare mitigation plans (Nationally Determined Contributions [NDCs]) and adaptation plans (National Adaptation Plans [NAPs]), with agriculture as an important component. Efforts have since been made to expand the conceptual focus of climate finance from agriculture to food systems, particularly following agreement on the Declaration on Sustainable Agriculture, Resilient Food Systems and Climate Action[9] at COP28 in 2023.

In sum, the combination of the 2030 Agenda and climate negotiations have broadened the focus of policy and research from financing agricultural and rural development, with an emphasis on staple products for calorie-rich diets and some cash crops for export, toward food systems transformation for healthy and diversified diets, environmentally sustainable production, and inclusive livelihoods along the whole value chain.

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7 In the 1970s, and in reaction to the limited focus on economic growth, the "basic needs" approach highlighted the importance of health, education, and other objectives (Streeten and Burki 1978). This approach led to the UN Human Development Indicators (first published in 1990); then to the Millennium Development Goals, approved in 2000; and subsequently to the SDGs, established under the 2030 Agenda in 2015.

8 IFPRI participated in the debates about financing the transformation of food systems, producing a variety of analyses (Díaz-Bonilla et al. 2021; on SDG2, Díaz-Bonilla 2021a; and on climate change, Díaz-Bonilla and Echeverría 2022) and also contributed to the publication *Food Finance Architecture: Financing a Healthy, Equitable, and Sustainable Food System* (World Bank 2023).

9 www.cop28.com/en/food-and-agriculture

Several lines of work relevant to financing have been undertaken in connection with the UNFSS and climate negotiations. One effort aims to estimate the costs of food systems transformation,[10] which is a first step toward analyzing how to finance it. Several global estimates exist (FOLU 2019; Laborde and Torero 2023; Ruggeri Laderchi et al. 2024), but a 2023 evaluation of progress toward achieving the UNFSS goals revealed that many governments had not completed similar analyses at the country level.[11]

A second line of work involves estimating the financial flows currently going to food systems, as the basis for the subsequent analysis of the gaps between flows and estimated costs for food systems transformation. This work is being conducted by the UN Food Systems Hub[12] through a working group led by the International Fund for Agricultural Development and the World Bank, which has developed the Financial Flows to Food Systems framework (3FS) (IFAD and World Bank 2023). Based in part on IFPRI work (Díaz-Bonilla and Centurión 2024),[13] 3FS classifies international development funds and government budgets (flows 3 and 4) into five groups of interconnected expenditures for food systems that can be mapped to equivalent ministerial entities in many developing countries: agricultural development and value chains; infrastructure for food systems; nutrition and health; social assistance (including emergency food assistance); and climate change and natural resources. These groupings allow some cross-country comparability for flows 3 and 4. The work to complete those estimates at the country level has started in some pilot countries. The conceptual framework to estimate the monetary value of other flows (particularly the banking system and capital markets) is still being developed but is hampered by the lack of systematic data collection with a food systems focus.[14]

A third area of work relates to the need for specific programs for food systems transformation in individual countries, bringing together the national pathways outlined by the UNFSS with the NDCs and NAPs of the climate

10 This is different from the debate about the "true costs of food."

11 The evaluation found that among the countries surveyed, only 29 percent mentioned having an "Investment plan/implementation plan," and just 33 percent acknowledged "Costing of the pathway/implementation plan," according to the United Nations (UN 2023).

12 The UNFSS Hub was created by the UN Secretary General to coordinate the work of UN agencies (and engage with other international institutions) in support of specific national programs aimed at improving food systems. A specific working group (co-chaired by IFAD and the World Bank) focuses on financial issues (www.unfoodsystemshub.org/). The author has been on the advisory committee to that work and the Inter-American Institute for Cooperation in Agriculture (IICA) was supporting the work in countries in Latin America and the Caribbean.

13 The original IFPRI work was done in 2018, but it was published just recently.

14 FAOSTAT presents country data about the banking systems' portfolio of loans for agriculture, forestry, and fishing, but there is no similar data exercise for whole agrifood systems.

agreement. Currently, there are no broadly agreed-upon operational templates for how this could or should be done, although there are some initial efforts (such as the "roadmap" outlined in FAO 2023) that can be expanded and applied at the country level.

Other topics since the 2010s: Funding, instruments, and operations

This century's socioeconomic trends and major events, including the 2008–2009 global financial crisis and the 2020 COVID-19 pandemic, have sparked a variety of financial developments, including the use of new instruments and tools that can support food systems transformation.

Digital communications and financial services. The rapid growth of digital communications, including the internet and ever-more powerful mobile phones, could substantially reduce information and transaction costs across food systems and is generating many important changes, including in financing. As of 2022–2023, 67 percent of people globally were using the internet, and there were 111 mobile cellular subscriptions for every 100 people (World Bank database).[15] Even in low-income countries, about 40 percent of people use the internet, and about 60 percent have mobile cellular subscriptions.

IFPRI's research on the impact of digitalization on agriculture and food systems began in the 2010s. For instance, a set of policy briefs titled *Innovations in Rural and Agriculture Finance* covered, among other topics, mobile banking and payment systems in some LMICs (such as M-Pesa in Kenya) that reduced transaction costs for rural populations (Kloeppinger-Todd and Sharma 2010). Other work included the use of mobile phones for new agricultural insurance schemes (see Chapter 10) (Ceballos et al. 2020); the application of novel ways to assess risks in rural lending (Hernandez and Torero 2014); and the extension of digital interventions for operations in agrifood value chains beyond primary agriculture (Ambler et al. 2023). A recent evaluation of the use of digital tools for agrifood systems in Africa argued that although impacts at scale may not yet be evident these tools hold great promise for the future (Abate et al. 2023). These analyses also note that the success of digital solutions depends on overall investments in infrastructure, macroeconomic policies, regulations, and a business environment that supports the existence of truly profitable activities in food value chains. Without an enabling environment that facilitates the emergence of viable business opportunities, digital financial options that simply act

15 This means that there may be more than one subscription or one mobile phone per person, not that everyone has subscriptions or mobile phones.

as a channel of funds may not have major impacts. However, digital options that help manage risks and reduce transaction costs for the intermediation of funds can indeed support the transformation of food systems.

Conscientious investment instruments. In part related to the 2030 Agenda and the Paris Agreement, a global trend emerged toward investments with broader environmental and social objectives. This led to the development of new instruments (mainly for flows 5 and 6), including thematic bonds and "impact investment" funds focused on objectives related to the SDGs and, more generally, investment options and financial services with "environmental, social, and governance" purposes (though this trend is now in retreat). Even more recently, sustainability-linked loans and bonds have been developed to finance decarbonization transition plans. These feature variable interest rates tied to emissions-reduction goals or supply chain sustainability metrics.

International development funds. The Paris Agreement negotiations in 2015 generated a proliferation of climate-related international funds (flow 3), including the Global Environment Facility, the Green Climate Fund, the Special Climate Change Fund, the Least Developed Countries Fund, and the Adaptation Fund. These provide relatively small amounts of financial support and are characterized by complex governance structures, modalities, and objectives (Watson and Schalatek 2021) (see Box 18.1). Climate finance outcomes at COP29 in 2024 are summarized in Box 18.2.

In the case of multilateral development banks, there have been suggestions about how to increase their leverage ratio and lending—for instance, by giving more weight in risk evaluations to the built-in guarantees offered by member countries (such as "preferred creditor status" and "callable capital"); by expanding co-lending operations with private capital investors; and by making greater use of guarantees (in addition to direct lending), among other actions. If those changes are not enough to increase lending by multilateral development banks, the possibility of increases in their capital must also be considered.

In addition, the 2008–2009 global financial crisis and the 2020 COVID-19 pandemic led to two special allocations of the International Monetary Fund's Special Drawing Rights (SDRs)[16] to increase financial support to the world economy (the value of the new SDRs was about $280 billion in 2009 and $650 billion in 2021). There is an ongoing dialogue about how to use the SDRs more effectively by reallocating some percentage from countries that do not need them

16 The SDR is an international reserve asset, based on a basket of five currencies: the US dollar, the euro, the Chinese renminbi, the Japanese yen, and the British pound sterling. Countries holding SDRs can convert them into any of the five currencies and can keep that currency permanently at extremely low interest rates.

BOX 18.2 Climate financing

Held in Azerbaijan in 2024, the 29th Conference of the Parties has been called the "finance COP." The financial outcomes included the following.

First, a new target was set for climate finance for LMICs, known as the New Collective Quantified Goal on Climate Finance, which raised the yearly global goal from its previous level of US$100 billion to $300 billion by 2035 from international development funds, including multilateral development banks, bilateral funding, and philanthropy (flow 3). The negotiators also made a commitment to work together to mobilize funds from *all sources* to increase finance to LMICs to $1.3 trillion per year by 2035. This will require an analysis of the current levels and applications of all six flows.

Second, meaningful steps were taken to fully operationalize the Fund for Responding to Loss and Damage, with some initial funding allocated at COP29 (flow 3). Progress to advance this longstanding effort, which was first proposed in the 2007 Bali Action Plan, builds on the agreement at COP27 to create a new financial facility dedicated to remediating loss and damage following a push from a coalition of vulnerable countries at COP26.

Third, agreement was also reached on two building blocks needed for functioning carbon markets: (1) the operation of country-to-country trading, including how countries will authorize trading carbon credits, track these operations, and ensure environmental integrity through transparent technical reviews (Paris Agreement, Article 6.2), and (2) the standards for a centralized carbon market under the United Nations (Article 6.4). Implementation of Article 6 can help to scale up and reorient other financial flows, particularly from banking systems (flow 5) and capital markets (flow 6).

However, the withdrawal of the United States from the Paris Agreement will have a large impact on the implementation of these agreements.

to vulnerable LMICs that require financial support.[17] However, many of the alternatives under discussion to expand multilateral and bilateral international development funds are now uncertain, given the decisions of the current US government to withdraw from the Paris Agreement, suspend bilateral aid, and review its participation in multilateral development banks.

17 This debate needs to go beyond the reallocation of SDRs for the Poverty Reduction and Growth Trust and the Resilience and Sustainability Trust, and consider allocating SDRs to multilateral development banks to expand their lending capacity, or creating a guarantee fund at the IMF to allow LMICs to issue perpetual bonds to replace shorter-term debt and finance programs to achieve the SDGs and climate-change objectives (Díaz-Bonilla 2021a, 2021b; von Braun and Díaz-Bonilla 2021).

Mobilization of private sector funds. The Third International Conference on Financing for Development, held in Addis Ababa in 2015, highlighted the concept of "blended finance"—using international development funds (flow 3) or government funds (flow 4) to mobilize additional private sector investments (flows 2, 5, and 6). This approach is part of different forms of de-risking operations, such as absorbing part of the losses or providing technical assistance and support to the entities operating the investments to reduce transaction costs.[18]

Other ideas have focused on using incentive and regulatory frameworks to steer private sector investments toward development goals, including climate goals. One suggestion emerging from climate negotiations was to require public disclosure of climate-related financial risks by firms, banks, and other investors, with the expectation that greater transparency would increase the costs of detrimental investments and thereby reduce them (see the work of the Task Force on Climate-Related Financial Disclosures,[19] created by the G20's Financial Stability Board). Some central banks and regulators began reviewing their monetary and financial supervision functions in the context of climate change risks, which could also constrain operations with detrimental climate impacts.[20]

Expansion of fiscal space in LMICs. The negative shocks of the last two decades and the increase in public debt levels have led to different initiatives to improve fiscal conditions in LMICs. For instance, the Common Framework for Debt Treatment initiative[21] focuses on reducing the debt burden in low-income countries and expanding these countries' fiscal space. But the process is advancing slowly and should also be extended to middle-income countries. Other approaches consider the inclusion of clauses in public loans and bonds to allow debt suspension or stretching of payments when systemic shocks occur, such as climate disasters, pandemics, and even GDP fluctuations, and to allow broader use of debt-for-climate and debt-for-nature swaps (Georgieva et al. 2022). All these efforts will help to reduce fiscal pressures in LMICs and could facilitate the expansion of public financing of food systems transformation.

Central banks and public development banks. The 2008–2009 financial crisis and the COVID-19 pandemic revived the role of central banks as purveyors of credit and liquidity, similar to the role played by many developmental

18 "De-risking" a financial transaction may take other forms and not necessarily involve the use of blended finance.

19 www.fsb-tcfd.org/

20 See the work of the Network of Central Banks and Supervisors for Greening Financial Systems, launched in 2017: www.ngfs.net/en

21 https://clubdeparis.org/en/communications/page/common-framework

central banks in the 1950s through the 1970s. At the same time, there has been new interest in the positive role that public development banks can play when managed with incentives, performance metrics, and controls to avoid past problems. An example is the Finance in Common initiative of public development banks.[22]

Current and future challenges to financing food systems transformation

The historical review has shown the variety of topics considered under the general idea of "financing." Over the next 25 years, a combination of approaches will certainly be needed to finance food systems transformation. This section focuses on four topics and considers IFPRI's possible contribution through research in these important areas: (1) integrated national programs, (2) enabling macroeconomic and regulatory frameworks, (3) optimization of public budgets, and (4) greater mobilization of funds from international development institutions, banking systems, and capital markets.

Integrated national programs

Efforts to generate and direct hundreds of billions of dollars in funding for food systems transformation will be of little use without operational programs at the country level, which are lacking in many LMICs. Integrated investment programs must be designed with quantifiable objectives, instruments, and activities; an adequate institutional setting; estimated costs; and financing options. These country-specific programs should also make detailed analyses of the current financial flows to and within national food systems and their uses; of how those flows affect program objectives; and of how funds could be reallocated and/or scaled up to cover the estimated costs. As yet, the work on estimating current financial flows to food systems is just starting.

A significant constraint to advancing food systems transformation in LMICs is institutional weakness and fragmentation, which hamper the implementation of necessary multisector and multi-actor programs (see Chapter 15). The problems experienced by IRD programs show that successful implementation requires not only adjustments in the organizational charts and functions of institutions but also a fully articulated vision and program, linked to the budget and with specific local operational systems that deliver goods and services. Currently, there are no broadly accepted templates for designing and implementing these programs.

22 https://financeincommon.org/

IFPRI's contribution. IFPRI research can make an important contribution to the design of operational programs for food systems at the national level with clear objectives, policy instruments, estimated costs, and adequate institutional arrangements and financing. In particular, IFPRI's suite of global and national quantitative models can help to better analyze the different pathways and trade-offs across objectives and instruments, within the budget constraints imposed by national accounts. Finally, insights from IFPRI's work on political economy and institutions could also improve the design of the organizational and operational aspects of those programs, increasing the likelihood of their successful implementation.

Macroeconomic policies, regulations, and incentives

Such country-specific programs must be supported by macroeconomic policies that promote growth with low inflation, as well as regulatory and incentive policies that provide an adequate enabling environment for the decisions of all food systems actors, beginning with consumers (flow 1).[23] Governments can steer food consumption and production flows away from obesogenic products and toward healthier and more sustainable diets by influencing consumer decisions through prices, incomes, preferences, markets, and food environments (see Chapter 12). Tools include taxes and subsidies, income support with a nutrition focus for poor and vulnerable populations, and nutritional information and regulations. Governments already apply regulations and controls on producers' activities (flow 2) to promote health, nutrition, and food safety. Other policy interventions may be needed to address climate objectives (such as stopping deforestation and reducing food loss and waste) and social ones (such as protecting vulnerable communities from land displacement).

IFPRI's contribution. IFPRI has years of experience in analysis of macroeconomic and trade policies in relation to agriculture that can be extended to food systems. The Institute can also contribute to the analysis of better regulatory frameworks for consumption and production.

Optimization of public budgets

Integrated national programs require a careful review of public budget expenditures and revenues (flow 3) to determine the level and quality of utilization of fiscal funds available for food systems transformation. These analyses should look at promising proposals to increase or redirect financing, such as repurposing of agricultural support (see Chapters 16 and 17), and should also consider other

23 Of course, peace and good governance are overall requirements.

expenditures relevant to food systems, such as social protection (see Chapter 11), infrastructure, and productive support in general (see Chapter 17), as well as reconsidering fossil fuel subsidies, which in some countries exceed spending for agricultural support or safety nets for the poor. [24] Revenues will have to be increased in cases where reallocating, better targeting, and improving the design and structure of current expenditures do not free up sufficient funds.

IFPRI's contribution. As mentioned in the historical review, IFPRI has worked on the growth, productivity, and poverty-reduction impacts of different types of public expenditures, and more recently on the repurposing of agricultural support. These analyses can be extended to the different aspects of expenditures and revenues affecting food systems.

Scale-up and strategic use of international development funds

International development funds (flow 3) are relatively small, but they can mobilize other financial flows (particularly flows 5 and 6) through various forms of de-risking and by pioneering new instruments and investment structures (see Box 18.1). As long as the current political and economic environment limits options for increasing these funds, efforts should concentrate on optimizing their use. Strong country-based programs and institutions can help ensure that multilateral, bilateral, and philanthropic organizations better coordinate their own operations to avoid fragmentation and isolated initiatives.

IFPRI's contribution. The different applications of IFPRI's work discussed in this chapter (such as those focusing on integrated programs for food system transformation, macroeconomic and regulatory frameworks, and public budgets) could also improve how countries and international organizations program and use scarce international development funds.

Mobilization of funds from the banking system and capital markets

The banking system and capital markets (flows 5 and 6) are also key sources of financing, but information on existing flows to food systems is limited, including whether they align with the SDGs and climate change objectives. Reorienting bank and capital market funds toward desired food systems goals will require adequate macroeconomic, regulatory, and incentive frameworks, as mentioned before; but some specific interventions, discussed here, will be needed as well.

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24 Díaz-Bonilla and Centurión (2022) compare social protection and fossil fuel subsidies in some countries in Central America.

Bank lending to the agriculture sector (flow 6) is affected not only by macroeconomic volatility but also by the dispersion and small scale of agrifood system operators (which increases transaction costs), the presence of covariant risks (weather, prices, pests, seasonality of production) that increase risks of default on loans (see Chapter 10), and investment regulations that are geared toward the urban sector (see Chapter 17). Historically, bank operations, and the issues they face, have been at the center of debates about agricultural financing. This broad subject is briefly summarized in Box 18.3, along with a more detailed discussion of some potential interventions, including the role of central banks for expanded lending to small-scale farmers and small and medium food system operators. However, for subsistence farmers and other poor operators in food value chains, loans—even with preferential terms—may not be the best instrument to support a just transition toward improved food systems. These populations would benefit more from cash transfers and other safety nets that include poverty, productivity, environmental, and nutritional components (see Chapter 11).

In the case of global capital markets (flow 6), IDFs could be used more strategically to leverage and mobilize private funds for food systems. For LMICs, the lack of a pipeline of investable options, with an attractive risk–reward profile, has been consistently identified as a key obstacle to scaling up the participation of capital market operators. That constraint could be alleviated by using IDFs or government funds to create and finance dedicated facilities for project preparation, incubation, and acceleration to develop a robust pipeline of investable opportunities (including individual projects, impact investment funds, and green bonds), particularly those involving small-scale farmers, women, youth, and micro, small, and medium enterprises (Díaz-Bonilla et al. 2018).

IFPRI's contribution. As was the case with microfinance, IFPRI can analyze policies, regulations, and instruments for the banking system to finance agricultural and rural development and the transformation of food systems. In addition to that research on more macro issues, the Institute can expand its current work on value chain finance insurance, and several other microeconomic topics.

Regarding capital markets, IFPRI could continue and expand its current efforts to articulate technological innovations from CGIAR and other sources with investable vehicles for the private sector, through project preparation and implementation teams and funds. An example is the Climate Smart Food System Fund, which aims to expand investments using CGIAR technology and financial support from KfW, the German Development Bank.

BOX 18.3 Banking systems

Fostering financial inclusion and expanding banking operations for the transformation of food systems will require a holistic analysis of banking systems (flow 5) and other financial services to inform effective policies. This analysis should consider (1) the source of funds, (2) types of institutions, (3) instruments on both the lending side and the deposit side, and (4) the enabling environment and other supporting policies (for greater detail on these four aspects, see Díaz-Bonilla 2015).

FUNDING. Bank funds may be sourced from deposits, central bank rediscounts, mandates to allocate a percentage of deposits to financing food systems or to buy dedicated government bonds, external loans, capital-market instruments, and the public budget. Bank deposits are usually short term, and therefore, credit for long-term investment may require dedicated funding from public fiscal or monetary sources or intermediation in capital markets.

Reviving the development role of central banks could provide additional funding. Within the framework of a consistent monetary program that controls inflation, central banks can offer specific lines of credit to finance loans targeted to small-scale farmers and small and medium enterprises (SMEs) in food value chains, including women and youth, and focused on improved technologies that address economic, social, and environmental objectives.

INSTITUTIONS. These include public development banks and a variety of private banks—from microfinance, community, and cooperative banks to large commercial banks. Well-managed development banks can be powerful instruments for addressing market failures that affect agricultural and rural financial markets and climate finance, as well as for crowding-in private sector funds from commercial banks and private investors by using blended finance and de-risking arrangements with their public capital.

INSTRUMENTS. Governments in LMICs tend to revert to subsidized interest rates to expand lending to farmers, although these can have negative impacts on growth and financial markets. To devise more adequate interventions, governments must address several factors that determine the effective interest rate charged to farmers, without interfering with market-determined interest rates. Other forms of financing also need to be supported, such as supply-chain or value-chain lending, which will require the adaptation of regulations and operational mechanisms. Other financial instruments are also crucial, such as developing appropriate options for rural populations and SMEs to manage payments and savings. These can include simplified checking and savings deposits, as savings are an important risk-mitigation tool for rural households.

ENABLING ENVIRONMENT AND SUPPORTING POLICIES FOR LENDING TO FARMERS AND SMES. Governments can play a key role in improving lending conditions for small-scale farmers and food system SMEs. For instance, lending regulations designed for the urban sector can be adjusted to account for seasonal cash flows in the agriculture sector. Governments can also offer transparent fiscal subsidies to financial institutions to cover the relatively high administrative and transaction costs of small loans, or to deploy trained extensionists to help small operators prepare bankable projects and complete necessary paperwork.

Other government investments that can facilitate lending to small-scale farmers include improvements in land legislation and public agencies that handle land titling (see Chapter 6), innovative insurance and guarantee schemes (see Chapter 10), and government support for critical public goods such as infrastructure, agricultural R&D, small irrigation schemes, drought-resistant seeds, improved sanitation and preventive health services, and weather forecasts (see Chapter 17), which can diminish risks and help to lower overall interest rates. Digital technologies can also improve financing for small operators by lowering transaction costs, expanding the geographic coverage of financial services, facilitating identification and monitoring of clients (thereby improving repayment rates), generating information about potential clients, and otherwise facilitating the links between supply and demand of different financial services.

Both the operations of the banking systems and capital markets could also benefit from IFPRI's work on digitalization that may help expand financing by lowering transaction costs, reaching isolated areas, gathering and analyzing information about potential clients, and improving the links between supply and demand of financial services in general.

In sum, IFPRI can build on its long history of policy and institutional research on financing for agrifood systems in LMICs—including its contributions on financial flows related to integrated rural development, macroeconomic and trade policies, value chains, microfinance, insurance, safety nets, and digitalization—to help optimize, reallocate, and scale up financial flows for the desired transformation of food systems. As during its first half-century, IFPRI will continue to contribute research and analysis of evidence-based policy options to help countries make investments that support the achievement of crucial development goals and sustainably improve lives and livelihoods.

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