An evidence-based approach to ending rural hunger

Homi Kharas, John W. McArthur, and Joachim von Braun

Abstract

Progress toward food and nutrition security (FNS) needs to be sharply accelerated in order to achieve the Sustainable Development Goal for ending hunger and malnutrition, especially in rural areas. The G20 should target interventions and investment opportunities to maximize impact on people and transformation of rural areas. Currently, few G20 countries map investments, technical assistance, capacity building and policy improvement in a data-driven way. Such tracking of needs, policies, and resources could include G20 countries' domestic efforts alongside countries they support with development assistance. The G20 could develop such a methodology to identify countries and interventions where additional resources could have a lasting impact. They could then systematically track and streamline FNS actions taken across international organizations and initiatives to help ensure the SDG is achieved.

Authors

Homi Kharas, ✉ The Brookings Institution, Washington, DC, hkharas@brookings.edu
John W. McArthur, The Brookings Institution, Washington, DC
Joachim von Braun, Center for Development Research (ZEF), Bonn University, Germany

Introduction

The G20 has taken up the challenge of improving global food security, producing a Food Security and Nutrition Framework paper in 2014 under the Australian presidency, adopting a Food Security Action Plan in Antalya in 2015, and endorsing a proposal on good practices on family farming and smallholder agriculture in Hangzhou in 2016. The 2017 Hamburg summit recommitted the G20 to supporting the Sustainable Development Goals (SDGs), including the second goal of ending hunger by 2030.

Taken together, the commitments reflect a good understanding of principal challenges, particularly those relevant to developing countries' rural areas, which are estimated to be home to roughly three quarters of today's undernourished people (WFP 2016). First, agricultural productivity increases must be scaled up and spread out. With roughly 800 million undernourished people and 150 million stunted children, as well as pressures from additional population and income growth, global food supply must rise by at least 50 percent by 2050, a distinct challenge in an era when climate change, degraded lands and water scarcity pose threats to productivity in many areas. Second, the 2 to 2.5 billion people reliant on 500 million family farms must secure sufficient income from sustainable farming and rural off-farm employment to have access to sufficient, safe and nutritious food. Third, vulnerability to temporary loss of food security and humanitarian emergencies requires systematic attention. Hidden hunger and micro-nutrition insecurity also deserve greater attention.

Many G20 countries are major providers of development assistance for FNS, as well as major shareholders of multilateral development banks that channel aid and non-concessional finance for investments in rural development. Some G20 countries also face considerable domestic FNS challenges. In a global context of stagnating budgetary resources, it is even more important to allocate resources effectively. This requires changes in how the international community prioritizes and allocates its resources. Targeting effort to maximize FNS progress within and across countries should be a central aim of G20 coordination.

I.   Key Trends

A starting point for the G20's FNS efforts should be to understand trends in global aggregates and country details of the main targets identified by the Inter-Agency Expert Group on SDG indicators. There has been progress in improving global food and nutrition security (FNS) but the pace is too slow. To achieve all of the targets under SDG 2, the current average rate of progress must be at least doubled and on some issues trebled.

A.   SDG 2.1 – End Undernourishment

A business-as-usual scenario would see the number of undernourished people only fall to around 500 million people by 2030 (see Figure 1). At least 54 countries would still not have

eliminated undernourishment by that year (McArthur and Rasmussen 2016) – substantial progress, but nowhere near the SDG objective of zero hunger. Reductions in undernourishment will need to accelerate, from approximately 16 million per year between 2005 and 2015, up to 55 million people per year from 2015 to 2030. In Africa, achieving SDG 2 will mean ending hunger for approximately the same number of people in 15 years as happened in Asia over the past 25 years. Distressingly, the number of hungry people in sub-Saharan Africa currently stands at approximately 220 million, and has recently been climbing by roughly four million per year.

At the same time, one should not interpret the preceding figures as overly precise, because country-by-country data are not systematically available. For example, the Food and Agricultural Organization does not publish details on undernourishment for the Democratic Republic of Congo (DRC), Burundi or South Sudan (among others) despite believing that hunger prevalence in these countries (home to 100 million people) is very high. Better information systems are essential for achieving the SDGs.

Figure 1: Prevalence of Undernourishment in the Developing World (Percent of population)
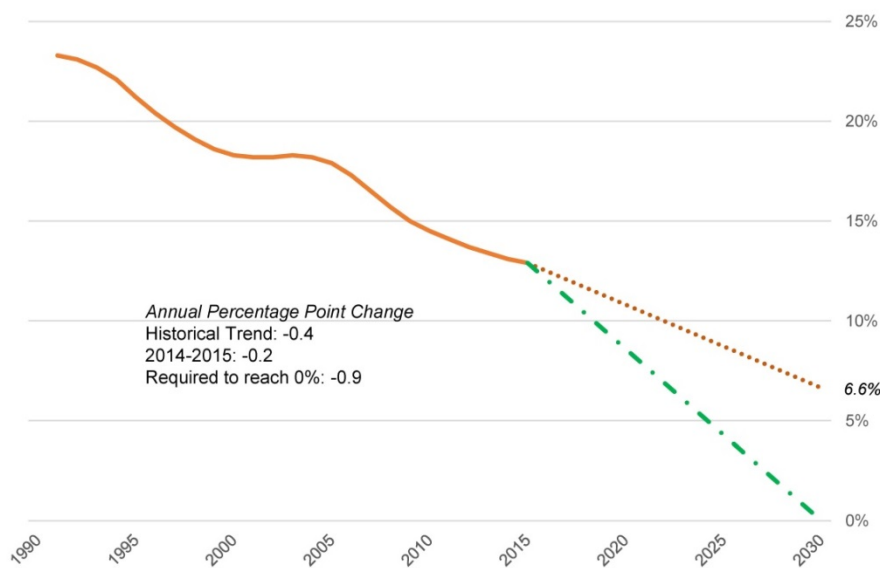
Source: Authors' calculations based on FAO (2016b)

B.   SDG 2.2 – End Malnutrition

According to the latest estimates by UNICEF et al. (2017), a quarter of children under 5 in developing countries are stunted, with attendant issues of reduced cognitive capacity and mental development and greater risk of illness and premature death. Since 1990, stunting has declined by an average of 0.8 percentage points per year. Even if that trend continues, 15% of children in developing countries will still be afflicted by 2030. According to the authors' calculations,

reaching the goal of zero stunting would require a near tripling of the annual rate of progress. Meanwhile, another indicator of malnutrition, the prevalence of wasting, continues to hover around eight percent and shows similarly slow long-term improvements, although the indicator is hard to measure precisely and data show great volatility over time, making trends hard to identify.

C.   SDG 2.3 – Double Agricultural Productivity of Small-scale Producers

Productivity data (either volumes or values) for small-scale food producers do not currently exist (FAO 2016c), but conventional indicators of average agricultural productivity in a country probably provide an upper-bound approximation. In cereal yields, for example, developing countries had average yields of 3.4 metric tonnes (MT) per hectare, a figure that has grown at 1.4% per year on average over the last 25 years. Yet this aggregate hides the fact that many countries are stuck at very low levels of agricultural productivity.

   In particular, as of 2014, 65 countries, two-thirds of which are in Africa, had cereal yields of less than 2MT per hectare, a threshold above which there is some evidence to suggest that households begin generating self-sustaining advances in economic growth (McArthur and McCord 2017). These 65 countries are home to more than 110 million[1] of the nearly 800

Figure 2: Average Cereal Yield in 65 Countries with Yields Below 2 Metric Tonnes per Hectare in 2014
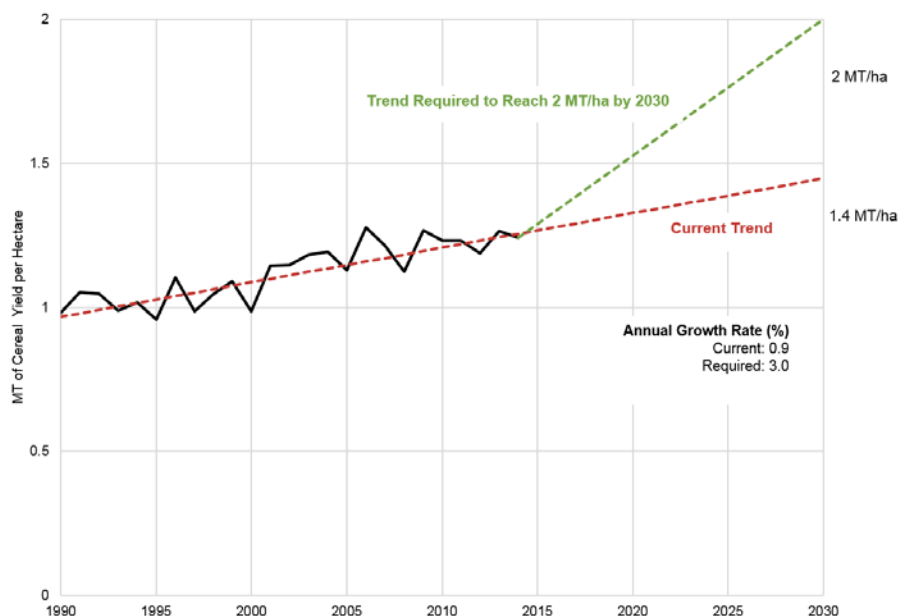
Source: Authors' calculations based on World Bank (2017)

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[1] Exact estimates are difficult due to missing data for major countries such as the DRC, Eritrea, Burundi, Somalia, South Sudan, and Sudan.

million people who are undernourished worldwide. The average undernourishment rate is 14% within these countries (at least among those with relevant data available). Figure 2 shows the trend for cereal yield growth across the group. The average growth rate would need to triple for these countries to get to 2MT/ha by 2030. This suggests a need to focus on policy change and practical investments to boost smallholder productivity in these countries.

D.   SDG 2.4 – Ensure Sustainable and Resilient Agricultural Practices

Data are not yet available for SDG indicator 2.4.1, the proportion of agricultural area under productive and sustainable agriculture. Several alternate indicators suggest that agricultural production in many developing countries is far from resilient and could suffer set-backs due to climate change, soil degradation and water shortage, while households face large shocks from volatile food prices that induce food insecurity. For context, the domestic food price volatility index, which tracks the variability of the relative price of food, has crept upwards between 2010 and 2014 for developing countries (FAO 2016b). Environmentally, developing countries have seen a decline in renewable freshwater resources per capita over decades, which may further endanger water supplies for the neediest among the population (FAO 2016a). The most proximate indicator of a lack of resilience is an acute and growing need for emergency food aid.

II.   Priorities for the G20

Achieving food and nutrition security will ultimately depend on each country's domestic government efforts, but international cooperation in forums like the G20 can support national actions in four ways.

First, G20 members can collectively help integrate global food markets and make them function more efficiently. There is some recent good news in this regard but more can be done and the gains must be sustained. Both developing and developed countries have reduced biases and distortions in international agricultural trade, but the level of global subsidies to agriculture still exceeds half-a-trillion dollars a year, with around $100 billion in EU countries alone (OECD 2017b). Countries have agreed to eliminate agricultural export subsidies and credits, thereby ending long-standing market imperfections. Nevertheless, greater consistency in policies on trade, aid, development, biofuels and climate could contribute to better global FNS outcomes.

Developing countries have worked to integrate their domestic food markets, building hard and soft infrastructure to enhance market connectivity of smallholders. Regional integration of food markets has progressed in South East Asia and parts of Africa. Access to input markets for improved seeds, fertilizer, machinery and finance needs strengthening. More efficient risk-sharing could be transformational. Government-level risk instruments like the African Risk Capacity mechanism can also help to mitigate the effects of widespread disasters.

Second, the G20 can do more to invest in agricultural research, extension, and data systems, especially in and for developing countries themselves. Aid from all donors for agricultural research for development[2] has remained at around 13 percent of FNS ODA between 2011 and 2015 (OECD 2017a), with no signs of an upward trend. The G20 has already promoted international collaboration through meetings of agriculture ministers and agricultural chief scientists. It is also promoting the sharing and application of data through a number of portals, including the global open data for agriculture and nutrition (GODAN), the coherence in information for agricultural research for development (CIARD), the global agricultural monitoring initiative (GEOGLAM), and the agricultural market information system (AMIS). Selected key data, notably on food loss and waste, on domestic private investments in agriculture in developing countries and on vulnerability metrics are priority gaps that need to be filled.

In the future, more emphasis should be placed on research for neglected tropical crops, for sustainable intensification, for helping to make existing crops more resilient to climate change (heat, pests and diseases, droughts and floods), and for adapting recommendations to suit local conditions and improve uptake. The G20 should pay particular attention to building evidence on smallholder, women and youth productivity and uptake of new approaches that can raise productivity and improve nutrition, including simple sustainable farming technology.

Third, the G20 should establish a central theme of targeting country-level investments in agriculture, livestock, fisheries and forests, as further discussed below. The main challenge for effectiveness is to determine, on the basis of evidence, the countries and intervention points where international assistance is likely to have the greatest impact on food and nutrition security and rural transformation. Food and nutrition security also needs to be tackled with consideration of security and diplomacy, as highlighted by the complex emergencies drifting towards famines in East Africa in 2017. This is a matter for G20 leadership, and not just for technical agencies.

To start, the G20 can identify a core group of countries where international assistance for FNS is likely to have greatest impact. This requires a database that can be used for G20 policy coordination and prioritization of FNS assistance along with coherent policies in non-agricultural areas that affect FNS.[3] Countries can then focus on scaling priority actions. For example, research suggests that increasing aid going towards nutrition could have very high long-run returns. Targeting infant and child undernutrition and biofortification can have important impacts on health and future labor productivity.

Reaching the global goals will require FNS resources to be committed as long-term and predictable sources of investment. After an initial expansion in 2008/2009, aid for FNS has

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[2] Defined as Agricultural extension, education, research, services, financial services, co-operatives, plant and post-harvest protection, Livestock/veterinary services, Fishery education, research, and services. CRS codes 31166–31195, 31381–31391.

[3] For examples of prioritization, see IFPRI's Best Bets study, Copenhagen Consensus' biggest bang for every buck, Brookings' Ending Rural Hunger database and report, and Center for Development Research (ZEF) "Tapping the Potentials of Innovation for African Food Security and Sustainable Agricultural Growth an Africa-wide Perspective."

stagnated of late (OECD 2017a).[4,5] Aid volatility is also a major problem, given a historical pattern of FNS aid following food price spikes and falls. Meanwhile, significant international resources for rural development are being made available in the form of non-concessional lending and commercial foreign direct investments. Innovative ways of bundling grants and commercial finance to achieve greater leverage of official aid could help.

Fourth, the G20 should take the lead in streamlining the global efforts to advance the previous three priorities, and more broadly to deliver on food security, nutrition, climate and other sustainable development goals. This implies solving current coordination problems while recognizing the implications of fast-growing demand for animal-sourced food. An increasing number of platforms and partnerships have emerged recently to tackle issues of markets, resources and science, but they risk varying combinations of overlap, dilution of efforts, and "orphan" issues of unfilled need. The G20 should assess whether the relevant international organizations and initiatives – especially those where group members have a majority stake – are optimizing their contributions. Through ministerial meetings, G20 members can assess the functioning of the global food and nutrition security system as a whole. This would provide context for individual organization replenishments, mandate changes, and necessary reforms of the global food governance system.[6]

III.   Proposed Framework

Currently, only a small share of G20 investments in food security and nutrition is targeted to priority countries. The G20 has not articulated any shared quantitative goals for ending hunger, and thus is not holding itself accountable for the effectiveness of the investments made by individual members. There is no agreement across G20 countries on a targeting framework or principles to guide targeting.

Targeting should be guided by three factors: each country's needs, policies, and available financial resources, as indicated in Figure 3.

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[4] One exception is the case of Germany where the "one world, no hunger" initiative has led to an increase in FNS aid.

[5] DAC CRS codes used here are Basic Nutrition (12240), Agriculture (311-), Fishing (313-), Agro-Industries (32161), Rural Development (43040), Food aid/Food Security Programmes (52010).

[6] See more on these governance aspects in G20 Insights, T20 Policy Brief on "Key Policy Actions for Sustainable Land and Water Use serving people. January 16, 2017.

Figure 3: A Simple Targeting Framework: Needs, Policies, and Resources
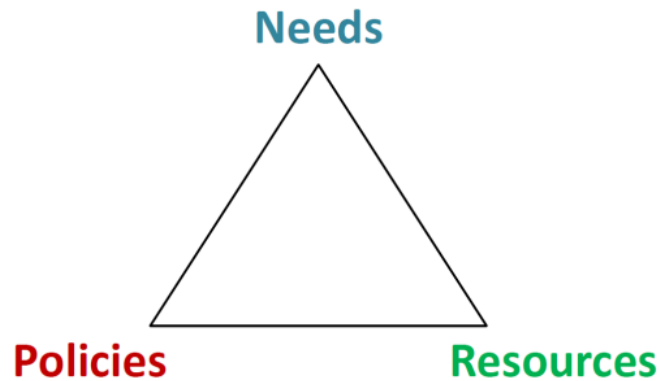
Source: Brookings Institution (2017)

- **Needs**: As indicated above, the SDG for ending hunger includes four underlying targets that are well suited for country-level assessment. In simplified terms, these are: (i) end undernourishment, (ii) end malnutrition, (iii) boost smallholder agricultural productivity and incomes, and (iv) ensure resilient agricultural systems. Each country's needs can be assessed by collating and synthesizing relevant indicators for each dimension. The higher the needs, the stronger the case for the G20 to target each country.

- **Policies:** On average, countries with higher levels of income per capita tend to have better domestic FNS policies – such as favorable rural investment climates, land rights for women farmers, and agricultural trade policies – and less hunger. However, at any particular level of income, countries with better FNS policies also tend to have lower levels of hunger. Assessing, first, the quality of local economic policies and, second, the extent to which political leaders prioritize FNS is an important component of targeting. The better the national policies and proven commitment, the stronger the case for targeting international efforts to support it.

- **Resources:** Countries that invest more in FNS tend to have lower hunger needs. Again, this is true after controlling for income levels. Many countries in sub-Saharan Africa have made commitments to raise agricultural spending in the Malabo Declaration but few have met their commitments. The more resources available in a country—be they from domestic budgets, international donors, or foreign investment or philanthropy, the weaker the case for targeting the country to receive additional resources.

This framework enables a straightforward logic, one that is in fact relevant for all SDGs related to ending extreme poverty and meeting basic needs for all. Attention should be focused on the countries with greatest need and, within each country, on the dimensions of food security that are most threatened. A plan to reduce food insecurity can then be developed around the policy reforms and political commitment of governments, as well as the level of resources, domestic and international, available to invest in food security.

In the best case, the fastest SDG results will be achieved by supporting countries with high needs, strong domestic policies, and very limited resources. In the worst case, little will be

gained by allocating additional financial resources to countries with low needs, weak policies, and already extensive resources. In those situations, efforts can focus on supporting policy improvements, in order to achieve the SDG vision of "no one left behind." In all cases, countries need to cooperate to ensure data systems are adequate to enable rigorous ongoing assessment.

If metrics are attached to the three dimensions, then trade-offs can be considered in a structured way. For example, some countries with high needs may not have adequate domestic policies in place to support a dynamic agricultural sector. In such cases, projects developed and implemented with international assistance will have to balance the short-term gains from helping a given number of project beneficiaries against the reduced likelihood of systemic rural transformation given an unsupportive policy environment. In other instances, countries with good policies may already have adequate resources for investment themselves, so the marginal contribution of international assistance might be correspondingly low.

The value of a quantified targeting framework is to force a necessary discussion of where resources of all forms might have the most impact, and to identify what kind of additional policy changes might be needed to ensure investments have a transformative impact. A targeting framework could help G20 countries do just that for both their collective international and domestic efforts. At the same time, it could provide an evidence base for other countries to understand their own responsibilities for structural reform to make international assistance more effective.

As an illustration, Figure 4 maps developing countries based on their recent overall FNS needs (on the vertical scale), policies (on the horizontal scale), and resources (the size of the bubble). Green bubbles indicate low-income countries and orange bubbles indicate lower-middle-income countries. The graph draws attention to several points. Most countries in the bottom right hand quadrant (low needs and strong policies) also have larger investments in FNS. The combination of high investments and strong policies contributes to good FNS outcomes. The figure also highlights that many countries have high needs and relatively strong policies, but still lack the resources to make large investments. This includes countries like Mozambique and Senegal.

Figure 4 also highlights that many countries have high needs and very low available resources, but in a weaker domestic policy environment. Development partners need to determine the magnitude of any transformational change that can be achieved by investing in these countries, and can focus on supporting policy progress in concert.

This framework suggests only one targeting methodology as drawn from an individual academic study. The core point is simply to argue for an evidence-based approach to targeting food security, rather than to argue for one approach versus another, or for some countries and against others. Under any appropriate framework, countries need a dynamic learning process where data are analyzed for insights and course corrections over each stage of the investment cycle. The G20 should task its agricultural and development ministers and chief scientists to develop such a framework and identify a list of highest priority countries for SDG 2.

Figure 4: Benchmarking Rural Hunger Needs, Policies and Resources, 2010–2014 average
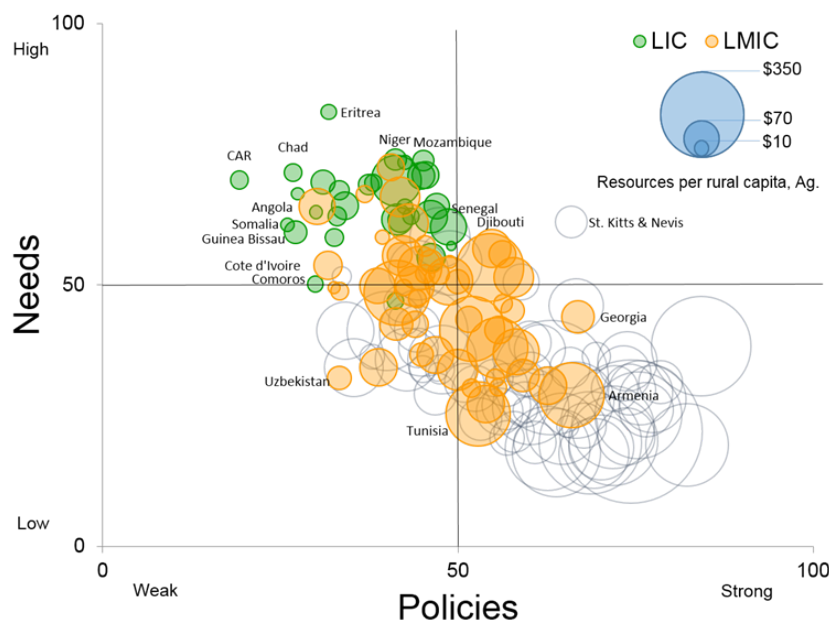
Source: Authors' calculations based on Brookings Institution (2017).

Note: Low Income Countries (LIC) and Lower Middle Income Countries (LMIC) follow World Bank classifications as of July 2017.

## IV.   Coordination across Organizations and Initiatives

In order to advance the policy priorities recommended above, the G20 needs to tackle the fragmented nature of international FNS resource flows and organizational efforts. In recent years, many platforms and partnership initiatives have emerged to tackle issues of markets, resources and scientific research. This includes a number of high-level multilateral initiatives announced at major meetings of the UN, G20, G7, and African Union.

If properly scaled and sustained, some of these efforts could signify the start of long-term international leadership guiding the end of hunger. The problem is that individual initiatives are too often simply operating subscale, or developed without full understanding of what is happening elsewhere, so overlap and waste cannot be ruled out. We have recently made a first attempt to map the pathways of relevant international financing flowing to developing countries for FNS, as presented in Figure 5. The graph draws attention to the complex channels through which resources flow. The G20 must strive to understand and coordinate these flows if they are to ensure the most effective investments.

Several other key points can be distilled from Figure 5. First, FAO and IFAD are only a small component of the overall channels for FNS aid. Second, private philanthropic groups are large implementers, mostly using bilateral donor funds, almost the size of multilateral agencies.

Third, nutrition accounts for only a small fraction of aid. Fourth, private FDI is large, suggesting that rules and regulations on sustainable farming governing their activities could be at least as important as public investments in meeting the challenge of food insecurity. Fifth, the amounts being extended by BRIC countries remain small in aggregate, although potentially large in specific countries. These issues all provide opportunities for G20 leadership.

Figure 5: Food and nutrition security financing to developing countries, 2011–2015 average
(Total flows equal $25 billion in constant 2013 $)
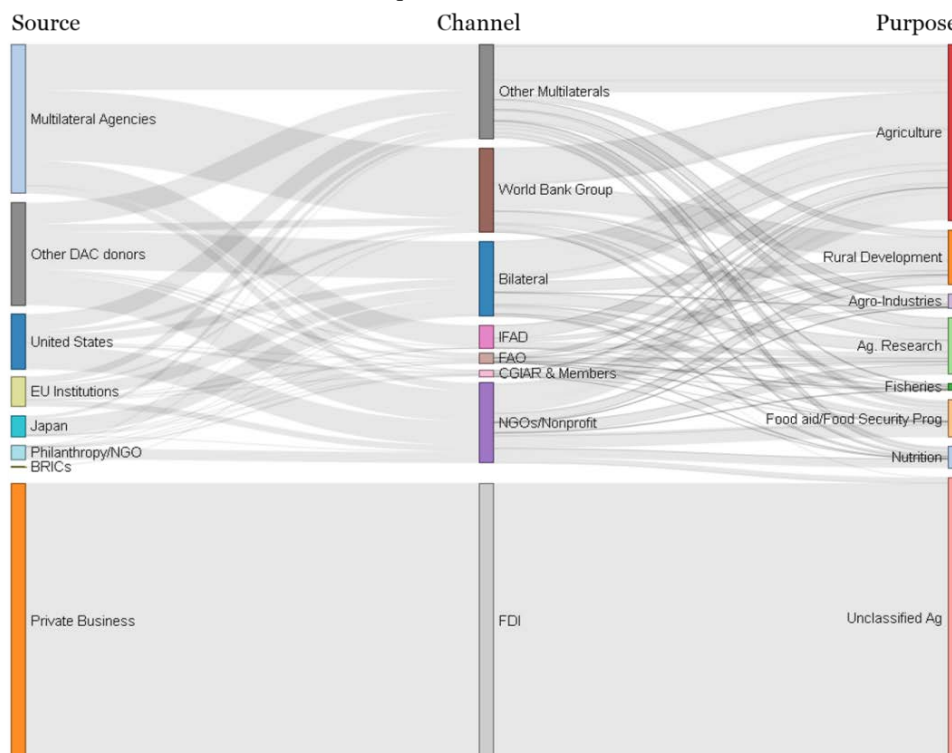
Source: Authors' calculations based on OECD (2017a) for ODA and OOF; AidData (2016) for BRICS information; AidData (2014) for US Philanthropy; Interaction (2017) for NGO spending; Financial Times (2015) for FDI.
Note: Humanitarian assistance is not included in above.

V.   Conclusion

Global progress needs to accelerate considerably if the SDG for ending hunger and malnutrition is to be achieved by 2030, especially in developing countries' rural regions. The G20 could make decisive inroads by adopting and implementing an evidence-based framework to guide FNS efforts across and within countries. One option is to assess each country's needs, policies and resources, linked to each of the relevant SDG targets. Systematic benchmarking could then inform targeting of efforts among countries and interventions, supporting ongoing learning and

course corrections among key actors. At a global scale, the same approach to benchmarking could help the G20 streamline multilateral efforts to maximum effect.

References

AidData (2014). US Private Foundation Data. Williamsburg, VA : AidData. Accessed on 25 August 2016. http://aiddata.org/research-datasets.

AidData (2016). AidDataCore_ResearchRelease_Level1_v3.0 Research Releases Dataset. Williamsburg, VA : AidData. Accessed on 10 October 2014. http://aiddata.org/blog/us-private-foundation-data-and-the-total-resource-envelope.

The Brookings Institution (2017). Ending Rural Hunger Database. https://endingruralhunger.org/.

Financial Times (2015). fDi Markets. London: Financial Times. http://www.fdimarkets.com/.

Food and Agriculture Organisation (FAO) (2016a). AQUASTAT Main Database. http://www.fao.org/nr/water/aquastat/data/query/.

Food and Agriculture Organisation (FAO) (2016b). FAO – Food Security Indicators: 16 December 2016 release. http://www.fao.org/economic/ess/ess-fs/ess-fadata/en/.

Food and Agriculture Organisation (FAO) (2016c). SDG Indicators 2.3.1, 2.3.2. http://www.fao.org/fileadmin/templates/rap/files/meetings/2016/161115_SDG_2016_-_Item_9_-_SDG_Indicators_2.3.1_and_2.3.2__FAO_.pdf.

InterAction (2017). NGO Aid Map. Washington, DC: InterAction. Accessed 22 May 2017. http://ngoaidmap.org/.

McArthur, John W. and Gordon C McCord (2017). Fertilizing Growth: Agricultural Inputs and Their Effects in Economic Development. *Journal of Development Economics* 127: 133–152. https://doi.org/10.1016/j.jdeveco.2017.02.007.

McArthur, John W. and Krista Rasmussen (2016). How Close to Zero? Assessing the World's Extreme Poverty-related Trajectories for 2030. Global Views No. 6, Nov 2016. Washington, DC: The Brookings Institution. https://www.brookings.edu/research/how-close-to-zero/.

OECD (2017a). Creditor Reporting System – April 2017 release. www.stats.oecd.org.

OECD (2017b). Producer and Consumer Support Estimates. OECD Agriculture statistics. www.stats.oecd.org.

UNICEF, WHO, World Bank Group (2017). Joint Child Malnutrition Estimates – Levels and Trends in Child Malnutrition. http://www.who.int/nutgrowthdb/estimates2016/en/.

World Bank Development Indicators (2017). Cereal yield (kg per hectare) (AG.YLD.CREL.KG). Accessed 20 June, 2017. http://data.worldbank.org/indicator/AG.YLD.CREL.KG.

World Food Program (WFP) (2016). Who Are the Hungry? https://web.archive.org/web/20161207164654/www.wfp.org/hunger/who-are.

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