

ENDING HUNGER BY 2030 – POLICY ACTIONS AND COSTS

Joachim von Braun (ZEF), Bezawit Beyene Chichaibelu (ZEF), Maximo Torero Cullen (FAO),
David Laborde (IFPRI), Carin Smaller (IISD)

1. Introduction - the new research basis

The 2030 Agenda for Sustainable Development pledged to move away from growing inequality to more inclusive, shared growth, away from ecocide, mass extinction of our plant and animal biodiversity, and waste and destruction of our planet's abundant but still finite natural resources to practices that respect and protect our common home, and away from activities that expose hundreds of millions of people to the insidious effects of rising global temperatures and its consequences for climate risks. At the heart of the 2030 Agenda was a promise to prioritize to eradicate poverty and end hunger and malnutrition in all their forms.

Too many people in the world today do not have access to sufficient, affordable, safe and healthy foods. About three billion people in the world cannot afford a healthy diet.¹ To address this global challenge, G7 heads of states at their Summit in Elmau in 2015 committed to lifting 500 million people out of hunger and malnutrition by 2030, i.e. 72 percent of the total undernourished in 2019 and 60 percent of the total including COVID-19 projections in 2020², as part of a broader effort to be undertaken with partner countries to support the 2030 Agenda for Sustainable Development, i.e. Sustainable Development Goal 2 (SDG 2) to end hunger and malnutrition by 2030 (Box 1).

Obviously, more and different investments and policy actions are needed to reach a world without hunger and malnutrition. We conceptualize ending hunger from different angles: as an important and feasible investment opportunity from a human rights perspective, as a humanitarian obligation, and for economic development.

Experiences with COVID-19 and related responses from societies and political leadership tell us that significant action is possible. The hunger problem can be solved and deserves such action.

¹ FAO: The State of Food Security and Nutrition in the World 2020: Transforming food systems for affordable healthy diets, 2020.

² Estimates as reported in FAO: The State of Food Security and Nutrition in the World 2020, and consistent with Laborde and Smaller (2020), What Would it Cost to Avert the COVID-19 Hunger Crisis?, Ceres2030.

The UN Secretary General's Food Systems Summit, and reform and policy efforts in support of the SDGs in many regions and countries, including by the EU and Germany, offer opportunities to take related interventions forward. This policy brief is a call to action from the research community to not only address the problems of hunger, malnutrition and poverty, but to actually act and invest and adapt policies to reach SDG 2 by 2030.

The findings presented here are based on a set of comprehensive and long-term research programs and partnerships among a large international research community³ to identify high-impact, cost-effective interventions that can address the challenges of SDG 2 and the related targets. This policy brief builds on findings from two costing exercises: the marginal abatement cost curves (MACC) approach, and the computable general equilibrium (CGE) modelling approach. The purpose of the use of different research approaches and methodologies is to identify levels of coherence and consistencies of results that may lend credibility to proposed policy actions and investments. Conceptually, the two approaches have complementarities as both envision sustainable development, and both aim at one or more SDG2 core target (Box 1). Also, differences of findings between a modeling approach (that in this research is constrained by environmental targets and the doubling of incomes of small-scale producers), and using a Marginal Abatement Cost Curve approach (without capturing synergies or tradeoffs) are presented. As shown below, both approaches show results that are consistent.

³ - International Food Policy Research Institute (IFPRI), International Institute for Sustainable Development (IISD), and Cornell University: Ceres2030: Sustainable Solutions to End Hunger; Ending Hunger, Increasing Incomes, and Protecting the Climate: What would it cost? <https://ceres2030.org/>. 2020

- Center for Development Research (ZEF), University of Bonn and United Nations Food and Agriculture Organization (FAO): [Investment Costs and Policy Action Opportunities for Reaching a World without Hunger \(SDG 2\)](#), Bonn and Rome, Oct 2020

- ZEF and Akademiya2063: [From Potentials to Reality - Transforming Africa's Food Production](#), Bonn and Dakar, Oct 2020 ([German version](#))

Box 1: SDG No. 2 “End hunger, achieve food security and improved nutrition and promote sustainable agriculture” and targets:

2.1 By 2030, end hunger and ensure access by all people, in particular the poor and people in vulnerable situations, including infants, to safe, nutritious and sufficient food all year round

2.2 By 2030, end all forms of malnutrition, including achieving, by 2025, the internationally agreed targets on stunting and wasting in children under 5 years of age, and address the nutritional needs of adolescent girls, pregnant and lactating women and older persons

2.3 By 2030, double the agricultural productivity and incomes of small-scale food producers, in particular women, indigenous peoples, family farmers, pastoralists and fishers, including through secure and equal access to land, other productive resources and inputs, knowledge, financial services, markets and opportunities for value addition and non-farm employment

2.4 By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality

2.5 By 2020, maintain the genetic diversity of seeds, cultivated plants and farmed and domesticated animals and their related wild species, including through soundly managed and diversified seed and plant banks at the national, regional and international levels, and promote access to and fair and equitable sharing of benefits arising from the utilization of genetic resources and associated traditional knowledge, as internationally agreed

2.a Increase investment, including through enhanced international cooperation, in rural infrastructure, agricultural research and extension services, technology development and plant and livestock gene banks in order to enhance agricultural productive capacity in developing countries, in particular least developed countries

2.b Correct and prevent trade restrictions and distortions in world agricultural markets, including through the parallel elimination of all forms of agricultural export subsidies and all export measures with equivalent effect, in accordance with the mandate of the Doha Development Round

2.c Adopt measures to ensure the proper functioning of food commodity markets and their derivatives and facilitate timely access to market information, including on food reserves, in order to help limit extreme food price volatility
<https://sustainabledevelopment.un.org/post2015/transformingourworld>

2. The state of Hunger and determinants of progress

Recent global projections have shown that the world is not on track to achieve Zero Hunger and Malnutrition by 2030 in line with SDG 2. In the past few years, the number of undernourished people has been on the rise again, from 653 million people in 2015 to 690 million people in 2019.⁴ The majority of the world’s undernourished – 381 million – are found in Asia while Africa – currently home to 250 million undernourished people – is the region with the fastest growth. Considering the total number of people affected by moderate or severe levels of food insecurity, an estimated 2 billion people in the world did not have regular access to safe, nutritious and sufficient food in 2019 and 3 billion people could not afford healthy diets.⁵

Without a more resolute response, the number of people suffering from hunger will surpass 840 million by 2030, or 10 percent of the global population. The world is also not on track to achieve the 2030 targets for child stunting and

low birthweight, important indicators of severe malnutrition. According to estimates, in 2019 21.3 percent (144 million) of children under 5 years of age were stunted, 6.9 percent (47 million) were wasted and 5.6 percent (38.3 million) were overweight. Foresight studies agree that without a determined effort to fight climate change and mitigate its negative consequences, the adverse effects as well as widening gaps of inequality will make it difficult to achieve the goal of ending hunger and malnutrition by 2030.

COVID-19 is expected to worsen the overall prospects for food security and nutrition as food insecurity may appear in countries and population groups that were not previously affected. A preliminary assessment suggests that the pandemic may add up to 132 million people to the total number of undernourished in the world in 2020.⁶ Beyond its short term macroeconomic impact, the Covid-19 crisis could undermine the long term wellbeing of vulnerable populations and economic productivity by depriving them from access to essential health, education and nutrition services.

⁴ FAO: The State of Food Security and Nutrition in the World 2020: Transforming food systems for affordable healthy diets, 2020.

⁵ FAO: The State of Food Security and Nutrition in the World 2020: Transforming food systems for affordable healthy diets, 2020.

⁶ FAO: COVID-19 global economic recession: avoiding hunger must be at the centre of the economic stimulus, 2020

3. Costs and targeting policies and investments to meet the G7 Elmau commitments and ending of hunger

Investments needed to end hunger and all forms of malnutrition are likely to be extensive, costly and difficult to implement, but also promise high returns in terms of lives saved, people's well-being and productivity. Identifying optimal and least-cost investment options is important for practical policy-making. Using the **marginal abatement cost curves (MACC)** approach, 22 different interventions were assessed to identify least-cost investment options with the highest potential for reducing hunger and malnutrition.⁷ The information about the interventions was drawn from best available evidence-based literature, including modelling studies and impact assessments. Some of these interventions can be implemented in the short-term (such as social protection), others in the longer-term (such as agricultural R&D, or soil fertility management). This assessment can broadly guide global and country efforts to achieve the SDG 2 targets by 2030. The results from the MACC indicate that

1. Achieving SDG 2 does not have to be prohibitively expensive, provided **that a mix of least-cost measures with large hunger and malnutrition reduction potential** are prioritized. This requires not only immediate action, but also an optimal phasing of investments by frontloading investments with high longer-term impacts in order to reap their benefits before 2030.
2. A rapid response is needed to **reach the hungry soon** with social protection and nutrition programs – including those adversely affected by COVID-19 with job losses and other socio-economic consequences. Scaling up existing programs is possible at low costs per unit with large effects. An important action in Africa would be regional trade integration with the African Continental Free Trade Area (AfCTA).
3. In order to meet the above mentioned **G7 commitment of lifting 500 million people out of hunger and malnutrition** by 2030, G7 governments would need to increase their investments by about **US\$ 11-14 billion** per annum over the coming ten years, that is, in addition to what they and governments of low and middle income countries are already investing. This is roughly equivalent to a doubling of current G7 development assistance for agriculture, food security and rural development. The mix of the identified low-cost, high-impact interventions include agricultural R&D, agricultural extension services, digital agricultural information systems, small-scale irrigation expansion in Africa, female literacy, and some scaling up of existing social protection programs (Figure 1).⁸ Clearly,

this portfolio is hunger-reducing in sustainable ways as most of the interventions are also income-enhancing and empowering, not just short-term hunger-reducing.

4. **Ending hunger**⁹ under a scenario of adverse trends would obviously require larger additional investments. We assess the costs of such a scenario that factors in both a continuation of the limited progress in hunger reduction as observed in the past 5 years as well as the additional threats posed by the COVID-19 pandemic which together could lead under business-as-usual to hunger of about 840 to 909 million people in 2030. To prevent this outcome it obviously would require significantly higher investments than to lift 500 million out of hunger, resulting in the need of government investments of about **US\$ 39 to 50 billion** per annum over the ten years until 2030, that is in addition to what governments are currently already investing. In this case, both donor and developing countries would have to bear a fair share of the financial burden. The promising investments and policy actions mix includes expanded new social protection programs, crop protection, integrated soil fertility management, the AfCTA, fertilizer-use efficiency, and child nutrition programs.¹⁰

It is important to note that the MACC consider each intervention independently with its marginal costs and hunger reduction effects. As a result, beneficial synergies among interventions are not captured. This implies that costs are probably overestimated and hunger reduction impacts underestimated although there could also be tradeoffs between interventions. This is one reason why these estimates are compared with comprehensive modelling that may capture synergies and tradeoffs.

The investments prioritized here contribute not only to reductions in hunger and malnutrition, but also to long-term development and sustainability, including beyond 2030. The mix of investments strengthens the resilience of populations affected by hunger today or are at risk of hunger in this decade. Investments in female literacy and nutrition-specific interventions would reduce **child malnutrition** (stunting among children below the age of 5 years) by about 34 million at a total incremental average cost of about US\$ 5 billion per year.

Additionally, taking all of the other hunger-reduction measures mentioned in Figure 1 together, the number of stunted children could be reduced by about 40 million without additional incremental cost.¹¹

⁹ When mentioning “ending hunger” it is assumed that there is about 3 percent transitory prevalence of undernutrition (PoU) not identified by PoU measurement.

¹⁰ Measures are also needed to overcome hunger related to complex emergencies combined with violent conflicts and wars. These were not included in the calculations presented here.

¹¹ ZEF and FAO (2020) Investment Costs and Policy Action Opportunities for Reaching a World without Hunger (SDG 2), Bonn and Rome, Oct 2020

⁷ ZEF and FAO (2020) Investment Costs and Policy Action Opportunities for Reaching a World without Hunger (SDG 2), Bonn and Rome, Oct 2020

⁸ See footnote 7.

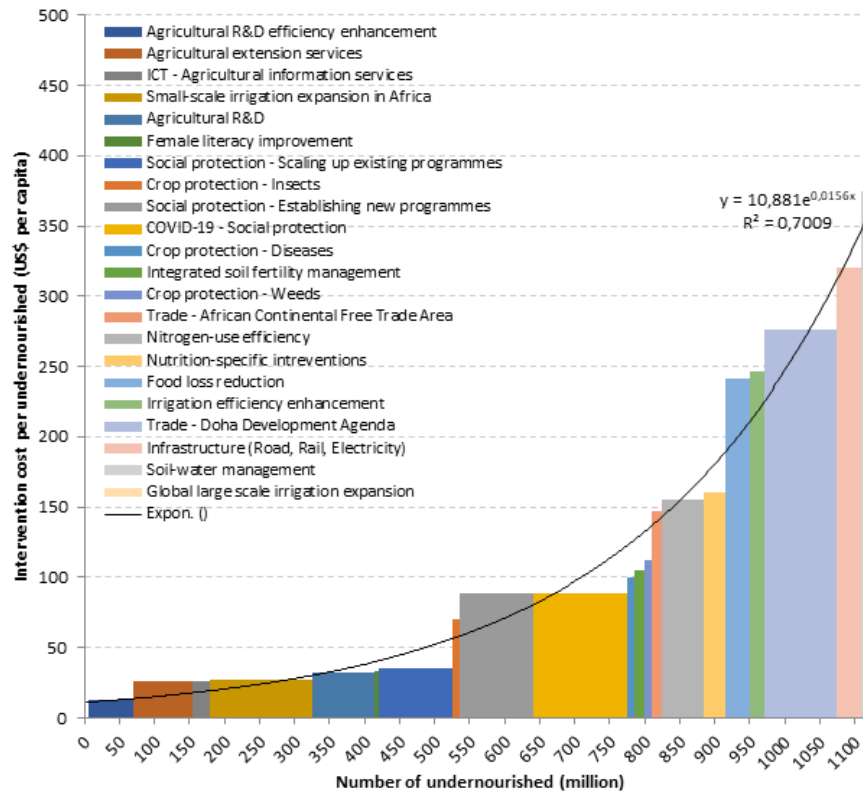


Figure 1: Marginal cost curve of the suggested interventions to eradicate hunger and malnutrition

Note: The MACC for hunger shows the cost of each hunger reduction measure such that each bar represents a single intervention where the width shows the number of individuals lifted out of hunger, the height its associated per-capita cost, and the area its associated total cost. The total width of the MACC reflects the total hunger reduction possible from all interventions, while the sum of the areas of all of the bars represents the total cost of reducing hunger (NoU) through the implementation of all interventions considered. The positions of the bars along the MACC reflect the order of each intervention by their cost-effectiveness. When moving along the MACC from left to right, the cost-effectiveness of the interventions declines as each next intervention becomes more expensive than the preceding.

Source: ZEF and FAO (2020) Investment Costs and Policy Action Opportunities for Reaching a World without Hunger (SDG 2), Bonn and Rome, Oct 2020

The MACC focused on the impacts of interventions on SDG 2 indicators related to hunger and malnutrition (2.1 and 2.2). In addition, SDG2 recognizes the importance of significantly **raising the productivity and incomes of small-scale food producers** as an integral part of hunger reduction strategies (2.3). Most of the investments considered for ending hunger also support the income and productivity targets. A recent analysis of different strategies to increase the supply of food from small-scale production systems for affordable, safe and healthy diets from sustainable use of resources in **Africa** suggests a set of key actions¹², including:

1. Investments in **young women and men**, i.e. vocational training and extension services, to improve skills for all core and support professions along the entire value chain.

2. Investments in **innovation and related agricultural research** on crops, animal production, agro-forestry and fisheries, and support of producer- and local private sector-led development and adoption of environmentally sustainable small-scale irrigation, rural energy, digitalization and mechanization of farm operations.
3. Investments in **mobile connectivity** of rural areas and across Africa as a prerequisite for digital tools to be widely and effectively used in the food and agriculture sector.
4. Improvements in **trade and market access** through rural infrastructure investments, and facilitating the participation of small-scale producers and small businesses in inclusive local and continental value chains as well as the opportunities of the AfCTA.
5. Aligning development **support to Africa's own agricultural transformation agenda**, at continental level, i.e. the African Union Agenda 2063 with the Malabo Declaration, and at country levels, and sustaining and expanding development assistance in the above-mentioned priority areas for agriculture development and food security.

¹² ZEF and Akademiya2063 (2020). From Potentials to Reality: Transforming Africa's Food Production. Bonn and Dakar, Oct. 2020. (The study was carried out for the African context, but the findings are transferable to other countries with comparable small producer-dominated production systems.)

4. Using a computable general equilibrium model to estimate the cost of ending hunger, doubling average incomes of small-scale producers and protecting the climate

In *Ceres2030: Sustainable Solutions to End Hunger* researchers sought to answer two linked questions: First, what does the published evidence tell us about agricultural interventions that work, in particular to double the incomes of small-scale producers and to improve environmental outcomes for agriculture? And second, what will it cost governments to end hunger, double the incomes of small-scale producers and protect the climate by 2030? The project focuses on three of the five targets in SDG 2 and looks at the public spending needed in low- and middle-income countries, including the contribution from donors through official development assistance (ODA). This brief focuses on the answer to the second question. The answer to the first question is published as a special collection in *Nature Research*.¹³

Ceres2030 used a computable general equilibrium (CGE) model to estimate the additional donor spending that is needed over the period 2020-2030 by allocating financial resources to a portfolio of public policy interventions (such as social protection programmes, rural infrastructure or payments for ecosystem services). The model also includes data from the international level all the way down to the

household level, allowing for simulation of targeted public investment across countries and population groups. However, it does not assume perfect targeting (e.g. a food subsidy program will be allocated based on income status, not hunger status, since the latter is not observable by policy makers). In order to simulate the portfolio of interventions, the model uses 14 policy instruments, grouped into three categories: (1) enabling inclusion, (2) on the farm, and (3) food on the move (see Box 2 for details).

Each instrument has a cost (public and/or private), and a marginal impact of structural variables (capital endowment, labor productivity) that will contribute to the final outcome (e.g. caloric available per household) after being mediated by the economic system. For example, the research and development spending in the Consultative Group on International Agricultural Research (CGIAR) system contributes to increasing agricultural productivity by paying a fixed cost in research services, but also provides larger benefits for a large number of low- and middle-income countries over time, while a fertilizer subsidy will reduce the fertilizer cost paid by the farmers receiving it on a recurrent basis. 14 policy instruments were modelled, based on existing data sources and a number of new parameters from the collection of evidence syntheses published in *Nature Research*. This list is aimed at capturing interventions for which data and parameters are available, especially regarding the actual cost (direct and opportunity costs) (See Box 2).

¹³ Sustainable Solutions to End Hunger, *Nature Research*, 2020.

Box 2: Interventions and Policy instruments considered in the Ceres2030 framework

This list of interventions is not exhaustive. Other policies are essential to improve the enabling environment (e.g. land reforms), while critical dimensions, such as gender equality and women's empowerment, should be embedded in each intervention and not seen as a separate tool.

Intervention	Policy Instrument
ENABLING INCLUSION	
Social protection	Food subsidy
Education	Vocational training
ON THE FARM	
Input subsidy	Fertilizer subsidy
Production subsidy	Investment subsidy
	Capital endowment
	Production subsidy
R&D	National Agricultural Systems (NARS)
	CGIAR
Extension Services	Extension services
Rural Infrastructure	Irrigation
Livestock subsidy	Agroforestry
	Improved forage
FOOD ON THE MOVE	
Post-harvest losses	Storage
Rural Infrastructure	Roads

The results from the modelling indicate that:

1. Donors need to contribute an additional **US\$ 14 billion** per year on average until 2030 to largely end hunger of more than 490 million people, double the incomes of small-scale producers, and protect the climate. Donors currently spend US\$ 12 billion per year on agriculture, food security and nutrition and therefore need to double their contributions to meet the goals.¹⁴ ODA alone will not be enough, however. Additional investments of **US\$ 19 billion** per year on average will have to be made by low- and middle-income countries.
2. The additional spending will not only lift 490 million people out of hunger, but double the average incomes of 545 million producers and their families, and limit greenhouse gas emissions for agriculture to the commitments made in the Paris Agreement.¹⁵
3. Any delay in spending will not only have human costs but will also increase the total costs. Early spending, on the other hand, allows investment in interventions that take more time – like R&D – but have a bigger payoff.
4. A portfolio of interventions is needed to achieve the multiple SDG 2 targets. The interventions in the model are balanced according to the impact on greenhouse gas emissions, economic growth, and the country context. The modeling offers a starting point for considering proper portfolio balance among the three categories of interventions: (1) enabling inclusion, (2) on the farm, and (3) food on the move.

The model's key strength is that it captures synergies and tradeoffs among interventions, along with a multitude of other complex interactions in the economy. This allows it to optimize public investment in its simulation of the achievement of SDGs 2.1, 2.3 and 2.4, minimizing public costs. In optimizing the public investment, the model intrinsically specifies how the public spending is distributed among the interventions, how much is spent each year from 2020 to

¹⁴ These figures of existing donor spending represent 5-year averages calculated using data for 2014-2018 extracted from the OECD Development Assistance Committee (DAC) Creditor Reporting System (CRS) database (OECD, n.d.(a)). Spending on food security and nutrition is defined by the DAC codes: basic nutrition (12240), agriculture (311), agro-industries (32161), rural development (43040) and food aid (52010). All values refer to total disbursements from all donors of official development assistance (ODA) and are stated in constant 2018 US dollars.

¹⁵ The targets are defined by SDGs 2.1, 2.3 and 2.4, under some constraints (mainly from SDG 2.4, which commits to minimizing the use of land, energy and fertilizer for agriculture through a reduction in greenhouse gas emissions). For target 2.1, the baseline simulates how hunger, as measured by the FAO's Prevalence of Undernutrition (PoU), would increase in the business-as-usual world. For target 2.3, the productivity and incomes (interpreted in the model as net incomes) of small-scale producers double on average in the scenario as compared with the baseline. For target 2.4, greenhouse gas emissions for agriculture conform to the commitments made in the NDCs from the UNFCCC Paris Agreement in 2016. The NDCs are both integrated into the baseline and a target in the model.

2030, and how much is spent per country. This capturing of complex interactions highlights the need for a mix of interventions, integrated together in the proper proportions.

The model is not, of course, omniscient. It can only model economic relationships for which there is widely available and consistent data. It also makes the underlying assumption that interventions are used efficiently at the microeconomic level (e.g. proper location of new roads, selection of the best technical solution in a given context). Therefore, it could not be properly interpreted and used independently of the growing literature on how successful interventions should be implemented.

5. Scaling national and international development actions

Some low- and middle-income countries have made significant progress towards reaching SDG2 in the last decade. These best performing countries achieved on average more than 50 percent reduction in hunger.¹⁶ Important lessons can be drawn from the factors that drove this performance. The agriculture sector continues to play an important role in these economies in terms of its contribution to GDP employment. The countries spent substantially more on agriculture and experienced relatively high agricultural growth. However, what they all have in common is that manufacturing is gaining in importance and labor is gradually moving out of agriculture and also out of rural areas. They also showed higher growth rates in capital formation and GDP compared to worse performing countries. These findings emphasize that hunger reduction goes hand in hand with improvements in various human and macro-economic development outcomes, such as poverty reduction and fiscal attention to agriculture.

ODA also has an important role to play towards ending hunger and malnutrition. At Elmau, the G7 countries committed to increasing bilateral and multilateral assistance to achieve SDG2. Analyses of ODA flows¹⁷ that relate to this commitment show that ODA from G7 countries specifically allocated to food security and rural development slightly more than doubled between 2000 and 2018 to reach US\$ 17 billion. Most of this ODA was targeted at countries with a relatively higher prevalence of undernourishment, notably in Sub-Saharan Africa, as indicated by these data: ODA represented 36 percent of the foreign finance received by African countries south of the Sahara, compared with 31 percent from overseas personal remittances and 23 percent from foreign direct investment.¹⁸ In other regions, ODA is less dominant with remittances representing 55 percent of foreign finance in South Asia.

¹⁶ ZEF and FAO (2020) Investment Costs and Policy Action Opportunities for Reaching a World without Hunger (SDG 2), Bonn and Rome, Oct 2020

¹⁷ See footnote 16.

¹⁸ Mali Eber-Rose, Sophia Murphy, David Laborde. Ending Hunger Sustainably: Trends in ODA Spending for Agriculture, 2020. Ceres2030-IISD, Geneva

In 2018, a significant portion of G7 member countries' ODA was allocated to agricultural development, and water and sanitation, food aid and environmental protection also receiving substantial investments. Germany has increased contributions to these sectors the most in recent years, followed by Japan and France. Analyses show that between 2000 and 2018, agricultural ODA helped to reduce hunger and child malnutrition, highlighting the importance of agricultural ODA to achieve improvements in hunger and malnutrition rates in the coming decade.

6. Concluding statement: End Hunger can be done

In the past few years undernutrition increased, but still ending hunger and malnutrition by 2030 is within reach. The research presented here is in agreement that an optimal portfolio of investments by the development partners supporting countries' own initiatives is feasible to reach the SDG 2. Many emerging economies have successfully cut hunger drastically in the past two decades through policy reform, investments and actions, in particular by accelerating investments in agriculture and thereby overcoming the undercapitalization of small-scale production.

The research agrees that between now and 2030 G7 governments need to double their efforts in order to achieve the Elmau commitment. That means an additional US\$ 14 billion per year is needed on top of current spending, which stands at about US\$ 12 billion per year.¹⁹ This effort, combined with more resolute efforts from developing countries would also mean a significant step forward towards achieving SDG2 in its entirety.

It will also require a focus of the additional resources towards Africa where the highest levels of hunger and dependency on external resources will be found in this decade. Delaying these essential investments further will make achieving SDG 2 more difficult and more expensive, while acting sooner can improve lives and our environmental future.

SUMMARY

1. Sound investment will facilitate a world without hunger. This includes, to expand and intensify nature-positive agricultural production that is resilient to climate threats, and to build back better from the COVID-19 pandemic.
2. Donors and affected partner countries must double their investments from now until 2030, and for OECD donors this means a total of about USD 14 billion more per annum.
3. In countries with hunger problems, agriculture must be a focus; donors and partner countries should agree on, and implement efficient packages of investment and policy measures.
4. Bring forward investments in social security to address acute hunger, and in research and training, because that takes time to take effect.

¹⁹ See footnote 14.



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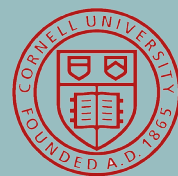
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**Food and Agriculture
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Ceres2030

Sustainable Solutions to End Hunger



Ceres 2030 is a partnership between Cornell IP-CALS, the International Food Policy Research Institute (IFPRI), and the International Institute of Sustainable Development (IISD) <https://ceres2030.org/>

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IMPRINT:

Center for Development Research (ZEF)
Genscherallee 3 | 53113 Bonn | Germany
E-Mail: presse.zef@uni-bonn.de
Phone: +49-(0)228 - 73 18 46