Ceres2030
Sustainable Solutions to End Hunger

Ceres2030: Sustainable solutions to end hunger is a joint initiative of Cornell University, the International Food Policy Research Institute (IFPRI) and the International Institute for Sustainable Development (IISD). By combining state-of-the-art modelling techniques with expert evidence, our collaborative project aims to build consensus on the way to end hunger sustainably, modelling the likely costs and assessing effective solutions.

The project started in January 2018 with support from the Federal Ministry for Economic Development Germany (BMZ) and the Bill & Melinda Gates Foundation.

With the involvement of stakeholders, the project is contributing to building and monitoring a global roadmap to achieve Sustainable Development Goal (SDG) 2. The implementation strategy is based on two core complementary activities:

1. Designing an advanced modelling framework to measure the cost of ending hunger through sustainable productivity growth
2. Building a list of effective interventions for achieving SDG 2 using a mixed methods approach that combines interdisciplinary teams of experts, machine learning and systematic reviews, with results released in a special journal issue of *Nature*

We continue to be busy and wanted to share some of the highlights of the second half of 2018. This is the second update on progress, latest developments and key activities of the project. (The first update is available here.)

Highlights

Ceres2030 launched at the UN Committee for World Food Security (CFS)

Ceres2030 was formally launched on World Food Day, October 16, at an evening side event of the 45th UN CFS at the FAO headquarters in Rome. The launch was a major collective achievement. The formal launch included the launch of the Ceres2030 website, press releases in English and French, and the publication of a brochure introducing the project.

In addition, the Bill and Melinda Gates Foundation (BMGF) hosted a cocktail event for project on October 15, attended by permanent representatives to FAO, IFAD and WFP; donors; intergovernmental organizations; and some of the civil society and private sector representatives who were attending the CFS. Neil Watkins of BMGF introduced the project, and Carin Smaller from IISD gave an overview of the project. We also put display boards around the room that explained different facets of the project.

Journal advisory board holds second meeting

On December 7, the journal advisory board met for the second time. The Center for Development Research (ZEF) of the University of Bonn hosted the meeting in Bonn, with support from the Global Donor Platform for Rural Development.

Donor representatives participated in the meeting and called for closer collaboration over the next 12 years to achieve SDG 2, through better evidence about what is needed and identification of clear interventions to focus global attention. They said Ceres2030 was a chance to close the gap between research and policy-making, but for this to happen, Ceres2030 needs to translate evidence into a language that decision-makers can use.

The main outcome was convergence around eight broad topics to frame the review of evidence on measures that support environmentally sustainable approaches to increase
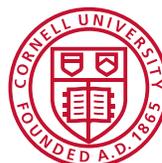
smallholder farmer incomes and productivity. The Ceres2030 team is revising and refining the topics and will share them in the next update.

Twenty-one high-profile experts from five continents have now enthusiastically joined our initiative. Ceres2030 welcomes its latest member, Jamie Morrison, Director and Strategic Programme Leader of FAO's Food Systems Programme, who joined the advisory board on December 7. Dr. Belay Begashaw, Director General of the Sustainable Development Center for Africa, wrote in his acceptance email: "It is indeed a pleasure and an honor to be in-service for this noble cause. I can't agree more on the importance of evidence for decision-making in today's highly competitive world, where often times the cost of misinformation is daunting and irreversible."

Definitions adopted for the indicators to model SDG targets 2.1, 2.3 and 2.4

Based on work done earlier in the year, the Ceres2030 team presented different options regarding the key indicators to be included in the model to track SDG targets 2.1, 2.3 and 2.4 (see pages 33–45 in the linked document) in October. Indicator definitions include the scope (the intended population), the concept and the data to be used. The project ambition is to have a definition that allows the model to be used already now, while remaining consistent with the Inter-Agency Expert Group on the SDGs (IAEG-SDGs), whose work is ongoing. The Ceres2030 team presented three options for defining "smallholder" at the SDG 2 Roadmap Donor Working Group meeting in October and asked participants to vote on their preferred definition. Two definitions included a measure of the area of land farmed, and the third was based on income levels. A majority of donors voted for a definition based on the area of land farmed refined with the use of a country-level average that captures the smallest 40 per cent of farms in a given country. This avoids using a given number of hectares that does not reflect the very different growing conditions and patterns of production found in different regions of the globe. The choice of this indicator is consistent with the definition used by the SDG 2 indicator group, chaired by the FAO.

Baselines and scenarios to measure smallholder productivity and environmental sustainability based on globally agreed definitions and targets

As a result of the many meetings held during the CFS, the Ceres2030 team can now create a new baseline that includes smallholder productivity and sustainable agriculture indicators. To this end, Ceres2030 also presented (pp. 44–46) the SDG 2 Roadmap Donor Working Group with a proposal for quantitative targets that could be included as assumptions in the model to estimate the cost of achieving SDG targets 2.1, 2.3 and 2.4 together. The SDG 2 Roadmap group gave a strong endorsement of the approach proposed by the project team, and Ceres2030 will therefore include these targets in the scenarios that it will generate with the model. The Ceres2030 team also presented the list of focus countries to stakeholders (p. 34). These were originally Senegal, Ghana, Nigeria, Uganda, Tanzania, Malawi and Zambia. That list has now been expanded to include Bangladesh, Guatemala, Rwanda and Ethiopia. There was broad support for the expanded list and all 11 countries will be included in the new baselines and scenarios.

Using machine learning to create a policy-relevant taxonomy for agriculture

With limited resources and urgent problems to address, ODA levels have to be both sufficient and well targeted. The abundance of academic and other writing that assesses food security initiatives should help, but it is not easy to make sense of the evidence in light of the sheer volume of writing available, its often highly specialized (and even esoteric) content and the restrictions on access imposed by most academic journals.

Ceres2030 addresses this challenge with a novel approach that brings together peer-reviewed and not peer-reviewed (often called "grey") literature. To date, the review has included more than 17,000 journals and 60 agency repositories. The tools are able to cope with source materials originating from a variety of different repositories (for instance, subscription databases, FAO, World Bank and CGIAR). The machine learning initiated by Ceres2030 allows a comprehensive and accelerated review process and increases the confidence level of finding relevant research on interventions. The research has been built around the demands of SDG targets 2.3 and 2.4. The team has created a taxonomy of policy-based agricultural interventions using machine learning semantic models. We have also used natural language processing to generate topic models, which is a useful way to explore a large, text-based dataset and to classify information. The result is a baseline against which to evaluate research trends by volume over time.

The team has also built a new online and open source dashboard to integrate and explore the data that is uncovered. We built an app to enhance the team's capacity to share data using Zotero, which is a free bibliographic software that is commonly used by global researchers. The platform allows ongoing monitoring of research as it is published. The approach and the system put in place by the Ceres2030 team can be repurposed for use in other contexts.

Evidence reviews

Ten evidence experts from North America and Africa have developed a draft protocol and a risk of bias assessment, which is now being validated by independent evidence experts. (They will subsequently be introduced to the Ceres2030 author teams.) Large reviews are often cited in evidence-based decision making because they serve as proxies to gauge the

quality and comprehensiveness of evidence from a field. Combining advances in machine learning can provide a near real-time method of searching and synthesizing what is a constantly expanding research landscape, looking for new insights into long-standing problems.

Engagement with scientific, policy and donor communities

The Ceres2030 team continued to engage with the scientific, policy and donor communities throughout 2018 to build consensus and support for the project.

PUBLICATIONS

Ceres2030 team member David Laborde published an article with Valeria Piñeiro entitled "Monitoring agricultural productivity for sustainable production and R&D planning" in *Economics: The Open-Access, Open-Assessment E-Journal* in December. Available online here.

POLICY

The central policy audiences for Ceres2030 include the UN General Assembly, particularly the HLPF, which is overseeing progress on Agenda 2030, the UN CFS, the G20, and intergovernmental agencies and development banks such as the FAO, IFAD, the World Bank, the OECD, the African Union and the African Development Bank. Ceres2030 attended and presented at five events in 2018 organized by these stakeholders and arranged a series of side meetings with key individuals. The most significant achievement in the engagement with this policy community was the inclusion of language in the G20 Agriculture Ministers' declaration in support of more work on productivity and sustainability as a result of Ceres2030 advocacy efforts: *"We believe that the challenges of achieving food security and nutrition and promoting sustainable agriculture in a changing climate and biosphere, can and must be addressed jointly and collaboratively […] [f]or improving agricultural productivity and sustainability, and call on members and OECD, FAO, IFAD, IFPRI/ CGIAR and other international organizations to disseminate lessons learnt beyond the G20."* The G20 Report to Agricultural Deputies included a similar message: *"Monitoring developments on sustainable productivity growth across countries requires further investments on methods and analytical framework."*

DONORS

The G7 and the SDG 2 Roadmap Donor Working Group are the key donor audience for the project. The Ceres2030 team attended a second meeting of the donor group in October 2018, where we presented the project and explained its role in supporting donor decision making around SDG 2.

Upcoming Events

The team will attend several scientific and policy-based events over the next six months. We have included a list below, though more may be added as the year progresses. Along with the events listed here, we will also continue to join meetings of the SDG 2 Roadmap Donor Working Group and will attend the spring meeting of Global Donor Platform for Rural Development.

18–19 March, Berlin, Germany
Global Solutions Summit

25–29 March, Washington, D.C., U.S.A.
World Bank Land and Poverty Conference

27–30 March, Washington, D.C., U.S.A.
American Society of International Law (ASIL) Annual Meeting

10–12 June, Kigali, Rwanda
Ceres2030 Journal Advisory Board Meeting

Launch of Ceres2030 in Rome