

AGRIFOOD DIGITALIZATION

CONCEPTS AND IDEAS FOR ACTION BASED ON EXTENSIVE DISCUSSION

Authors: Federico Bert, Viviana Palmieri, Carlos Ruiz



Inter-American Institute for Cooperation on Agriculture (IICA) 2022



Agrifood digitization: Concepts and ideas for action based on extensive discussion
by IICA is published under license Creative Commons
Attribution-ShareAlike 3.0 IGO (CC-BY-SA 3.0 IGO)
(<http://creativecommons.org/licenses/by-sa/3.0/igo/>)
Based on a work at www.iica.int

IICA encourages the fair use of this document. Proper citation is requested.

This publication is also available in electronic (PDF) format from the Institute's web site:
<http://www.iica.int>.

Editorial coordination: Federico Bert
Layout: Nadia Casullo

Agrifood digitization: Concepts and ideas for action based on extensive discussion/
Federico Bert, Viviana Palmeri y Carlos Ruiz – San Jose, C.R.: IICA, 2022

23 p.; 21x16 cm.

ISBN: 978-92-9273-022-2

Published also in Spanish and Portuguese

1. agrifood systems 2. digital technology 3. innovation
4. agricultural extension 5. Start-ups agtech I. IICA II. Título

AGRIS
Q54

DEWEY
664

The ideas, forms of expression and approaches in this document are the author's own (or authors'), therefore do not necessarily represent the opinion of IICA or any judgment on its part regarding the situations or conditions raised.

San Jose, Costa Rica
2022

FOREWORD

Over the course of its 80-year history, IICA has channeled a great deal of effort into fostering the development and use of technologies, based on its conviction that they were, are and will continue to be indispensable for the sustainable development of agriculture and rural communities.

In retrospect, technological development in the agrifood sector has been growing exponentially. New technologies are converging, pushing the frontier of what is possible in terms of productivity and sustainability. The emergence of digital technologies has further accelerated this process. Digital technologies offer a variety of solutions to agrifood system stakeholders. The digitalization of agrifood systems is taking place at this very moment and will yield significant benefits, though not without some collateral damage.

Digitalization will likely be the most transformative process that agrifood systems will undergo in the coming years. With that in mind, and in accordance with our mission, this issue has become a top priority on IICA's agenda. This is evidenced by the incorporation of the Digitalization of Agrifood Systems Program into the Medium-term Plan that will guide my administration from 2022 to 2026. The digitalization of agrifood systems is a complex process involving multiple stakeholders. As part of our efforts to build bridges and contribute to dynamic and inclusive digitalization, we decided to celebrate Digital Agriculture Week, providing a forum for dialogue and the coordination of actions among those involved in this process.

This document presents the main concepts and ideas stemming from the multiple and diverse presentations and dialogues that took place during Digital Agriculture Week. I encourage you to browse through them and join our efforts to further enrich discussions and, more importantly, propose and plan actions to drive the digitalization of agrifood systems.



Manuel Otero
Director general

CONTEXT

The increasing availability of digital solutions is transforming various aspects of human life and agrifood systems are no exception. The progressive incorporation of digital solutions into the production, processing, distribution and sale of food and other agricultural products signals the dawn of a new era in agrifood history. The transformation that digital technologies has triggered in other industries such as passenger transportation, entertainment, the hotel industry and finance are an indicator of the magnitude of the changes that can be expected.

Given the real benefits of the multiple available digital solutions and the relatively minimal transformation observed in agrifood systems today, it would seem that the digital transformation of the sector is a relatively recent phenomenon. However, everything would indicate that the process is beginning to accelerate. The extensive number of digital solutions that are being developed for the agrifood sector and the enabling environment created by the COVID-19 pandemic are undoubtedly key factors in accelerating this transformation.

In essence, digital solutions change the way in which we operate. The exponential progress in digital solutions leads one to believe that there is no task or process that could not be changed by the introduction of technology. Applied to the agrifood universe, no node or actor in the agrifood network will be unaffected by this digital transformation. Indeed, it is clear that the progressive incorporation of digital solutions is creating changes, ranging from the nature and type of stakeholders carrying out production to the type of stakeholders that are developing agricultural or agrifood technologies.

The magnitude of the expected impact and the imminence of agrifood digital transformation highlight the need to reflect and coordinate actions that will enable us to interpret and direct the course of change. Like all major transformations, the changes are expected to yield tremendous benefits, but also negative impacts. The ability to act at a time when the process is

beginning to accelerate is a major opportunity to ensure that measures are implemented to minimize damage, while also maximizing the resulting benefits for the overall society. The only means of achieving this is through dialogue and collaboration among stakeholders from various places to manage the changes.

Given this context, for some time IICA has sought to pay special attention to the issue of the digital transformation of agrifood systems, carrying out multiple actions aimed at evaluating this phenomenon through studies and dialogue and developing forums to foster collaboration among key stakeholders and promote concrete digitalization experiences. As part of these efforts, IICA organized Digital Agriculture Week, bringing together a wide variety of stakeholders involved in this issue for the purpose of continuing to analyze the transformation process and determining the actions and collaboration needed to drive it.

ABOUT DIGITAL AGRICULTURE WEEK AND THIS DOCUMENT

The purpose of Digital Agriculture Week was to provide an opportunity for exchange and the forging of linkages between various actors involved in the digital transformation of agriculture, as a means of driving actions to encourage it. As mentioned, the event is part of a series of actions that IICA is undertaking and that have established the basis for concepts, frameworks and actions that the Institute is carrying out in collaboration with public and private organizations.

In keeping with this objective, the Institute invited and brought together emerging digital technology companies ; policy decision-makers; corporations linked to technology and agriculture; innovation-focused public R+D policy institutes and cooperation mechanisms; leaders in the academic and agriculture sectors; multilateral agencies; investment funds; and support organizations for emerging companies, initiatives or programs to foster agricultural digitalization. The aforementioned stakeholders made 56 presentations throughout the Week. Annex 1 includes the list of participants.

This document summarizes the main concepts arising from the presentations and dialogues during Digital Agriculture Week. These concepts have been incorporated into and enrich the framework and guidelines for action that IICA has been developing with respect to agrifood digitalization. **The document is intended to serve as a baseline to interpret the current and future status of agrifood digitalization and to design actions to promote it.**

EMERGING CONCEPTS AND CONCLUSIONS

The main concepts arising from the presentations and exchanges during the Week are presented and described below. This is not an exhaustive summary of all of the information; however, the most dominant and commonly reoccurring concepts throughout the various presentations have been prioritized.

Digital solutions are essential for the transformation of agrifood systems: There is widespread consensus about the contribution that digital solutions can make to agrifood system transformation. Digital solutions may contribute significantly to increasing production and resilience, minimizing the impact on the environment and health, generating inclusion and providing people with opportunities for development. The political authorities who participated indicated that digital solutions are indispensable tools to tackle the problems and challenges of agrifood systems in their countries and regions.

Digital solutions offer concrete benefits: The available digital solutions can contribute directly to resolving problems and challenges.

Various participants highlighted the contribution that digital solutions can make to decrease vulnerability and increase adaptation and resilience to

"Technology is one of the only alternatives to ensure efficiency and productivity, by doing more with less, polluting nature less and living in a sustainable world in the coming years".

Augusto Valderrama
Minister of Agricultural Development of Panama

"Digital technologies... are critical in assisting farmers to update the information that they require, to make better decisions in the market and to transform agricultural development to be more productive and resilient and to provide food security".

Zulfikar Mustapha
Minister of Agriculture of Guyana

climate variability and change; facilitate access to information and technical assistance and extension processes; develop new markets and integrate farmers into these markets; facilitate traceability and the implementation of certification schemes or voluntary standards; improve the characterization and monitoring of soils, water resources and production; increase efficiency in the management of processes and use of inputs, within a crisis framework

"Digital solutions have the capacity to level out information imbalances. Another benefit is that they reduce the cost of transactions, in cases such as price negotiations or sales specifications.

Joanne Gaskell
World Bank

"What digital technologies can do with the general marketing of producers would remove many of the inefficiencies and inequalities of the current system".

Eduardo Izaguirre
Vice-Minister of Production
Development of Ecuador

(fertilizers, phytosanitary areas); monitor, predict and improve pest control; and support the development of small farmers.

Very simple digital solutions can produce major impacts: Although they are a wide variety of digital solutions that are available today, with some of them being technologically very sophisticated, relatively simple solutions can have a major impact in terms of increasing productivity, generating inclusion, etc. The PxD experience provides an example of this concept, as timely dissemination of high-quality technical content via text messages significantly improved the output of small farmers in Asia and Africa. Similarly, some of the solutions proposed by the 15 startups are based on concepts that are very basic but stand to have an extremely high impact (e.g. the digital identity of farmers).

"Digital agriculture is already a cost effective way of increasing crop yield and it has the potential to be even more impactful as technology advances".

Michael Kramer
Winner of the 2019 Nobel Prize in Economics, Professor of Economics and Public Policy, University of Chicago

Digital solutions promise to make a major contribution to environmental care: Various benefits offered by digital solutions directly relate to increased efficiency (in the use of natural resources and inputs) and a decrease in or elimination of the impact on the environment. Thus, the incorporation of the environmental dimension is a central aspect in the design of the solutions and in the discussions of the vast majority of the startups that responded to the IICA call.

"The challenge... is to optimize the production of tons of food per cubic meter of water used in the medium and long term and metric tons of food per hectare produced, in other words, ensuring productivity with sustainability. We consider digital technologies to be essential for these processes, whether in soil analysis, digital technical assistance..."

Santiago Argüello

Director General of Agricultural Promotion in the Secretariat of Agriculture and Rural Development of Mexico

"Various digital technologies are being used to enable a 30% reduction in environmental impact".

Ana Paulina Posso

Bayer

"Digital technology is key to minimizing the environmental footprint."

Ann Stapleton

USDA National Institute of Food and Agriculture

"Beyond food production, there are real environmental services and climate impact opportunities that are beginning to be part of the discussion about Agtechs."

Scott Day

Director of Agronomy at Fall Line Capital

Digital transformation can also have a negative impact: The digital transformation of agriculture also comes with certain threats. For example, it raises concerns with respect to possible social exclusion; the strengthening of an extractivist model and an increase in negative environmental effects; a greater concentration of power in the hands of chains and the loss of professional and cultural identity, among other issues (L. Klerkx reviews these concerns). The gaps that are currently evident, particularly as regards access to technologies and the skills for their use, increase the likelihood of these negative impacts. Thus, careful reflection on the possible undesirable effects

and trade-offs will be necessary during the design and use of these solutions, while considering a diversity of pathways for transformation.

"We have gaps in rurality and in digital issues.... At this time we have to ensure that all of us become farmers that can efficiently use data, particularly in our use of water".

Esteban Valenzuela Van Trek
Minister of Agriculture of Chile

"In order to bring about inclusive and positive digital agriculture, certain methodologies and approaches are required, such as a focus on responsible innovation, which consists of anticipating what may happen and who it could affect and including these persons in the process of development to adapt these technologies, thereby ensuring that their effects are not as deleterious".

Laurens Klerkx
Technology and Innovation Group, Wageningen University

A lack of digital skills is one of the main barriers: Minimal digital skills among farmers and other food chain stakeholders (including professionals) was repeatedly mentioned (as well as the lack of connectivity and access to these technologies) as one of the major factors limiting digital transformation. The lack of digital skills not only reduces the incorporation and use of digital solutions and slows down transformation, but it also is factor in reduced competitiveness and the increase marginalization of those with fewer skills and opportunities to acquire them.

"I think it is very important to place a great deal of emphasis on issues related to digital training".

Luciano Braverman
Microsoft

Digital technologies are revitalizing innovation and technology development models: The issue of digital solution development is becoming increasingly important in the area of technology development for agriculture. Given the very nature of digital solution development (low entry barriers, refinement of solutions and great scaling-up potential), new stakeholders are emerging and are increasingly collaborating amongst themselves and with pre-existing stakeholders). In particular, there is a proliferation of agtech startups (emerging agrotechnology companies), as well as support and technical, business and financial assistance organizations and initiatives (incubators, investment funds, etc.). The response to the IICA call for startups demonstrates this phenomenon: multiple proposals from various countries (16), from initiatives that were generally led by small, young and dynamic teams.

"As part of the process that we are building, on the one hand, we want producers to be the ones to direct the course of innovation, and, secondly, we want professionals traditionally involved in agriculture to be able to interact with those not traditionally involved in agricultural professions, within the context of an intelligently designed agenda".

Blas Cristaldo
FECOPROD, Paraguay

"Organizations like ours (AgTech Garage) are emerging because a new innovation dynamic is unfolding. If everything is changing, why don't we change the way in which we are developing new things...? We need new ways of accelerating technology development."

José Tomé
Agtech Garage

Agtech startups play a key role in digital transformation: Agtech startups are key stakeholders in agricultural digital transformation, as they provide many of the available solutions. They are generally small organizations, with a great deal of flexibility and agility to adapt their proposals to the needs of users, directly interacting with them (and frequently including them in the development process). Moreover, given their close engagement with users, the startups also play an important role in supporting users during the process of incorporating and using these tools (including skills training). They have a great deal of potential to be scaled up, although they are extremely heterogeneous and to

"What role do startups play in AG innovation? [...] We are seeing the consolidation of all types of segments of the industry. The agricultural equipment sector is on the rise, as is the crop protection industry. We have these gigantic companies that can facilitate certain types of innovation, but in reality they are not an ideal environment for the type of innovation that can produce any real change".

Scott Day
Director of Agronomy at Fall Line Capital

date only a few of them have been validated in the market or enjoyed significant expansion.

Observation of the authors: In most cases, observation of the 15

participating startups revealed that these startups were the life project of their founders. This has two key implications in terms of the quality and sustainability of the solutions offered: (1) the founders were intent on thinking about how to offer a good solution and to improve it on a daily basis and (2) they felt compelled to work continuously to perfect their proposal and ensure its use, in order to safeguard their personal economic survival.

"Is it much more likely that this process (digital transformation) will be spearheaded by entrepreneurs like yourselves, rather than by large companies".

Gustavo Grobocopatel
Founder, Grupo Los Grobo

Startups are generally vulnerable and require financial leveraging: Startups are generally small organizations with no assets and normalized financial statements; they may also be in the process of consolidating their businesses (whether products, business models, markets, etc.). As such, they are very vulnerable to changes in the surrounding environment and market in which they are operating. Thus, the high rate of failure of this type of business is an established fact. The startups that participated in the Week (offering diverse solutions and from a variety of backgrounds) all agreed that financing is their priority need (to develop their product, build their team and develop markets)¹. They also faced similar difficulties in establishing linkages with financiers, corporations involved in digital agriculture, and with national science and technology systems, etc.

"More than simply writing checks and providing capital [to startups], this calls for the addition of value by providing access to [...] support programs, such as those related to governance, talent, trade strategy, scaling up and resource mobilization, among others."

Brandon Day
The Yield Lab

¹ Normally, the financing that startups are seeking comes from investment funds that provide resources in exchange for a share package in the company.

Digital transformation requires the involvement and collaboration of multiple actors: In addition to what has already been said about the role of startups, digital transformation will only be dynamic and inclusive if all relevant actors are involved in the development and use of solutions. As mentioned in the corresponding panel discussion, public R+D and extension systems have prioritized the issue and are designing a new generation of actions that will make a decisive contribution to digital transformation. As such, the participants highlighted the invaluable contribution that these systems stand to make to the development of solutions for segments that may not be attractive to private players (eg. small-scale agriculture); the generation of data to support decision-making; the development of skills in relation to the use of digital solutions; the provision of technical support to direct and strengthen the development of solutions; the creation of opportunities for discussion among different stakeholders and the development of base technologies (whose value can then be leveraged through private solutions). Academia may also make an equivalent contribution, as demonstrated in the presentation by New Mexico State University.

“One of the universal challenges that we have faced in working with digital agriculture is the ability to work in a cross-functional manner across different areas of discipline...to be able to understand each other in the same language”.

Lara Prihodko
New Mexico State University, USA

“Embrapa is undertaking open innovation with the productive sector, through innovation-focused projects—undertaken through public-private partnerships—with cofinancing by the partners and the sharing of intellectual property rights”.

Carla Geovana do Nascimento Macário
Deputy Director of Research and Development,
Embrapa Digital Agriculture

“The efforts of national agricultural research institutes (NARIs) should serve as a catalyst in generating ecosystem innovation”.

Próspero Aguirre
Representing the President of
FONTAGRO, IDIAP, Panama

"Digital agriculture is very developed in large agribusinesses, but public research has a role to play in working with other production systems and small farmers to bridge the gaps".

Steven Kappes

President of PROCINORTE, USDA-ARS-Office of National Programs

"There is always something we can learn from others and something to share and that is significant... We must update ourselves and keep abreast of developments in the world – a world that is and will continue changing. Working in isolation could prove to be a mistake".

José Bonica

PROCISUR Management Committee, Chairman of the INIA Uruguay Board of Directors

The presentations by public sector representatives highlighted the critical role of farmer associations, both in developing digital solutions (eg. the digital solutions developed by FECOPROD), as well as in collaborating with private and public developers and working with members to increase the use of these solutions.

Digital transformation is a priority in stakeholders' agendas: The various presentations throughout the Week demonstrated that agricultural digital transformation is a priority in the agendas of many stakeholders. Both the multilateral agencies, as well as the policy decision-makers and corporations confirmed the importance of the issue in their agendas and highlighted several initiatives intended to drive digital transformation (with differing impacts, depending on the nature of each stakeholder). Moreover, given the recognition of the role of agtech startups, various organizations discussed actions or programs directly targeting these entities.

"I believe that the issue of agroecological transition is imperative, given all of the global challenges that we face and, finally, the issue of digitalization, which is the one that brings us here today".

Octavio Sotomayor

Economics Officer, Agricultural Development Division, ECLAC

"Digital agriculture is extremely important for each of the Latin American countries and we see it as the main tool that will allow us to improve our cultivation and production systems, as well as enable more effective decision-making at the board and managerial levels of the Ministry of Agriculture and Livestock of Honduras."

Roy Lazo

Vice-Minister of Livestock and Agriculture of Honduras

"The agriculture sector is gaining increasing importance in our spatial program".

Alberto Menghini

European Union Regional Cooperation for Central America, Panama and Costa Rica

Data management policies should be part of the work agenda: The digital transformation of agriculture calls for the generation and management of increasing volumes of data. This therefore demonstrates the need to define policies that will ensure proper manipulation and use of data and information, safeguarding against direct violations of the property and privacy rights of the creators of that information.

"This (digital) agriculture will naturally require that careful attention be paid to security, privacy and ethics concerns".

Ann Stapleton

USDA National Institute of Food and Agriculture

"Another issue that we are now discovering is the importance of trust and security, how to reach users and instill a sense of trust in them in their use of certain applications".

Fabrizio Bresciani

IFAD, Latin American and Caribbean Division

GUIDELINES FOR ACTION

Based on what was presented and discussed during the Week, outlined below are some actions that should be considered, with a view to fostering a dynamic and inclusive digital transformation process. These areas provide opportunities for international technical cooperation and should be undertaken while taking into consideration the previously discussed conclusions or concepts.

Increasing linkages with stakeholders: The discussions established the need to increase linkages among different stakeholders (to target and improve the efficiency of the transformation process), in some cases, in view of the apparent difficulty to establish these linkages, for various reasons. Organizations with a significant presence in rural areas and an extensive network of linkages can play an invaluable role in promoting these linkages, as was pointed out by various participants during the Week. The establishment of linkages may be undertaken by creating networks or communities of practice, organizing plenary meetings that bring together a wide variety of stakeholders (with Digital Week being one example), or by facilitating bilateral meetings (eg. research institutes with startups, startups with potential donors, etc.), etc. Supranational organizations and institutions have a broader regional vision on the basis of which to identify public-private synergies that may spur digital solutions. Thus, they may act as a bridge between the problems identified and the proposed solutions, but may also engage in multi-actor partnerships that drive digital transformation in the agriculture sector of the Americas.

"The purpose of sharing experiences and best practices should be to create a short-, medium- and long-term plan of action to demonstrate to people that it is possible to improve agriculture with digital technologies"

Luis Adrián Salazar Solís

Former Minister of Science, Technology and Telecommunications, Costa Rica

"In the coming years we will seek to promote [...] territorial innovations hubs, namely facilities in rural areas that will enable producers and rural service providers to connect with entities that offer digital services that may be of use to them".

Carolina Trivelli

Senior Strategic Analysis Advisor at FAO

Increasing linkages between rural areas: In light of the fact that there are common problems and challenges in different areas and solutions that are potentially scalable, the promotion of cooperation among countries is extremely important. Here again, multinational organizations (public or private) stand to play an important role in fostering linkages and/or disseminating solutions and experiences among countries. Explicit mention was made of the contribution of organizations such as IICA in facilitating the soft landing of digital entities in countries other than their country of origin.

Preventing possible negative impacts: The possible negative impact of an imminent transformation process should be given priority attention in agendas, in particular among policy decision-makers. There seems to be sufficient agreement regarding factors that can trigger negative impacts (in particular the lack of connectivity and digital skills) and there is an urgent need to address them, given that the transformation is inevitable. At a more general level, all initiatives to spur agricultural digitalization, whether public or private, should consider strategies and best practices that will safeguard against this potential damage.

Increasing the availability of skills training: In line with the previous point, there is an imperative need to undertake skills training to assimilate the transformation and implement the solutions. There also appears to be a great need to increase the amount and specificity of the training offered, bearing in mind the diversity of the target group (farmers, technicians, professionals). In addition to the obvious role of R+D institutes and knowledge centers, solution developers may also be critical not only in providing training in the use of their technologies, but also in possibly incorporating users into the process to design, test and adapt the solution.

"If we want producers in different regions to understand and use the technology, we must serve as a resource to allow them to take what they need, download the [relevant] data and organize it in an understandable way, equipping them with the tools to be successful".

Don Edgar

New Mexico State University Team, USA

"We want to use technological tools as a means of supporting decision-making, not to replace any process [...] It is matter of how we enable users in rural areas to have reliable information on hand, which they are able to use as quickly as possible".

Arlene López Sampson

Tropical Agriculture Research and Higher Education Center (CATIE)

Defining public-private synergy frameworks: The development of digital solutions can undoubtedly be strengthened through collaboration between public and private stakeholders. For example, the commercial solution of a startup may be based on and enhance the value of a base technology previously developed by a public entity or a public organization may make substantial contributions to the design and expansion of a solution. Fostering this collaboration would require the creation of structures and mechanisms to ensure that the value contributed by the different entities participating in the development is properly recognized and captured. In particular, this would facilitate the participation of public entities in development processes (e.g. it would determine the type and scope of actions that they could undertake, ensuring equal and transparent treatment in comparison to private actors).

"We have tried to combine the technological aspect with the knowledge of the producers, so that they can make informed decisions".

Arlene López Sampson

Tropical Agricultural Research and Higher Education Center (CATIE)

Promoting and supporting the development of public and private digital enterprises: Agricultural digital transformation is driven by the increasing availability of digital solutions, among other factors. Spurring the creation and development of entrepreneurs (private and public) who develop solutions is indispensable to increasing technology availability and improving quality. As such, it is important that the public sector recognize the role of entrepreneurs and implement initiatives to build innovation ecosystems and bolster entrepreneurship. This will not only foster the development of the solutions required by agrifood stakeholders, but also the creation of companies with the potential to be scaled up and ultimately to make a significant socioeconomic contribution.

ANNEX 1:

LIST OF PARTICIPANTS IN DIGITAL AGRICULTURE WEEK

NAME	ORGANIZATION AND POSITION	BLOCK
Manuel Otero	IICA, Director General	Roundtable discussion with Ministers and officials
Zulfikar Mustapha	Minister of Agriculture of Guyana	Roundtable discussion with Ministers and officials
Augusto Valderrama	Minister of Agricultural Development of Panama	Roundtable discussion with Ministers and officials
Eduardo Izaguirre	Vice-Minister of Agricultural Production Development of Ecuador	Roundtable discussion with Ministers and officials
Ann Stapleton	National Program Leader at USDA, Institute of Food and Agriculture	Roundtable discussion with Ministers and officials
Roy Lazo	Vice-Minister of Livestock and Agriculture of Honduras	Roundtable discussion with Ministers and officials
Santiago Arguello Campos	General Coordinator of Agriculture, Secretariat of Agriculture and Rural Development, Mexico	Roundtable discussion with Ministers and officials
Esteban Valenzuela Van Treek	Minister of Agriculture of Chile	Roundtable discussion with Ministers and officials
Federico Villarreal	IICA, Director of Technical Cooperation	IICA, the digital transformation of agriculture
Federico Bert	IICA, Digital Agriculture Specialist	IICA, the digital transformation of agriculture

Nicolás Santinelli	Representative of GBot solutions	Startup presentations
Leonardo Elgart	Representative of Milar	Startup presentations
Ramiro Carretero	Representative of Agroconsultas	Startup presentations
Robinson López Monzón	Representative of AGROS	Startup presentations
María del Carmen García	Representative of Appi.ar by Beemore	Startup presentations
Diego Heinrich	Representative of Origino	Startup presentations
Hubert Pieri	Representative of TheFarmerbox	Startup presentations
Eduardo Martín Cordasco	Representative of Wiagro.	Startup presentations
Danilo Miranda	Representative of BloomsPal Network	Startup presentations
Alfredo Sfeir	Representative of Frescapesca.com	Startup presentations
Andrei Grespan	Representative of Tarvos	Startup presentations
Luciano Acosta	Representative of Ecodrip	Startup presentations
Antonio Cabreira	Representative of Neltume Agro	Startup presentations
Mauricio Varela	Representative of SIMA	Startup presentations
Erick Cuellar	Representative of AgTechApps	Startup presentations
Jonathan Lehe	PxD, Chief Development Officer and Director of New Programs	Presentation of experiences
Ana Paulina Posso	Food Value Chain Manager	Perspective and actions of strategic partners
Joanne Gaskell	World Bank, Senior Agricultural Economist	Perspective and actions of strategic partners
Luciano Braverman	Microsoft, Senior Director of Education for LATAM	Perspective and actions of strategic partners

Wilson País	Microsoft, Digital Native Companies Lead	Exchange session between startups and strategic partners
Keneth Solano	IICA, Project Management Specialist	Presentation of the Agroamérica Emprende project
Laurens Klerkx	Professor, Technology and Innovation Group of Wageningen University, Netherlands	Perspective and actions of academia
Michael Kremer	Winner of the 2019 Nobel Prize for Economics; Professor in Economics and Public Policy at the University of Chicago)	Perspective and actions of academia
Luis Adrian Salazar Solís	Former Minister of Science, Technology and Telecommunications, Costa Rica	Perspective and actions of academia
Derek Bailey Lara Prihodko Mahdi Haghshenas- Jaryani Manoj Shukla Mario Allegri	New Mexico State University	Perspective and actions of academia
Arlene López Sampson	CATIE, Senior Researcher	Perspective and actions of academia
Carla Geovana do Nascimento Macário	EMBRAPA, Head of Digital Agriculture	Role of R+D+i mechanisms and institutes in the digital transformation process
Steven Kappes	PROCINORTE, President	Role of R+D+i mechanisms and institutes in the digital transformation process
Prospero Aguirre	FONTAGRO, representative; Institute of Agricultural Innovation of Panama, Head of International Technical Cooperation	Role of R+D+i mechanisms and institutes in the digital transformation process

José Bonica	PROCISUR, representative; INIA Uruguay, President	Role of R+D+i mechanisms and institutes in the digital transformation process
Hugo Chavarría	IICA, Manager of the Bioeconomy Program	Role of R+D+i mechanisms and institutes in the digital transformation process (moderator)
Gustavo Grobocopatel	Former Chairman of Grupo Los Grobo	The perspective of producers
Blas Cristaldo	FECOPROD, General Manager	The perspective of producers
José Tomé	Agtech Garage, Chief Executive Officer	Perspective and actions of stakeholders involved in entrepreneurship
Brandon Day	The Yield Lab Institute, Chief Operating Officer	Perspective and actions of stakeholders involved in entrepreneurship
Scott Day	Fall Line Capital, Director of Agronomy	Perspective and actions of stakeholders involved in entrepreneurship
Carolina Trivelli	FAO, Senior Strategic Analysis Advisor	Perspective and actions of multilateral agencies
Fabrizio Bresciani	IFAD, Lead Regional Economist for Latin America and the Caribbean	Perspective and actions of multilateral agencies
Octavio Sotomayor	ECLAC, Economic Affairs Officer, Agricultural Development Unit	Perspective and actions of multilateral agencies
Alberto Menghini	European Union, Head of Regional Cooperation for Central America, Panama and Costa Rica	Perspective and actions of multilateral agencies
Janssen Sander	Digital AgriHub, Coordinator	Multilateral initiatives
Benjamin Kwasi Addom	Advisor, Agriculture and Fisheries Trade Policy	Multilateral initiatives

ANNEX 2:

PARTICIPATING STARTUPS IN DIGITAL AGRICULTURE WEEK

 <p>A business intelligence platform for producer organizations that need to digitalize field data; make better decisions, through the use of dashboard and maps that display key indicators; and monitor sustainable landscapes with their partners.</p> 	 <p>The Netulme Agro service facilitates compliance with monitoring standards required by local and international authorities; generates timely notifications and optimizes the application of products for the control of pests and diseases.</p> 	
 <p>Agroconsultas offers digital technical assistance, combining expertise and artificial intelligence, thus helping farmers and technicians to make better decisions.</p> 	 <p>A tool for agricultural producers who use irrigation on their crops. Using satellite images, data from weather stations and data provided by the client, its algorithm calculates the exact moment when irrigation should be applied to each crop and of how much water must be applied to each plot. Efficient irrigation application facilitates an increase of up to 40% in yields, while saving millions of liters of water in the process.</p> 	
 <p>A platform to improve decision-making in agriculture. It integrates various internal and external data sources (such as satellite images, climate information and data uploaded by users) to build prediction algorithms that issue recommendations.</p> 	 <p>Facilitates business dealings in a direct, secure and scalable way, between rural, digital and non-digital producers.</p> 	 <p>A hybrid Business-to-Business (B2B) and Business-to-Consumer (B2C) online marketplace that "uberizes" seafood supply chains, by delivering fresh and frozen seafood directly from fishing vessels to end consumers.</p> 
 <p>ORIGINO enables the tokenization of supply chain assets, using NFTs to give each production unit a digital identity and, through blockchain events, facilitating the end-to-end traceability of products. It incorporates financial and insurance tools, offering Proof of Existence for goods, thereby improving the liquidity of production assets.</p> 	 <p>By using predictive modeling with real-time data from connected traps, it enables growers to visualize pest trouble spots and to use crop protection inputs precisely where and when they are needed for more sustainable and cost-effective control.</p> 	 <p>Company dedicated to developing agricultural solutions. It initially focused on software and subsequently on creating a selective spraying device for weed control.</p> 
 <p>Mobile applications that capture data from different agricultural activities. Offline functionality, solution rental, paperless solutions. Rapid access to field information to facilitate timely decision-making, resulting in reduced costs, process efficiency and increased productivity.</p> 	 <p>Safeguarding the world's food supply, by accelerating the transition of agribusinesses towards digital transformation, through technology use, with a view to preventing losses in the post-harvest sector and creating a blockchain-based, global digital food platform.</p> 	
 <p>Gbot offers solutions that describe crops, as a means of supporting genetic improvement and research programs, as well as agricultural development. It guarantees precise characterization and high-level output by combining two technologies: robotics, to automate field data collection, and artificial intelligence to generate valuable information on crops, through the use of images.</p> 	 <p>B2B software that enables agricultural producers and international buyers to negotiate directly with each other, providing one central location for all logistics chains and payment processes. The Alibaba of the agriculture sector.</p> 	

ANNEX 3:

LINKS TO VIDEOS FROM DIGITAL AGRICULTURE WEEK SESSIONS

16 MAY

- Facebook link; streamed in Spanish
[Día 1 - Semana de la Agricultura Digital: Inauguración | Facebook](#)
- YouTube link in English
[Day 1 - Digital Agriculture Week: Opening - YouTube](#)
- YouTube link in Portuguese
[Dia 1 - Semana da Agricultura Digital: Abertura – YouTube](#)

17 MAY

- Facebook link; streamed in Spanish
[Semana de la Agricultura Digital - Día 2: Mirada académica e investigación | Facebook](#)
- YouTube link in English
[Day 2 - Digital Agriculture Week: Academic perspective and research - YouTube](#)
- YouTube link in Portuguese
[Dia 2 - Semana da Agricultura Digital: Olhar acadêmico e pesquisa – YouTube](#)

18 MAY

- Facebook link; streamed in Spanish
[Semana de la Agricultura Digital - Día 3: Startups y emprendedurismo | Facebook](#)
- YouTube link in English
[Day 3 - Digital Agriculture Week: Startups and entrepreneurship - YouTube](#)
- YouTube link in Portuguese
[Dia 3 - Semana da Agricultura Digital: Startups e empreendedorismo – YouTube](#)

19 MAY

- Facebook link; streamed in Spanish
[Semana de la Agricultura Digital - Día 4: Énfasis en organizaciones multilaterales y colaborativas | Facebook](#)
[Semana de la Agricultura Digital Día 4: Cierre](#)
Not available in English and Portuguese on social media networks.