

## Symposium Report

“Innovation systems for food security and  
nutrition: understanding the capacities  
needed”

Tuesday, 21 June 2016

FAO Rome, Sheik Zayed Centre

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## **Preface**

This Symposium was organized by the Tropical Agricultural Platform to discuss capacity development for food security and nutrition in Agricultural Innovation Systems. In addition, the symposium aimed to present the findings of the e-conference on "Innovation systems for food security and nutrition: understanding the capacities needed" that took place between 18 April and 13 May 2016.

The Tropical Agriculture Platform is grateful for the support of the United States Government that made possible both the discussion of this important issue and the Symposium as a whole.

Keywords: innovation systems, capacity development, food security, nutrition, biofortification, EMBRAPA, Brazil

## **Executive Summary**

The Tropical Agriculture Platform (TAP), a G20 initiative hosted by the Food and Agriculture Organization (FAO), organized on 21 June 2016, at FAO headquarters a half-day international symposium on "Innovation systems for food security and nutrition: understanding the capacities needed".

TAP aims to contribute to the development of capacities for agricultural innovation in the tropics, with particular focus on small- and medium-scale farmers, with the specific objective of enhancing Capacity Development (CD) for Agriculture Innovation Systems (AIS).

The symposium was a follow up to an email conference with the same title, carried out from 18 April to 13 May, 2016, which aimed at exploring ways to promote enabling policies for and to enhance capacities of AIS, therefore improving local sustainable agricultural production and increasing its contribution to food security and nutrition.

The e-conference and this symposium have its origin in an agreement between the United States and Brazil to jointly promote the implementation of the Post-2015 Development Agenda Sustainable Development Goals, on particular the goals related to food security, nutrition, and sustainable agriculture. To fulfil this pledge, the United States and Brazil agreed to work together via TAP on improving food security and nutrition by promoting innovation in agriculture, with special emphasis on tropical agriculture.

The symposium included three presentations followed by questions and a discussion.

The first presentation by Christian Hoste, TAP Steering Committee Chair, provided an overview of TAP and its activities, with emphasis on the development of a common framework for capacity development, and how this framework is being tested and improved through pilot projects being implemented in eight countries in three continents.

The second presentation, by Ricardo Elesbão Alves and Edna Maria Morais Oliveira, Senior Researchers from EMBRAPA, Brazil, illustrated a series of examples of South-South collaboration, where EMBRAPA is supporting Latin American and African countries with transfer of technology and capacity development, at individual and organizational levels.

The third and last presentation was on the findings of the email conference, by Javier Ekboir, FAO Senior Consultant, who summarized the topics discussed during the four weeks virtual conference and some additional topics that were identified as still needing further analysis.

Participants came from different backgrounds including specialists on innovation systems, capacity development, nutrition, and policy formulation. The majority of participants were representatives of Permanent Delegations, FAO staff, and international organizations hosted by FAO. The event was webcast in English, French and Spanish, allowing participants of the e-conference and the public to follow. The presentations and discussions are currently available on FAO webpage: <http://www.fao.org/webcast/home/en/item/4139/icode>.

### **The key messages**

Several key messages emerged during the symposium, in particular, a strong consensus for the engagement of local stakeholders starting in the design phase in order to increase the success and sustainability of projects. Other messages include:

- EMBRAPA and TAP work with demand driven approaches that engage a broad range of stakeholders from international organizations to government and local communities.
- There is a need to achieve better coherence and coordination at country level, where multiple interventions from different organizations are happening. TAP aims to contribute to those efforts.
- To improve the Agricultural Innovation Systems (AIS), actors need a better understanding of the system they operate in, and learn how to collaborate with other actors.
- Decision makers need to have a better understanding of the trends that drive innovation processes, and how these trends influence interventions.
- Facilitators play a crucial role in innovation process. Their skills need to be developed through training and university curriculum change, a component of the TAP project.
- Investments in research and innovation rely on developing convincing cases, not just with agriculture officials, but also with ministries of finance and planning and other important stakeholders.
- The AIS framework stresses the need for new ways of doing research, in which different actors engage in different ways that depend on the particular features of the research questions that are being asked.
- Several actors still assume that research is the basis of innovation, a proposition that has been shown to be inaccurate in most scientific fields, including agriculture and natural resources management. The persistence of this vision demonstrates the need for developing the capacities of those working in AIS.
- The capacity needs of local communities and countries evolve as their economies integrate into fast-changing global markets, new technologies emerge and local societies assimilate foreign influences. External knowledge should complement local knowledge.
- Government instability often compromises long term interventions. Involving a diversity of local stakeholders in the design and implementation of interventions can increase continuity in case of changes of government officials.
- Advocacy and solid demonstrations of support from a diversity of stakeholders can increase the commitment from governments and funders.

## Opening Remarks

Ms Maria Helena Semedo  
DDG – Natural Resources Coordinator, FAO

Excellences, Ladies and Gentlemen

The challenges in food and agriculture are increasingly complex in terms of feeding the world's growing population in the face of a changing climate and degrading natural resources.

Agricultural development depends on innovation which is widely recognized as a major source of increased and more sustainable productivity.

Agricultural innovation already plays and will increasingly play a key role in contributing to achieving the Sustainable Development Goals (SDGs) of ending poverty and hunger, achieving food security, improving nutrition and promoting sustainable agriculture.

However, innovations cannot simply be transferred from one place to another. Innovation processes need to be locally owned, responding to the needs and conditions of local stakeholders and to agro-ecosystems.

Unfortunately, many low-income countries are not fully exploiting their innovation potential because of weak capacities, lack of resources and unfavourable and uncondusive enabling environment.

Excellences, Ladies and Gentlemen

In 2012, G20 established the Tropical Agriculture Platform (TAP) to promote the development of national capacities for agricultural innovation in the tropics with the aim of enhancing the overall performance of Agricultural Innovation Systems (AIS). A particular focus is placed on small- and medium-scale producers and enterprises in the agribusiness sector.

The 41 TAP partners agreed to develop a common framework on capacity Development (CD) for AIS, among other activities. The objective of the framework is to harmonize and coordinate the different approaches to CD in support of agricultural innovation. Such harmonization would ensure optimal use of resources.

The framework promotes a shift in mind-set and attitudes among the main actors and provides concepts, principles, methodologies and tools to better understand the architecture of AIS, to assess CD needs and to plan, implement, monitor and evaluate CD interventions. All this should lead to more sustainable and efficient AIS.

The draft common framework, developed thanks to EU funding and in collaboration with the European consortium AGRINATURA, has been approved by the TAP partners' assembly last January and its validation is now in progress in 8 countries in Africa, Central America, and South-East Asia.

Today's Symposium has been convened to discuss the issues related to capacity development for Agricultural Innovation Systems in general and, in particular, the outcomes of the e-consultation on "Innovation systems for food security and nutrition: understanding the capacities needed" that took place between 18 April and 13 May 2016.

The electronic consultation was made possible by the support provided by the United States and Brazil, which are gratefully acknowledged.

The virtual conference brought together agricultural practitioners and policy makers from all over the world, who discussed how to promote enabling policies for agricultural innovation, to improve sustainable food production and consumption systems and close gaps in nutrition.

I wish a very fruitful discussion on these very important themes that are crucial to achieve the SDGs and to face the challenge of ensuring food security and nutrition to present and future generations.

Thank you

## Introduction to the Symposium

The symposium was introduced by Karin Nichterlein, FAO Agricultural Research Officer and TAP Secretariat, and Cristina Sette, FAO Consultant and Facilitator.

## Objectives

The international symposium objectives were as following:

- a. Presentation of the Tropical Agriculture Platform's Capacity Development Framework
- b. Learn about initiatives EMBRAPA participates in in relation to research and innovation
- c. Presentation of the e-conference findings
- d. Discussion of the conclusions of the e-conference, the relation of the TAP Framework to capacity development in the field of food security and nutrition (including discussion of appropriate tools) and the implementation of related policies at regional and country level

## Program

Time	Session	Session format	Speaker
14:00 – 14:05	Opening		Maria Helena Semedo, DDG, Natural Resources Coordinator
14:05 – 14:10	Objectives and process		Karin Nichterlein, TAP Secretariat, FAO Cristina Sette, Faciliator
14:10 – 14:50	Tropical Agriculture Platform's Capacity Development Framework	Presentation and discussion	Christian Hoste, TAP Steering Committee Chair
14:50 – 15:30	Research Capacity Needs for Improving Human Nutrition and Health. Embrapa's experience	Presentation and discussion	Ricardo Elesbão Alves and Edna Maria Morais Oliveira, Senior Researchers, Embrapa, Brazil
15:30 – 16:10	E-conference: findings	Presentation	Javier Ekboir, FAO Senior Consultant
16:10 – 16:50	General discussion	Plenary discussion	Cristina Sette (facilitator), FAO Consultant
16:50 – 17.00	Concluding remarks		Samy Gaiji, Chief, AGDR, FAO



## Virtual Participation in the Symposium

According to Akamai<sup>1</sup>, 75 computers were connected watching the livestream of the symposium. The top 10 countries connected were Italy, Brazil, Kenya, Belgium, Netherlands, France, Germany, Switzerland, Taiwan, and Japan.

According to Google Analytics, from 21 June until 27 June, the webpage containing the symposium video, <http://www.fao.org/webcast/home/en/item/4139/icode/>, had been visited 199 times by a total of 134 unique users. On June the 21<sup>st</sup>, the page was visited 160 times, by a total of 99 users.

## Panel Presentation

The symposium had three presentations which are included in the Annex. This section highlights the main points made by each presenter.

### **I. Tropical Agriculture Platform's Capacity Development Framework, by Christian Hoste, TAP Steering Committee Chair**

Many low- and middle income countries, especially those located in the tropics, lack capacities to support agricultural innovation. To address this gap, the G20 launched the TAP, hosted by FAO, with the goal of contributing to the development of capacities for agricultural innovation in the tropics, with particular focus on small- and medium-scale producers, and the objective of enhancing Capacity Development (CD) for AIS. TAP is a multilateral facilitation mechanism with more than 40 partners.

TAP's action plan is based on regional needs assessments conducted in 2013 in Latin America, Africa and Asia. Since 2015 the TAP Action Plan is supported by the EU-funded Capacity Development for Agricultural Innovation Systems project for global and country results. The needs assessment identified capacity needs at the planning and implementation phases as well as in governance, which led to the implementation of three lines of work: (a) advocacy and policy dialogs; (b) development of the Common Framework for CD for AIS; and (c) TAPipedia knowledge hub.

- TAPipedia knowledge hub

TAPipedia is an information sharing system designed to enhance knowledge exchange in support of Capacity Development (CD) for Agricultural Innovation Systems (AIS). TAPipedia aims to be a global information system for good CD practices, innovation outputs, success stories and lessons learned. It allows partners and other stakeholders to share their CD for AIS resources and initiatives. In particular, TAPipedia presents, explains and promotes the TAP Framework, including learning modules.

- The TAP Common Framework for CD for AIS

The Common Framework promotes a systems perspective on agricultural innovation, which involves complex interactions among stakeholders at essentially three levels: individual, organizational and the enabling environment. Capacities at these levels are specific for different types of actors but they interact among themselves; therefore, they must be addressed in an integrated manner. The Common Framework pays especial attention to the enabling environment.

The Common Framework identifies four plus one key capacities

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<sup>1</sup> Akamai is the leading content delivery network (CDN) services provider for media and software delivery, and cloud security solutions.

- Capacity to Navigate Complexity
- Capacity to Collaborate
- Capacity to Reflect and Learn
- Capacity to Engage in Strategic and Political Processes

These four capacities are the core of an overarching “Capacity to Adapt and Respond in order to Realize the Potential of Innovation”, shifting focus from reactive problem solving to co-creating the future. This requires facilitative leadership to enable all of the above to happen.

The Common Framework distinguishes two levels of CD:

- Innovation niches: The spaces for learning, experimentation and micro-level transformation where innovations are developed. In innovation niches, small groups of actors experiment with alternative socio-technical practices. The strength of the niches result from the interplay among three components: (1) articulation and negotiation of shared expectations by participating actors; (2) social networks, including all relevant types of actors within the niche, both creating opportunities for stakeholder interaction and micro-markets that provide the resources necessary for experimentation and temporary protection; and (3) learning mechanisms (across experiments, between actors, etc.). CD at this level takes place around specific innovation agendas, in which actors of all types allocate time and resources to achieve change.
- System level: The wider system in which the niche operates. Lessons learned from innovation niches inform actors at the system level about their own interactions and help improve the enabling environment for FSN-AIS. CD at system level recognizes social, cultural and political structures in which power relations and social and institutional dimensions determine opportunities for different groups of actors to initiate innovation niches, and then, acting upon the interventions, to attain sustainability

The Framework proposes a cycle of five stages for implementing CD for AIS. The cycles are substantially identical for each of the three dimensions (Individuals, Organizations and the Enabling Environment) although the actors involved and the methods used usually vary. In particular the cycle stimulates learning and interactions among the three dimensions. The key elements of the cycle are:

- Facilitation
- Reflection, learning and documentation
- Monitoring and evaluation

The Common Framework is being tested in eight countries through the EU-funded project Capacity Development for Agricultural Innovation Systems, implemented by Agrinatura and FAO in close collaboration with national organizations. The project runs from 2015 through 2018 and is executed in Angola, Ethiopia, Burkina Faso, Rwanda, Bangladesh, Laos, Honduras and Guatemala.

In its four years, the project is expected to:

- Accurately define CD needs for strengthening the AIS
- Identify demand-driven and efficient CD interventions around priority themes and selected value chains.

Until now, four activities have been implemented:

- Development of a shared vision on CD for AIS which was fed by a scoping study and supported by policy roundtables.
- Country-led capacity needs assessments, based on the Common Framework.

- Development of CD action plans.
- Strengthening of AIS multi-stakeholder mechanisms or platforms, including policy roundtables and marketplaces.

Four documents were produced within this activity:

- Review Report: Review of existing resources on CD in AIS
- Conceptual Background: Theory, concepts, principles, definitions
- Synthesis: Summary of conceptual background
- Guidance Note on Operationalization: Approach and tools

## **II. Research Capacity Needs for Improving Human Nutrition and Health: EMBRAPA's experience, by Ricardo Elesbão Alves and Edna Maria Morais Oliveira, Senior Researchers, EMBRAPA, Brazil**

Brazil has created a large research and education system. EMBRAPA, the Brazilian agricultural research corporation, is the largest organization in the system and the largest agricultural research organization in Latin America. EMBRAPA has 9,842 employees, of which 2,415 are researchers and 2,182 have doctoral degrees. With an annual budget of US\$1.2 billion, Embrapa has 47 centers and services, divided into 11 national thematic centers, 14 national product centers, 17 ecoregional or agroforestry centers and 5 service centers.

In addition to EMBRAPA, the agricultural research system is composed of 23 state agricultural research centers with a large network of experimental stations, 7 agricultural universities and an active private sector which supplies technologies and technical assistance both in agricultural production and food processing.

Thanks to a dynamic agricultural sector, real prices of the food basket fell almost 50% between 1975 and 2011. The key drivers of agricultural innovation in Brazil have been

- Government commitment and public policies
- Development of science-based tropical agriculture
- Availability of basic infrastructure
- Large extensions of arable land and adequate climatic conditions
- Landscape suitable for mechanization
- Availability of mineral resources (limestone and phosphate)
- Entrepreneurship of farmers

EMBRAPA maintains programs of scientific cooperation with a network of prominent research organizations. This programs include 93 bilateral and 12 multilateral agreements with 89 organizations in 56 countries. A central role among these programs is the Labex (laboratories without walls) program, where senior researchers are posted for a period of 2-3 years in advanced research organizations; currently, these virtual laboratories have been implemented in the USA, France, Germany, the UK, China and Japan (to be opened soon). EMBRAPA also has programs of technical cooperation with Peru, Paraguay, Mali, Burkina Faso, Ghana, Benin, Angola, Mozambique, Tanzania, Chad, Kenya, Uganda and Burundi.

Currently EMBRAPA is going through a change in its research paradigm moving from just food security to also nutritional security, with the goal of not just curing diseases but also to prevent them. The targets include biofortification (increasing the content of vitamins and minerals of agricultural products), bioactive compounds, proteins and peptides, dietetic fiber and prebiotics, probiotics, and studying anti-nutritional factors, allergenics, sodium, sugar and fatty acids. The components of RD&I projects include "omics" (genomics, proteomics, metabolomics and nutrigenomics), pre-breeding,

conventional breeding, production systems, post-harvest and storage, agroindustrial processing, transversal studies (e.g., socioeconomic analysis and nutritional impact), technology transfer and communications.

EMBRAPA engages in international technical cooperation by demand of the Brazilian Cooperation Agency of the Ministry of Foreign Affairs. In 2015 there were 61 technical cooperation projects and 55 research projects in Africa, Asia, Latin America and the Caribbean. An important program is the Agricultural Innovation Marketplace Initiative, a partnership that seeks to foster agricultural research and innovation for development by supporting policy dialogs, knowledge sharing and funding collaborative projects for the benefit of smallholders. The rationale of the initiative is to meet the governments' demands for activities and policies supporting South-South cooperation, and exploit similarities between Africa, Latin America and Brazil. The strategy's pillars are to

- Promote investments in agricultural research and development
- Strengthen South-South cooperation through new, innovative and effective mechanisms to satisfy a large demand for tropical agricultural technology
- Inclusive governance mechanisms
- Accessibility to a large group of stakeholders (online based)

Currently the Initiative includes 34 projects in 9 African countries and 13 projects in 8 Latin American and the Caribbean countries. Between 2010 and 2016, the activities included 793 pre-proposals, 82 approved projects and 34 concluded. The most active countries were Ethiopia (112 preproposals), Nigeria (72 preproposals), Kenya (64 preproposals), Uganda (60 preproposals), and Colombia and Tanzania (50 preproposals each).

Another example of international cooperation is the Biodiversity for Food and Nutrition Project, a multi-country, multi-partner initiative led by Brazil, Kenya, Sri Lanka and Turkey and funded by the Global Environment Facility. The initiative is coordinated by Bioversity International with implementation support from the United Nations Environment Program and FAO.

The project includes supplementation, commercial fortification, dietary diversity and biofortification, i.e., the process of enriching the nutrient content of plants as they grow. The Biofortification Network in Brazil developed cultivars of maize, sweet potato, pumpkin, wheat, cowpea, cassava, rice and common beans. Recent results obtained by the project include methods for the preparation of products derived from sheep meat (premium and low-cost lines), dried cassava chips with the variety BRS Jari, biofortified lettuce (increased folic acid content) and biofortified varieties of cassava (larger quantities of beta-carotene and carotenoid amount of roots).

### **III. E-Conference Findings, by Javier Ekboir, FAO Senior Consultant**

The presentation started by defining a few concepts at the heart of the e-conference.

Agricultural innovation is the process whereby individuals or organizations bring existing or new products, processes and forms of organization into social and/or economic use to increase effectiveness, competitiveness, resilience to shocks, wellbeing or environmental sustainability.

Innovations are developed by actors collaborating within the agricultural innovation system (AIS), which is a network of actors – individuals or organizations – which, together with supporting formal and informal institutions (i.e., “rules of the game”) and policies in the agricultural and related sectors, bring existing or new products, processes, and forms of organization into social and/or economic use.

A nutrition-focused AIS (FSN-AIS) should consider the broader concept of rural households in addition to smallholder farmers because decisions about food production, consumption, and allocation of the household's assets (especially labour for agriculture, off-farm employment or migration) are linked

and have implications in terms of the nutritional status of the household members. Better communications and infrastructure are integrating rural households into globalized markets, both for agricultural products and labour. After food markets were deregulated in the 1980s, many smallholder farmers had to compete with large commercial farmers from countries with strong agricultural sectors (e.g., USA and South America) even if they continued doing what their families had done for generations. High value agriculture created off-farm employment which, together with migration (both domestic and international) integrated local and global labour markets, increasing the opportunity cost of on-farm agriculture. In fact, the share of agriculture in rural households' income is falling in most developing countries; also, an increasing proportion of poor rural households are net consumers instead of net producers. Now connected with distant societies, rural inhabitants (especially young ones) are learning of alternative life styles, consumption patterns and diets.

Capacity is defined as 'the ability of people, organizations and society as a whole to manage their affairs successfully.' While Capacity Development (CD) 'is the process whereby people, organizations and society as a whole unleash, strengthen, create, adapt and maintain capacity over time.' CD enables actors in the AIS to acquire knowledge, skills, and attitudes; it also allows the AIS to operate more effectively. CD at the level of the FSN-AIS should include:

- fostering interactions among, public and private actors, rural households, development organizations and/or research organizations;
- building trust between them;
- changing laws, regulations and informal rules, like cultures;
- strengthening the capacities of public officers and lawmakers; and
- iterative learning, periodically revisiting performance and how it is managed.

With support of the USA, TAP organized between 18 April and 13 May 2016 an e-conference on capacity development for agricultural innovation systems, with special reference to tropical agriculture; the title of the conference was "Innovation systems for food security and nutrition: understanding the capacities needed". 293 people registered for the conference. The organizers posed 7 questions that elicited 99 responses.

Almost half (46%) of the participants were women and 63% of the respondents<sup>2</sup> were based in developing countries. The nature of the responses was strongly influenced by the academic background of the respondents, where the majority worked on agriculture or innovation systems. Only 3 respondents worked both in AIS and nutrition, which by itself indicates an important gap in capacities. Figure 1 shows the distribution of respondents by area of work.

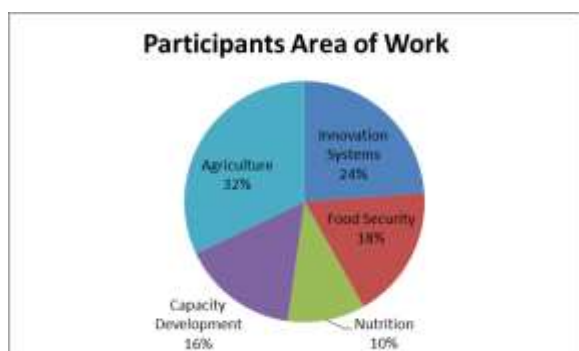


Figure 1. Participants' areas of work

<sup>2</sup> Organizers applied a survey at the end of the e-conference to understand the participants' profile.

The responses confirmed some principles that are widely accepted by practitioners:

- Participatory and multi-stakeholder processes are important for CD interventions, but it should be made sure that they are not captured by elites;
- Rural households and consumers should be given access to information about the benefits of diversified agriculture and diets;
- The capacity of policy makers (including donors) and university professors for understanding AIS-FSN and its complexity should be strengthened;
- Researchers and research managers should better understand the implications of the innovation systems for food security and nutrition framework;
- The rural advisory services/agricultural extension systems should refocus their strategies to better include food security and nutrition in their activities;
- Nutritionists should be involved in agricultural projects and extension;
- It has been difficult to find appropriate indicators of CD for FSN-AIS, as opposed to inputs and outputs because (a) indicators serve specific purposes and have meaning only within specific conceptual frameworks (i.e., theories of change), and (b) different goals and different theories of change would use different indicators to monitor the same process or intervention.

At the same time, some gaps in knowledge became apparent:

- It is difficult to harness organizational change and adaptation in part because organizations are conservative and decisions are partially irreversible. The reason is that once an organization has developed an effective way to do what it is supposed to do, it has few incentives to change unless it is being forced by the environment it operates in (for example, competition from other organizations). Therefore, it is necessary to learn how to learn at the organizational and system level.
- It is not known what the most effective interventions to help researchers, policy makers and other stakeholders to work within a FSN-AIS framework are.
- Visioning exercises are important because science and society are changing rapidly and these exercises help to identify the capacities that will be needed in the mid- and long-term. But few countries and organizations have the resources to conduct thorough visioning exercises, and the capacities to use the results.
- There is a dearth of information on how to improve the performance of the enabling environment, in particular (a) what types of interventions are most effective in different junctures, for example, participatory value chain development or vertical integration of supply chains; and (b) how key decision makers in the AIS (e.g., policy makers, donors, NGOs and community organizations) can rapidly react to emerging needs, problems and opportunities
- How to develop capacities to design and implement nutrition-sensitive projects and programs, as pointed out in FAO documents on nutrition-sensitive agriculture.

Other knowledge gaps at the system level include how to:

- Best facilitate interactions and build trust among partners and network participants;
- Promote effective coordination among actors that shape policies;
- Identify gaps in the competencies, capacities and skills of governing, regulatory, and policy-making structures affecting AIS;

- Align CD of AIS initiatives with country and regional policy and planning frameworks as well as expressed CD needs.

A large number of responses focused on research only, reflecting the still widespread notion that innovations originate in formal research. The responses highlighted that

- It is important to build critical mass for research and innovation and maintain it;
- In most developing countries there is a shortage of qualified researchers and teachers;
- It is not clear how innovation capacities can be developed and maintained, especially in the poorest countries who have the greatest research and innovation needs;
- New approaches for managing research embedded in AIS are needed.

Another important finding was that while in most developing countries there are strong capacities and active programs on agriculture on the one hand and nutrition on the other, participants perceived that there are few programs that look jointly at both themes.

More than a dozen examples of national and regional projects on FSN-AIS were mentioned. The majority of examples did focus on individual or group capacities, and technical skills, and a minority on system level capacities as proposed by the TAP framework indicating that more information is needed on how to build these capacities. Finally, most of the examples were pilot or small projects, reflecting the fact that it is very difficult to (a) build lasting capacities at the system level, (b) identify them if they emerge, and (c) establish a clear link between interventions and capacity development at the system level.

The following examples were mentioned:

- Brazil: Zero Hunger program supporting vulnerable people to improve nutrition and with food consumption while consolidating local food markets;
- Guatemala: Information for small-scale producers on climate change, production technology, etc. in local languages provided by a platform comprised of universities, cooperatives and farmer associations;
- Mexico: 300 scholarships for MSc and PhD international students;
- Central America: Agriculture technologies made available to 4000 small-scale farmers through local innovation consortia;
- Central America: 25 families trained on vegetable production on community kitchen gardens. It included solid waste management and disposal, production of handcraft goods, gender and entrepreneurship. The project enhanced their technical skills and access to innovations that enabled them to improve their income and food security;
- Mexico: Improvement of joint actions for economic integration;
- Caribbean: strengthening of women's producer networks;
- Belize, Costa Rica, Ecuador, Guatemala, Honduras, Peru, Panama, and Paraguay: design of policies, plans, and agreements on agricultural, rural development and food security; and
- Pakistan: Multi-sectoral and cross-sectoral strategies shifting from emergency mode to long-term sustain interventions.

The recommendations were categorized into two categories: for international development agencies and the donor community on the one hand, and for policymakers at the national level on the other.

The international development agencies and the donor community are called on to:

- Increase and sustain the level of assistance devoted to CD for FSN-AIS;
- Design and implement CD for FSN-AIS initiatives with national actors in an integrated manner, considering all dimensions of CD (individual, organizational and enabling environment), and functional capacities;
- Increase the flexibility of CD interventions so that they can respond to the evolving needs of actors in the FSN-AIS;
- Base new interventions on TAP's Common Framework and FAO's guidelines for better design of nutrition-sensitive agricultural projects.

Policymakers at national level are called on to:

- Increase and sustain the level of national investments in CD for FSN-AIS;
- Establish an enabling environment conducive to innovation in FSN-AIS;
- Create the space and incentives for actors in the FSN-AIS to interact, collaborate and learn together to bring about the changes needed.

The capacities required to operate in complex FSN-AIS depend on the systems' particular features. However, to develop these capacities holistic, long-term approaches are needed which brings out a number of issues related to policies, markets, technologies, social trends and communications. To make this complexity manageable, it is necessary to identify a small number of guiding principles. The Common Framework provides the basis of such principles which can be refined with pilot projects that address specific questions related to FSN. Currently FAO and Agrinatura in close collaboration with national partners are implementing 8 country projects and 24 innovation cases which explore how this adaptation can be done, and how lessons can be learned from comparing the projects. Until now, TAP has implemented two interrelated sets of activities:

On the "theory" side, the Common Framework provides common principles to navigate the complexity of CD and TAP's Guidance Note on Operationalization offers specific tools for use in the different stages of applying the Common Framework. On the "operational" side, the country projects and innovation cases are being used to explore:

- how the Common Framework on CD for AIS can be used and adapted to develop new approaches for CD for FSN-AIS;
- how lessons can be learned from intercountry comparison;
- how to fine tune new monitoring and evaluation systems based on process indicators, an approach essential for operating in complex innovation processes.

## **Highlights of the Discussion with the Audience**

The discussions were mostly related to the complementarities between the initiatives being implemented by research and development organizations, such as EMBRAPA and FAO, the need for more exchange and coordination, more capacity in innovation processes, and the funding mechanisms for acting in capacity development and innovation.

- How is the MarketPlace, presented by Ricardo Elesbão Alves from EMBRAPA, organized to match supply and demand?

A national committee and an international committee, who funds the initiative, work together. Every year EMBRAPA launches one or two calls for demands. Governments and national organizations, for example research and university organizations, discuss their needs and prepare a letter of intention,



submitting it through a website link. The demands placed on the site can be seen by EMBRAPA researchers, who discuss internally who could solve the problem of a particular country. The team discusses what proposals can have a greater impact, performing a first screening. During the second phase, EMBRAPA researchers meet with representatives of the demanding country, and together they develop a full proposal. About 25% to 30% of the initial requests go to the proposal development state. A panel then evaluates the proposals and selects those that will be implemented. Only 10% of all requests are approved and funded.

MarketPlace could be a useful mechanism to identify national capacities needed. TAP is looking at coherence and better coordination at the country level. TAP plans a MarketPlace in each of the eight countries TAP is currently working on.

➤ How to establish and develop capacities to work in an innovation system?

The innovation system emerges autonomously by the actions and interactions of different actors. AIS is about people and organizations working together. You don't establish an innovation system. Farmers go to the market, factories buy grains, governments design policies. But how to improve the collective performance? The way to improve it is to help the actors to understand that (a) they are embedded in a system, (b) they are interacting and collaborating with other actors, and (c) how they can collaborate better.

How to improve the functioning of the AIS is a major issue. Many AIS are dysfunctional because there are lots of competing interests. GFAR's own strategy and theory of change is very simple, is about breaking walls between research, extension, education, and enterprise. We have been working for years on that and you still have interests in rural advisory services that are detached from research. There are few people who are working in both, food security and nutrition, which should be naturally linked. You cannot work in food security without addressing nutrition. TAP can provide major inputs into those gaps.

When you have actors working in a system, you have to understand that it has life of its own. Migration is happening, despite interventions to stop it. Technical change is not planned, it happens. There are trends in the system that drive the system. Decision makers need to understand how to work within those trends, either to try to steer the system into a desired direction or try to understand how they can limit negative outcomes. This is important because the trends put the limits into what interventions can do. And that is where the capacity development framework comes in that stage of visioning, because it provides the framework and the limits of what you can do, and shows you the opportunities.

TAP is piloting the framework in 8 countries, developing organizational capacity of organizations to facilitate innovation processes. Facilitators are trained and if new needs arise in the country for innovation processes, these people who will have the basic skills in bringing other actors together, in strategic lobbying, political influencing, will be available as a standing capacity to help the countries to strengthen their innovation system if new problems, new diseases in a community arise. Universities can change their curriculum for developing new professionals in this area.

➤ Investments in agricultural research and innovation provide great return and benefits, but investments are decreasing, particularly for rural extension. Have you made the case to the ministry of finance, the people who look at your request as a potential investment for the future?

When FAO works in a country it works closely with the ministry of agriculture, but the ministry of agriculture does not make decisions on how funding is distributed among the ministries. What TAP

is doing with the CDAIS project is really to involve, at the policy level, the ministries of planning and finance, to help them learn and improve the dialogue between what we have at the pilot (local level) and the national level, to raise awareness on what the problems are and advocate for more investments in the sector. There are the policy dialogues, and several are planned where we really engage the government at the highest level to change the way they consider capacity development. Policy makers and finance ministries may say that what the sectors have been growing for the past 20 years are areas where the public sector is not present, such as high value agriculture. Why do we need to invest in something that is not producing value for the country? Researchers have tried to justify the need for investments, unsuccessfully. What the innovation system clearly shows is the need for new ways of doing research. More investments will not occur until researchers and organizations transform themselves to work in a different way, to better engage with different actors in the innovation systems. There are many cases in which you see very important innovations in the countryside that were developed by individual researchers establishing new research frameworks. No-Till in Latin America was the collaboration between 15 researchers and farmers, but these were individuals and not organizations.

The lack of funding for innovation is contradictory, because all declarations and policies mention innovation as key for development. But no effort is put into promoting innovation. It is very important that the international community and the national governments give more attention to innovation. And innovation means not just research, many people speak about funding of research, and yes, this is true, this is important, but what about advisory services? There is no money for advisory services despite some good examples such as the work done by Brazil and the state extension agencies.

TAP could shift its business model, going beyond demonstrating the value of capacity development through the activities and the case studies, to add some robust advocacy for funding. The MarketPlace TAP is working on will provide an opportunity for that. It will get the private sector involved, and the government. It will demonstrate with a very specific investment or test case the benefits from the investment. The goal is to have governments making long term commitments.

There is the example of Rwanda, where TAP supports three innovation partnerships and the government identified two other areas they want to invest on.

- The discussion on AIS misses the identification of other actors besides researchers, such as farmer organizations and the private sector. How can we bring all these actors together and how can we identify which actor can be a driver for innovation in a given situation?

Most people think of research-based processes, innovation fuelled by research. It is a narrow vision of innovation systems, and it just highlights the need to develop this capacity and vision on researchers and on other actors in the system, to understand the role they play in the AIS.

- Working with a diversity of stakeholders on the implementation is very effective. How do you plan to work in community based, to be closer to the people to change their habits, the way they work?

The TAP project initiates with a scoping study to identify who are the major players in the country, in the areas of AIS. The players identified are diverse, such as local NGOs, extension services, advisory services, local governments, and research stations. The national government is also consulted on where capacity needs to be developed. The challenge found in the regional assessments, is that there are many small initiatives but no up-scaling. The TAP project addresses that by engaging the government when working at the local level, so that they are fully aware and involved on what came as their request.

This is the most important message TAP is trying to convey, start the project from the needs at the community level, from the needs assessment.

- "Projectization", the reality of short term projects vs the long term capacity development strategies that help a nation to develop itself. How can we improve this tension between a project that is time bounded to the very long term vision?

A major problem is when a government changes, and the strategy changes as well. Efforts and resources can be compromised if there isn't strong government commitment

TAP supports countries to develop policies and strategies so that they have a long term vision. The strategy is to involve the stakeholders in developing these strategies and policies, so it is more likely they are sustainable even if there are changes at the very top of the government.

- How to strengthen the role of the facilitator in the AIS?

Although the role of the facilitator was not discussed in the e-conference, it is addressed in the Common Framework. To go into all the capacity development and innovation processes, a facilitator is key and capacities for facilitating need to be developed.

TAP is working at the country level, strengthening the capacity of facilitators through training and mentoring programs. This is of crucial importance for TAP, and for strengthening AIS at the local level. There are examples of how this is done in TAPipedia. As TAP implements the 8 case studies these experiences will be shared through the TAPipedia website and other means

## **Follow up**

Some action points were raised during the discussion that would need follow up. These points are as following:

- Further explore the portfolio of activities EMBRAPA is working on, that could complement TAP activities.
- Further discuss funding mechanisms and approaches for increasing funding to capacity development and innovation.
- Identify cases where nutrition specialists have acquired capacity on AIS, or are operating with the AIS principles.

## Closing Remarks

Mr Samy Gaiji  
Chief, AGDR, FAO

Excellences, Ladies and Gentlemen

We come to the close of what has been a very successful and productive symposium. On behalf of FAO, I want to thank the speakers, facilitators, and of course, participants for your contributions which made this symposium a success. Those who are listening to us on the webstreaming, my profound thank you for staying with us all afternoon.

As we have heard from Ms Maria Helena Semedo early this afternoon on the increasing challenges in food and agriculture, I am confident that through collective action we will address these challenges.

Today we have heard from Christian Hoste on how over 40 partners, with a common goal, developed a framework to support innovation. Great efforts went into developing this resource, by people committed to help individuals and organizations to do better.

We also heard from Ricardo Elesbão Alves and Edna Oliveira on how Embrapa and its partners are working not just to improve human health and nutrition in Brazil, but helping other countries around the world by sharing valuable knowledge and strengthening the capacity of those in need.

We had the confirmation from the findings of the e-conference, presented by Javier Ekboir, that the topics of innovation, capacity development, and food security and nutrition are not easy to be addressed, especially if trying to combine all three topics. We heard that there are still a lot to learn on how to build solid innovation systems addressing food security and nutrition.

Yes, we have many challenges ahead of us, but I am confident that this symposium has made a contribution to our thinking. I leave this symposium today convinced that with the collective efforts of professionals like yourselves, we can achieve the Sustainable Development Goals (SDGs) of ending poverty and hunger, achieving food security, improving nutrition and promoting sustainable agriculture.

I wish to thank those who organized the symposium, Karin Nichterlein and her team, for the excellent work. I wish to thank also our sponsor, the US Government, for making this event possible.

And I thank you all for coming today, and for sharing your thoughts. The discussion does not end here. We need a diversity of minds working together if we want to improve the world we live in.

I hope to see you again soon.

Thank you and goodbye


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## Annex: Presentations


### I. Tropical Agriculture Platform’s Capacity Development Framework, by Christian Hoste, TAP Steering Committee Chair



**TROPICAL AGRICULTURE PLATFORM and CAPACITY FOR CHANGE**

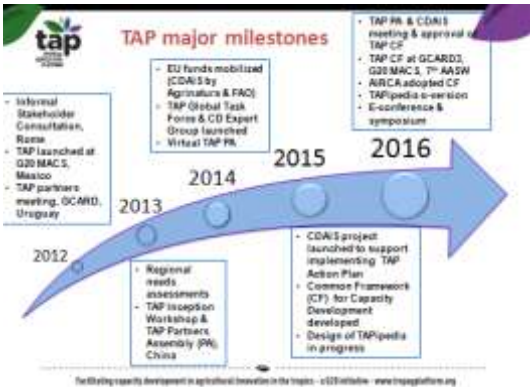
Common Framework on Capacity Development for Agricultural Innovation Systems (CD for AIS)

On behalf of TAP & CDAIS Partners  
Christian Hoste, Chair  
Tropical Agriculture Platform facilitated by FAO



**Capacity needs in the Tropics: the G20 establishes TAP**

- Low and lower-middle income countries, which are mainly located in the tropics, often lack capacities to support agricultural innovation;
- To address this gap, the G20 launched the Tropical Agriculture Platform;
- With more than 40 partners, TAP is a multilateral facilitation mechanism to promote greater coherence and impact of CD for AIS;
- The TAP Action Plan is based on regional needs assessments (CIAT, FARA, SEARCA) carried out in 2013;
- Since 2015, the TAP Action Plan is supported by the EU-funded Capacity Development for Agricultural Innovation Systems project for global and country results.



**TAP major milestones**

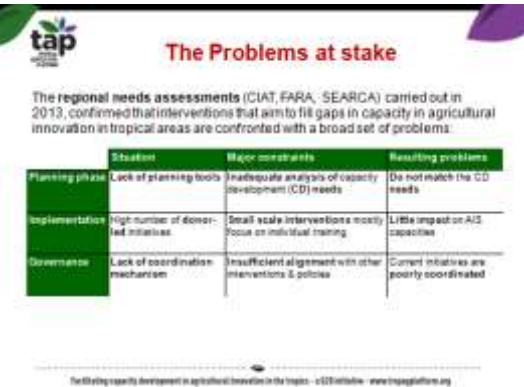
2012: Informal Stakeholder Consultation, Rome; TAP launched at G20 MACS, Malabo; TAP partners meeting, SCARD, Uruguay

2013: Regional needs assessments; TAP Inception Workshop & TAP Partners Assembly (PA), China

2014: EU funds mobilized (CDAIS by Agrinatura & FAO); TAP Global Task Force & CD Expert Group launched; Virtual TAP PA

2015: TAP PA & CDAIS meeting & approval of TAP CF; TAP CF at GCARD3, G20 MACS, TP, ANSW; AICA adopted CF; TAPipedia e-version; E-conference & symposium


2016: CDAIS project launched to support implementing TAP Action Plan; Common Framework (CF) for Capacity Development developed; Design of TAPipedia in progress



**The Problems at stake**


The regional needs assessments (CIAT, FARA, SEARCA) carried out in 2013, confirmed that interventions that aim to fill gaps in capacity in agricultural innovation in tropical areas are confronted with a broad set of problems:

Planning phase	Situation	Major constraints	Resulting problems
Planning phase	Lack of planning tools	Inadequate analysis of capacity development (CD) needs	Do not match the CD needs
Implementation	High number of donor-led initiatives	Small scale interventions mostly focus on individual training	Little impact on AIS capacities
Governance	Lack of coordination mechanism	Insufficient alignment with other interventions & policies	Current initiatives are poorly coordinated



**Global coherence of CD approaches for AIS**

Advocacy and policy dialogue | Common Framework on CD for AIS | TAPipedia knowledge hub



<http://www.tapipedia.org/>

**TAPipedia knowledge hub:**

- allows Partners and other stakeholders to share their CD for AIS resources and initiatives;
- presents, explains and promotes the TAP Framework, including learning modules.



### The TAP Common Framework

**Framework Products**

1. Review Report: Review of existing resources on CD for AIS
2. Conceptual Background: Theory, concepts, principles, definitions
3. Synthesis: Summary of Conceptual Background
4. Guidance Note on Operationalization: Approach and tools

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### Agricultural Innovation System (AIS)

The Common Framework promotes a **system perspective** on agricultural innovation, since agriculture increasingly involves complex interactions among stakeholders at multiple levels.

www.tropagriplatform.org

### Dimensions of Capacity Development

The Framework recognizes 3 CD DIMENSIONS (individuals, organizations, enabling environment)

The CD dimensions are interdependent and must be addressed together. The Framework pays special attention to the **enabling environment**.

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### Functional capacities

The Common Framework identifies 4 + 1 key capacities for AIS to perform effectively. These apply to all three dimensions of CD.

- Capacity to Navigate Complexities
- Capacity to Collaborate
- Capacity to Reflect and Learn
- Capacity to Engage in Strategic and Political Processes

Capacity to Adapt and Respond in order to Realize the Potential of Innovation

The 4 capacities on the left are the core of an overarching capacity to **adapt and respond** in order to realize the potential of innovation.

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### Functional capacities

The key capacities in detail			
<b>Navigate Complexity</b>	<b>Collaboration</b>	<b>Reflect &amp; Learn</b>	<b>Engage in Strat. &amp; Polit. Process</b>
System thinking Multi-stakeholder analysis Gender & diversity Nutrition Learning from past experiences	Team building Conflict resolution Incentives for collaboration, networking, partnerships Create enthusiasm & shared responsibility	Tracking change processes Encouragement to reflect and learn jointly and to try new approaches Use participatory M&E processes	Understanding political & decision making processes Building partnerships across organizations Influencing decision-making processes

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### Dual pathway

The Common Framework proposes a dual pathway approach to CD for AIS. This conceptual approach includes two aggregated processes: at **system level** and at **innovation niche level**.

**System level:** the focus is on the functionalities and performance of the system as a whole.

**Innovation niche level:** CD takes place around specific innovation agendas, in which actors of all types allocate time and resources to achieve change.

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### The CD for AIS Cycle

- > The Framework proposes a CD CYCLE in 5 STAGES for the operationalization of CD interventions in AIS
- > The CD cycle stimulates learning and interactions between the 3 CD dimensions.
- > Key elements:
  - ◆ Facilitation
  - ◆ Reflection, Learning and Documentation
  - ◆ Monitoring and Evaluation

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### Applying the Common Framework in countries

Through the EU-funded project on Capacity Development for Agricultural Innovation Systems (CDAIS) implemented by Agrinatura and FAO in close collaboration with national organizations from 2015-2018.

**CDAIS**

**Stages:**  
Angola, Ethiopia, Burkina Faso, Rwanda  
**Asia:**  
Bangladesh, Laos  
**Central America:**  
Guatemala, Honduras

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**tap** What is expected after 4 years in countries?

1. **CD needs** for strengthening AIS in 8 pilot countries are **defined accurately**.
2. **CD interventions** in AIS within 8 pilot countries and around priority themes and selected value chains are **demand-driven and efficient**.



The Global Capacity Development in Agricultural Innovation in the Tropics - GCD initiative - www.innoplatform.org

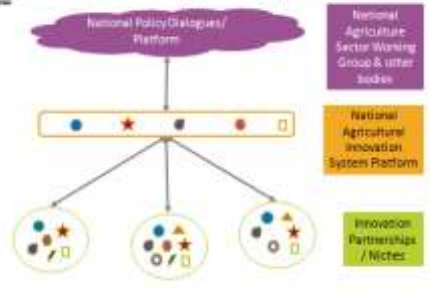
**tap** Country level activities

- > Develop a **shared vision** on CD for AIS (fed by scoping study, supported by policy roundtable)
- > **Country-led** capacity needs assessments (Based on Common Framework)
- > Develop CD for AIS **action plans**
- > **Strengthen AIS** multi-stakeholder mechanisms / platforms (policy roundtables, marketplace)



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**tap** Influencing country policies



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**tap** TAP Framework applied in eight countries



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**tap** Inception workshops in Africa



30 niches identified  
10 niches pre-selected  
5 niches selected  
17 niches identified

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**tap** COAIS Participatory needs assessment at niche/local level

Farmers' Group in Xanakhom district, Lao PDR



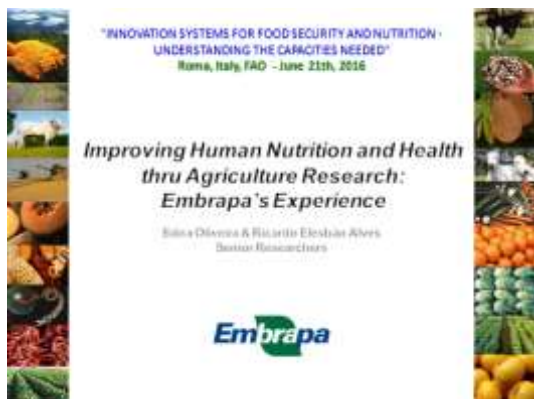
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**tap** Thank you!



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## II. Research Capacity Needs for Improving Human Nutrition and Health: Embrapa's experience, by Ricardo Elesbão Alves and Edna Maria Morais Oliveira, Senior Researchers, Embrapa, Brazil



### The Brazilian Agricultural Research Corporation

**Embrapa**  
 Largest Agricultural Research Organization in Latin America

Employees: 9,540  
 Total Scientists: 2,416  
 Researchers with PhD/DSc: 2,182  
 Budget: US\$ 1.2 billion

47 Centers and Services:  
 11 National Thematic Centers  
 14 National Product Centers  
 17 Ecoregional Agroforestry Centers  
 05 Service Centers

Operations in the U.S., Europe, Asia, Africa and Latin America

### Institutional Building and Strengthening

Brazil has created a large research and education system for agriculture

23 State An Research Centers  
 Large network of experience centers

The Brazilian Agricultural Research Corporation  
 41 Embrapa Centers Dedicated to Technology Development

Federal Network of Professional Education

70 Agricultural Universities

Private Sector  
 Brazil has also an active and growing private sector, which supplies technology and technical assistance, many of them inputs and food processing

### Brazil became a Food Secure Country in a short period of time



### Key Drivers of Agricultural Innovation in Brazil

- Government commitment and public policies
- Development of science-based tropical agriculture
- Availability of basic infrastructure
- Large extension of arable land and adequate climatic conditions
- Landscape suitable for mechanization
- Availability of mineral resources (ironstone and phosphate)
- Entrepreneurship of farmers

### Main initiatives of Embrapa abroad



### SCIENTIFIC COOPERATION

**Scientific Cooperation**  
 Labex ("Laboratories without Walls"): Labex USA, Labex Europe (France, Germany and Israel), Labex Singapore, Labex Korea, Labex China and Labex Japan (to be implemented)

**International Partnerships**  
 Regarding international relations, Embrapa keeps a collaboration network with government research institutions.

93  
 bilateral agreements

56  
 memoranda of understanding

89  
 technical agreements

12  
 research networks

### EMBRAPA-LABEX PROGRAM IN THE WORLD



### Food Security... But Also Nutritional Security!

**NEXT TARGET:** Increasing nutritional density and functionality of foods  
Explore the connections between Food - Nutrition - Health



Change of paradigm: from curing diseases ... to helping preventing them !!

### Portfolio "Food, Nutrition & Health"

#### TARGETS

Vitamins

Minerals

Bioactive compounds

Protein and peptides

Dietetic fiber and prebiotics

Probiotics

Anti-nutritional factors

Allergenicity

Sodium

Sugar

Fatty Acids

#### BIO-ORIT

#### COMPONENTS OF R&D PROJECTS

"Omics" (genomics, proteomics, metabolomics, nutrigenetics)

Pre-breeding

Breeding (conventional)

Production Systems

Post-harvest & Storage

Agroindustrial Processing

Transversal Studies (Nutrition, Impact, Socio-economic, Market & Consumer Studies, Dietary habits, Nutrition education, ...)

Technology Transfer & Communication

### TECHNICAL COOPERATION

EMBRAPA acts by demand of the Brazilian Cooperation Agency (ABC) of the Ministry of Foreign Affairs

### Technical Cooperation 2015 – In numbers

- 61** • Technical cooperation projects (TCPs) with Africa, Asia, Latin America and Caribbean
- 55** • Research Projects in 13 African countries and 8 Latin American and Caribbean countries, through the Agricultural Innovation Marketplace initiative
- 9** • Structuring TCPs with Africa and South America
- 19** • TCPs projects with Africa and South America under negotiation

Source: EMBRAPA/IRI – April 2015

**AGRICULTURAL INNOVATION MKTPLACE**

A partnership to foster agricultural research and innovation for development by supporting policy dialogue, knowledge sharing and funding of collaborative projects to the benefit of smallholders

<http://www.mktplace.org/>

#### Rationale

- Government demands – activities and policies supporting S-S cooperation
- Agriculture: vital for Africa and LAC and Brazil
- Similarities Africa, LAC, and Brazil
- Agricultural growth in Brazil was supported by R&D
- New players (BRICs) and ODA world order

#### Strategy

- Promote investments in agricultural research and development
- Strengthen South-South Cooperation through new, innovative and effective mechanisms to satisfy a large demand for tropical agricultural technology
- Inclusive governance mechanisms
- Accessibility to a large group of stakeholders (online-based)

#### Partners







### Ongoing Projects

- Africa: 34 in 9 countries
- LAC: 13 in 8 countries
- 2010 – 2016:
  - 793 pre-proposals;
  - 82 approved
  - 35 concluded



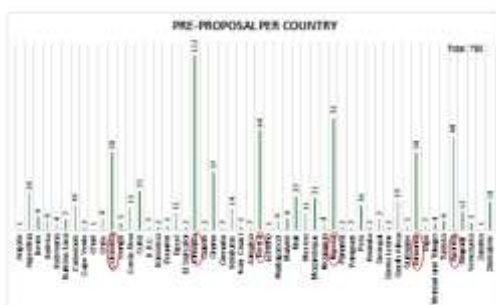
	2010 - July 2016	Examples
Technologies, Products & Services	127	1) Technology for development of digestible for African agriculture 2) A new maize line
Specific Knowledge Generated	88	Link of local and groundnut particle combination in fogg
Events Organized	37	International Course, Cereals Workshop, Bread Making, Cereals workshop and alternatives for the management of the diseases
Publications	122	Book on "Incorporating local-level data into national platform for smallholders in Kenya"
Major knowledge sharing and Capacity Strengthening Events	Over 1000 attendees from 40 countries	

Campaigns/Challenges		
Species / Events	Number of Accessions/Samples	Recipient Countries
Major crop cereals: maize, coffee, cowpea, banana, papaya, pear and potato	389	AFRICA: Cameroon, Kenya, Nigeria, Uganda and Tanzania LAC: French Guiana, Colombia and Bolivia



### Results 2010-2016



### Adding value to Biodiversity



#### Genetic Resources



#### Analytical Facilities



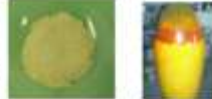
#### Agro-industrial Waste & By-products



#### Processing



#### Adding Value



The Biodiversity for Food and Nutrition Project is a multi-country, multi-partner initiative led by **Brazil**, **Kenya**, **Sri Lanka** and **Turkey** and funded by the **Global Environment Facility**. The initiative is coordinated by **Biodiversity International** with implementation support from the **United Nations Environment Programme** and **FAO**.

Main source of information in food composition in underutilized crops for **FAO / INFOODS Database**

#### Supplementation



#### Commercial Fortification



#### Biofortification

#### Dietary Diversity

Biofortification is the name given to the process of enriching the nutrient content of plants as they grow. (Jeong and Guzmán, 2008).

### Biofortification in Brazil

Biofortification Projects in Brazil (2000-2016) coordinated by BBNP, until 2003, aims to develop micronutrient dense crops to address **malnutrition** and **obesity** effects on nutritional status.



Year	Accession	Accession developed by the government and/or private sector
2000	10 maize lines produced by BBNP, until 2003, aims to develop micronutrient dense crops to address malnutrition and obesity effects on nutritional status.	10 maize lines developed by the government and/or private sector
2001-2002	10 lines of rice, sorghum, and millet produced by BBNP, until 2003, aims to develop micronutrient dense crops to address malnutrition and obesity effects on nutritional status.	10 lines of rice, sorghum, and millet developed by the government and/or private sector
2003	10 lines of rice, sorghum, and millet produced by BBNP, until 2003, aims to develop micronutrient dense crops to address malnutrition and obesity effects on nutritional status.	10 lines of rice, sorghum, and millet developed by the government and/or private sector
2004	10 lines of rice, sorghum, and millet produced by BBNP, until 2003, aims to develop micronutrient dense crops to address malnutrition and obesity effects on nutritional status.	10 lines of rice, sorghum, and millet developed by the government and/or private sector
2005	10 lines of rice, sorghum, and millet produced by BBNP, until 2003, aims to develop micronutrient dense crops to address malnutrition and obesity effects on nutritional status.	10 lines of rice, sorghum, and millet developed by the government and/or private sector
2006	10 lines of rice, sorghum, and millet produced by BBNP, until 2003, aims to develop micronutrient dense crops to address malnutrition and obesity effects on nutritional status.	10 lines of rice, sorghum, and millet developed by the government and/or private sector
2007	10 lines of rice, sorghum, and millet produced by BBNP, until 2003, aims to develop micronutrient dense crops to address malnutrition and obesity effects on nutritional status.	10 lines of rice, sorghum, and millet developed by the government and/or private sector
2008	10 lines of rice, sorghum, and millet produced by BBNP, until 2003, aims to develop micronutrient dense crops to address malnutrition and obesity effects on nutritional status.	10 lines of rice, sorghum, and millet developed by the government and/or private sector
2009	10 lines of rice, sorghum, and millet produced by BBNP, until 2003, aims to develop micronutrient dense crops to address malnutrition and obesity effects on nutritional status.	10 lines of rice, sorghum, and millet developed by the government and/or private sector
2010	10 lines of rice, sorghum, and millet produced by BBNP, until 2003, aims to develop micronutrient dense crops to address malnutrition and obesity effects on nutritional status.	10 lines of rice, sorghum, and millet developed by the government and/or private sector
2011	10 lines of rice, sorghum, and millet produced by BBNP, until 2003, aims to develop micronutrient dense crops to address malnutrition and obesity effects on nutritional status.	10 lines of rice, sorghum, and millet developed by the government and/or private sector
2012	10 lines of rice, sorghum, and millet produced by BBNP, until 2003, aims to develop micronutrient dense crops to address malnutrition and obesity effects on nutritional status.	10 lines of rice, sorghum, and millet developed by the government and/or private sector
2013	10 lines of rice, sorghum, and millet produced by BBNP, until 2003, aims to develop micronutrient dense crops to address malnutrition and obesity effects on nutritional status.	10 lines of rice, sorghum, and millet developed by the government and/or private sector
2014	10 lines of rice, sorghum, and millet produced by BBNP, until 2003, aims to develop micronutrient dense crops to address malnutrition and obesity effects on nutritional status.	10 lines of rice, sorghum, and millet developed by the government and/or private sector
2015	10 lines of rice, sorghum, and millet produced by BBNP, until 2003, aims to develop micronutrient dense crops to address malnutrition and obesity effects on nutritional status.	10 lines of rice, sorghum, and millet developed by the government and/or private sector
2016	10 lines of rice, sorghum, and millet produced by BBNP, until 2003, aims to develop micronutrient dense crops to address malnutrition and obesity effects on nutritional status.	10 lines of rice, sorghum, and millet developed by the government and/or private sector



Will farmers *adopt* the biofortified varieties and will consumers *buy/eat* them in sufficient quantities?

- Seed and stem multiplication.
- Field days and Demonstrative Units.
- Strategic Alliances.
- Communication strategy.
- Governmental programs.
- Impact Assessment.



### Recent Results- Bio fortification

- Methods for the preparation of products derived from sheep meat (premium and low-cost lines)
- Dried cassava chips with the variety BRS Jari.
- Bio fortified lettuce (increased folic acid content).
- Bio fortified varieties of Cassava (larger quantities of beta-carotene and carotenoid amount of roots).

### Genetic Engineering in Agribusiness

Portfolio of RD & I projects focused on the use of genetic engineering, and other Molecular Biology tools for troubleshooting and value in Brazilian agriculture, in essence, anticipating trends and ensuring the permanent setting of research priorities for the maintenance of the Brazilian agribusiness competitiveness.

- *Feijão Embrapa 5.1* – common bean resistant to Golden mosaic virus.
- Soybeans resistant to drought

### Analytical Tools

Food adulteration/cross-contamination  
Ready-to-use plates for GMO monitoring

Multiuser Laboratories

Good Laboratory Practices

### Post-harvest losses



### Needs

- Monitoring of "New Breeding Techniques" products!
- Participation on Discussions Groups related to regulatory issues associated to NPBTs.
- As expert groups have been set up to advice on classification of the NPBTs & products *vis-à-vis* biotech crop legislations.

### Final Message

*Collaborative science-based agriculture can help the world face the challenges ahead for providing food that will not only eliminate hunger but will also improve the nutritional and health status of the population in sustainable ways*





### III. E-Conference Findings, by Javier Ekboir, FAO Senior Consultant

**Findings of the e-conference on capacity development (CD) in food security and nutrition-sensitive agricultural innovation systems (FSN-AIS)**

Javier Ekboir, Senior Consultant, FAO

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**What is agricultural innovation?**

The process whereby individuals or organizations bring existing or new products, processes and forms of organization into social and/or economic use to increase effectiveness, competitiveness, resilience to shocks, wellbeing or environmental sustainability

Innovations result from the interaction among individual, organizational and systemic capacities

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**A nutrition-focused AIS should focus on**

Rural households (which include smallholder farmers) because decisions about food production, consumption, and allocation of the household's assets (especially labor for agriculture, off-farm employment or migration) are linked and have implications in terms of the nutritional status of the household members.

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**CD at the level of the FSN-AIS involves**

- > Fostering interactions among public and private actors, rural households, development organizations and research organizations;
- > building trust between them;
- > Iterative learning, periodically revisiting performance and how it is managed;
- > changing laws, regulations and informal rules (cultures and customs);
- > strengthening the capacities of public officers and lawmakers.

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**The e-conference Innovation systems for food security and nutrition: understanding the capacities needed**

- Organized by TAP (hosted by FAO) with support from the USA in the framework of the USA - Brazil agreement;
- Ran from 18 April to 13 May 2016
- 293 registrations
- 7 questions asked by the facilitators
- Elicited 99 responses

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**The e-conference Innovation systems for food security and nutrition: understanding the capacities needed**

- 46% of participants were women
- 63% of respondents based in developing countries
- Only 3 respondents worked on both AIS and nutrition

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**tap** What do we know about FSN-AIS

- Participatory and multi-stakeholder processes are important for CD, but they can be captured by elites;
- The capacity of policy makers (including donors) for understanding AIS-FSN should be strengthened.



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**tap** What do we know about FSN-AIS (2)

- Researchers and managers should better understand the implications of the FSN-AIS framework;
- Rural advisory services/agricultural extension should refocus their strategies to include food security and nutrition;
- It has been difficult to find appropriate indicators of CD for FSN-AIS, as opposed to inputs and outputs.



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**tap** What we need to know better

- How to harness organizational adaptation and learning: they are difficult to implement in part because most organizations are conservative and decisions are to some extent irreversible;
- How to help researchers, policy makers and other stakeholders to work with an AIS perspective;
- How visioning exercises can be used: they are essential given rapid advances in science and social changes, but few countries have the resources to do them thoroughly;


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**tap** What we need to know better (2)

- There is a dearth of information on how to best improve the enabling environment;
- How to develop capacities to design and implement nutrition-sensitive projects and programs, as pointed out in the FAO documents on nutrition-sensitive agriculture

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**tap** Linking the findings to the Common Framework



The CD Spiral stimulates learning and interactions between the 3 CD dimensions

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**tap** Findings that inform the implementation of the Common Framework

While many insights have been made in recent years on how to improve the AIS at the system level, there is still a lot that needs to be known, including how to:

- Best facilitate interactions and build trust among partners and network participants;
- promote effective coordination among actors that shape policies;
- identify gaps in the competencies, capacities and skills of governing, regulatory and policy-making structures affecting AIS;
- align CD of AIS initiatives with country and regional policy and planning frameworks as well as expressed CD needs.

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**tap** A large number of responses focused on research only



- Building critical mass for research and innovation and maintaining it
- In most developing countries there is a shortage of qualified researchers and teachers;
- It is not clear how innovation capacities can be developed and maintained, especially in the poorest countries who have the greatest research and innovation needs;
- New approaches for managing research embedded in AIS are needed.

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**tap** Link between agriculture and nutrition

While in most developing countries there are strong capacities and active programs on agriculture on the one hand and nutrition on the other, participants perceived that there are few programs that look jointly at both themes.



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**tap** Examples mentioned in the e-conference (1)

- The Brazilian Zero Hunger program had a national approach, more information needed to better understand its impacts;
- Pakistan: multi-sectoral and cross-sectoral strategies for shifting from emergency mode to long-term sustained interventions;
- Caribbean: strengthening of female producer networks;
- Mexico: 300 scholarships for MSc and PhD international students;

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**tap** Examples mentioned in the e-conference (2)

- More than a dozen examples (national and regional) of projects on FSN-AIS were mentioned
- A majority of the examples did focus on individual or group capacities, and technical skills;
- a minority on system level capacities as proposed by the TAP framework (more info is needed);
- Most of the examples were pilot or small projects.

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**tap** International Development Agencies and donor community are called on to:

- Increase and sustain the level of assistance devoted to CD for FSN-AIS;
- Design and implement CD for FSN-AIS initiatives with national actors in an integrated manner, considering all dimensions of CD (individual, organizational and enabling environment), and functional capacities;
- Ensure flexibility of CD interventions so that they are responsive to evolving needs of actors in the FSN-AIS;
- Base new interventions on TAP's Common Framework and FAO's guidelines for better design of nutrition-sensitive agricultural projects.

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**tap** Policymakers at national level are called on to:

- Increase and sustain the level of national investments in CD for FSN-AIS;
- Establish an enabling environment conducive to innovation in FSN-AIS;
- Create the space and incentives for actors in the FSN-AIS to interact, collaborate and learn together to bring about the changes needed.

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**tap** Learning from current pilot projects

- Complexity of issues cannot be addressed with small dev. projects;
- A holistic, long-term approach is needed;
- The TAP initiative is one approach with two interrelated sets of activities:

A-1. On the "theory" side, the Common Framework (CF) provides common principles to navigate the complexity of CD;

A-2. TAP's Guidance Note on Operationalization offers specific tools for use in the different stages of applying the CF.

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**tap** Learning from current pilot projects (2)

B. On the "operational" side, FAO & Agrinatura in close collaboration with national partners are implementing 8 country projects and 24 innovation cases being used to explore:

- how the Common Framework on CD for AIS can be used and adapted to develop new approaches for CD for FSN-AIS;
- how lessons can be learned from intercountry comparison;
- make use of new M&E system and adjust to FSN-AIS based on process indicators (necessary in complex processes).

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**tap**



Thanks

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