



# TROPICAL AGRICULTURE PLATFORM (TAP)

## ASSESSMENT OF CURRENT CAPACITIES AND NEEDS FOR CAPACITY DEVELOPMENT IN AGRICULTURAL INNOVATION SYSTEMS IN LOW INCOME TROPICAL COUNTRIES

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### Synthesis Report

By

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**On Behalf of Its Partners**

**ROME, 26 AUGUST 2013**

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## **EXECUTIVE SUMMARY**

Innovation plays a crucial role in the reduction of hunger and poverty in low-income tropical countries. It also contributes to a more efficient use of natural resources in agriculture. Yet, despite numerous recent public and private initiatives to mobilize investment and innovation for agricultural development, an estimated 852 million people continue to be undernourished (FAO 2012). Those affected mostly live in tropical regions where 90 percent of low-income countries are located. They lack the capacity to benefit from innovation in agriculture, despite the fact that the amount of national, regional and global efforts to promote agricultural development in tropical regions has increased substantially since the first global food crisis in 2008.

To respond to this capacity gap, the G20 Agriculture Ministers requested FAO to take the lead in the development of a Tropical Agriculture Platform (TAP) designed to facilitate Capacity Development (CD) for agricultural innovation. TAP was officially launched in September 2012 in Mexico: it is envisioned to be a multi-lateral and dynamic facilitation mechanism designed to capitalize on, and add value to, ongoing initiatives by fostering collective action for capacity development in tropical agriculture in the public and the private sector, strengthening collaboration for more harmonized action and greater mutual accountability, and avoiding duplication.

This Synthesis Report summarizes the work completed in the inception phase of TAP. It briefly reviews existing literature on CD for agricultural innovation, summarizes the findings of three regional assessments, draws conclusions, identifies key constraints, and makes recommendations for an Action Plan for TAP.

The TAP Secretariat at FAO requested three partner organizations to conduct regional needs assessments in selected LDCs to identify the gaps in current capacities and the development needs as perceived by stakeholders involved in the national and regional Agricultural Innovation Systems (AIS). These needs assessments were carried out by the Southeast Asian Regional Center for Graduate Study and Research in Agriculture (SEARCA) based in the Philippines, the International Center for Tropical Agriculture (CIAT) in Colombia, and the Forum for Agricultural Research in Africa (FARA) in Ghana.

The methodology for the regional needs assessments and the structure of the reports were agreed in May 2013. This methodology consisted of: (a) a review and mapping of stakeholders' involvement in national AIS; (b) a review of the institutional and political economy context; (c) a review of capacity levels and needs, and (d) a questionnaire-based survey to key informants in stakeholder organizations of target countries on perceived gaps. The three regional reports were submitted in draft in June and July, and finalised by August 2013.

The final reports of the regional needs assessments revealed that many of the institutions involved in agricultural research and extension are highly dependent on development assistance and that interventions for CD in agricultural innovation are often focused on individual rather than the enabling environment and organizational dimensions of capacity. Survey respondents in all three regions further observed that actors in the AIS often lack incentives to respond to the expressed needs of local producers, producer cooperatives and agribusiness. In turn, they see the creation of an enabling environment for public-private partnerships in CD as crucial for improving the effectiveness and the responsiveness of AIS in less developed tropical countries. The many positive examples of CD mentioned in the three reports are often linked to innovation-promoting public-private partnerships that may have been initiated by development assistance agencies and supported through national facilitating policies but are ultimately managed by local private organizations that respond to market-driven forces. Countries that have recently transformed their agricultural systems and managed to significantly reduce hunger and poverty in rural areas have successfully applied such facilitating policies. The needs assessments indicate that there are as yet unexploited opportunities for these countries to share their knowledge and experience more widely with the less developed countries in their region and beyond. A global platform such as TAP is uniquely positioned to facilitate this knowledge sharing and enhance its quality and impact through the knowledge, experience and endowment of its partners in developed countries.

The needs assessments in the three regions identified constraints that all the selected low-income tropical countries seem to have in common.. These constraints were largely in line with basic findings of many previously published studies (see Annex 1) as summarized in chapter 2 of the report. In the final section of the report, these constraints were grouped into three major sets of constraints:

- 1) Capacity development (CD) interventions from internal and external actors are not sufficiently targeted to meet the AIS capacity needs of tropical countries.*
- 2) CD interventions are frequently implemented independently from each other, and are often too small in scale, narrow in scope, and neglecting institutional and organizational capacity dimensions.*
- 3) Lack of high-level political and operational mechanisms to coordinate interventions for capacity development in tropical AIS.*

Set in a complex and dynamic environment, the strategic goal of TAP is to contribute to the development of national capacities in agricultural innovation in the tropics. Experience has demonstrated that enhanced coherence and stronger partnerships can improve the quality and impact of capacity development in innovation systems, and so the TAP is intended to be a multi-lateral dynamic facilitation mechanism. It should capitalize on and add value to ongoing initiatives by fostering greater coherence of capacity development interventions in tropical agriculture, strengthening interaction for more harmonized action and greater mutual accountability, and avoiding duplication. The ultimate “impact groups” who will benefit

from the Platform will be small and medium-scale producers, as well as small and medium enterprises in the agribusiness sector.

The partners now have to formulate a strategic Action Plan for TAP, and the four originally envisaged services for the TAP provide the basis for delivering this Action Plan.

As a major priority, a global Task force should be established by the TAP partners to create a common **Framework** for coordinated action on CD in agricultural innovation that would provide the basis for designing capacity assessments and effective CD interventions leading to sustainable change. This Framework would be an important contribution to addressing the first two sets of constraints identified. Such a Framework should comprise contributions from the TAP partners in the form of validated tools, policies and methodologies for the creation and ongoing assessment of demand-oriented AIS. With regard to the second constraint identified above, the global Task Force should also use the resources gathered in relation to the **Framework** to compile a set of materials for advocacy and learning on effective facilitating policies and practices.

With regard to the **TAP Marketplace** and action at country-level, three regional Task Forces should be established by the TAP partners with regional leadership to provide support to selected less developed tropical countries on the analysis of existing gaps in AIS and the creation of joint national visions of CD for agricultural innovation as the demand site for capacity development. In this context, TAP partners would also contribute to country-specific multi-stakeholder assessments of capacities and needs, together with the design of potential solutions. In addition, the regional Task forces would facilitate the creation of operational partnerships, contribute to inclusive national mechanisms/platforms as “innovation brokers” in selected tropical LDCs that are committed to change through learning from others (i.e. that have sound/coherent CD vision and strategy), support the organization of national (and regional) innovation fairs and events to articulate demand and offers in capacity development in AIS in countries and to showcase good policies and practices.

The **TAPipedia** service should capture many elements of the other services. All the information and resources gathered and developed in relation to the common **Framework** should be made easily searchable, openly accessible and promoted. In addition, all information collected through the **Marketplace** such as searchable profiles of the demand and supply sides of CD in AIS should be compiled and provided, together with inventories of CD initiatives in selected least-developed countries, with particular emphasis on institutional development and involvement of the private sector.

In terms of the **TAP Policy Dialogue** service, the three Regional Task forces mentioned above should facilitate dialogue around key policy issues that contribute to the creation of enabling environments at sub-regional/country level that facilitate sustainable change through demand-oriented AIS that contribute to improved CD. This dialogue should be organized through face-to-face and virtual events (such as e-conferences). The themes to be discussed should include policy coherence, building effective public-private partnerships, and South-South and Triangular collaboration. TAP was initiated by the G20 and thus also has a mandate to foster a more fruitful policy dialogue at the global level by supporting to the establishment of high-level political and operational mechanisms that coordinate interventions for capacity development in AIS. This would draw attention to the potential contributions of South-South and Triangular collaboration and of private sector entities to capacity development in AIS. The TAP partners should use the **Framework** and the work done by the established regional Task Forces to advocate for the importance of creating an enabling environment for CD in agricultural innovation that properly responds to the needs of local producers, producer cooperatives and agribusiness. This would contribute to efforts to secure political agreement and support for a common vision for CD in national AIS at the level of G20 meetings, as well as other international mechanisms such as the FAO governing bodies, and the conferences and assemblies of the various forums and representative bodies related to AIS such as the GCARD.

With regard to above recommendations, three outcomes can be foreseen for the TAP Action Plan.

The first outcome in the TAP Action Plan representing a response to the first group of CD constraints identified above should be: *Capacity development needs of AIS in tropical countries are defined accurately through inclusive country-led multi-stakeholder processes leading to more demand-oriented CD interventions.*

The second outcome in the TAP Action Plan representing a response to the second group of CD constraints identified above should be: *Capacity development interventions in tropical AIS that are better integrated with each other, that are more focused on development of institutional and organizational capacities and that include the private sector.*

The third outcome in the TAP Action Plan representing a response to the third group of CD constraints identified above should be: *High-level political and operational mechanisms are established at global level to improve coordination between interventions in capacity development in tropical AIS.*

This three outcomes that comprise the Action Plan will provide the basis for TAP to add value through maximizing the efficiency of application of existing resources in the public and the private sector directed at CD in AIS in the least developed parts of the tropics.

## LIST OF ABBREVIATIONS/ACRONYMS

AAACU	Asian Association of Agricultural Colleges and Universities
ADB	Asian Development Bank
AFAAS	African Forum for Agricultural Advisory Services
AFTA	Asian Free Trade Agreement
AGRA	Alliance for Green Revolution in Africa
AIS	Agricultural Innovation System
APAVIC	Asociación Peruana de Avicultura
APAARI	Asia-Pacific Association of Agricultural Research Institutions
APEC	Asia-Pacific Economic Cooperation
ARD	Agricultural Research for Development
ASARECA	Association for the Strengthening Agricultural Research in Eastern and Central Africa
AEC	ASEAN Economic Community
ASEAN	Association of Southeast Asian Nations
AU	African Union
AUC/NEPAD	African Union Commission/ New Partnership for African Development
BCIE	Central American Bank for Economic Integration
CAADP	Comprehensive African Agriculture Development Programme
CAC	Central American Council of Ministries of Agriculture
CAFTA	Central American Free Trade Agreement
CAESPA	Center for Strategic Analysis and Policy (at IICA)
CATIE	Center for Research and Education in Tropical Agriculture
CCARDESA	Council for the Coordination of Agricultural Research and Development in Southern Africa
CD	Capacity Development
CGIAR	Consultative Group of International Agricultural Research
CIAT	International Center for Tropical Agriculture
CIMMYT	International Maize and Wheat Improvement Centre
CIRAD	Centre International for Research in Agriculture – France
COMIECO	Council of Ministers of Economy
CORAF/WECARD	Conseil ouest et centre Africain pour la Recherche et le Développement Agricole/ West and Central African Council for Agricultural Research and Development
COSUDE	Swiss Development Cooperation Agency
DAC	Development Assistance Committee



DFID	Department for International Development (United Kingdom)
EAAPP	Eastern Africa Agricultural Productivity Programme
EFARD	European Forum for Agricultural Research and Development
EC	European Commission
EMBRAPA	Brazilian Agricultural Research Corporation
EU	European Union
FAAP	Framework for African Agricultural Productivity
FAO	Food and Agriculture Organization of the UN
FARA	Forum for Agricultural Research in Africa
FECAGRO	Federation Agricultural Producer Associations
FECALAC	Federation of Dairy Industry Associations
FEDESCABO	Federation of Beef Cattle Producers Associations
FONTAGRO	Regional Fund for Agricultural Research
GFAR	Global Forum on Agricultural Research
ICTs	Information Communication Technologies
IDRC	International Development Research Centre
IFAD	International Fund for Agricultural Development
IICA	Interamerican Institute for Cooperation on Agriculture
ILRI	International Livestock Research Institute
INCAE	Central American School of Business Administration
INIAs	Generic name for National Agricultural Research Centers
INTA	Costa Rican National Agricultural Research Center
IPRs	Intellectual Property Rights
ISNAR	International Service for National Agricultural Research
LDCs	Least Developed Countries
MRIA	Myanmar Rice Industry Association
MoU	Memorandum of Understanding
NAFSIP	National Agriculture and Food Security Investment Plans (of CAADP)
NAIS	National Agricultural Innovation Systems
NAPs	National Agricultural sector investment Programmes
NARS	National Agricultural Research Systems
NASRO	North Africa Sub-regional Organization
NIS	National Innovation Systems
OECD	Organization for Economic Cooperation and Development
PAFO	Pan African Farmers' Organization
PanAAC	Pan African Agribusiness and Agro-industry Consortium .

PANGSOC	Pan African Non-Governmental Organization Consortium
PPPs	Public-Private Partnerships
PROLINNOVA	Promoting Local Innovation
REDD	Reducing Emissions from Deforestation and Forest Degradation
RiU	Research into Use Programme
R&D	Research and Development
SAC	Special Agricultural development Companies
SEAMEO	Southeast Asian Ministers of Education Organization
SEARCA	The Southeast Asian Regional Center for Graduate Study and Research in Agriculture
SICA	Central American Integration System
SICTA	Regional System of Agricultural Research
SIECA	Central American Trade Secretariat
SPAAR	Special Programme on Africa's Agricultural Research
SSA	Sub-Saharan Africa
SSA-CP	Sub-Saharan Africa Challenge Programme
TAE	Tertiary Agricultural Education
TAP	Tropical Agriculture Platform
TEAM-Africa	Tertiary Education for Agriculture Mechanism-Africa
TFP	Total Factor Productivity
TVET	Technical and Vocational Education and Training
UNIBRAIN	Universities, Business and Research in Agricultural Innovation
USAID	United States Agency for International Development
UNDAF	United Nations Development Assistance Framework
WAAPP	West African Agricultural Productivity Programme
YPARD	Young Professionals Platform for Agricultural Research for Development

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## 1. INTRODUCTION

### *1.1 Why TAP can make a difference*

Globalization is driven by the use and re-use of ideas, and empirical research indicates that it is the exchange of ideas and knowledge rather than the exchange of goods that has contributed most to poverty reduction and increases in life expectancy in developing countries (Bourguignon and Morrison 2002). Institutions influence the rate at which ideas are produced, adopted and embedded into existing production systems and thus contributing to innovation (Romer 2010). The Tropical Agriculture Platform (TAP) aims to enhance the flow of ideas and sharing of experiences regarding policies and institutions that facilitate the development of national capacities in agricultural innovation<sup>1</sup>.

Why is the exchange of ideas so important in the field of agriculture? As the basic ingredient of innovation, ideas enable people to do things in new ways and to produce more with less (Jones and Romer 2009). In this sense, the value of ideas increases with increasing use in the economy. This makes it different from tangible resources where increased use eventually leads to overuse and thus a decrease in value (Warsh 2006). The private sector tends to underinvest in the production of ideas because ideas are non-rivalrous and often treated as non-excludable by nature<sup>2</sup>. However, if the public sector creates an enabling environment for innovation (e.g. through the creation of pull-mechanisms) it might attract more private sector investment in innovation in areas of high priority. An enabling environment for innovation is especially valuable in the field agriculture where there is an urgent need invest in sustainable intensification through innovation in technology and management (World Bank 2012).

Yet, the successful creation, adoption and up-scaling of agricultural innovation and its tailoring to the local needs of farmers, farm cooperatives and agri-business requires capacities on policy, institutional and individual levels, especially in low-income countries in tropical regions. These countries have often been bypassed in the priority setting process of agricultural innovation in the private sector since the purchasing power of their people is low and the agricultural markets on which they primarily rely on are too small to attract investment. At the same time, even public sector initiatives to promote agricultural innovations such as the Green Revolution were not very successful in effectively addressing the agricultural challenges faced by small-scale farmers in marginal regions because the improved crop varieties and agricultural

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<sup>1</sup> The term 'agricultural innovation' refers to bringing new products, processes and forms of organization into use to achieve food security, economic development and sustainable natural resource management. It covers innovation in the crop, livestock, forestry, fishery/aquaculture and agro-industry sectors.

See also: <http://www.fao.org/docrep/015/an906e/an906e00.pdf>

<sup>2</sup> A good is 'non-rival' when its consumption by one individual does not reduce the quantity available for consumption by other individuals. A good is 'non-excludable' if, when it is produced, no one can be prevented from using it (examples: national defense, flood control systems, street lighting). Innovation may however require to be partially excludable through the protection of intellectual property rights (IPR) in order to provide sufficient incentives for the private sector to invest in innovation (Romer 2010).

practices were largely designed for farmers in favourable regions with access to capital, fertile land, irrigation and know-how (Byerlee and Morris 1993). Even though more funding was available for agricultural research and to improve small-scale farming in low income countries after the food crisis in 2008, additional funding did not necessarily translate into an increase in the quality and relevance of research. Moreover, the strengthening of neglected public extension services did not lead to any significant increase in the adoption of agricultural innovation. Additional funds were instead used for much-needed salary increases and the rehabilitation of infrastructure and equipment after years of neglect (Beintema and Stads 2011). In the meantime, a growing number of NGOs and private sector entities, along with public-private partnerships have focused on making research and extension more conducive to the need to integrate farmers into value chains (Birner and Anderson 2008). Such initiatives are however unable to fill all of the gaps left by the often dysfunctional public research and extension systems that are primarily designed to assist smallholders and other people in disadvantaged areas with the provision of quality agricultural services (World Bank 2012). As a result, there is growing dual economy in agriculture in many of these countries, consisting of a large informal farming sector with no growth potential on one side and booming formal market-driven and export-oriented farms on the other side (Interagency Report to the Mexican G20 Presidency 2012).

Many emerging economies that managed to make innovation in agriculture a more inclusive process that leads to convergence rather than divergence in the agricultural sector have done so by investing successfully Capacity Development (CD) for agricultural innovation (Juma 2011). In view of the large consensus about the need to also improve CD for agricultural innovation in low income countries, TAP was officially launched at the first G20-led Meeting of Agriculture Chief Scientists (MACS) in September 2012 in Mexico. MACS is one of the first international initiatives related to food security and poverty reduction that explicitly aims at learning from the facilitating policies in emerging economies such as Brazil and China in addition to the more traditional OECD development partners. Thanks to increasing public and private sector investments in capacity development in agricultural innovation, these countries managed to substantially raise Total Factor Productivity (TFP) in agriculture (Fuglie 2012) and thus succeeded in making their agricultural systems more productive and competitive, as well as a driving force of economic empowerment in rural areas that helped to reduce hunger and poverty substantially despite a growing population.

### **1.1.1 The need for change**

Many low-income countries aim to learn from this experience by making their Agricultural Innovation Systems (AIS) more effective in their efforts to deliver goods and services that meet the needs of the domestic agriculture. However, these countries lack the resources and the capacities to develop their

innovation systems effectively. Even though numerous existing interventions are designed to address the gaps in capacity development, education and knowledge in agricultural innovation in least developed tropical economies, there has been an insufficient alignment with country and regional policy and planning frameworks and with institutional development needs, with too little coordination and synergy between each other. In addition, many interventions are small-scale activities with relatively high transaction costs and limited impact on the ground and many are based on inadequate analysis of interdisciplinary needs and the demands of agricultural markets. Experience has demonstrated that enhanced coherence and stronger partnerships can improve the quality and impact of capacity development in innovation systems (The World Bank 2012, Ludemann et al. 2012, Juma 2011, The World Bank 2007).

Moreover, governments have so far been focused mostly on regulating agricultural change through protective trade policies and have tended to neglect the potential of facilitating policies that enable sustainable change and increased private sector investment in agriculture (Interagency Report to the Mexican G20 Presidency 2012).

### **1.1.2 The TAP approach**

The TAP is a multi-lateral dynamic facilitation mechanism designed to assess ongoing initiatives, current priorities, capacities and needs in Agricultural Innovation Systems AIS. Based on these assessments TAP supports the creation of national/regional action plans and subsequently advocacy for the development of a framework for coordinated actions articulated around the following three services.

- “Policy Dialogue Space”: convening multi-stakeholder interactions to enhance coherence of and mobilize investments for national and regional policies for capacity development in tropical agricultural innovation systems.
- “Innovation Fairs/Marketplace”: brokering effective capacity development approaches and partnerships in tropical agriculture which aggregate and match existing demands and offers, and facilitate up-scaling.
- “TAPipedia”: creating an information system that increases accessibility and enhances knowledge flows in support of capacity development of tropical innovation systems, capturing success stories, socioeconomic impacts, lessons learned and innovation outputs.

The intended users of the Platform include policy-makers, development agencies and institutions in agricultural innovation (research, extension, education etc) as well as in the private sector and civil society engaged in innovation processes to support smallholder producers. TAP will be facilitated by FAO in its role as global convener and knowledge broker. The primary TAP partners at national, regional and international

level represent constituencies involved in tropical agricultural innovation, which will share their knowledge and experiences and learn from each other about sound capacity development policy and practice.

In line with the Paris Declaration, the Accra Action Plan, and the Busan High Level Forum for Effective Development Cooperation, TAP's services will capitalize on and add value to ongoing initiatives that are owned and lead by tropical Least Developed Countries (LDCs) by fostering greater coherence of capacity development interventions and strengthening collaboration for more harmonized action and greater mutual accountability.

### **1.1.3 The strategic goal and the added value of TAP**

The strategic goal of TAP is to contribute to the development of national capacities in agricultural innovation. TAP will achieve this through<sup>3</sup>:

- fostering the acknowledgment of national leadership and ownership to ensure that capacity development interventions respond to national demands and are based on strong partnerships;
- encouraging greater coherence between regional and international capacity development programmes, and alignment with national plans and priorities;
- improving the effectiveness and efficiency of capacity development to facilitate the emergence of innovation systems in tropical agriculture which increase farmers' income, food security and environmental sustainability;
- scaling-up sustainable development solutions with lower transaction costs, based on integrated approaches across the three capacity dimensions of enabling environment, organizations and individuals.

The ultimate "impact groups" who will benefit from the Platform will be small and medium-scale farmers, as well as small and medium enterprises in the agribusiness sector.

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<sup>3</sup> [http://www.fao.org/docs/eims/upload/305473/GCARD2\\_C-2-1\\_Briefing\\_Paper\\_Final.pdf](http://www.fao.org/docs/eims/upload/305473/GCARD2_C-2-1_Briefing_Paper_Final.pdf)

## 1.2 The TAP Partners

The partners of the Platform are a coalition of willing and committed partners/constituents. They consist of leading international, regional and national institutions that deal directly or indirectly with capacity development for agricultural innovation, as well as universities and actors in the private sector that are involved in agricultural research, extension and education. The list below starts with international organizations and then shows the stakeholders by world region.

Global associations, organizations and institutions to promote agricultural research, education and extension:

- Consultative Group on International Agricultural Research (CGIAR): <http://www.cgiar.org/>
- Food and Agriculture Organization of the United Nations (FAO): <http://www.fao.org/home/en/>
- Global Confederation of Higher Education Associations for Agricultural and Life Sciences (GCHERA): <http://www.gchera.com/>
- Global Forum on Agricultural Research (GFAR): <http://www.egfar.org/>
- Global Forum for Rural Advisory Services (GFRAS): <http://www.g-fras.org/en/>
- International Center for Biosaline Agriculture (ICBA): <http://www.biosaline.org/>
- International Centre for Integrated Mountain Development (ICIMOD): <http://www.icimod.org/>
- International Fund for Agricultural Development (IFAD): <http://www.ifad.org/>
- International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA): <http://www.planttreaty.org/>
- World Bank Group: <http://www.worldbank.org/>
- Young Professionals' Platform on Agricultural Research for Development (YPARD): <http://www.ypard.net/>

Regional and national associations and institutions to promote agricultural research and education and extension:

### *Africa and the Middle East*

- African Forum for Agricultural Advisory Services (AFAAS): <http://www.afaas-africa.org/>
- Agricultural Research Council, South Africa (ARC): <http://www.arc.agric.za/>
- Alliance for a Green Revolution in Africa, Kenya (AGRA): <http://www.agra.org/>
- Association of Agricultural Research Institutions in the Near East and North Africa (AARINENA): <http://www.aarinena.org/>
- Forum for Agricultural Research in Africa, Ghana (FARA): <http://www.fara-africa.org/>
- ICIPE - African Insect Science for Food and Health <http://www.icipe.org/>



### *Asia*

- Asia Pacific Association of Agricultural Research Institutes, Thailand (APAARI): <http://www.apaari.org/>
- Central Asia and the Caucasus Association of Agricultural Research Institutions, Uzbekistan (CACAARI): <http://www.cacaari.org/>
- Chinese Academy of Agricultural Sciences (CAAS): <http://www.caas.net.cn>
- Chinese Academy of Tropical Sciences (CATAS): <http://www.at0086.com/CATAS/>
- Indonesian Agency for Agricultural Research and Development (IAARD): <http://www.litbang.deptan.go.id/>
- Japan International Research Center for Agricultural Sciences, JIRCAS: <http://www.jircas.affrc.go.jp/>

### *Europe*

- Center for Agricultural Bioscience International, UK (CABI): <http://www.cabi.org/>
- Consiglio per la Ricerca e la Sperimentazione in Agricoltura, Italy (CRA): <http://sito.entecra.it/>
- Consortium national pour l'agriculture, l'alimentation, la santé animale et l'environnement, France (AGREENIUM): <http://www.agreenium.org/>
- European Alliance on Agricultural Knowledge for Development, Czech Republic (AGRINATURA): <http://www.agrinatura.eu/>
- Istituto Nazionale di Economia Agraria, Italy (INEA): <http://www.inea.it/>
- National Institute for the Agricultural and Food Research and Technology, Spain (INIA): <http://www.inia.es>
- National Resources Institute, University of Greenwich, UK (NRI): <http://www.nri.org/>
- Technical Centre for Agricultural and Rural Cooperation, the Netherlands (CTA): <http://www.cta.int/en/>
- Wageningen University, The Netherlands: <http://www.wageningenur.nl/>

### *Latin America*

- Associação Brasileira das Entidades Estaduais de Assistência e Extensão Rural, Brazil (ASBRAER): <http://www.asbraer.org.br/>
- Brazilian Enterprise for Agricultural Research, Brazil (EMBRAPA):
- Centro Agronómico Tropical de Investigación y Enseñanza, Costa Rica (CATIE): <http://catieeducacion-web.sharepoint.com/>

- Foro de las Américas para la Investigación y Desarrollo Tecnológico Agropecuario (FORAGRO): <http://www.iica.int/foragro/>
- Instituto nacional de investigaciones forestales, agrícolas y pecuarias (INIFAP), Mexico: <http://www.inifap.gob.mx>
- Instituto nacional de tecnología agropecuaria, Argentina (INTA): <http://inta.gob.ar/>
- Inter-American Institute of Agricultural Sciences, Costa Rica (IICA): <http://www.iica.int/>
- Programa Cooperativo de Investigación, Desarrollo e Innovación Agrícola para los Trópicos Sudamericanos, Brazil (PROCITROPICOS): <http://www.procitropicos.org.br/>

#### *North America*

- United States Agency for International Development, USA (USAID): <http://www.usaid.gov/>
- United States Department of Agriculture, USA (USDA): <http://www.usda.gov>

### **1.2.1 The role of TAP partners**

The partners have a wide range of expertise in many different areas related to capacity development for agricultural innovation and many of them are major stakeholders in their particular country/region and could serve as advocates for political and institutional change in support of capacity development approaches that are more responsive to local demands.

The TAP platform aims to engage them in their particular field of expertise, which will be identified through a process of categorization of competences. In each of these fields, capacities are required at the policy level, as well as the organizational and individual levels. The gaps identified at the different levels in low-income tropical countries effectively represent the demand for capacity development to which those wishing to assist should respond.

## **2. COMMON FINDINGS AND IDENTIFIABLE GAPS IN PRIOR REPORTS IN CD AGRICULTURAL INNOVATION**

### ***2.1 Common insights and gaps in prior reports about CD in agriculture***

The findings of the various publications on capacity development in agricultural innovation that are discussed in the ANNEX are applicable to all tropical regions. They can be summarized in the following three points:

- 1) Current CD initiatives need to be better coordinated with national and regional policies to promote CD in agricultural innovation.
- 2) Overall national agricultural innovation systems in most low-income countries in tropical regions remain insufficiently embedded into the local agricultural economy and thus research priorities, the education and training curricula and the competences in the extension services remain insufficiently aligned with the priorities of farmers, farm cooperatives and agribusiness.
- 3) There is a need to develop a common framework for capacity development that enables less developed countries to better learn lessons from southern innovation champions and to conduct effective policy reforms on the policy and the institutional level to facilitate sustainable structural change in agriculture.

A common gap found in prior reports on capacity development in agricultural innovation may be the absence of any references to National Innovation Systems (NIS) in general. Agricultural innovation systems, especially in emerging economies, tend to be embedded into a larger national/regional strategy to create systems of innovation that go beyond agriculture. Governments in emerging economies see their agricultural innovation system as part of a larger national innovation strategy that is to be facilitated by responsive policy and institutional reforms on all levels of governments and affecting all sectoral policies. In this context, functioning national innovation systems are the result of facilitating policies that bring about institutional change towards a more dynamic and demand-driven innovation systems that also involve agriculture. They eventually create an enabling environment that reduces the risk of doing business in off-farm, as well as on-farm investment and increases the rewards of public-private partnerships in capacity development for agricultural innovation - this is one of the lessons that can be learned from the experience of southern innovation champions such as Brazil and China. Unlike in other economic sectors, political interests in agriculture benefit from the status quo (especially in countries with protective agricultural policies and/or a high share of foreign aid in the public budget assigned to agricultural development). In these countries, those who benefit from the status quo tend to be more numerous, more vocal and better organized in politics. They are thus also well-positioned to undermine efforts to enable policy and institutional reforms if they are to fear a loss in access to public resources and an increase in competition. Most agricultural policies should therefore be embedded into an overall vision of national economic development in order to overcome the strong sectoral resistance to change in agriculture.

## ***2.2 Capturing the trend toward South-South/triangular collaboration***

The discourse on effective capacity development in agricultural innovation used to be shaped by actors in donor countries. They correspondingly influenced the funding priorities and action programmes in foreign aid. The resulting projects were then embedded in larger bilateral, multilateral or private development programmes designed to promote capacity development in areas that were considered to be relevant.

The Paris Declaration on aid effectiveness in 2005 and the subsequent Busan High Level Forum for Effective Development Cooperation in 2011, aimed at reducing the dominance of the donor countries in the priority setting process and to improve coordination among the multiple actors involved in capacity development initiatives by defining principles that would increase ownership and accountability.

The expectation that this declaration would enable the recipient countries to set the priorities independently and induce donor countries to passively align to the respective national strategy for capacity development was however hardly realistic in view of the current landscape of influence and power in development assistance (Easterly and Williamson 2011). Moreover, the perceptions of taxpayers and donors in developed countries matter a great deal in the priority setting process. These constituencies may want implementing organizations and agencies to reduce hunger and poverty, but would also like to see immediate results of the 'good' that has been achieved. Creating an enabling environment to promote institutional capacity development that facilitates agricultural innovation may however not loom largely in the minds of people who see aid mainly as a form of charity. In other words, investment in capacity development is unlikely to produce immediate and tangible results in terms of poverty alleviation, yet such investments may be crucial for long-term agricultural growth and sustainability. Most monitoring and evaluation indicators however do not address this issue to a great extent (Shanta et al. 2003).

It is precisely the creation of such an enabling environment that explains how agriculture was put on a path of endogenous growth in emerging economies such as Brazil, China, and Malaysia. These countries now invest in institutional capacity development in Africa and other low-income countries, not because of a sense of charity but primarily out of self-interest (Scoones et al. 2013). Their commitment to contribute to the build-up of local infrastructure, the training local people and the sourcing from local enterprises may strengthen the long-term process of economic empowerment; in particular China, a large investor in Africa, also expects to benefit from the growing consumer markets in these countries and hopes to ensure access to important primary commodities in these countries that are in desperate demand in their home countries (Brautigam 2009).

The advantage of these emerging economies is that they still remember how they developed. They know that it was the political will to enact and enforce institutional change that ultimately strengthened

capacities in agricultural innovation, improved the transmission of new knowledge from research to teaching at universities and from agricultural service providers to farmer cooperatives and agri-businesses. This resulted in the creation and rapid adoption of innovation in agricultural technology and management that contributed significantly to the reduction of poverty on the countryside, enabled rural empowerment and led to an increase in agricultural productivity and competitiveness. This was possible because the institutions in charge of capacity development for agricultural innovation on all policy and institutional levels were forced to become more responsive to the changing needs of agricultural producers, cooperatives and agribusiness and more imaginative in addressing intricate and multifaceted problems of rural poverty (Juma 2011).

Innovation-driven change is certainly not without risks and many food safety related scandals in China and the negative environmental effects of large-scale monoculture practices in soybean and sugarcane production in Brazil illustrate that the economic and technological system has to constantly respond to new challenges. Moreover, technological change also produces economic inequality because it makes a few very rich while the large majority of the population has no access to technology and have to bear the potential risks. As Schumpeter pointed out 70 years ago (Schumpeter 1942), thanks to monopolistic competition that forces companies to constantly innovate (Romer 2010), the price, complexity and risk of technological innovations decrease substantially over time and eventually convert technology into a tool of empowerment, as the case of ICT but also agricultural biotechnology illustrate well in the 21<sup>st</sup> century (Aerni 2011, Aerni 2006). This is well illustrated in a Comprehensive African Agriculture Development Programme (CAADP) Policy Brief (CAADP 2012) pointing out that high-end genomics techniques linked with farmer innovators by internet and cell phone offer a potential for new alliances for open-source low-cost innovation – less easily captured by elite research and business interests.

Another crucial component of the national strategy of emerging economies to jump-start agricultural development within the NIS was to attract foreign direct investment in capacity development in agriculture, to strengthen the linkages between universities and the local private sector, as well as the creation of incubators and financial institutions designed to invest in start-up companies in agriculture. This increased economic opportunities in the domestic economy and contributed to the reversal brain drain by offering attractive employment packages for talents who studied and worked at top research institutions abroad. It also gave them the opportunity to share their acquired capacities with knowledge hungry local universities and make use of their established international knowledge and business networks to set up a research-oriented agri-business in one of the numerous incubators and technology parks set up at universities and operating under a favorable regulatory environment that is conducive to experimentation and technological change (Etzkowitz et. al. 2005). All this was possible thanks to prior economic reforms and facilitating policies that helped reducing institutional and political uncertainty and thus minimizing

investment risks. At the same time, it increased the potential rewards of learning and responding to a changing environment with new opportunities. In line with this insight, many emerging economies never stopped investing in agricultural Research and Development (R&D) and agricultural business services. The Brazilian Agricultural Research Corporation (EMBRAPA), Brazil's state-owned enterprise established in 1973 by federal law currently employs a total of 9,242 persons, of whom 2,215 are researchers (18 percent with Master's degrees, 74 percent with PhDs and 7 percent with postdoctoral qualifications). Its budget totaled some US\$1 billion in 2011.

In the past decade, China's total expenditure on R&D increased by about 20 percent per year. In 2009, it overtook Japan to become the world's second-largest investor in R&D after the United States (Qiu 2012). China also has the world's largest and most decentralized public agricultural R&D system. It employs some 43,000 researchers in more than 1,000 research agencies at the national, provincial, and prefectural levels. Moreover, the share of the private sector in agricultural R&D has increased substantially too: in 2006, 16 percent of China's total spending on agricultural R&D compared to just 3 percent in 1995 (Qiu 2012). As a result, agriculture is seen as part of the global knowledge-based economy and rather than an economic sector in decline. This perspective also attracts more of the highly skilled young professionals into the business.

In a certain way, the trends in agriculture are comparable to the trends in US agriculture in the 19th century when the first Land Grant College Act was passed in 1862 after the end of the civil war to fight rural poverty and give agriculture a boost by bringing knowledge to the countryside through the establishment of agricultural colleges that had a mandate to focus on applied research that is supportive of the needs of the local population. Each college had a county agent who would establish the link between higher education and farming communities, learning from farmer and farm business experience and identifying problems that need to be addressed in cooperation with the agricultural colleges. At the same time the colleges trained the students in highly needed skills that would contribute to rural business development. Today a similar approach is pursued by New Zealand after agricultural liberalization in the 1980s (Aerni 2009) and to some extent in China and Brazil once they started with their agricultural reform policies (Liu et al. 2011, Etzkowitz et al. 2012).

It is true, that this process of economic and technological transformation in agriculture created not just more capacity in agricultural innovation but also more social inequality because many farming families with lack of connections or lack of access to finance and capacity development have been left behind. Since the governments in emerging economies did not have the endowment to embark on great income redistribution schemes and were reluctant to tax their emerging domestic private sector with too many social security payments, they started to experiment with other forms of social protection schemes. In the

case of Brazil and Mexico, conditional cash transfer payments proved to be an effective tool in reducing poverty and promoting social empowerment through enhanced choice with regard to the educational and health services that are supplied to them (Dixon 2013, Fiszbein et al. 2009). This enhanced choice has again improved the responsiveness of service providers in the educational and health sector who are forced to take the poor seriously as clients if they want to stay in business. Similar forms of enhanced choice could be or are already being introduced for agricultural service providers (Wongtschowski et al. 2012). Such schemes could then also serve as most valuable capacity indicators that signal if there is a mismatch between capacity development intervention and effective needs for capacity development.

Developing countries such as India have pioneered the use of Information Communication Technologies (ICTs) as a tool for rural empowerment transforming the way farmers do business and the way agricultural service providers deliver their services. ICT has also massively enhanced access to finance, education, market information and business services not just in India, but also Africa where mobile telephony could spread quickly (penetration of mobile phones in Africa is expected to exceed 80 percent while fixed phone penetration remains under 10 percent) (ITU 2013).

South-South collaboration itself will however not be enough to tackle the sustainability challenges in tropical agriculture. South-South cooperation requires the support of traditional donors in efforts to improve the quality and the up-scaling potential of the outcomes. Moreover actors in South-South collaboration may require the experience and the support of organizations that are well-established in development assistance and international agricultural research to build the capacity of their own development cooperation. This sort of triangular cooperation is a relatively recent mode of development cooperation and in most examples it is driven by southern actors that seek particular expertise in companies and research institutes in the North to enhance capacity development in agricultural innovation. It normally involves a traditional donor from the ranks of the Organization for Economic Cooperation and Development's (OECD) Development Assistance Committee (DAC), an emerging donor in the South, and a beneficiary country in the South. The trend toward South/South Triangular cooperation has been addressed by UNCTAD (2012). Its importance has also be pointed out in the Bogotá Statement—Towards Effective and Inclusive Development Partnerships and the UN Secretary General Report on development cooperation also in 2010. To assess practices on the ground, the OECD engaged in a pilot mapping exercise (Yamashiro Fordelone 2009) and European donors have started a reflection process on triangular cooperation in the context of aid effectiveness (Schulz 2010).

### 3. REGIONAL NEEDS ASSESSMENTS FOR CD IN AGRICULTURAL INNOVATION

The main purpose of this TAP synthesis report is to propose an agenda for action based on identified gaps and future needs in CD for agricultural innovation in low-income countries in the tropics. This action plan must be based on insights gained from existing CD literature, as well as the regional needs assessments commissioned by FAO to take stock of ongoing CD initiatives to promote agricultural innovation. The needs assessments also contain regional stakeholder surveys that capture the prevailing perceptions on the challenges and opportunities of AIS in the public debate on CD for agricultural innovation. The stakeholder surveys were carried out between April and June 2013 in the selected developing countries of the three regions in Africa, Asia and Latin America.

The purpose of the regional needs assessments is meant to identify the needs in CD for agricultural innovation on the policy level, the institutional level and the individual level. The information obtained from the regions provides the basis for formulating a strategic action plan for TAP that is also in line with findings in previous CD studies.

The selected regions are Sub-Saharan Africa, Central America and South/Southeast Asia mostly represent low/middle-income economies with an interest in the improvement of capacities in the NAIS, especially on the policy and the institutional level.

FARA in Ghana surveyed countries in three regions of *Sub-Saharan Africa*:

- 1) Ethiopia, Rwanda, South Sudan, and Tanzania are linked to the Association for the Strengthening Agricultural Research in Eastern and Central Africa (ASARECA);
- 2) Comoros, Angola, Lesotho, Malawi, Mozambique, and Zambia are part of the Council for the Coordination of Agricultural Research and Development in Southern Africa (CCARDESA); and
- 3) Benin, Burkina Faso, The Gambia, Niger, and Liberia being part of Conseil ouest et centre Africain pour la Recherche et le Développement Agricole/West and Central African Council for Agricultural Research and Development (CORAF/WECARD).

The development indicators of the three sub-regions in Africa vary widely. There are big differences in terms of population growth, income/capita, agricultural yield increases and public investment in agriculture. Unlike in the other two regions, the governments in Africa have developed a common vision of agricultural development, based on the Comprehensive Africa Agricultural Development Programme (CAADP), launched in 2002 in Maputo. This initiative is Africa-owned and Africa-led. At the same time, donor initiatives to promote capacity development for agricultural innovation are highly concentrated on the African continent. Africa thus plays a very important role in this needs assessment, not only because it is the largest recipient of funding for CD for agricultural innovation, but also because it is the continent that



has so far only made slow progress in reducing poverty, hunger and malnutrition in the past two decades, even though many African countries have performed rather well in recent times. The questionnaire-based perception survey on the challenges and opportunities of the NAIS was completed 33 stakeholders across all three regions in Africa.

CIAT in Colombia was in charge of the needs assessment for Latin America, focusing on *Central American countries*. The countries covered in the survey are part of or will become part of the Central American Free Trade Agreement (CAFTA). The questionnaire-based survey included 34 key stakeholders involved in the debates in CD for agricultural innovation in Guatemala, Belize, Honduras, El Salvador, Nicaragua, Costa Rica and Panama; as well as in the region as a whole.

The partner organization who carried out the regional survey in *South/Southeast Asia* was the Southeast Asian Regional Center for Graduate Study and Research in Agriculture (SEARCA). It covered in total five low-income countries, four of them in Southeast Asia (Laos, Cambodia, Myanmar, Timor-Leste) and one in South Asia (Bangladesh). Altogether 71 stakeholders completed the semi-standardized questionnaire on the gaps and needs of the national as well as supra-national agricultural innovation systems in the Asian region.

### **3.1 Africa report by FARA**

The Regional Assessment for the African Region differs from the other regional assessments in the sense that agriculture in many countries Sub-Saharan Africa has hardly moved from informal semi-subsistence to more formal and market-oriented agricultural practices. Up to 80 percent of farms in Sub-Saharan Africa (SSA) are smallholders (<2 hectares) who make up 90 percent of the total farm output. It is also the only one of the three regions where land sizes tend to shrink rather than grow. Ever smaller farm households with ever less means for on-farm investments and thus lack of access to basic inputs and markets explain why productivity is not growing rapidly, why the quality of the output (e.g. food safety) is hardly improving and why the natural environment is rapidly deteriorating due to deforestation and nutrient deficient soils.

Declining land sizes and increasing population growth therefore call for concerted efforts (including promotion of agricultural innovations) to induce rapid structural change in agriculture through improved capacity development in agricultural innovation and a better integration of the agricultural sector into regional and global value chains.

The slow progress in agricultural development stands in strong contrast to the fact that there are far more international, regional and national initiatives to improve CD in agriculture than in the other two regions. In

addition to that, Africa is the only region where governments have created a joint initiative to initiate CAADP that is Africa-owned and Africa-led. It follows a common Framework for African Agricultural Productivity (FAAP) designed to be an advocacy tool for policy change and, at the same time, focused on strengthening agricultural knowledge systems to deliver profitable and sustainable technologies that are widely adopted by farmers resulting in sustained agricultural growth.

### **3.1.1 CD regional initiatives**

The endorsement of the CAADP framework by the African Union Assembly in 2003 marked an important milestone in Africa's agricultural development. As the first African-owned initiative, the CAADP offers a shared vision for sustainable growth in agriculture, provides a framework for collective continental action, and introduces indicators for peer monitoring of progress towards agreed growth targets. In terms of CD development for agricultural innovation, Pillar 4 of CAADP is crucial since its overall aim is to improve agricultural research and systems in order to disseminate appropriate new technologies.

Pillar 4 builds upon three strategic areas of support to the CAADP process namely:

1. Integrating agricultural research, advisory services, education and training aspects as advocated in the FAAP in national and regional agriculture and food security investment plans.
2. Increasing the scale and quality of investments in agricultural research, advisory services, education and training aspects with the support of political leadership, private sector and civil society and development partners in order to mobilize the technical and financial resources required for investment in agriculture.
3. Strengthening the alignment and coordination of financial support from development partners and financial institutions towards common CAADP priorities in agricultural research, advisory services, education and training.

All efforts should lead to annual agricultural productivity increases of 6 percent. In order to achieve these ambitious goals, African Heads of State and governments have called for a minimum of 10 percent annual allocation of national budgets to agriculture in their Maputo Declaration of July 2003.

Table 1 shows the CAADP implementation status for the TAP countries in 2012. All the 15 countries have initiated country engagements on the CAADP, 67 percent have signed compacts and developed the National Agricultural and Food Security Investment Plans (NAFSIPs), 60 percent have developed implementation programmes, secured funding and moved on to implementation of the programmes.

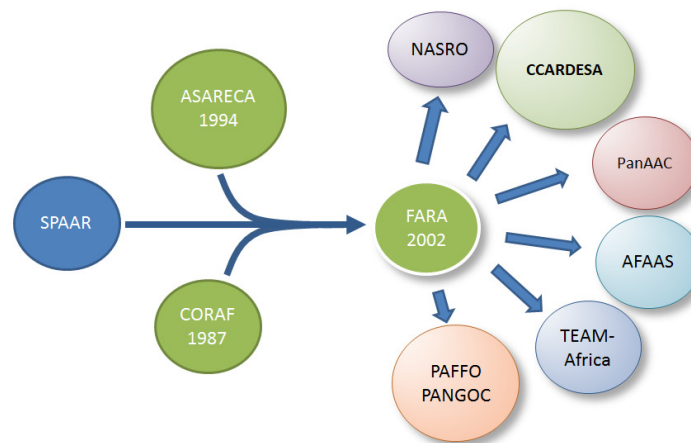
In terms of achievement of the CAADP targets, only four countries (Ethiopia, Malawi, Burkina Faso and Niger) have since allocated at least 10 percent of their annual budgets to agriculture. Mozambique, on whose soil the Maputo Declaration was brokered, still falls short of this target posting only about 7 percent budgetary allocation to agriculture in the last couple of years. In terms of sectoral growth, only Ethiopia, Angola, Tanzania, Burkina Faso and The Gambia have attained the 6 percent annual target.

No	Stage of CAADP Country Implementation						CAADP Targets	
	Target country	National roundtable process initiated	Compact signed	NAFSIPs completed	Programmes developed	Funding received from GAFSP <sup>4</sup> and programme implementation initiated	10% budget allocated to agriculture	6% production p.a.
1	Comoros	√	x	x	x	x	x	X
2	Ethiopia	√	√	√	√	√	√	√
3	Mozambique	√	√	√	x	x	x	X
4	Rwanda	√	√	√	√	√	x	X
5	South Sudan	√	x	x	x	x	x	X
6	Angola	√	x	x	x	x	x	√
7	Lesotho	√	x	x	x	x	x	X
8	Malawi	√	√	√	√	√	√	X
9	Tanzania	√	√	√	√	√	x	√
10	Zambia	√	x	x	x	x	x	X
11	Benin	√	√	√	√	√	x	X
12	Burkina Faso	√	√	√	√	√	√	√
13	The Gambia	√	√	√	√	√	x	√
14	Niger	√	√	√	√	√	√	X
15	Liberia	√	√	√	√	√	x	X
% accomplished (√)		100	67	67	60	60	27	33

**Table 1: CAADP Implementation Status for TAP Target Countries in Africa**

The mixed record of implementation may also be related to the weak regional institutions that were designed to implement CAADP. Figure 1 illustrates how regional implementation agencies for improvement of agricultural research and systems (CAADP Pillar 4) evolved over time. Advocacy campaigns for an African-led institution by the pre-existing sub-continental organizations, ASARECA (formed in 1994) and CORAF/WECARD (formed in 1987), led to the formation of FARA in 2002 as a successor to the Special Programme on Africa's Agricultural Research (SPAAR). Since then, FARA – as lead Institution mandated by the African Union Commission/New Partnership for African Development (AUC/NEPAD) and sub-regional stakeholders - orchestrated the formation and strengthening of an African stakeholder base to support implementation of CAADP Pillar 4. These are: Pan African Farmers' Organization (PAFO); Pan African Non-Governmental Organization Consortium (PANGOC); Council for the Coordination of Agricultural Research and Development in Southern Africa (CCARDESA); North Africa Sub-regional Organization (NASRO); Tertiary Education for Agriculture Mechanism-Africa (TEAM-Africa); the African Forum for Agricultural Advisory Services (AFAAS); and the Pan African Agribusiness and Agro-industry Consortium (PanaAAC).

<sup>4</sup> Global Agriculture and Food Security Program (GAFSP) Trust Fund



**Figure 1: FARA's Origins and CAADP Pillar 4 Stakeholders**

This effectively defined an African continental agricultural innovation system comprising the key knowledge domains consisting of research (ASARECA, CCARDESA, CORAF/WECARD, and NASRO), tertiary agricultural education and training (TEAM-Africa), extension and advisory services (AFAAS), private sector and agribusiness.

In this sense, Africa has perhaps one of the most clearly defined organizational architecture for continental agricultural engagement starting from the sub-national organizations (i.e. universities, research institutes, extension agencies, farmer organizations, and so on) to the supra-national organizations (ASARECA, CCARDESA, CORAF/WECARD, and NASRO), and, finally, the apex continental organization, FARA, that links up with the Global Forum on Agricultural Research (GFAR). Yet many of these public institutions tend to be underfunded and understaffed and therefore often unable to fulfill their mandate as facilitators of improved capacity development for agricultural innovation.

Many of the existing international and regional initiatives to improve CD in agricultural innovation are meant to be integrated into the overarching CAADP and its implementing institutions. These initiatives include for example innovation-promoting projects led by foreign aid agencies (DFID's [Research into Use Programme] RiU, Denmark's Universities, Business and Research in Agricultural Innovation [UNIBRAIN], USAID Feeding the future, etc), large public-private partnerships (e.g. AGRA, Grow Africa Initiative, AGORA etc), World Bank-led Programmes (e.g. Eastern Africa Agricultural Productivity Programme, EAAP), Western Africa Agricultural Productivity Programme, WAAP), South-South Projects led by Brazil and China (e.g. Agricultural Growth Corridors, ProSAVANA) and Africa-led projects such as The FARA's SSA Challenge Programme (SSA-CP). This is just a brief and very incomplete overview of ongoing projects that all contribute to capacity development in agricultural innovation but may not always be well-aligned with the CAADP goals that especially focus on the strengthening of capacities of national and regional agricultural innovation systems.

### **3.1.2 Review of the state of CD in the selected countries**

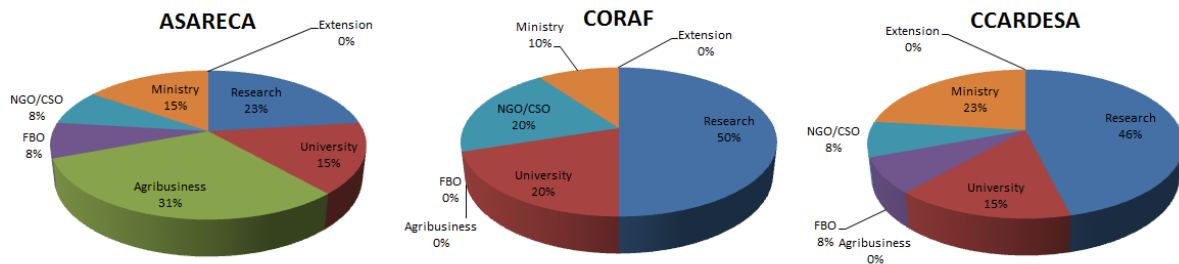
Although, almost all the African countries reviewed have national-level policies on agriculture, very few of them have specific interventions that directly deal with the development of innovations for or support of the smallholders at the rural farm level. Thus, the national policies have not been implemented to the grassroots level. This lack of focus on grassroots actions is considered to be a major bottleneck in Africa's agricultural innovation system. Even the transformational agenda of the CAADP may not achieve desired impacts unless there are clear channels and actions for cascading policies to the grassroots level. Exceptions include Benin, Malawi, Mozambique, Rwanda, Tanzania and Zambia. For instance, Mozambique has a strategic plan for agricultural decentralization, which if well implemented would promote extension outreach and involvement of many local farmers in the innovation process. Tanzania has a supportive Cooperative Act that facilitates small farmer group registration, while Malawi has a farm input subsidy policy. Rwanda, Benin and Zambia have specific R&D and innovation policies that promote collaboration, scale-up and private sector investments in agricultural innovations. There is reduced business red tape in Rwanda, which has a one-stop department for processing of all international business permits, i.e., the Rwanda Development Board. Furthermore, Benin, Rwanda and Tanzania have producer associations (FUPRO, IMBARAGA and MVIWATA, respectively) through which producers define their innovation needs, priorities and challenges. In Tanzania, various legal mechanisms exist for farmer group registration as cooperatives, associations or trusts and farmer forums are being established in Tanzania at ward, district and national levels and are empowered to procure and contract services. Mozambique has a land governance system that allows for strong protection of community-based land rights, promotes community consultation with respect to partnerships with investors, and secures rights to land for investors.

The FAO's Investment Centre Division (TCI) assists various African countries to develop their National Agricultural sector investment Programmes (NAPs) based on their national CAADP compacts. This is followed by TCI support to countries in formulating post-CAADP compact investment strategies, plans and programmes. TCI has collaborated with Ethiopia, Gambia, Malawi, Mozambique, Niger, Rwanda and Tanzania by facilitating the participation of producers' associations in the preparation of such plans and programmes.

### **3.1.3 Demand, gap analysis and identified capacity**

FARA invited 105 stakeholders across all three African regions to complete a questionnaire-based survey on the challenges and opportunities of the AIS in the region. 33 responded and returned the completed questionnaire. The response rates were very low in some countries (14.29 percent in Ethiopia, Kenya and Angola) to very high (100 percent in Lesotho, 71.43 percent in Zambia and Rwanda). The distribution of responses by the various stakeholder groups in each of the three sub-regions shows that in the ASARECA region the majority of responses were from private sector agribusinesses (see Figure 2). This stands in

strong contrast CCARDESA and CORAF/WECARD where there were no responses from agribusiness stakeholders. Perhaps this points to the relatively more advanced agribusiness subsector in ASARECA countries as compared to the other regions. Public research agencies and universities constituted the majority of stakeholder responses in CCARDESA and CORAF/WECARD.



**Figure 2: Stakeholder share of responses per sub-region in Africa**

The survey results in all three regions show that stakeholders perceive an inherent distrust in public-private-partnerships for R&D. They also consider it difficult to access technologies without Intellectual Property Rights (IPRs), and attract investment capital. These are considered to be factors that constrain private sector participation in CD for agricultural innovation. Moreover the private sector may only invest if it believes in the potential economic viability of an agricultural project.

Based on the responses of the stakeholders, the authors think that there is a need to repackage smallholder agriculture as a business instead of sticking to the current peasant nature of agricultural systems in many African countries. This would unlock potential innovations by private sector players.

The major challenges for innovations identified by the respondents of the stakeholder survey in all the three sub-regions can be broadly classified as: (1) resource endowments (insufficient access to innovation finance from financial institutions, high cost of new technology and equipment, lack of farmer training centres for distribution of e-learning materials in remote areas, and lack of communication infrastructure); (2) attitudes and mindsets (inadequate participation in innovation meetings, reluctance by farmers to use warehouse receipt system, negative cultural values towards new varieties, application of new technologies if tedious or laborious); (3) environmental (desertification and climate change); and (4) access to markets for value added products. These call for various remedial interventions, for example, institutional innovations to facilitate access to innovation finance and markets, capacity development to change attitudes and mindsets, and technical innovations to adapt to effects of climate change.

As indicated in Table 2, the opportunities that motivated innovations identified in the last five years include abundant natural resources, collaborative linkages, conducive investment policies, new markets for innovative products, innovation capacity and willingness to adopt innovative extension pathways such as e-extension.

Issue	ASARECA	CORAF/WECARD	CCARDESA
<b>Innovations</b>	<ul style="list-style-type: none"> <li>Review meetings on innovation awareness</li> <li>Banana product development and diversification</li> <li>Linking farmers with warehouse receipt systems</li> <li>Improved awareness on Sanitary and Phytosanitary standards</li> </ul>	<ul style="list-style-type: none"> <li>Irrigation skills</li> <li>New plant varieties</li> <li>Nature rehabilitation</li> <li>Transformation of aquatic plants</li> </ul>	<ul style="list-style-type: none"> <li>Drought tolerant maize and beans varieties</li> <li>Inclusive financing models</li> <li>Conservation agriculture</li> <li>Fruit processing</li> <li>New herbicides</li> <li>Better water utilization techniques</li> </ul>
<b>Challenges</b>	<ul style="list-style-type: none"> <li>Unwillingness by financial institutions to lend money for innovations</li> <li>Inadequate participation in innovation meetings</li> <li>Reluctance by farmers to use warehouse receipt system</li> <li>Lack of farmer training centres for distribution of e-learning materials in remote areas</li> </ul>	<ul style="list-style-type: none"> <li>Lack of communication infrastructure</li> <li>Desertification</li> <li>Language barriers</li> </ul>	<ul style="list-style-type: none"> <li>climate change</li> <li>negative cultural values towards new varieties</li> <li>high cost of new technology and equipment</li> <li>lack of markets for value added horticulture products</li> <li>application of new technologies is tedious/laborious</li> <li>poor institutionalization of the technologies</li> </ul>
<b>Opportunities</b>	<ul style="list-style-type: none"> <li>Abundant natural resources</li> <li>Friendly investment policies</li> <li>Many stakeholders interested in e-learning channels for farm extension</li> </ul>	<ul style="list-style-type: none"> <li>Diverse food preferences</li> <li>Natural resource base</li> </ul>	<ul style="list-style-type: none"> <li>Collaboration with international organizations</li> <li>Skilled staff</li> </ul>

**Table 2: Key innovations, challenges and opportunities in the last five years in three African sub-regions**

### 3.1.4 Identified Gaps

At country level, the regional producer organizations have succeeded to an considerable extent in having farmers represented in the CAADP roundtable processes. However, producer organizations do not appear to be actively engaged in determining research and extension priorities, except in some isolated cases.

Many interventions are small-scale with relatively high transaction costs, have limited impacts on the ground, and are often based on inadequate analysis of interdisciplinary needs and the demands of agricultural markets. Experience has demonstrated that enhanced coherence and stronger partnerships can improve the quality and impact of capacity development in innovation systems.

Although, almost all the African countries reviewed have national-level policies on agriculture, very few of them have specific interventions that directly deal with development of innovations to support the smallholders at the rural farm level. Thus, the national policies have not been implemented at the grassroots level.

Major obstacles in capacity development for agricultural innovation are: Lack of policy dialogue between government and private stakeholders, lack of Public-Private Partnerships (PPPs), lack of private sector incentives, rigid or high interest rates constraining access to business finance, property or land rights not conducive to commercialization of agriculture, lack of institutional and regulatory frameworks (especially under fragile political situations), import-based economies to the detriment of local products, and other policy and institutional issues constraining private sector investment. Human factors included poor mindset of private sector actor to participate in agricultural R&D and lack of long-term vision when it comes to the benefits of research.

### **3.1.5 TAP recommendations**

The FARA reports points out that according to the needs assessment, all three regions in the survey desire the reform of current public extension systems. Such a reform would not just improve CD in agricultural innovation, but also facilitate economic development in rural areas. Respondents in all regions preferred the provision of government incentives such as tax credits, matching grants, and joint-cooperation platforms to foster PPPs in innovations. This leads the authors to the following recommendations with regard to the three pillars of TAP.

#### ***On TAP Policy Dialogue***

- 1) Policy dialogue should revolve around the challenge of integrating smallholders and other value chain actors in the innovation process. This would include issues such as
  - a. Involving farmer groups and agro-based micro-enterprises in the design of technologies, for example through establishment of rural agri-technology hubs and agribusiness incubators.
  - b. Transferring the development of foundation technologies (e.g., foundation seeds) from public agencies to the private sector to encourage widespread entrepreneurial culture/up-scaling of agricultural innovations.
  - c. Intensifying policy monitoring and budget management for agricultural innovations.
  - d. Creating appropriate legislations to incorporate community-based extension workers in national extension systems, for example facilitate their registration/licensing to provide services.
  
- 2) Policy dialogue should be fostered on the facilitation of private sector investments tackling the challenges promoting private sector investments for agricultural innovations through:
  - a. Collaborative planning and implementation of research activities.
  - b. Development and enforcement of Memorandum of Understanding (MoU).
  - c. Provision of tax incentives (e.g., zero tax on inputs used by private firms that invest in technology development).
  - d. Transparency and consistency in policies that affect private investments.
  - e. Establish a recognition system for private entrepreneurs to invest in innovations as a core corporate social responsibility activity.
  - f. Develop an IPR system that safeguards innovations.

#### ***On TAP Marketplace***

1. A marketplace for capacity development should address major constraints in the Tertiary Agricultural Education (TAE) system as well as the national AIS. It would include efforts to
  - a. revise the content of agricultural courses in local institutions to offer more technical skills that can readily address emerging challenges such as climate change.



- b. provide continuous hands-on training to officials of regulatory authorities to improve their oversight role in the design and application of innovations.
  - c. package information on innovations and value addition in languages and formats that can be easily understood and applied by the smallholder farmers, especially those without formal education.
  - d. strengthen local agricultural education institutions' capacities to offer relevant and high quality advanced training (possibly at Ph.D and postdoctoral levels) in critical areas of agricultural innovations where such capacity is still lacking, for instance climate change science, natural resource engineering and value chain modifications.
2. Further examples recommended for individual and institutional CD under the "Marketplace" are:
- e. Building partnership and collaboration to enhance capacity to facilitate multi-stakeholder processes – farmers, researchers, extensionists, , university staff.
  - f. Creating communication skills to facilitate better cooperation among AIS stakeholders and value chain actors.
  - g. Coordination skills – programme coordination staff in government ministries; FBO leaders; researchers and university staff.
  - h. Designing infrastructure for innovation actors including research institutes, universities (could be at national or supra-national scales).
  - i. Customizing strategies of actor organizations to respond to national development needs.

***On TAPipedia***

TAPipedia should serve the following objectives:

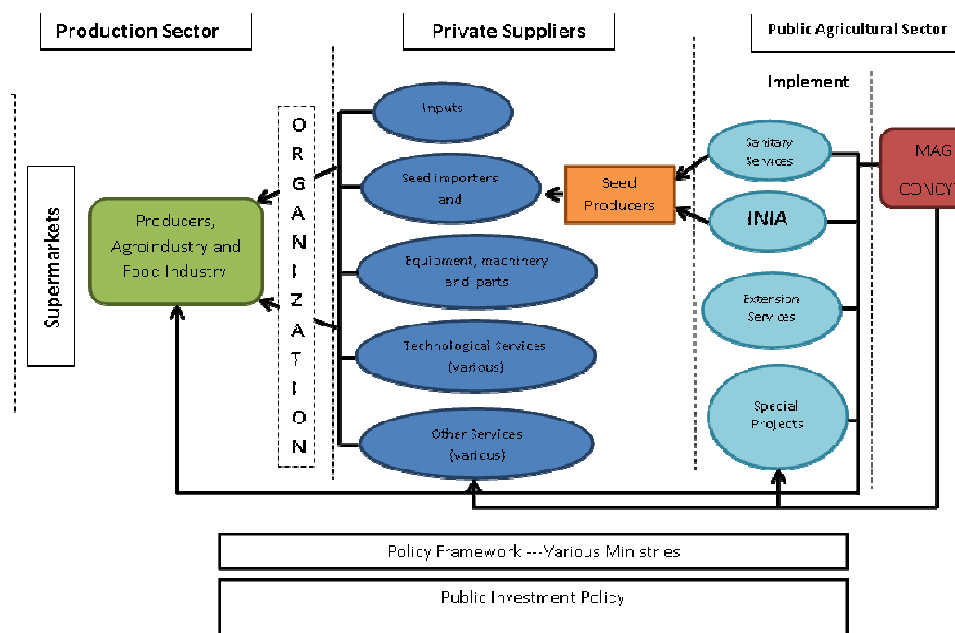
- a) Comprehensive assessment of extension and agricultural finance models in the region to outline successful approaches for adoption elsewhere.
- b) Exhaustive inventory of capacity offers or demands currently active in the African countries.
- c) Exhaustive inventory of agencies providing capacity development funding or technical assistance.
- d) Inventory of success stories on innovation in Africa and beyond to positive contagion elsewhere (this would need to be done and submitted to the TAPipedia repository).
- e) Inventory of all key organizational actors in each of the TAP countries and the major areas of their innovation activities (this would need to be done further and the submitted to the TAPipedia repository).

### **3.2. Central America report by CIAT**

In terms of population and land area Central America is comparatively small. But unlike the low-income countries assessed in the Asian region, the Central American region is a comparatively compact and homogenous zones. Belize, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, and Panama share a common history of Spanish colonialism and an ambiguous but economically important relationship with the USA. The region is therefore also characterized by similar cultural condition, a common geography and agroecological conditions - with humid tropics on the Atlantic side and dry tropics on the more populated Pacific side. In between the two areas are mountains of fragile lands, where most small-scale farming takes place. However, in terms of agricultural development there are significant differences. Whereas agriculture in some countries (e.g. Nicaragua, Honduras, Guatemala) still comprises a major part of the domestic economy and represents the most important employer in rural areas, the importance of the agricultural sector has diminished substantially compared to other economic sectors in countries such as Costa Rica and Panama. The socioeconomic relevance of agriculture in the domestic economy also determines the amount of government support that is spent on small-scale semi-subsistence agriculture, largely based on the production of food crops such as maize and beans.

Once rural livelihoods become less dependent on semi-subsistence agriculture, the promotion of a competitive and export-oriented agricultural sector gains importance in agricultural policy. In Costa Rica for example, the focus of agricultural policy (with the exception of rice) is on the integration of farmers into private-sector-driven global value chains mostly related to internationally traded agricultural commodities with the potential to process and commercialize added value products within the country (e.g. banana, pineapple, palm oil, sugarcane etc). Capacity development with regard to these products is mainly carried out by commodity-based organizations that bring together input providers, agribusiness, farm cooperatives, research institutes, post-harvest processors and retailers that all share a common interest in the improvement of the profitability of the agricultural product, as well as the reputation of the value chain in terms of social and environmental impact.

Figure 3 visualizes the basic idea behind this agricultural innovation system in which public sector institutions (sanitary services, research - National Agricultural Research Centers [INIA] , extension services) are primarily designed to support private sector institutions in their efforts to innovate and integrate into global value chains. The enabling environment for agricultural innovation must be provided by a Policy Framework that involves and commits all the relevant ministries and by a complementary public investment policy.



**Figure 3: Agricultural Innovation System in Central America**

Commodity-based organizations also exert political influence ensuring that government institutions and agricultural policies are supportive of their economic activities and their efforts to comply with regulation and standards. Interestingly, commodity-based organizations have also selectively strengthened capacity development within the National Agricultural Research Institutes (NARS) and universities, provided that they do research that is relevant to the respective business. At the same time, they have greatly contributed to the rise in income and employment in rural areas and thus to the reduction of poverty and the dominance of semi-subsistence agriculture in marginal rural areas. The fact that Costa Rica has reached the most advanced stage in commercial agriculture may also be related to its historical record as a country that has experienced political stability over a long period of time and where the colonial heritage of large-scale land appropriation by European immigrants in the fertile regions of the pacific coast and the push of the indigenous population into the marginal slopes of the Altiplano has been less of an issue. These historical conflicts in rural areas loom however largely in many of the other Central American countries, especially in Guatemala and El Salvador. In fact, apart from its vulnerability to climate change, the most serious challenge the region currently faces is political violence, mostly in the countries that have experienced civil war during the Cold War period. In a recent meeting in Guatemala the World Bank representative highlighted that in Central America eight percent of GNP is destined to cover the public and private security bill (Guatemala Investment Summit, 1 June, 2013). Corruption and violence are also significant deterrents for private sector investment in agriculture. However, despite these challenges, many of the Central American states were able to take advantage of special trade preferences offered by the United States to advance the production of non-traditional crops designed for exportation. Such crops

comprise vegetables, fruits and flowers and despite increasing competition from other developing countries they were able to hold their position in many markets thanks to innovation. The growth of non-traditional export crops has become an important source of income for semi-subsistence farmers that may still grow maize and beans for home consumption but also participate in contract farming with export-oriented agribusinesses and cooperatives. However, the compliance with public food safety standards in the importing countries continues to be a constraint where CD is highly needed. Even though a lot of public R&D in national and international research institutes has been spent on the improvement of maize and bean cultivation and even though many foreign aid agencies have spent a substantial amount in individual project-based capacity building in semi-subsistence agriculture, productivity and the rate of innovation in maize and bean cultivation has not grown much over the past decade. Capacity development especially on the policy and institutional level will be crucial to overcome the persistent dual agricultural economy in the region.

### **3.2.1 CD regional initiatives**

The report investigated the state of CD for agricultural innovation in Guatemala, Belize, San Salvador, Honduras, Nicaragua, Costa Rica and Panama. They are mostly found in the category of low and middle income countries and as such, can count on substantial amount of foreign aid (USAID, EFARD, CIRAD, COSUDE) to improve CD in agricultural innovation mostly channeled through regional bodies such as IICA and CATIE but also the regional branches of CIMMYT, CIAT, ILRI and FAO. Most of the CD projects funded on the regional and the national level are technical cooperation initiatives that focus on building the individual capacities of farmers and staff at public bodies. The tools are mainly training and the donation of equipment. The authors note that apart from some useful exceptions, there is a trend among foreign donors that each one works in isolation from others, which is often not conducive to a more coherent strategy of capacity development in agriculture across the region.

Central America is politically quite well organized at the regional level. The regional institutional framework include the Central American Integration System (SICA) which provides a base to avoid legal discrepancies between the member states; the Central American Trade Secretariat (SIECA) made up of trade ministers; the Council of Economic Ministers (COMIECO), and the Central American Bank for Economic Integration (BCIE).

In the area of agriculture, there is the Regional Organization for Animal and Plant Health which also includes Mexico, and the Central American Agricultural Council (CAC), both involving the ministers of agriculture (all these bodies have permanent secretarial units); and finally there is Regional System of Agricultural Research (SICTA) made up of the managers of the INIAs (or NARIs in English). SICTA has played a useful role in facilitating the dissemination of knowledge on relevant research issues and in the upgrading

of research staff at the INIAs. However, there is a strong need to rethink its role and functions and to include the participation of more actors beyond public research entities.

Policy dialogue on agriculture general takes place in the region within the CAC on specific sectoral policies (e.g. intraregional trade barriers. Joint meetings of agricultural, trade and health ministers have taken place to discuss issues related to the trade agreements). However the only mandatory regional agreements are those subscribed to by the economic ministers at the COMIECO, and by the ministers of trade at the board of SIECA.

In addition to these supra-regional governing bodies, several of the national agricultural producer-chain organizations have also created regional federations. They include FECAGRO, the umbrella organization that oversees the general interests of the agricultural sector, FECALAC that represents the dairy cattle and industry, FECESCABO representing the beef cattle and industry and APAVIC representing the poultry industry, among others. These organizations played an important role in the negotiations of the regional free trade agreements (CAFTA) and in the regional dialogue on health and food safety regulations.

### **3.2.2 Review of the state of CD in the selected countries**

Agricultural products, primary and processed, were, until the 1980s, dominant in the export portfolio. On average they now represent 45 percent of total exports with a much lesser proportion in Costa Rica (28 percent) and much larger in Nicaragua (89 percent).

Cropland use is distributed in the following way: Basic grains (maize, beans and rice), on average account for near 40 percent of cultivated land (60 percent in Guatemala). Export-oriented crops (coffee, sugar cane, oil palm, banana and pineapple) use around 45 percent of the cultivated land, with some variations among countries. Vegetables, cassava, fruits and other crops, add another 15 percent. Pasture is not included in this subtotal.

A very small proportion of the land under cultivation is irrigated, less than seven percent. The potential to improve productivity and producers income through water utilization and irrigation technologies is significant, especially with regard to basic food crops such as maize and beans and cash crops such as vegetables, fruits and flowers.

The high duality of the agricultural structure; a large dominance of small-scale hillside farming; climate vulnerability; absence of irrigation and related matters help explain why many Central American states have not been able to increase the productivity of basic food crops substantially.

So far, the NAIS in Central America have performed poorly in their efforts to increase CD for agricultural innovation. The reason behind the decline of NAIS in Central America in the provision of public agricultural services are the result of structural adjustment programmes during the debt crisis in the 1980s when public expenses for agricultural research and extension suffered great cuts. As a result many producers were left without any such services. On the other hand, producers that organized themselves managed to create cooperatives and private service programmes that proved to be more efficient than their public predecessors. The export-oriented sector also benefited from improved plant and animal health and food safety services.

Innovations and institutional arrangements were analysed in nine crop chains (beans, maize, rice, vegetables, bananas, coffee, cacao, sugarcane and oil palm) and in dairy production. In some cases innovation in one product included several aspects. For example, in the case of beans it included new seeds, seed inoculants, fertilization, planting density, seed density, and post-harvest packing. In dairy cattle, it included silvopastoral systems, small-scale silage, use of mineral supplements, clean milking, differentiated prices according to quality, etc. The completeness of the innovation used is referred in this study as the depth of innovations. The most commonly referred technological innovation was improved seeds. However, it was also reported that the lack of complementary relations with other recommended practices (such as fertilization and plant density), and a lack of support to develop local seed industries, did not allow for a deeper innovations and therefore a more complete benefit of using better quality seeds.

Regarding managerial innovations, there were also some related to managing the enterprise and others related to interaction with other actors. They included pricing for the different quality of milk; pricing for the different content of sucrose in sugar cane; planning vegetable plantings to take advantage of price seasonality; cooperative milk collection points; contract farming, and others.

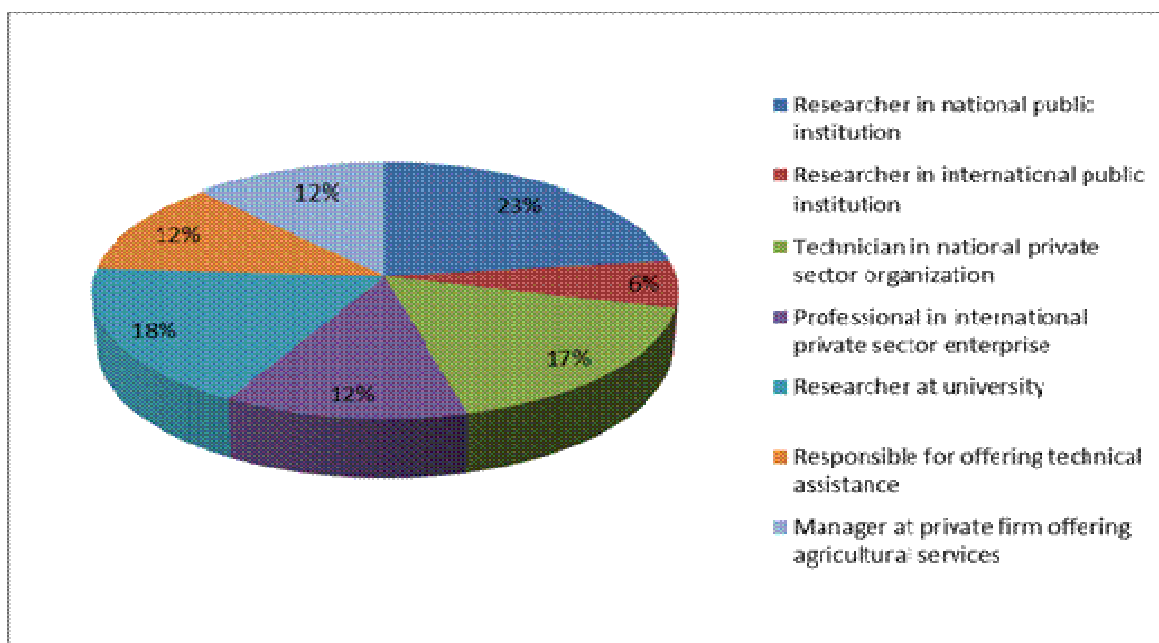
Generally, it is argued that leading firms in the agricultural value chains have played so far the most important role in building capacity for producers, farm cooperatives and local agribusiness to innovate and introduce food safety practices. For example, thanks to Wal-Mart's Tierra Fertil Program that offers guaranteed market access to small scale producers in Honduras, farmers rapidly increased their production and eventually led to a reduction of fresh vegetables imports in 2012 down one third of the level in 2007 (Wal-Mart, 2013). The cases not just of Tierra Fertil but also tilapia production in Costa Rica and poultry in all the countries provide important evidence about the great value of capacity building within vertical integration. Effective and business-oriented capacity development led to the reduction of transaction costs and an improved quality and dependability in the provision of services. In the cases of tilapia and poultry, the processing industry provides producers with breeding material, technical assistance, certified veterinary products and feed. Also in both cases, small scale producers who meet the requirements become part of

the value chain through contract farming (Pomareda, 2006). Some of the requirements include compliance with technical, crop and animal health and food safety related norms, and punctuality on delivery.

Neither universities nor national agricultural research institutes have taken any lead in any of these efforts to improve capacity development for agricultural innovation. They are largely de-coupled from market-driven private sector activities. The passive role of NAIS is considered to be strongly linked to incoherent sectoral policies that are managed by many authorities, including the ministries of agriculture, trade, and environment. All of them have important influence but often diverging interests; this does not contribute to an enabling environment for capacity development for agricultural innovation even though the lack of institutional capacity is generally recognized as one of the major obstacles in efforts to increase productivity in agriculture, as well as the quality of its processed output. It also hampers the depth of innovation where innovation has already been successful in one area but would need to be accompanied by innovation in another area to enjoy the full positive impact (e.g. improved seed varieties may also require new forms of nutrient management).

### **3.2.3 Demand, gap analysis and identified capacity**

The CIAT group designed a questionnaire for its regional survey that slightly differed from the questionnaires administered to stakeholders in Africa and Asia. Figure 4 reveals the institutional and professional affiliation of the 33 respondents that completed the questionnaire (from a total of 100 stakeholders contacted). The sample was taken at random from the original file provided by SIDE, the International Services for Agricultural Enterprise Development, and included persons in seven groups of actors: working at a national public institution, international public institution, private sector organization, international private sector enterprise, university, supplier of technical assistance and managers of private firms in agriculture. Private sector organizations included representatives from producers at several scales and dedicated to different products.



**Figure 4. Current activities of actors who responded to the questionnaire in Central America**

Their respondents' assessment of AIS indicate that innovation has taken place in Central America but mainly with regard to the improvement of genetic material for higher yields and better quality of products, and to some extent better soil and water management techniques. A major concern is the limited rate of adoption of innovations. A majority of stakeholders believes that one reason for that is the doubt that the type of innovation created is not sufficiently resilient to cope with weather instability and resistance to adverse climate conditions. Other reasons for the low adoption rates are considered to be: the reluctance of farmers to follow recommendations made by advisory services (often neglecting the complementary aspects necessary to improve the impact of innovation), the ill-equipped state of extension and support services for producers and the lack of consideration of traditions and culture preferences (in the case of beans, local seeds are preferred because of tolerance to weather instability, reduced cooking time and better taste of the product). Market-driven alliances and partnerships along the value chain are considered to be the best approach to tackle to the lack of adoption of innovation, combined with improved support services for farmers and communication that makes use of farmer language.

As for the assessed importance of institutions in the AIS, the universities and national agricultural research centers rank very low and even international agricultural research centers do not seem to have significant influence on policies that are relevant for the creation of innovation in agriculture. The limited participation on the part of these groups of organizations is due to their lack of involvement/ability to contribute to a useful information base for policy makers in the area of CD for agricultural innovation. Many academic institutions also tend to confuse policy advice with politics and therefore believe that they should not get involved.



In turn, integrated-value chain and commodity-based organizations are considered to be the most influential actors according to the respondents of the survey. They have been influential on government decisions regarding policies on agricultural health issues, taxation of revenues from agriculture land taxation. Regarding participation in market interactions, the most active participants are the dealers of inputs and seeds, who rely strongly on advertising. Local producer organizations and cooperatives have moved significantly in this field as in the cases of dairy and coffee.

### **3.2.4 Identified gaps**

The regional needs assessment in Central America finds that institutional capacity to implement policies that enable agricultural innovation is limited. It emphasizes the need to review policy instruments to cope with new challenges.

The authors note that innovations along value chains reveal important CD arrangements that are driven by market opportunities. Such innovations helped to increase not just agricultural productivity but also the quality of the output, especially in the area of dairy, coffee and sugarcane. It constitutes a pull effect exercised by all actors in the value chain and resulted in great advances in capacity development for agricultural innovation. Complementary roles are played by various other institutional actors that are linked to national and regional agricultural innovation systems. Yet, these AIS are largely underperforming. Budgetary limitations often hinder AIS institutions to become more active in the creation of innovation that meets the needs of small-holders who are not yet integrated into a global value chain. Innovation that meets the need of smallholders would also require to tap the knowledge and investment from the private sector. Yet, government policies do often not provide sufficient incentives for the private sector to invest in agricultural innovation with a high public good character.

In relation to the functioning of a national AIS, the capacity and role of the NAIS to stimulate and facilitate interaction between actors is very limited; alternative entities must be created for this role. Limitations in capacity are also evident among other actors in the NAIS, such as universities, affecting their effective participation. Among the weaknesses in the systems is the absence of facilitating mechanisms such as innovation platforms and of financial mechanisms, such as venture capital, competitive funds, among others.

With respect to individual capacity created within the regional agricultural research system, some institutions have made valuable contributions to the development of human resources for research and education, with beneficiaries from all Latin American countries and some from other countries. Also, the

outputs of research are well-recognized throughout the region. SICTA has played a useful role in facilitating the dissemination of knowledge on relevant research issues and in the upgrading of research staff at the INIAs. There is however a strong need to rethink its role and functions. The system has to become more responsive to the needs of farmers, farm cooperatives and agribusiness. For that purpose it must include the participation of more actors beyond public research entities. This would address the crucial lack of institutional capacity for agricultural research and innovation and thus create great value for small-scale as well as large-scale agriculture. Institutional capacity needs however to become a top item on the political agenda and implementing institutions need to have the personnel with the required qualifications.

International cooperation in agriculture, especially in the form of regional and national projects, is abundant and dispersed. It has been of help in improving the capacity of personnel, facilitating mechanisms for interaction among the national agricultural entities, and contributing to the quality of research. However, there is no strategy, nor evidence, that the capacity of public and private sector institutions has been improved thanks to the contributions of the agencies and projects related to international cooperation in agriculture.

### **3.2.5 TAP recommendations**

Based on their needs assessment for Central America, the authors of the report suggest the following recommendations for the three pillars of TAP.

#### **On TAP Policy Dialogue**

- 1) Considering the many policies influencing agriculture and food supply and particularly innovations in agriculture, governments would benefit from creating public-private agricultural councils, in which the relevant ministers participate. Leadership could be provided at presidential level for the council to have political influence and the Minister for agriculture could lead the Secretariat.
- 2) As a result of the dialogue, governments must define the most essential policies and commit public resources to high quality strategic research in public entities, together with support for other actors through competitive funding for research, leading to public goods.
- 3) There should be pressure for research to respond better to the needs of those most dependent on agriculture. Attention on this matter must reach the highest authorities and leading producer organizations.
- 4) Dialogue and action should be taken soon, in order to shift international cooperation from technical assistance to well-conceived programmes that contribute to improve institutional capacities, including improved management, equipment, resources, planning and evaluation systems, hiring of qualified personnel and paying better salaries and providing incentives, etc.

### **On TAP Marketplace**

- 1) Fostering innovations in agriculture happen in the context of a changing scenario, where communications and market relations play a major role at national and global level, and where multiple actors have much to contribute. Thus, promoting interaction, partnerships and technology related business must be encouraged.
- 2) Recognizing the low capacity of the NAIS, an option is to create a public-private innovation council with a technical secretariat within NAIS, and with a more profound view of market relations. For this purpose, guaranteed government funding, as well as partners' contributions and commitment, must be assured and followed up to evaluate results.
- 3) Mechanisms must be created that allow more intensive participation of actors in the NAIS, including competitive funds, platforms, networks that are not limited to researchers in public entities, and incentives for cooperation among actors in the value chains, with others in the NAIS.

### **On TAPipedia**

- 1) Public agricultural sector entities and producer organizations should extensively share innovations in agriculture. Those referenced in this study in the case of Central America are only a sample of the many alternatives and cases.
- 2) Advance documentation of costs and benefits must be made to improve the credibility of recommendations. Using renewed methods to extend knowledge like ICTs with a higher quality of useful information requires much support, especially to reach more actors. Encouraging young people into small agricultural businesses and molding children on positive attitudes towards agriculture and nature has proved useful and must be pursued.

The authors suggest the TAP Secretariat to convey a Task Force that makes use of the suggestions made in the regional needs assessments by converting them into a common framework for action on CD development for agricultural innovation. This Task Force should further generate a strategy and to seek adequate funding, including seed money to promote country level strategies and investment programmes in close relation with the government ministries. Their effort needs to be heard by the core decision makers in the relevant national authorities, as well as Ministries of Planning and Ministries of Finance, as improving institutional capacity requires funding, not usually included in current allocations.

This Task Force could use existing Fora to gain support. This includes for example the FAO Regional Conferences, the banks' annual meetings, the Interamerican Board of Agriculture (conveyed by IICA) and others. However, most important is to have first an action plan. The Task Force would benefit from communicating its message at key country level Fora for discussion on these issues.

**A final comment:** The International Service for National Agricultural Research (ISNAR) had a mandate on assisting countries to build agricultural research. The research and innovation systems have evolved substantially. A renewed approach is necessary. ISNAR has not been replaced by a substantive effort to support the development of agricultural innovation systems within the scope of the challenges ahead, and there is a gap in international cooperation on these aspects. Therefore, the suggestion made regarding a Task Force to make proposal on this matter is commended.

### **3.3 Asia report by SEARCA**

The regional needs assessment conducted by SEARCA has taken stock of ongoing CD development initiatives in Bangladesh, Cambodia, Timor-Lest, Laos and Myanmar and discussed the national and regional challenges and opportunities of CD in agricultural innovation in the light of the results of the stakeholder perception survey conducted with national and regional stakeholders.

The current state of CD in agricultural innovation and the contribution of national agricultural innovation systems in these low-income countries must be understood in the regional context that is largely shaped by the fast growing emerging economies interested in trade, exchange and South-South collaboration on numerous sectoral issues.

The economic rise of Asia has substantially reduced poverty and increased agricultural productivity substantially in many countries in the region. While the population in the region is still growing, it is the increasing affluence of its people that increasingly shapes the demand for food, feed, fiber, and fuel, and farmers are responding correspondingly to this new demand, not just in Asia but also in the rest of the world. One reason for the economic success of Asian countries such as China, Malaysia, South Korea, Thailand and Viet Nam is that they gradually moved away from socialist and military regimes that were largely focused on controlling, regulating and planning the domestic economy towards more open systems of economic governance in which the government nevertheless continued to play a crucial role not just as a regulator but also as a market player and facilitator of economic and technological change. This shift was also crucial in the transformation of agriculture from a centrally-organized food distribution system towards a more market-oriented agricultural system that responded to government incentives and market signals. This transition improved capacity development on the policy, the institutional and the individual level and eventually led to more responsive AIs and resulted in substantial productivity increases in agriculture and the reduction of rural poverty.

### 3.3.1 CD regional initiatives

The growing economic performance of the emerging economies in the region has led to increased regional economic integration and South-South collaboration in efforts to sustain growth, as well as to regulate transboundary challenges resulting from regional growth. The recognition of the value of trade and exchange for human development in the region has manifested itself in the growing importance of regional bodies such as the Asia-Pacific Economic Cooperation (APEC), Asian Free Trade Agreement (AFTA), Association of Southeast Asian Nations (ASEAN), the ASEAN Economic Community (AEC) 2015<sup>5</sup>, and the Southeast Asian Ministers of Education Organization-Southeast Asian Regional Center for Graduate Study and Research in Agriculture (SEMEO-SEARCA) to cite a few. They are poised to prepare the stage for growth and development in the Region. However, despite this progress, there are still many low-income countries in the Asian region where the majority of the population still lives in poverty and where agricultural transformation has been more slow mainly due to lack of capacity at the policy and the institutional level to address the constraints related to the creation and adoption of agricultural innovation. There are no regional initiatives that cover exclusively the low-income countries in the South and Southeast Asian region and the existing initiatives are largely reflecting priority areas of emerging economies.

Various international funding and donor agencies are however significantly contributing to capacity development in agricultural innovation system in these low-income Asian countries. Foremost it is FAO that has contributed extensively through financial, policy and technical assistance in agriculture as well as the Asian Development Bank, the World Bank, USAID and the EuropeAID. SEARCA itself is involved in many ARD initiatives in Asian low-income countries.

SEARCA has established strategic partnerships to promote the responsiveness of the Tertiary Agricultural Education (TAE) system. It includes a University Consortium comprising of a network of five leading agricultural universities in Southeast Asia, with four associate members in Canada, Australia, Germany, and Japan and its collaboration with the Asian Association of Agricultural Colleges and Universities (AAACU) – a network of agricultural colleges and universities in Asia. SEARCA has also recently linked with Agreenium, a consortium of institutions in France working on research and training in agriculture, food production, animal health and the environment. Finally SEARCA is also an International Development Research Centre (IDRC) partner in the implementation of the project ‘Southeast Asian Fellowships for Upland Agriculture and Food Security’. The project is focused on the development of agriculture for the uplands of Southeast Asia including Viet Nam, Cambodia and Laos. Under its institutional development assistance, it is supporting

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<sup>5</sup>The ASEAN Economic Community (AEC) strives towards regional economic integration by 2015. AEC envisages (a) a single market and production base, (b) a highly competitive economic region, (c) a region of equitable economic development, and (d) a region fully integrated into the global economy.

curriculum review and development and strategic university planning for agriculture and rural development with three universities in Myanmar, Laos, and Cambodia.

### **3.3.2 Review of the state of CD in the selected countries**

This regional needs assessment by SEARCA in Cambodia, Lao ,Myanmar, Timor-Leste and Bangladesh is primarily focused on external actors that are committed to assist these LDCs in their efforts to improve CD in agricultural innovation. As such they heavily rely on foreign aid in their efforts to promote agricultural development. Foremost donor organizations like the Asian Development Bank (ADB), the World Bank, European Commission (EC), FAO and other United Nations Agencies, and the United States Agency for International Aid (USAID). Moreover, the United Nations Development Assistance Framework or UNDAF, a joint agreement between the UN and the recipient country, is present in all countries except in Timor-Leste.

Agriculture is the economic backbone in all five countries and the largest source of employment. Yet, unlike many of the more advanced economies in the Asian region, these countries have failed to become export champions of agricultural commodities and continue to be net-food importing countries (Valdes and Foster 2012), which makes them vulnerable to global peaks in food prices. Its smallholder farmers are most vulnerable to climate change, not well organized as stakeholders in the domestic economy, have poor access to agricultural support (the input supply and markets), entrepreneurial and advisory services, agricultural training and education institutions (weak research- farmer-extension linkages), and a dearth of dynamic farmers' organizations. All this explains the prevailing low productivity levels in agriculture. Moreover, the agricultural innovation system in these countries is largely heteronomous in nature. Initiatives to promote agricultural innovation hardly ever emerged from the bottom-up. They are either government-led or initiated by foreign institutions and then carried out through local partners. Some of the largest initiatives to strengthen capacity development for agriculture have been established by the Asian Development Bank, The World Bank, FAO, AusAid (Seeds of Life 3) and USAID (Feed the Future). Many of these rural development programmes are also dedicated to support the empowerment of women with the private foundation CARE taking the lead in gender capacity development. Yet, despite the strong presence of foreign aid and international institutions in support of agricultural development, capacity development in these countries remains uncoordinated and mostly focused on training of farmers and farm cooperatives. When it comes to strategies to ensure food security, low-income Asian countries tend to rely heavily on government planning and relatively little attention is given to the role of agricultural innovation systems and the improvement of policy and institutional capacity in the agricultural economy. This is well illustrated by the fact that the Asian rice economy and rice trade is largely run by public sector agencies

rather than the private sector. This however did not prevent the rice price to increase four-fold during the first major food crisis in 2008.

Timor-Leste and Myanmar are both special cases. Since Timor-Leste's independence in 2002, Australia has been its largest development partner contributing the creation of civil and government institutions in the formerly war-ravaged country. The focus of AUSAID over the past three years has been on investment in agricultural development<sup>6</sup>. As for the creation of capacity building for agricultural innovation, the Government of Timor-Leste has focused on Building Agribusiness Capacity (the BACET project). It offers supplementary training in agribusiness skills through a one-year, postsecondary certificate programme (The World Bank 2012). Myanmar is in a process of transition from an isolated authoritarian socialist regime to a more open market-oriented and democratic country. This has given rise to the introduction of reforms such as lifting controls over prices and domestic trade in rice and other major crops, abolishment of subsidies on agricultural inputs, and establishment of border trading. However many of the reforms are incomplete and have not always resulted in the expected economic benefits for smallholders due to basic lack of dependable tangible (e.g. infrastructure, power) and non-tangible infrastructure (e.g. business advisory services) (ADB 2012, IFAD 2011). The agricultural innovation system seems to play a subordinate role in capacity development provided in Myanmar where commodity associations such as the Myanmar Rice Industry Association (MRIA) and the Special Agricultural development Companies (SAC), established as rural township enterprises, seem to be most engaged in the support of farmers with input (Dapice et al. 2010).

### **3.3.3 Demand, gap analysis and identified capacity**

The questionnaire-based stakeholder survey was completed by 71 respondents (three from Bangladesh, eleven from Cambodia, five from Laos , 25 from Myanmar and 17 from Timor-Leste). The results show that most stakeholders involved in capacity development for agricultural innovation think that the lack of facilitating policies to promote capacity development in agriculture is the most serious constraint in efforts to make the national agricultural innovation systems more effective and farmer-oriented. The prime concern is followed by the perception that there is a lack of private sector involvement in the national agricultural economy. This concern is again linked to the first concern that often discourages private sector investment. It may indicate that too much public sector and donor activities in rural areas may lead to a crowding out effect of private sector activities, especially if governments focus primarily on the regulation of the agricultural economy rather than the facilitation of economic and technological change in agriculture. Different stakeholders that are perceived to play important roles in innovation enhancement

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<sup>6</sup>See [http://www.usaid.gov/our\\_work/cross-cutting\\_programs/eastasia/timor-leste/Pages/default.aspx](http://www.usaid.gov/our_work/cross-cutting_programs/eastasia/timor-leste/Pages/default.aspx)

include public advisory extension services, national research institutes, and domestic private sector. There are very low expectations regarding the contribution of universities to NAIS.

Stakeholders considered innovation in the areas of agro-ecological techniques, biotechnology and solar technology to be very important, especially with regard to the need to increase agricultural productivity, environmental management and food quality. Platform technologies, such as biotechnology and information technology, that have resulted in low-cost and user friendly products (mobile phones, tissue culture laboratories) are perceived to have a positive environmental, economic and social influence. Respondents also found that institutional/management innovations such as government policies that enable provision of extension services, technology, microfinance, business mentoring could best help address perceived challenges among NAIS in the countries studied. Important tools to encourage PPP included government incentives (matching grants, tax credits, etc), joint cooperation platforms, and presence of national marketing boards.

### **3.3.4 Identified gaps**

The surveyed countries continue to be net-food importing countries despite numerous external actors involved in the provision of capacity development for agricultural innovation. This indicates that there might be a misalignment between current CD interventions and the effective needs for CD on the demand side representing farmers, farm cooperatives and agribusiness. Many of the ongoing CD projects have increased efforts to integrate small-scale farmers and especially women into market-driven value chains and thus increase income and employment opportunities. These projects may have to draw more on private sector expertise.

The authors of the regional assessment conclude in accordance with the results of the stakeholder survey that the NAIS must become more responsive to private sector needs in agriculture (e.g. supporting farmers, farm cooperatives and agribusiness with tangible and intangible goods and services that help them to increase productivity and participate in value chains) and increase their ability to innovate in collaboration with farmers to address the numerous environmental, agricultural and economic and social challenges.

### **3.3.5 TAP recommendations**

The SEARCA Report suggests that capacity development of the various actors in agricultural innovation among the surveyed low-income countries should focus on the following areas: 1) organizational and management skills at central and local levels; 2) curriculum, agricultural/vocational and extension education; 3) research and extension services; 4) micro-finance and small and medium-term enterprises; and 5) the supply and value chain development.



### ***On TAP Policy Dialogue***

The authors suggest that the TAP policy dialogue revolves around identified demand gaps in the different policy and institutional level, as well as in the individual levels:

The challenges on the policy and institutional level are

1. To develop an integrated framework that makes AIS also a platform for knowledge management, knowledge exchange and sharing within the Asian Region.
2. To make use of lessons learned from different agricultural initiatives in the region and to improve facilitating policies that encourage demand-oriented agricultural research activities and development programmes.
3. To mobilize networks comprising national AIS actors in each country and regional stakeholders to develop regional initiatives and regional development programs that are focused on capacity development for agricultural innovation. This could also include the provision of evidence-based advocacy campaign to key policy decision makers both in the national and regional levels.

### ***On TAP Marketplace***

The TAP Marketplace should mainly function as a broker that facilitates partnerships for effective capacity development by matching offers and demands for capacity development services in tropical agricultural innovation leading to scaling up of existing efforts and fostering knowledge sharing among countries and organizations. Furthermore, innovation platforms could bring various stakeholders together and address the currently weak linkages among various actors in the joint effort to respond to farmer needs with innovation services.

### ***On TAPipedia***

TAPipedia can enhance knowledge exchange among the numerous stakeholders involved in CD for agricultural innovation through the creation of learning resource base for capacity development.

## 4. CONCLUSIONS, RECOMMENDATIONS AND ACTION PLAN

### 4.1 Conclusions

The three regional needs assessments reviewed the main stakeholders involved in the national and regional AIS, discussed the institutional and political climate for capacity development in agricultural innovation, and identified capacity levels and needs through surveys of relevant stakeholders at national and regional levels.

The challenges and opportunities of CD in agricultural innovation were found to be very different in each of region. In principle the regional and national AIS share a vision of serving the production sector by responding to capacity needs, but the implementation record is often mixed. Many actors within the AIS play a rather passive role, which is also related to budget limitations and lack of government incentives to innovate over the past two decades. This was noted in all three reports. Even though funding for AIS actors increased after the first global food crisis in 2008, the regional reports pointed out that most of this funding did not go into new research and extension projects or programmes but was mostly spent on urgently needed salary increases and the restoring of AIS infrastructure.

Generally, many of the institutions involved in agricultural research and extension are highly dependent on development assistance and hardly autonomous. This limitation was particularly reported in the LDCs in the Southeast Asia assessment. CD projects in these countries were mostly funded by external actors and then carried out in collaboration with local NGOs or government agencies. The report on Africa highlights a similar dependence on foreign funding in the field of CD for agricultural innovation, even though the CAADP framework endorsed by the African Union Assembly in 2003 is an Africa-owned and led initiative that represents a shared vision for sustainable growth in agriculture and a willingness for collective action.

However, many of the concrete positive examples of CD in agricultural innovation in Africa are related to public-private sector initiatives which CAADP welcomes as long as they contribute to the shared vision. These initiatives include innovation-promoting projects supported by development assistance agencies<sup>7</sup>, by public-private partnerships<sup>8</sup>, by the World Bank<sup>9</sup>, by South-South Projects led by Brazil and China<sup>10</sup>, and by Africa-led projects such as FARA's Sub-Saharan Africa Challenge Programme (SSA-CP). Countries such as

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<sup>7</sup> e.g. "Research Into Use" from DFID; "Universities, Business and Research in Agricultural Innovation" (UNIBRAIN) from Denmark; "Feeding the Future" from USAID etc

<sup>8</sup> e.g. Alliance for a Green Revolution in Africa (AGRA), Grow Africa Initiative

<sup>9</sup> e.g. Eastern Africa Agricultural Productivity Programme (EAAP) and Western Africa Agricultural Productivity Programme (WAAP)

<sup>10</sup> e.g. Agricultural Growth Corridors, ProSAVANA

Benin, Malawi, Mozambique, Rwanda, Tanzania and Zambia have made an effort to improve the enabling environment for public-private partnerships through policy reforms in selected areas. Yet, considering that these African countries mostly fall short of meeting the benchmarks set by CAADP, more reforms may have to be undertaken to increase business opportunities for smallholder agriculture through enhanced private sector innovation and investment. In this context, the survey respondents in Africa identified four major challenges in efforts to unlock innovation for agricultural development: (1) resource endowments<sup>11</sup>; (2) attitudes and mindsets<sup>12</sup>; (3) environmental challenges such as desertification and climate change); and (4) access to markets for value added products.

The fourth challenge is also strongly emphasized by the authors of the regional needs assessment in Central America. They argue that innovations are driven by market opportunities, and commodity-based organizations that enable farmers to integrate into global value chains may contribute more to CD in agricultural innovation than the national and regional AIS at this stage. The authors see market forces as a constitute pull effect that encourages farmers to acquire capacities in agricultural innovation. AIS actors could potentially play an important complementary role by focusing on the integration of the more informal and less productive semi-subsistence farming sector that still relies on the production of beans and corn mainly for home consumption. Yet the AIS system in Central America faces budgetary limitations and lack of expertise/incentives to effectively collaborate with the private sector in the field of agricultural innovation.

Even though the authors of the Asia report praise the numerous efforts of various external actors to improve CD in agricultural innovation, the respondents of the survey in Southeast Asia indicated gaps. They reported a lack incentives to innovate, a lack of a clear innovation strategy in public policy, distrust in public-private partnerships, and a lack of private sector investment in agriculture. This indicates a risk that numerous externally-funded public sector initiatives may lead to a crowding-out of private sector investment and innovation in agriculture.

In view of the rather passive role of the AIS in Southeast Asia, a shift of capacity development for agricultural innovation from public to private sector organisations can be observed, as in the case of Central America. This seems to be especially the case in Myanmar where commodity associations such as the

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<sup>11</sup> e.g. Insufficient access to innovation finance from financial institutions, high cost of new technology and equipment, lack of farmer training centres for distribution of e-learning materials in remote areas, and lack of communication infrastructure.

<sup>12</sup> e.g. inadequate participation in innovation meetings, reluctance by farmers to use warehouse receipt system, negative cultural values towards new varieties, application of new technologies if tedious or laborious)

Myanmar Rice Industry Association (MRIA) and the Special Agricultural development Companies (SACs) established as rural township enterprises are most engaged in the CD support of farmers.

The consequence of the general neglect of AIS system in the less developed countries in the three regions is a pronounced two-track agricultural economy that is characterized firstly by a large informal farming sector with little growth potential and secondly by a relatively small but highly competitive formal sector that is growing rapidly through agricultural trade and innovation. The informal sector is dominated by semi-subsistence farmers who are assisted by a public system of agricultural extension that hardly responds to the real CD needs in agricultural innovation. The formal sector, in turn, is largely organized through private initiatives to upgrade CD to an extent that enables producers to comply with the strict business requirements of a growth-oriented and innovative agricultural sector. This also explains the success of privately-organized commodity-based organizations in CD for agricultural innovation in Central America and selected Asian countries and innovative forms of public-private partnerships in the African region. Least-developed countries in the Asian region benefit from a large amount of CD projects funded through development assistance that are mainly focused on improving resilience and livelihoods of small-scale farmers. But the main drivers of value chain integration tend to be agricultural investors from emerging economies in the region.

These trends do not suggest that national AIS actors have insignificant roles in assisting producers in the informal sector to improve the quantity and quality of their production and eventually benefit from integration into larger value chains that encourage innovation. But such producers need to be assisted not just through the development of their individual capacities, as has been the predominant focus in international assistance to date, but through a coordinated effort by the public and private sectors to improve capacities of the enabling environment and organizations related to agricultural innovation. AIS need to have incentives to seek and sustain more collaboration with private sector institutions. In addition, the private sector may need more policy incentives to work with actors in the national AIS and in the international development arena to enhance CD interventions. All this would create an enhanced awareness that the ultimate clients of the AIS are the producers, producers' cooperatives and agribusiness that face obstacles in their efforts to enhance agricultural practices, adopt innovations and improve their post-harvest management and marketing skills in order to generate more revenues and employment for their respective community. It would also help to create a different mindset among AIS actors, as well as the TAE systems that business opportunities in agriculture are necessary to promote agricultural development, reduce poverty and promote the empowerment of men and women in rural areas. These insights are in line with the findings of previous reports on CD in agriculture in less developed countries and largely confirm the call of the interagency report of the G20 for the creation of an enabling environment for agricultural innovation on national, regional and the global levels.

## **4.2 Identified constraints in CD for agricultural innovation**

Three major groups of constraints which were manifested to a greater or lesser extent in all the regions analyzed could be identified from the conclusions in the previous section, which were drawn in turn from the regional assessments and the key literature at global level.

- 1) **CD interventions from internal and external actors are not sufficiently targeted to meet the AIS capacity needs of tropical countries.** This first group of constraints refers to the way that capacity development is planned. The previous section has shown that both internal and external initiatives to develop agricultural innovation capacities are not effectively targeted to meet the needs articulated by actors at local level including producers, cooperatives, and agribusiness. Many interventions are based on inadequate analysis of interdisciplinary needs and the demands of agricultural markets. This poor targeting is partly caused by the absence of specific national, provincial and institutional strategies and plans that could direct such investments, which in turn leads to approaches with too narrow scope or with poor coordination at local level (as per the second constraints group). Key stakeholder groups such as the private sector are often not involved in the policy and decision-making processes that lead to the design of investment plans. A specific example of a systemic constraint is the lack of responsiveness of TAE systems in LDCs to the needs of the production sector, which is manifested in outdated curricula for degrees and postgraduate courses, as well as Technical and Vocational Education and Training (TVET) that do not imbue the skills required for professional development. In addition, CD interventions often use poor methodological approaches to the assessment of needs that reduce the likelihood of sustainability and impact, as embodied in the development effectiveness approaches endorsed through the Busan Agreement.
- 2) **CD interventions are frequently implemented independently from each other and are often too small in scale, narrow in scope, and neglecting institutional and organizational capacity dimensions.** This second group of constraints refers to the way that CD is implemented. The regional reports highlighted the large number and variable composition of CD interventions from international, regional and national levels, and the reports noted that these were not linked or coordinated when they might easily have been. Especially in Africa, there is a significant risk that unconnected engagements with separate external investors and actors absorb significant amounts of local resources and time, which can prevent country officials from convening the relevant domestic actors in the AIS to facilitate collective streamlined action for capacity development of AIS. The lack of collaboration between external actors is recognized in the CIAT report that makes the following observation which also relates to the first group of constraints: *“International cooperation, especially in the form of regional and national projects is widespread. It has been helpful in improving the capacity of personnel, facilitating mechanisms for interaction and contributing to the quality of research, but there is not yet a strategy, nor is there*

*evidence of having improved the capacity of public and private sector institutions*". In addition, all three regional reports state that many donor-led initiatives focus on development of individuals' capacities, through training etc, while in fact AIS systems in the least-developed countries in the tropics have weak institutional and organizational capacities. Domestic AIS institutions, and especially areas without any institutional capacity, often do not receive the support they require to improve the enabling environment for investment in AIS and CD in agriculture as a whole. In fact, there are too few mechanisms at country-level to provide the required coordination between locally and internationally-driven investments, and too seldom are appropriate approaches to CD used to ensure that interventions are appropriately structured and balanced in line with established good practice.

- 3) **Lack of high-level political and operational mechanisms to coordinate interventions for capacity development in tropical AIS.** This third group of constraints relates to the governance of CD interventions in support of AIS, which has several dimensions. The international development community contributes significant investments in this area, driven by political commitments between governments and international agencies/actors. Initially, the G20 support for the TAP rested partly on the premise of a perceived weakness in governance of external interventions in less developed countries, a constraint which has been validated repeatedly in the international literature. Governments in the LDCs especially in Africa are not benefiting sufficiently from the important lessons learned by the principal emerging economies such as Brazil, China, and India on how to create enabling environments which facilitate change in AIS.

### ***4.3 TAP response to identified constraints and recommendations for action***

Many actions already exist to address these constraints. There has been a shift toward more diversified approaches to CD in agricultural innovation. Previously, CD initiatives in AIS were predominantly public-sector-driven with an emphasis on theoretical approaches and social planning, and now there is a noticeable trend towards more experimental forms of public-private partnerships and South-South collaboration to enhance CD of AIS with the aim of enabling farmers to integrate into global value chains. The financial sustainability of these initiatives is often higher because farmers are encouraged to be entrepreneurial and innovative with the prospect of enhancing and diversifying their income. These initiatives develop spontaneously through trial and error and are rarely embedded in official government strategies in least-developed countries. But since they are in line with the needs articulated by the local farmers, farm cooperatives and agribusiness, they tend to foster demand-oriented CD in agricultural

innovation which can be supported by governments through the creation of an appropriate enabling environment.

There is a general recognition of the value of South-South and “Triangular” collaboration, and of large private-sector driven initiatives, as pointed out in the regional assessment on Africa by FARA. Governments are making increasing efforts to learn from experiences of more developed tropical countries that have facilitating policies to increase the effectiveness of CD for agricultural innovation. The many external partners active in development assistance will continue to play an important role in terms of funding and expertise to promote innovation towards sustainable agricultural practices.

Set in this complex and dynamic environment, the strategic goal of TAP is to contribute to the development of national capacities in agricultural innovation in the tropics. Experience has demonstrated that enhanced coherence and stronger partnerships can improve the quality and impact of capacity development in innovation systems, and so the TAP is intended to be a multi-lateral dynamic facilitation mechanism. It should capitalize on and add value to ongoing initiatives by fostering greater coherence of capacity development interventions in tropical agriculture, strengthening interaction for more harmonized action and greater mutual accountability, and avoiding duplication. The ultimate “impact groups” who will benefit from the Platform will be small and medium-scale producers, as well as small and medium enterprises in the agribusiness sector.

The partners now have to formulate a strategic Action Plan for TAP that ensures its contribution to fostering the trend towards demand-oriented CD in agricultural innovation in the least developed tropical countries, and ensures that it fills an important gap. The four services originally envisaged for the TAP will provide the basis for delivering this Action Plan, as will now be shown. The recommendations described in this section are also intended as the basis of a draft Action Plan for TAP.

With regard to the first constraint identified in the conclusions, TAP has already made an initial contribution to identifying the needs of AIS in low-income countries through the three regional needs assessments and this synthesis report.

As a major priority, a global Task Force should be established by the TAP partners to create a common **Framework** for coordinated action on CD in agricultural innovation that would provide the basis for designing capacity assessments and effective CD interventions leading to sustainable change. This Framework would be an important contribution to addressing the first two sets of constraints identified in section 4.2. Such a Framework should comprise contributions from the TAP partners of validated tools and methodologies for the creation of more demand-oriented AIS, supported by case studies of sound policy

and practice and other evidence. With regard to the second constraint identified above, the global Task Force Group should also use the resources gathered in relation to the **Framework** to compile a set of materials for advocacy and learning on effective facilitating policies and practices.

With regard to the **TAP Marketplace** and action at country-level, three regional Task Forces should be established by the TAP partners with regional leadership to provide support to selected less developed tropical countries on the analysis of existing gaps in AIS and the creation of joint national visions of CD for agricultural innovation. In this context, TAP partners would also contribute to country-specific multi-stakeholder assessments of capacities and needs, together with the design of potential solutions. In addition, the regional Task Forces would facilitate the creation of operational partnerships, contribute to inclusive national mechanisms/platforms as “innovation brokers” in selected tropical less developed countries that are committed to change through learning from others (i.e. that have sound/coherent CD vision & strategy), support the organization of national (and regional) innovation fairs and events to articulate demand and offers in capacity development in AIS in countries and to showcase good policies and practices.

The **TAPipedia** service should capture many elements of the other services. All the information and resources gathered and developed in relation to the common **Framework** should be made openly accessible and promoted. In addition, all information collected through the **Marketplace** such as searchable profiles of the demand and supply sides of CD in AIS should be compiled and provided, together with inventories of CD initiatives in selected least-developed countries, with particular emphasis on institutional development and involvement of the private sector.

In terms of the **TAP Policy Dialogue** service, the three Regional Task Forces mentioned above should facilitate dialogue around key policy issues related to the creation of enabling environments at sub-regional/country level that facilitate sustainable change through demand-oriented AIS that contribute to improved CD. This dialogue should be organized through face-to-face and virtual events (such as e-conferences). The themes to be discussed should include policy coherence, building effective public-private partnerships, and South-South and Triangular collaboration.

TAP was initiated by the G20, and thus also has a mandate to foster a more fruitful policy dialogue at the global level by supporting to the establishment of high-level political and operational mechanisms that coordinate interventions for capacity development in AIS. This would draw attention to the potential contributions of South-south and Triangular collaboration and of private sector entities to capacity development in AIS. The TAP partners should use the **Framework** and the work done by the established regional Task Forces to advocate for the importance of creating an enabling environment for CD in



agricultural innovation that properly responds to the needs of local producers, producer cooperatives and agribusiness. This would include efforts to secure political agreement and support for a common vision for CD in national AIS at the level of G20 meetings as well as other international mechanisms such as the FAO governing bodies, and the conferences and assemblies of the various forums and representative bodies related to AIS such as the GCARD.

With regard to above recommendations, three outcomes can be foreseen for the TAP Action Plan.

The first outcome in the TAP Action Plan representing a response to the first group of CD constraints identified above should be: Capacity development needs of AIS in tropical countries are defined accurately through inclusive country-led multi-stakeholder processes leading to more demand-oriented CD interventions.

The second outcome in the TAP Action Plan representing a response to the second group of CD constraints identified above should be: Capacity development interventions in tropical AIS that are better integrated with each other, that are more focused on development of institutional and organizational capacities and that include the private sector.

The third outcome in the TAP Action Plan representing a response to the third group of CD constraints identified above should be: High-level political and operational mechanisms are established at global level to improve coordination between interventions in capacity development in tropical AIS.

This three outcomes that comprise the Action Plan will provide the basis for TAP to add value through maximizing the efficiency of application of existing resources in the public and the private sector directed at CD in AIS in the least developed parts of the tropics. Finally, TAP will contribute to development of national capacities in AIS by achieving the following:

- Fostering capacity development interventions that acknowledge national leadership and ownership and respond to national demands, based on strong partnerships.
- Encouraging greater coherence of regional and international capacity development programmes that are aligned with national plans through shared visions.
- Improving the efficiency and effectiveness of capacity development to facilitate the emergence of innovation systems in tropical agriculture which increase farmers' income, food security, nutrition and environmental sustainability.

- Facilitating the scaling-up of sustainable development solutions with lower transaction costs, based on integrated approaches across the three capacity dimensions of enabling environment, organizations and individuals.

The Action Plan should provide the basis for TAP to become an important mechanism in the long-term struggle to fight hunger and reduce poverty in the tropics that fills an important gap in the current development arena.

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## **ANNEX: REVIEW OF PRIOR WORK RELATED CD FOR AGRICULTURAL INNOVATION**

Many reports and surveys on capacity development in agriculture have been published by multilateral, regional and national organizations in recent years. The relevance of the subject may have increased with the Paris Declaration on Aid Effectiveness and the Accra Agenda for Action (AAA) in 2005 and the 4th High Level Forum for Effective Development Cooperation in Busan in 2011. These were significant steps towards enhancing donor coordination and responsiveness to country strategies and priorities that asked for more institutional ownership, inclusive partnerships and better coordination in development projects in order to improve their long-term impact for the local people. Improvement in capacity development “to build the ability of countries to manage their own future”, also lies at the heart of the AAA<sup>13</sup>. The High-level Panel on the Global Food Security Crisis (FAO High Level Task Force 2009) also pointed out that despite valuable regional initiatives such as the Comprehensive Africa Agriculture Development Programme (CAAPD) in 2002 to promote coherent policy and institutional frameworks and translate them into concrete national action plans, there continues to have substantial dependence on external sources for monitoring, information, policy research, analysis and advice, particularly in sub-Saharan Africa, which underscores the urgent need for developing both national and regional capacities.

What is “capacity development”? Capacity is defined as “the ability of people, organizations and society as a whole to manage their affairs successfully. Capacity development is the process of unleashing, strengthening and maintaining of such capacity”. This definition, based on the work of the Organization for Economic Co-operation and Development (OECD/DAC), reflects the broadest consensus within the international development community.

Capacity development is again strongly linked to Agricultural Research for Development (ARD)<sup>14</sup> that is mainly concerned with the identification, implementation and local adaptation of research with relevance to development (Pound and Adolph, 2005) and the creation of Agricultural Innovation Systems (AIS) in which a network of organizations, enterprises and individuals focus on “bringing new products, new processes and new forms of organization into economic use, together with the institutions and policies that affect their behavior and performance” (World Bank 2006).

So the field of capacity development for agricultural innovation covers a wide range of development literature involving education, research, training, extension, business services, public-private partnerships and the design of innovation policies and strategies on all levels of governance.

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<sup>13</sup><http://www.oecd.org/dac/effectiveness/parisdeclarationandaccraagendaforaction.htm>

<sup>14</sup><http://www.eiard.org/media/uploads/File/documents/policy%20briefs/EIARD%201.1%20capacity%20development%20for%20ARD%20policy%20brief%20final.pdf>

The following chapter may only discuss a fraction of the reports published on the subject but they all seem to reach the same conclusions and recommend similar policy action that are very much in line with the findings of our own regional needs assessments.

### ***FAO studies and reports***

The development of capacities in agriculture and food security across the three dimensions (enabling environment, organizations and individuals) has always been at the heart of FAO's mandate. However the way the organization approaches the challenge has changed. This change is reflected in the shift from a 'capacity building' concept to a 'capacity development' concept. While capacity building takes into account only the initial stages of an externally-driven CD process, 'capacity development' also looks at pre-existing capacities and understands it as a process of creating and building capacities and their (subsequent) use, management and retention using a concept that places strong emphasis on national ownership and on endogenous change processes (UNDP, 2009)<sup>15</sup>.

In order to communicate this transition FAO has created a Capacity Development Portal<sup>16</sup> that aims at strengthening the national capacities of its member countries to achieve their own goals in the areas of food security and agricultural development. Through its learning resources and learning services, the Portal addresses the needs of individuals in rural communities, organizations and institutions, and at policy level. A further sign of change is its 'Corporate Strategy on Capacity Development' that has been developed in consultation with member countries and all FAO units worldwide. It enables more of a learning-based, coherent and member-driven approach to CD. It is based on the FAO Capacity Development Framework<sup>17</sup> that addresses at three different CD dimensions:

- 1) The dimension of enabling environment relates to political commitment and vision; policy, legal and economic frameworks; national public sector budget allocations and processes; governance and power structures; incentives and social norms.
- 2) The organizational dimension relates to public and private organizations, civil society organizations, and networks of organizations in terms of: a) strategic management functions, structures and relationships; b) operational capacity (processes, systems, procedures, sanctions, incentives and

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<sup>15</sup>Frequently Asked Questions: The UNDP Approach to Supporting Capacity Development. Capacity Development Group

Bureau for Development Policy. United Nations Development Programme. June 2009

<sup>16</sup><http://www.fao.org/capacitydevelopment/en/>

<sup>17</sup>[http://www.fao.org/fileadmin/user\\_upload/capacity\\_building/img/1110\\_fcd\\_brochure\\_final\\_web\\_NO\\_INSERT.pdf](http://www.fao.org/fileadmin/user_upload/capacity_building/img/1110_fcd_brochure_final_web_NO_INSERT.pdf)



values); c) human and financial resources (policies, deployment and performance); d) knowledge and information resources; and e) infrastructure.

- 3) The individual dimension relates to the people involved in ARD in terms of: knowledge, skill levels (technical and managerial) and attitudes that can be addressed through facilitation, training and competency development.

Generally, attention has shifted from focus on individual capacity to focus on the development of capacities on the policies and institutions that enable individual capacity development in the first place. The recent FAO work on AIS, institutional strengthening, human development, technology and technical assistance are all indicative of this change of thinking<sup>18</sup>. A recent study report looking at the challenges of climate change and food security examines the role of research, extension and communication for development assessing case studies from Bangladesh, Bolivia, DR Congo and Ghana. The report highlights that for farmers to adapt to climate change, technical capacity and change for farm-level adaptation and mitigation is needed, in addition to a change of policy and institutional regimes that govern agricultural production, value chains and natural resource management (Leuwis and Hall 2013)<sup>19</sup>. This study report is in line with earlier findings that small producer can only benefit from technological changes such as biotechnologies, if countries have developed their national vision and policy for the role of the new technologies; regulator frameworks; effective communication and participation strategies with the public in place; and that stronger partnerships among and within countries will facilitate the development and use of new technologies. To benefit from new technological developments, effective and enabling national policies are required, as well as investments in capacity development to support, in particular, smallholders, producers and small enterprises (FAO 2011)<sup>20</sup>.

On the field level, FAO has recognized the need to integrate smallholders into markets through the acquisition of skills that are unlikely to emerge merely by experience. They instead have to rely on two broad categories of services that help making farming a business: a) tangible goods such as credit, seed, fertilizer, transport storage and equipment and b) business services, such as technical advice, contacts, information and management skills that are provided through training, demonstrations, coaching and business network creation. Business services may be considered as part of extension services, but they go beyond mere technical assistance and advice. They represent the 'software' (intangible goods) that enable farmers to make effective use of the available hardware (tangible goods) to increase agricultural productivity as well as the quality of the produce. Unlike in the case of classic extension services, the provision of business services is meant to become a competitive business by itself, that is forced to

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<sup>18</sup> <http://www.fao.org/nr/research-extension-systems/res-home/en/>

<sup>19</sup> See also <http://www.fao.org/uploads/media/climate%20change.pdf>

<sup>20</sup> <http://www.fao.org/docrep/014/i2300e/i2300e.pdf>

continuously improve the quality and range of its services in order to ensure financial sustainability. In order to ensure that such services also reach farmers in remote marginal regions, governments must however provide part of the financial support. In return, the business services organizations have to include smallholders that may not be in a position to pay for the service provided into its client portfolio. Most of this business service providers thrive on a mix of revenue sources (free services, subsidized services, fully paid services) and as such they contribute to the narrowing of the gap in the dual agricultural economy, especially in African countries (Wongtschowski et al. 2012)<sup>21</sup>.

### ***World Bank studies***

The World Bank has created a capacity resource center<sup>22</sup> to improve the thinking and practice around results-oriented capacity development. The World Bank Institute published a 'Capacity Development Results Framework' (Otoo et al. 2009) that addresses the common failure to build monitoring of capacity development outcomes and impact into project monitoring and evaluation systems so that results can be better compared and good practices identified and replicated. The report also advocates for more accountability about results of capacity development, so that unproven assumptions and potentially inappropriate interventions can be duly challenged.

Within the broad field of capacity development the World Bank has paid special attention to the need to invest in agriculture (WDR 2008) and Agricultural Education and Training (AET) in Africa in particular (World Bank 2007), even before the World Food Security Crisis. As for AET in Africa, the report concluded that the supply of agricultural education and training is often out of synch with labor market demands in terms of knowledge and practical competencies, especially agribusiness, basic management and problem solving. Moreover, poor linkages with research and isolation from knowledge sources prevent AET from realizing its potential contribution to agricultural capacity development. The report further concludes that fragmented organizational responsibilities, underfunding, unattractive working conditions, and consequent staff depletion contribute to AET underachievement.

In a more recent report on AIS (The World Bank 2012) the importance of agricultural education and training is reiterated as the foundation of a properly working AIS that heavily relies on human resources in the development of new knowledge and technology (Module 2 in the investment sourcebook). The major priority for reform in AET within AIS was identified in the need to develop a policy framework and

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<sup>21</sup> See also <http://www.fao.org/uploads/media/building%20market%20east%20africa.pdf>

<sup>22</sup> <http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTCDRC/0,,menuPK:64169181~pagePK:64169192~piPK:64169180~theSitePK:489952,00.html>

innovation policy management capacity to guide AET. This implies improved interministerial cooperation, financing and enhanced stakeholder involvement. Furthermore the report points out the potential of ICTs to accelerate the process of change in the agricultural education and training system and to improve knowledge diffusion and communication among the stakeholders involved in the national agricultural innovation systems. Finally strong emphasis is put on the potential of South-South collaboration in the development of AIS capacities and the promotion of PPPs in efforts to convert new knowledge into commercially viable new goods and services that respond to the needs of local farmers, farm cooperatives and agribusinesses.

In order for this change to happen, the World Bank points to the importance of enabling environments that allow actors of change within the AIS to flourish and thus enhance capacity development for agricultural innovation. FAO and World Bank literature largely seem to converge on that insight.

The World Bank is further looking into facilitating policies that may attract more private sector investment in agricultural innovation and thus also CD for agricultural innovation. It does so through an initiative called Agricultural Pull Mechanism (AGPM) developed in 2011 which aims at enhancing smallholder welfare and improve food security for the poor and vulnerable through the use of "pull mechanisms" in agriculture. Pull mechanisms are designed to overcome market failures and encourage private and public sector innovators to develop products and services that they would not otherwise bring to the market due to high levels of uncertainty. The name of the initiative has change from AGPM to 'AgResults' when it was officially launched at the G20 Summit in Los Cabos, Mexico, on 18 June 2012<sup>23</sup>.

## ***Further seminal reports***

### **Agrinatura**

The recent report by Agrinatura on Capacity Development in Agricultural Research for Development (Luudeman et al. 2012) provides vast stocktaking of the current state of knowledge and the various activities funded and implemented in this field. The report was commissioned by the European Initiative for Agricultural Research for Development (EIARD) within the framework of the European Union's Food Security Thematic Programme (FSTP), which is providing support to EIARD and its members to implement its current strategy.

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<sup>23</sup> For more information see

<http://web.worldbank.org/WBSITE/EXTERNAL/EXTABOUTUS/ORGANIZATION/CFPEXT/0,,contentMDK:23005969~pagePK:64060249~piPK:64060294~theSitePK:299948,00.html>

Some of the major conclusions of the report are very much in line with the insights gained from FAO and World Bank reports:

- Capacity strengthening initiatives should focus more on organizational and institutional strengthening as opposed to individual training.
- There is a general lack of systematic situation analyses to assess the existing local capacities, as well as a lack of attention for exit-strategies. This explains why many of the capacity development initiatives promoted by EIARD members are unlikely to be financially sustainable.
- Prevalence of outdated programmes and curricula, combined with traditional teaching methods and persistent use of conventional, discipline-oriented research methods has led to a situation in which agricultural graduates are not equipped with the type of skills required to be employed in the local agricultural private sector.
- Little evidence that changing societal demands (from the commercial sector, from the industry or services sector, from producers and their organizations, or from the sector as such) are a major leading principle to guide the design and implementation of support programmes for capacity development through higher education and ARD.
- Although there have been some recent comprehensive studies, the availability or accessibility of Monitoring and Evaluation (M&E) data is low and this suggests that insufficient attention is given to this important area.

The report indicates however that there is ample scope for sharing ‘good practice’ and experiences among European and developing country partners. Platforms that share this knowledge are considered to be very useful.

## **DFID report**

The Department for International Development (DFID) has funded ‘A systematic review on the impacts of capacity strengthening of agricultural research systems for development and the conditions of success’ (Posthumus et al. 2012) conducted by the University of Greenwich with the support of the International Initiative for Impact Evaluation (3ie) and the Evidence for Policy and Practice Information and Coordinating Centre (EPPI Centre). The needs assessments and the review conducted note significant progress in many areas of capacity development but also suggest that capacity strengthening has to become more demand-driven, especially when it comes to the work done at National Agricultural Research Institutes (NARIs) and universities. There should be incentives that encourage more knowledge exchange and joint innovation, not just among research actors but also including service providers, the public sector, NGOs and the private sector. It is concluded that this would substantially increase the quality of capacity development in the long term.

DFID also funds an interesting programme called Research into Use (RiU) that addresses the challenge of making research activities more demand-driven<sup>24</sup>. It seeks to integrate the supply 'push' and demand 'pull' elements of national and regional innovation systems by improving the flow of information between the two. The ultimate purpose is to catalyse agricultural innovation by moving away from merely generating new knowledge and towards ensuring that existing research is promoted and scaled up successfully. This will also help to better understand how the promotion and widespread use of research can contribute to poverty reduction and economic growth.

## **Team Africa/YPARD surveys**

Team Africa is a network of 131 educational institutions in 35 African countries. Its aim is to make agricultural education in Africa more effective and thus increase its measurable impact on livelihoods and environmental conservation. A first step towards increased effectiveness is to include Tertiary Agricultural Education (TAE) institutions in the framework of Common African Agricultural Development Programme (CAADP) processes. CAADP is an Africa-owned and Africa-led initiative to boost agricultural productivity in Africa. It represents a common vision and is based on benchmarks based on the state budget spent on agriculture (target: 10 percent of government expenditure) and agricultural productivity growth (target: 6 percent annual productivity increase). It is based on four pillars<sup>25</sup>. Pillar IV, which is core to CD in agricultural innovation: it aims at improving agricultural research and innovation systems the better facilitate the dissemination, tailoring and adoption of new skills and technologies by farmers, farm cooperatives and agribusiness. In this context, Pillar IV approaches follow the Framework for African Agricultural Productivity (FAAP) principles<sup>26</sup>. The Principles emphasize the importance of the empowerment of end-users and especially women, respecting subsidiarity in decision-making, supporting policy dialogue through evidence-based analysis and better integrating agricultural research with extension services, the private sector, vocational training, capacity building, and education programmes to respond in a holistic manner to the needs and opportunities for innovation in the sector. In this context, African agriculture faces several challenges related to the passive role of universities, national agricultural research institute and extension agencies, as well as the image problem agriculture has among young Africans who perceive the sector as overburdened by policy and aid interventions and slow on embracing change, and with little

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<sup>24</sup> See <http://researchintouse.com/>

<sup>25</sup> The four CAADP Pillars: Pillar I deals with extending the area under sustainable land management and reliable water control systems; Pillar II is concerned with improving rural infrastructure and trade-related capacities for improved market access; Pillar III focuses on increasing food supply and reducing hunger; and Pillar IV is on agricultural research, technology dissemination and adoption. Each of these pillars identifies enabling policies, institutional reform and capacity building as necessary preconditions for agricultural growth.

<sup>26</sup> <http://r4d.dfid.gov.uk/PDF/Articles/faap.pdf>

growth potential. TEAM Africa has been established with the vision to radically transform the TAE system in Africa to improve efficiency and mainstream TAE into CAADP processes. In this context, a recent TEAM Africa paper argues the Africa TAE system lacks strategic alignment to national development priorities in agriculture. The roots of the isolation of universities in the national economic context are found in its historical role as an educator of civil servant designed to serve government rather than society at large. The report further regards teaching curricula as being outdated since they often focus on farm production rather than encompassing markets, entrepreneurship, agribusiness, and processing. Finally the report also argues that agriculture in the perception of the local people, equals poverty and the dream of any farmer family is for their children to escape the constraints that they have experienced, thus young Africans are not attracted into agriculture (TEAM Africa 2012). If the sector aims to attract skilled, young and entrepreneurial people, it will have to become more profitable, competitive, and dynamic. Currently, youth are however often ignored and undervalued when developing priorities in the agricultural sector, including curriculum development (Brooks et al. 2013).

A survey by the Young Professionals Platform for Agricultural Research and Development (YPARD) that was conducted with 140 young professionals from different stakeholder groups in agriculture and a smaller group of employers of young professionals (for comparison purposes) indicated that there is a significant gaps between what young graduates in agriculture think are important skills (writing funding proposals, seeking research collaboration with universities departments in affluent countries, acquiring internet skills) and the skills that employers in the agricultural economy expect from these graduates to be employable (Entrepreneurial, Financial and Marketing skills)(Percy-Smith and Akkermans 2012). The report concludes by proposing measures to 'create' graduates that are better attuned to the needs of the workplace. This includes a revision of school and university curricula that include various stakeholders involved in agriculture, to encourage greater cross-fertilization of ideas, industry, alumni, students, teachers, farmers, extension workers and government, and to make internships mandatory to obtain a degree in agriculture, to strengthen entrepreneurship and links to the private sector. However, until curriculum is up-to-date and meets the needs of the employment sector, it is suggested to start with additional capacity development initiatives to fill these capacity gaps.

## **Women's empowerment**

Women are central to the development of rural areas and national economies. They make up 43 percent of the agricultural work force worldwide, and as much as 70 per cent in some countries. This average share ranges from 20 percent in Latin America to 50 percent in Eastern Asia and sub-Saharan Africa. Their contribution to agricultural work varies even more widely depending on the specific crop and activity. Generally, rural women tend to work longer hours than men taking into account that they are also the

caregivers who look after children, the elderly, and the sick. In addition, many rural women are small business entrepreneurs and investors who dedicate most of their earnings to the well-being of their families and societies. In this context, the SOFA report 2010 on 'Women in Agriculture' (FAO 2010) encourages decision-makers to consider policy interventions that help close the gender gap in agriculture and rural labour markets. These include priority areas for reform such as: eliminating discrimination against women in access to agricultural resources, education, extension and financial services, and labour markets; investing in labour-saving and productivity enhancing technologies and infrastructure to free women's time for more productive activities; and facilitating the participation of women in flexible, efficient and fair rural labour markets. This requires not just investment in the individual capacities of women, but also organizational and institutional capacities to enact and implement political reform designed to protect women's rights through women's empowerment. As it is the case with the human right to food, rights cannot be wished into existence but require institutions to become realities (Juma 2013).

In this context, UN Women and the three Rome-based United Nations agencies (FAO, IFAD, WFP) working on food and agriculture launched a joint programme in 2012 to empower poor rural women through economic integration and food security initiatives. The FAO Dimitra community listeners' clubs illustrates how this can be achieved. A Listeners' club comprises groups of rural women, but also men and young people, who meet regularly to discuss development issues and challenges, and to find solutions together. Because discussions are always action-oriented, clubs build members' skills in such areas as: agricultural and livestock practices, reducing food shortages and strengthening resilience, hygiene and sanitation, health and nutrition, and food safety<sup>27</sup>.

### ***Capacity Development indicators***

Many capacity development activities in low-income countries have been initiated over the past decade without a prior rigorous needs assessment. The resulting lack of responsiveness to the local/national demand for capacity development explains the inability of many donor-driven CD initiatives to create a permanent capacity base that enables local stakeholders to manage sectors and deliver services on their own. This weaknesses in CD initiatives ask for better tools to track, monitor, and evaluate capacity development efforts. This would enable policy makers to compare results across programmes and to identify good practices for replication.

A first effort to build a 'Capacity Development Results Framework' (CDRF) has been undertaken by the World Bank Institute (Otoo et al. 2009). Its objective is to promote a common and systematic approach to

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<sup>27</sup> <http://www.fao.org/gender/gender-home/gender-projects/gender-projectsdet/en/c/178374/>

the identification, design and monitoring and evaluation of learning for capacity development. The Framework and associated standardized indicators are meant to raise the effectiveness of resources devoted to capacity development by revealing clearly what works and what does not work. As such it is meant to contribute to an improved information base for decision-makers, leading to more effective CD strategies on the policy and the organizational level. CDRF is largely focused on learning outcomes to capture the immediate results of capacity development efforts as reflected in the behavior of agents of change. By linking programme activities to development goals through capacity indicators and learning outcomes, the CDRF intends to provide a structured change-process logic (Otoo et al. 2009).

The Africa Capacity Index 2012 (ACIR 2012) is a composite index computed from the four sub-indices generated from an analysis of clusters, each of which is an aggregated measure calculated on the basis of both a quantitative and a qualitative assessment of various components that form a cluster. The Africa Capacity Indicators Report discusses capacity for agricultural transformation and food security. The methodology used for the ACIR in 2012 maintains the three levels of core capacity: (i) the enabling environment; (ii) the organizational level and (iii) the individual level. The enabling environment encompasses the broader system within which individuals and organizations function thus influencing their performance outcomes. The organizational level of capacity is characterized and driven by the internal policies, arrangements, procedures and frameworks that allow organizations to operate and deliver on their mandate and that enable the integration and consolidation of individual capacities to work together to achieve specified goals. The individual level assesses skills, experience, and knowledge that are vested in people. Leadership comes at the individual level in the values espoused that determine accountability and results, as well as at the level of policies. The four clusters used to analyze the indicator data are obtained largely through self-assessments about a) the effectiveness of the policy environment, b) the soundness of processes in place for implementation, c) the ability to achieve a track record of development results, and d) the dynamic capability to generate capacity development outcomes. The four clusters are used in addition to the three dimensions mentioned above to generate a set of sub-indices and a composite index of capacity that allows linkage to strategies and actions aimed at improving capacity.

Even though these existing indicators to assess the quality of CD in agriculture are valuable in the sense that they reveal the perception of the stakeholders involved and provide a feedback from the supposed beneficiaries, measuring the real quality and impact of capacity development is notoriously difficult because either it is largely based on self-assessment, as it is the case with ACIR or the feedback received from those who benefited from the CD learning experience may be largely influenced by the hope of being also a future beneficiary.



In this context, there may be a need to use more tangible indicators that are rooted in empirical research e.g. looking at Total Factor Productivity (TFP) increases in agriculture and comparing it with policy and institutional reform in capacity development for agricultural innovation that occurred in the same period of time; or choice experiments with farmers/farm cooperatives that have benefited from multiple CD initiatives (e.g. giving them US\$50.00 of which they can keep half if they give the other half to the organization they think benefited them most in improving the capacity they needed).