21. Developing Capacity for Change to Enhance the Potential of Investments into Agricultural Innovation

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ABSTRACT

Findings of regional assessment in South Asia and in two other regions undertaken by Tropical Agriculture Platform (TAP) and its partners in 2013 revealed that several tropical countries lack the resources and capacities to fully develop their Agricultural Innovation Systems (AIS). In Asia and the Pacific region, the development of the agricultural sector of a group of the least developed countries (Bangladesh, Cambodia, Laos, Myanmar and Timor Leste) is hampered by the adverse effect of climate change and especially by the weakness in the countries' agricultural research, development and extension services. The smallholder farmers, who mostly live in poverty-stricken rural areas, are often suffering from shortage of food supplies, poor access to agricultural support (input supply and technology) and lack of advisory services and agricultural training. Supporting smallholder family farmers is crucial to the emergence of functioning AIS that improve farmers' income, food security, nutrition and environmental sustainability. To develop the capacity for agricultural innovation in the least developed countries of Asia and the Pacific region, TAP advocates for increasing investments in agricultural research and development (R&D) and more coherent, efficient and coordinated capacity development interventions that address individual, organizational and institutional capacity needs.

The paper will present the Common Framework on Capacity Development for Agricultural Innovation Systems (CDAIS).The framework is a core component of the Action Plan of the TAP, a G20 Initiative, aiming to increase coherence and effectiveness of capacity development for agricultural innovation that lead to sustainable change and impact at scale. The framework developed with contributions by TAP Partners including APAARI consists of a conceptual background document and a practical guide for the operationalization of the framework. It is planned to apply the framework initially in eight countries in Africa, Asia and Central America with support of the EC funded CDAIS project, jointly implemented by AGRINATURA and FAO in collaboration with local organizations from 2015 to 2018. Countries in the region include Bangladesh and Laos, where the framework will be applied and needed capacity development interventions will be undertaken. APAARI will facilitate the application of the common framework, policy dialogue for improved capacity development for agricultural innovation in Asia and the Pacific region.

Keywords: Agricultural innovation systems; Capacity development; Common framework; Foreign assistance; Research and extension

1. Introduction

Innovation in agriculture is a precondition for meeting the challenge of feeding world's growing population in the face of a changing climate and degrading natural resources. It is fundamental to achieving the Sustainable Development Goals of ending poverty and hunger, achieving food security, improving nutrition and promoting sustainable agriculture. Innovation also has a role to play in achieving gender equality, ensuring healthy lives for all and contributing to economic growth, but process and product innovation cannot simply be transferred from one place to another. Nonetheless many countries are not fully exploiting their innovation potential. In order to do so, they must strengthen the capacity of individuals and organizations, create an enabling environment and, crucially,

reinforce or set-up efficient agricultural innovation systems.

In Asia and the Pacific region, the development of agricultural sector of a group of the least developed countries (Bangladesh, Cambodia, Laos, Myanmar and Timor Leste) is hampered by the adverse effect of climate change and especially by the weakness in the countries' agricultural research, development and extension services (Aerni *et al*. 2015). The smallholder farmers, who mostly live in poverty-stricken rural areas, are often suffering from shortage of food supplies, poor access to agricultural support (input supply and technology) and lack of advisory services and agricultural training. Supporting smallholder family farmers is crucial to the emergence of functioning Agricultural Innovation Systems (AIS) that improve farmers' income, food security, nutrition and environmental sustainability.

In 2012, the Agriculture Ministers of the G20 called for the creation of the Tropical Agriculture Platform (TAP) to promote the development of national capacities for agricultural innovation in the tropics, where almost all low-income countries are located. The aim of TAP is to enhance the overall performance of Agricultural Innovation Systems, with particular focus on small- and medium-scale producers and enterprises in the agribusiness sector. TAP's ultimate objective is to make agriculture more sustainable and improve livelihoods.[1]

2. Investments into Agricultural Innovation

Food and Agriculture Organization of the United Nations' (FAO's) 2014 State of Food and Agriculture report highlights that public investment in agricultural R&D and extension and advisory services should be increased and refocused to emphasize sustainable agricultural intensification and closing yield and labour productivity gaps (FAO 2014). However, overall investments into agricultural research and development (R&D) have remained consistently at low levels and are concentrated in high-income as well as in larger middle-income countries.

[1]For a full description of the Tropical Agricultural Platform membership, objectives, overall approach and plan of work, see http://www.tropagplatform.org/

2.1. National Public Expenditures

While public sector investments in agricultural R&D exhibited little growth in the 1980s and 1990s, evidence suggests that this trend was reversed to some extent over the consecutive decade (Fuglie and Wang 2012). Between 2000 and 2008, the figures for total global public spending went up by 22 per cent (Beintema *et al*. 2012). This growth has been mainly driven by increased spending in middle income countries, such as China, India, Brazil, Argentina and Nigeria for example. More recent data suggests that the trend observed from 2000 to 2008 has slowed down.

Through national institutional surveys, the Agricultural Science and Technology Indicators (ASTI) initiative collects detailed data on public spending on agricultural R&D related to three categories: salaries, operating and programme expenditures and capital investments. In terms of spending on agricultural R&D relative to agricultural GDP, data for the developing countries covered by ASTI dataset provide evidence that the research intensity ratio has not increased but remained relatively constant, exhibiting some fluctuation from year to year. The interquartile range of the research intensity ratio over the period from 2000 to 2011 as shown in Figure 1 demonstrates that, for a wide range of developing countries, there is the lack of sustained growth in investments into agricultural R&D.

For Asia and the Pacific region, the ASTI database only contains information on a limited number of countries. Figure 2 shows that the average research intensity ratio for the years 2006 to 2011 for Cambodia, Vietnam, Nepal and Bangladesh is below or at 0.4 per cent. Relative to agricultural GDP, Malaysia invests considerably more into agricultural R&D, with an average value well above of 1 per cent, which is beyond the upper quartile for developing countries that can be seen in Figure 1.

2.2. Foreign assistance

Results obtained from three regional needs assessments undertaken by TAP in 2013 reveal that capacity development for agricultural innovation initiatives are often funded exclusively through foreign aid programmes and are hardly embedded in national innovation strategies (Aerni *et al*. 2015).

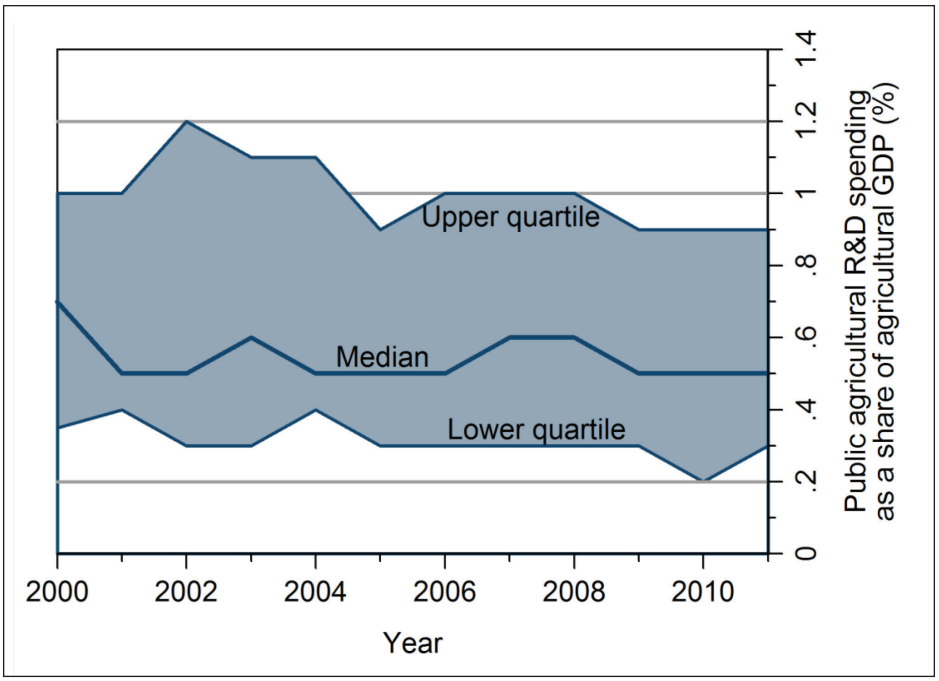

Figure 1. Research intensity ratio in developing countries (median and interquartile range)

Note: The research intensity ratio figure is based on the dataset for developing countries available through the ASTI website and omits countries with a population of less than 500,000 inhabitants.

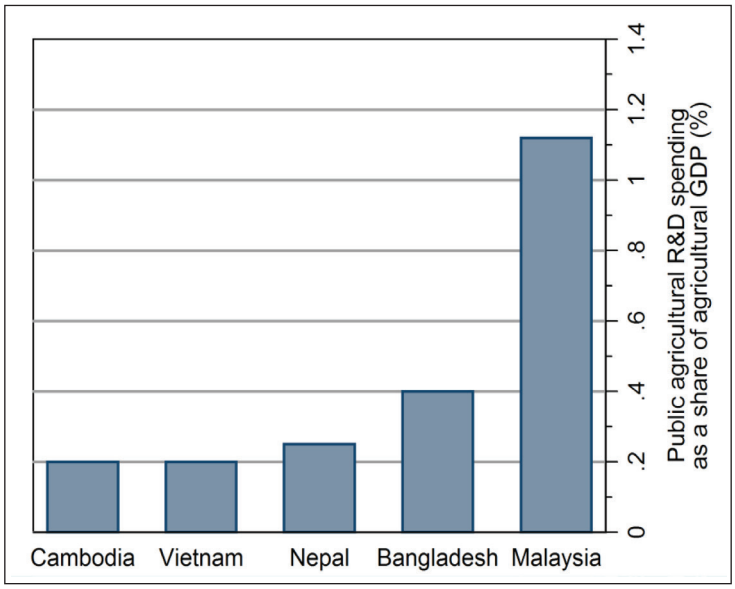

Figure 2. Research intensity ratio for selected Asian countries (average 2006 to 2011)

A recent FAO study used The Organization for Economic Cooperation and Development (OECD) data to analyse, during the period of 2002 to 2012, the amount and variability of foreign aid directed to agricultural research and extension, as well as to forestry and fishery research (Angelico *et al.* 2015). It shows that the findings of consistently low public investments in agricultural research and development also apply to foreign assistance. Out of the total Official Development Assistance (ODA) that went to the agriculture, forestry and fishing sector, on average, seven percent was allocated to research and two percent to extension. The top ten contributors to ODA for agricultural, forestry

and fishery research are France, the World Bank, UK, Australia, the EU Institutions, USA, Canada, Germany, Sweden and the Netherlands, while the top ten contributors to ODA for agricultural extension are the World Bank, IFAD, Canada, Sweden, Norway, UK, Germany, USA, Belgium and Australia.

As Figure 3 illustrates, over the period from 2002 to 2012, the share of foreign assistance invested into research and extension has decreased or remained steady rather than increased. Furthermore, aid flows are also concentrated in high-income as well as in a few middle-income countries.

In absolute numbers, the overall ODA commitments to research in agriculture, forestry and fishery increased markedly between 2005 and 2008, when they reached USD 839 million, but then dropped dramatically to USD 523.9 million in 2009. After this year, a slight increase was recorded in 2010, but was further cut in 2012, when ODA to agricultural, forestry and fishery research amounted to USD 486.7 million. As shown in Figure 4, the reduction of commitments in 2009 followed a decline in disbursements after 2007. This trend is mainly driven by external assistance to agricultural research.

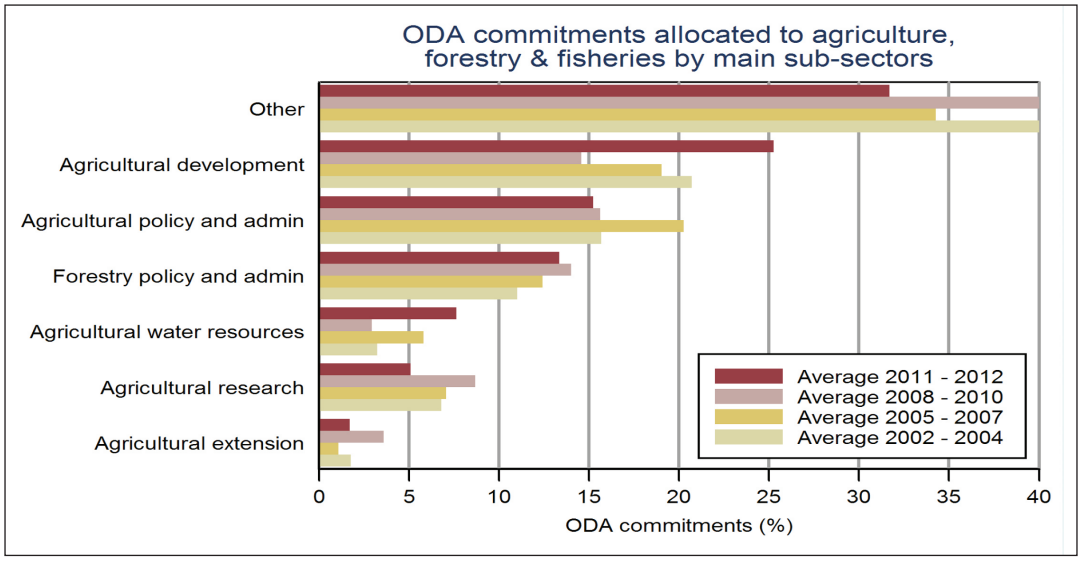

Figure 3. ODA commitments to agriculture, forestry and fishing by main subsectors

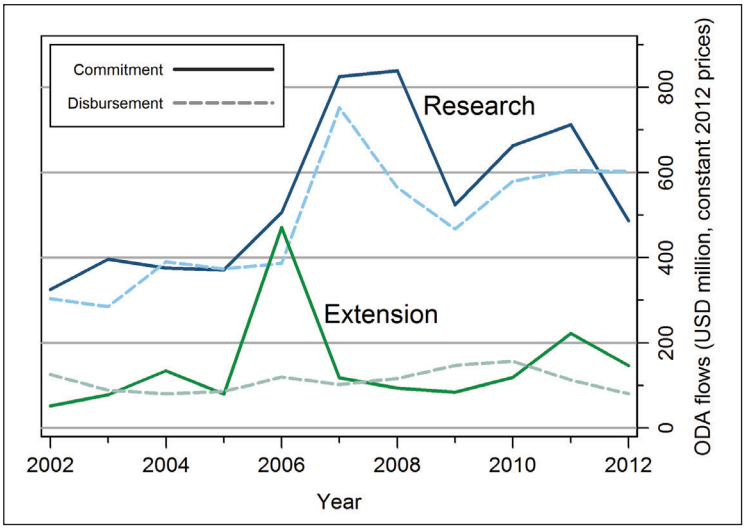

Figure 4. ODA commitments and disbursements to agriculture, forestry and fishery research and agricultural extension from 2002 to 2012

Like public and private spending, foreign assistance proved to be volatile, causing challenges for planning and implementation. This corroborates existing evidence of sizable deadweight loss for developing countries due to volatile aid flows. Even if the volatility of ODA commitments is, in relative terms, lower for the least developed and other low-income countries than for other regions, it remains high. Also, it has a comparatively more profound impact, since these countries are more reliant on foreign assistance. The international community needs to give more priority to addressing the problems brought about by insufficient and unpredictable investments in research and extension.

Figure 5 shows how ODA to agricultural, forestry and fishery research was allocated across regions. During the period 2002-2012, 29 per cent of commitments to agricultural, forestry and fishery research have been directed to Africa South of Sahara, 4 per cent to South America, 8 per cent to Far East Asia, 7 per cent to South and Central Asia, and 3 per cent to Oceania; while Europe, North and Central America and Middle East received only a small portion of the aid. In addition, 41 per cent was reported as unspecified developing countries and 5 per cent as regional projects.

3. Capacity Development

A survey conducted by TAP in 27 countries in Africa, Asia and Latin America found that capacity development (CD) for Agricultural Innovation Systems (AIS) is seldom designed and implemented in an integrated manner and consequently fails to capture the full complexity of innovation processes (Aerni *et al*. 2015). The needs assessments in the three regions identified constraints that all the selected low-income tropical countries seem to have in common:

- CD interventions from internal and external actors are not sufficiently targeted to meet the AIS capacity needs of tropical countries.
- 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.
- Lack of high-level political and operational mechanisms to coordinate interventions for capacity development.

As far as Asia and the Pacific region is concerned, the assessment covered five low-income countries, namely, Bangladesh, Cambodia, Lao PDR, the People's Republic of Myanmar, and the Democratic Republic of Timor Leste (Cardenas and Bellin 2013). Besides the features in common with the other regions, the study on Asian countries suggests that capacity development of the various actors in agricultural should focus on the following areas: i) organizational and management skills at central and local levels; ii) curriculum, agricultural/vocational

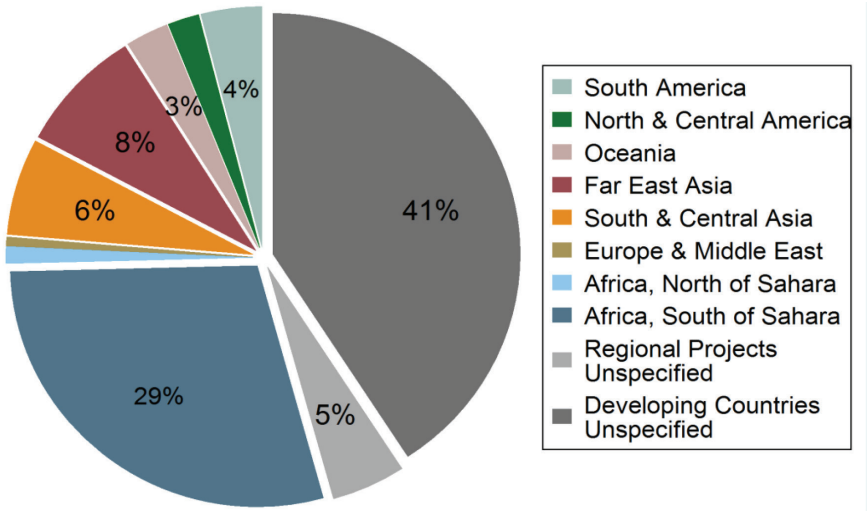

Figure 5. Percentage of total ODA commitments to agriculture, forestry and fishery research by region, average values 2002-2012

Note: Regional projects include Europe, Oceania, Africa, America, and Asia

and extension education; iii) research and extension services; iv) micro-finance and small and medium-term enterprises; and v) the supply and value chain development.

3.1. The Common Framework

Taking into consideration the results of the need assessment, the 44 TAP partners agreed to develop a Common Framework on Capacity Development for Agricultural Innovation Systems (CDAIS), among other activities[2]. The objective of the Framework is to harmonize and coordinate the different approaches to CD in support of agricultural innovation. Such harmonization would promote optimal use of the resources of different donors and technical cooperation agencies.

The development and thus the validation of the TAP Common Framework is supported by the Capacity Development for Agricultural Innovation Systems (CDAIS) project, funded by the European Commission (EC) and jointly implemented by the European agricultural research alliance AGRINATURA and the FAO. The validation at country level will be implemented in 8 developing countries, including Bangladesh and Lao PDR for Asia and the Pacific region.

The Framework promotes a shift of mind-set and attitudes among the main actors and provides concepts, principles, methodologies and tools to better understand the architecture of AIS, to assess CD needs and to plan, implement, monitor and evaluate CD interventions. It emphasizes the crucial role of facilitation, learning, documentation and knowledge management issues for enabling agricultural innovation. All this should lead to more sustainable and efficient AIS (Ekong *et al*. 2015).

3.1.1. The AIS perspective

The Common Framework builds conceptually on the AIS perspective, which emphasizes that agricultural innovation, as opposed to linear approaches, results from a complex, multi-stakeholder process of interaction. Conceptually, the AIS, as outlined in Figure 6, comprises four components: knowledge and education, business and enterprise, including small-holder farmers, bridging institutions, such as stakeholder platforms and advisory services, and the enabling environment, consisting of policies as well as practices, mind sets and attitudes. Innovation, in order to take off, requires the right mix of different actors, social mechanisms and policies. An endogenous process, it cannot rely only on spin-off from foreign research, but needs local capacities to generate knowledge and develop new technologies and business processes.

3.1.2. The capacity for change

'Capacity' is defined simply as "the ability of people, organizations and society as a whole to manage their affairs successfully" (OECD 2006). And for that to happen, individuals, organizations and society as a whole need to acquire competencies – core knowledge, skills, attitudes and energies – through capacity development. One widely accepted definition of *'Capacity Development'* is that it *'is the process whereby people, organizations and society as a whole unleash, strengthen, create, adapt and maintain capacity over time'* (OECD 2006).

As with agricultural innovation, capacity 'emerges' over time, driven by multiple factors. No single element such as incentives, leadership, financial support, trained staff, knowledge or structure can alone lead to the development of capacity. But if capacity is understood as involving collective learning and adaptation to numerous opportunities and challenges, then it cannot be designed and implemented by external actors with a well-defined and standardized set of products and services. Accepting this fact calls for a fundamental change in our perception of CD – not just as a vehicle for results but a way of facilitating processes that enable stakeholders to seize opportunities, build trust and take joint action.

Conventionally, capacity is often viewed as a sort of hierarchy with individual, organizational, inter-organizational and system-wide levels. It was usually assumed that competencies at individual level would, through a knock-on effect, enhance capacity at other levels, creating an enabling environment. But this rather static categorization fails to describe the interconnections between the various dimensions involved. As shown in Figure 7, the Common Framework recognizes three dimensions: Individuals, Organizations and the Enabling Environment. Within the context of

[2]For a full presentation of the approved TAP Action Plan see http://www.tropagplatform.org/sites/default/files/TAP%20ACTION%20PLAN%2022August2013_0.pdfAccessed 29 October 2015.

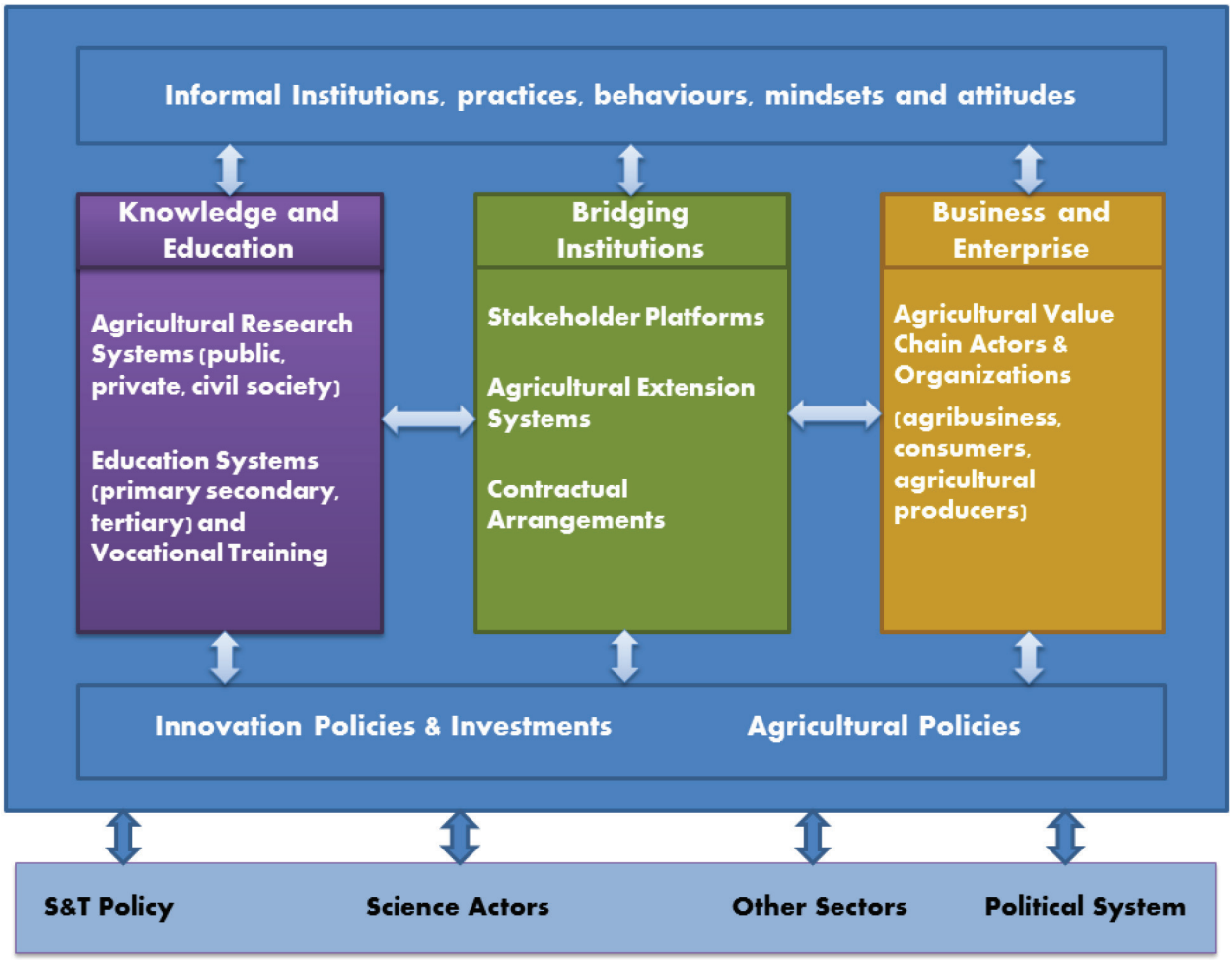

Figure 6. The Agricultural Innovation System (Source: Ekong *et al.* 2015, modified from Spielman and Birner 2008)

Figure 7. The Dimensions of Capacity Development (Source: FAO, 2010)

AIS, it is pertinent to stress the crucial importance of partnerships and networks in creating that interconnectedness, and in bringing together the three dimensions to create new knowledge. The Framework emphasizes the interdependent relationship between these dimensions as a way of strengthening 'system-wide' capacity.

For AIS to perform effectively, four key capacities are required:

- **Capacity to navigate complexity.** A shift in mind-sets, attitudes and behaviour to comprehend the larger system and to create an understanding of the whole system, as well as a shift from mainly reductionist understanding of the parts to systemic understanding of the relationships among the parts; viewing change as an emerging property that cannot be predicted or planned for in a linear fashion.

- **Capacity for collaboration**. Enabling actors to understand each other's perspectives and managing conflicts, manage diversity in order to combine individual skills and knowledge, and create an awareness of their complementarity; and building synergetic partnerships and networks to enhance collaboration. It also involves communication skills and strategies, both internally and externally.
- **Capacity for reflection and learning.** Bringing stakeholders together, designing and leading processes of critical reflection and following a double-loop learning process leading to action and change. It requires respect for different opinions and an atmosphere of trust for those opinions to be voiced. It also requires a systematic tracking of processes and progress to enable reflection to take place. Interventions need to be sufficiently flexible and adaptable to changing conditions, and analysis undertaken in an iterative fashion so as to promote experimentation and adaptive capacities as new opportunities for learning emerge.
- **Capacity to engage in strategic and political processes.** CD for transformational change is inherently political, and involves questioning the status quo. Power relations need to be understood in a number of dimensions, including: economic interests; the balance of power among elites; and civil society-state relations. Understanding and influencing the politics and power relations between individuals, within organizations and of the wider society, is crucial for bringing about new forms of interaction among stakeholders. It includes the conscious empowerment of vulnerable and often marginalized groups.

These four capacities are the core of an overarching capacity to adapt and respond in order to realize the potential of innovation, shifting focus from reactive problem solving to co-creating the future. This requires facilitative leadership to enable all of the above to happen. The five capacities, illustrated in Figure 8, are interdependent and are relevant at each of the three dimensions of CD.

3.1.3. Capacity development for AIS

The concept of AIS not only calls for a shift in the roles of various actors in agricultural innovation, but also calls for innovative and systemic approaches to capacity development itself. The basic principles that inform the Common Framework of CD for AIS are presented in Box 1.

The conceptual model distinguishes two levels of CD, the:

- ***Innovation niche:*** Niche – the locus of learning and experimentation and micro-level transformation – developing innovation that has the potential, if managed strategically, to seed sustainable transformation. Innovation niches are spaces in which small groups of actors become part of a learning process in which alternative socio-technical practices can be experimented with and developed in such a way that they subsequently inform and influence mainstream. The strength of the

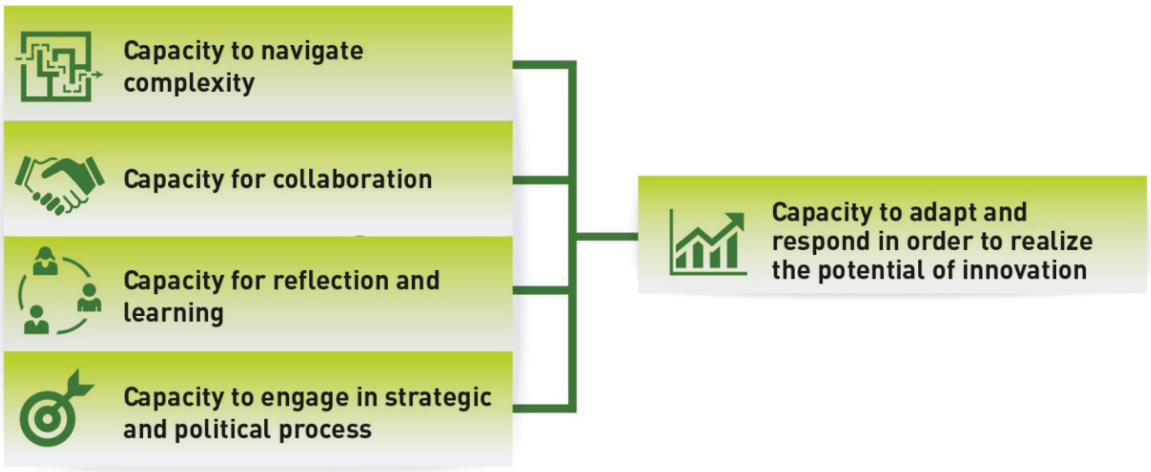

Figure 8. The 4 + 1 capacities

Box 1 : Basic CD for AIS principles promoted by the Common Framework

- Agricultural innovation is critically required for increasing agricultural productivity along with sustainability of agricultural systems
- Innovation cannot rely only on spin offs of foreign research, but needs endogenous capacities to generate, systematize, and adapt knowledge and to adopt and up-scale new practices
- CD for AIS interventions must respond to expressed needs of actors. It cannot be designed and implemented by external actors with a well-defined and standardized set of products and services
- CD for AIS process is an endogenous one, ownership by local actors is paramount to its success; collective energy, motivation and commitment of stakeholders to engage in a process of change are crucial
- CD for AIS is not politically neutral, it involves questioning and sometimes upsetting the status quo and may lead to conflict; it therefore needs strong, facilitative leadership and commitment
- CD for AIS is an iterative process rather than a one-off time-bound intervention. Capacity needs of today will change tomorrow based on experience gained in the face of new challenges or emerging opportunities
- It is a multi-dimensional and multi-actor process that goes well beyond the direct transfer of knowledge and skills at the individual level and addresses in an integrated manner organizational and institutional dimensions
- It enhances interaction, builds trust and the creation of synergy between research institutions and public and private sector actors, smallholder farmers and development organizations to enable them to address a whole range of activities, investments and policies and avail of opportunities to make change happen
- CD for AIS interventions go beyond improving immediate performance and develop the capacity to adapt to new and constantly changing environments, to learn and analyse the internal and external context and to relate and build partnerships and pro-actively plan the future
- CD for AIS is context-specific and no blueprint or one-size-fits-all recipe can be applied

niche results from the interplay among three niche processes: (i) articulation and negotiation of shared expectations by participating actors giving direction and legitimacy to the niche; (ii) a growing social network, including all relevant types of actors within the niche, both creating opportunities for stakeholder interaction and a micro-market that provides the resources necessary for experimentation and temporary protection; and (iii) a learning mechanism (between experiments, between actors, etc.) that is a vital ingredient for the establishment of new rules and design heuristics

- ***System level:*** The wider system of which the niche is a part consists of the multiple and diverse actors within the boundaries of a defined AIS. Learning from the innovation niche is one input to inform actors at system level in their own interactions to create an enabling environment for AIS. CD at system level recognizes social, cultural and political structures in which power relations, social and institutional dimensions determine opportunities for different groups of actors to initiate an innovation niche, and then acting upon the interventions to attain sustainability.

A purposeful intervention is necessary that enhances capacities of individuals and organizations (actors in the innovation niche) on the one hand, and capacities of other social, institutional and political actors for improving enabling environment on the other hand. The CD of individuals and organizations will be linked to their involvement within niches or at system level, as can be seen from Figure 9.

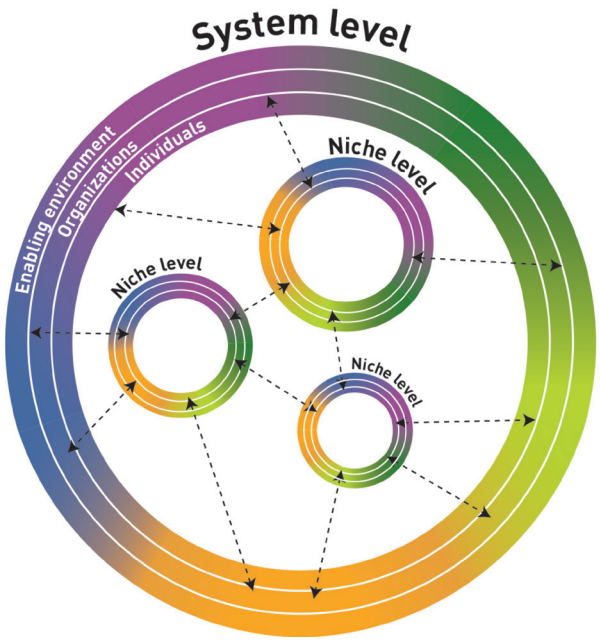

Figure 9. CD at niche and system level

3.1.4. An operational approach

The Framework proposes a cycle of five stages for implementing CD for AIS interventions: "Galvanizing Commitment", "Visioning", "Capacity needs assessment", "CD strategy development" and "Implementation". The cycles will be substantially identical for each of the three dimensions (Individuals, Organizations and the Enabling Environment) although the actors involved and the methods used may vary. Figure 10 shows that, as moving forward in the cycle from one stage to another, capacities are continuously enhanced.

The cycle is proposed as a guide for contextualized action rather than as a blueprint for achieving effective CD for AIS. Country approaches may differ significantly in content and process according to of context, opportunities, commitment and resources. The practicalities of the proposed approach need to be piloted and the CD cycle further refined in the light of experience. But the key element common to all countries should be a systemic approach through dual pathways ensuring that all actors within the system have the opportunity to participate, to learn together and to formulate joint solutions.

Given the importance of skilled facilitators in the CD process, it is vital that the process described by the cycle is accompanied by the identification and strengthening of individuals and organizations that can act as effective agents of change. They can be extension services, private consulting firms,

Figure 10. The five stages of the CD cycle

university departments, capacity development organizations or NGOs.

The Framework includes also a monitoring and evaluation scheme, which should accompany CD for AIS projects along all their phases.

4. Conclusion

There is large consensus within the international community about the fact that agricultural innovation is critically required for increasing agricultural productivity and reducing the environmental pressure of agricultural systems and, consequently, for meeting the internationally agreed goals. Nevertheless, the support provided to the AIS in least developed countries is quantitatively and qualitatively insufficient and erratic. TAP is a major international undertaking aimed at conferring better coherence and coordination to current and future capacity development projects. It is, therefore, expected that TAP activities in general, and the development of the Common Framework on CD for AIS in particular, will have a significant impact on the capacity for change that can be deployed in developing countries. All the same, the resources allocated to strengthen AIS' of developing countries, both at national and international level, should be substantially increased and made steadier. The magnitude of the challenges in front of us justifies the necessary effort.

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