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CTA ASTI Experts Workshop

From Maastricht to Montpellier: Lessons from the CTA Capacity Building Programme on Analyzing the Agricultural, Science, Technology and Innovation (ASTI) Systems (2004 – 2009)

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Synthesis Report

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1.0 BACKGROUND

Several expert assessments, including the International Assessment of Agricultural Knowledge Science and Technology for Development (IAASTD), acknowledge that agriculture faces multiple and complex challenges and recognize that *the mounting crisis in food security is of a different complexity and potentially different magnitude* to that which was experienced in the 1960s. The IAASTD report (McIntyre et al., 2009) concludes that *knowledge systems and human ingenuity in science, technology, practice and policy are needed to meet the challenges and opportunities and uncertainties ahead.*

CTA's programme on Science, Technology and Innovation (ST&I) in support of agricultural and rural development in the ACP Group of States (Africa, the Caribbean and the Pacific), acknowledges the need for; (i) the ACP region to have well researched, and well articulated ST&I positions on the major issues affecting their agricultural and rural sectors and related agro-based industries and, (ii) increasing national investments for ST&I while also mobilizing complementary international funding. Through the programme, CTA has provided platforms for the exchange of information and knowledge among ACP scientists and other stakeholders and between them and their European and international counterparts. Since 2004, CTA has contributed to building ACP capacity on understanding, analyzing and strengthening agricultural, science, technology and innovation (ASTI) systems.

CTA has supported the conduct of numerous ASTI case studies focusing on various agricultural commodities of importance to ACP countries. The criterion for choosing the commodities, was based on either their contribution to food security, export earnings, export diversification or under threat from loss of preferential markets. The *motive* was clear: to build capacity of ACP professionals to better understand and apply the innovation systems approach in analyzing the performance of the agricultural sector in their countries and develop a network of experts. The *means* to achieve that motive was through training followed by the application of the approach to undertaking a national case study. CTA provided the *opportunity* for the ACP professionals to implement/apply the skills by availing both financial resources and technical support to enable them and their organizations to understand innovation processes. The case studies were implemented by following a methodological framework designed by the technical teams (CTA/UNU-INTECH/KIT, 2005) with additional input from the ACP senior level experts and professionals.

The case studies generated both quantitative and qualitative data. The results were disseminated at national and international level to enhance knowledge and understanding of agricultural innovation systems and to inform ST&I policy processes for creating the enabling environment for agricultural innovation and rural development. In 2010, CTA convened an Expert workshop which had a two-fold purpose: (i) to take stock of the work done so far; consolidate lessons, challenges and successes from the programme and; (ii) to deliberate on ways of furthering the capacity building efforts and mainstream innovation systems approach in the ACP region. The specific objectives were:

- To reflect on the lessons learned from the CTA led-initiative on building the capacity of ACP professionals in analyzing the agricultural science, technology and innovation (ASTI) systems over the period 2004 – 2009;
- To identify and deliberate on future strategies and actions needed for mainstreaming innovation systems thinking;
- To strategize on how to integrate core expertise from within the ACP region in expanding outreach and increasing impact;
- To propose ways for fostering greater convergence of science, technology and innovation policies for agricultural and economic development; and
- To evolve a framework for monitoring and evaluating innovation performance in ACP agricultural and rural development.

The workshop had the following expected outcomes:

- Knowledge and skills of ACP lead trainers / facilitators on innovation systems thinking strengthened;
- Knowledge and experience from 2004 – 2009 ASTI training and case studies shared and analysed and lessons learned, published and widely disseminated;
- ACP community of practice on ASTI systems established and actively engaged;
- Future strategy for further embedding innovation systems thinking in ACP agricultural and rural development processes determined; and
- CTA future strategy for further supporting the analysis, strengthening, monitoring and evaluation of ACP ASTI systems developed.

Dr Ibrahim Khadar (CTA) set the stage for the meeting with his opening remarks by emphasizing that the real value of CTA’s capacity building initiative on ASTI systems “lies in the process more than the outputs”. He emphasized that even though the outputs such as reports and publications were the tangible products, a lot more was achieved from the complex intensive networking amongst professionals and the resultant social capital from these interactions and networks. He emphasized that a lot of learning had taken place within the programme, particularly through applying the methodology and the expert meeting was a timely event for consolidating these lessons and suggesting recommendations for improving both the methodology and the process.

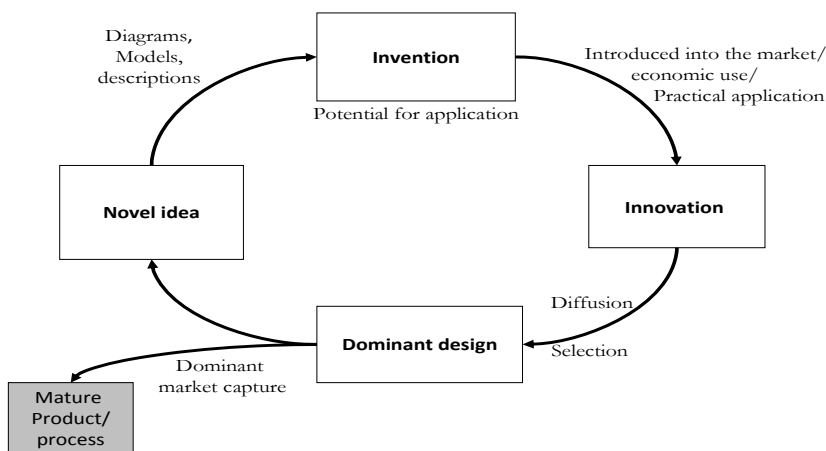
2.0 CLARIFYING THE KEY CONCEPTS

Given the diversity of experts in the meeting, their various stages of exposure to the CTA programme and the confusion often posed by use of various terminologies, the first step was to review the key concepts and terminologies used to ensure that participants had a shared understanding of the innovation systems approach. In particular the meeting sought to clarify the differences between the terms: invention and innovation; institutions and organizations; and finally innovation systems approach versus the linear models of innovation. These are outlined below:

2.1 Inventions and innovations

Inventions are seen as a *novel idea* that has been given *form* as a diagram, model or description and has *potential* for application. The emphasis on this definition lies in the novelty of the idea; that the idea is expressed (given form) and it has potential for application. However, unless the invention is applied by being introduced into either the market or being used for social or economic benefits, it is not innovation. In other words, it is the practical application that turns an invention into an innovation as the diagram A shows.

Diagram A: The innovation cycle



Source: Bolo (2009)

Innovation has been defined variously by different authors. For example, Lundvall (2001) defines innovation as new creations of economic significance, either material or intangible. These may be totally new or combinations of existing elements while Dosi (1988) defines innovation as the search for and discovery, experimentation, development, imitation and adaptation of new processes, products or organizational set ups. While these definitions vary, Bolo (2010) argues that there exist ‘common strands/threads’ amongst all the different definitions. These include: *newness*; *usefulness and application*. As such, innovation can take different forms (e.g. as a product, a process or new organizational forms) but whichever form it takes, it needs to be new and useful in its context and must demonstrate practical application. ACP experts concur that innovation must add value.

2.2 Institutions and organizations

Institutions are “the rules of the game” (North 1990) i.e. they represent “the sets of common habits, routines, established practices, rules, or laws that regulate the relations and interactions between individuals, groups or organizations (Edquist and Johnson (1997:46). On the other hand, *organizations* are “the players in the game” i.e. they are the actors in the society...they perform functions. They represent formal structures with an explicit purpose (Edquist and Johnson, 1997). Whereas the

organizations are the actors and they perform certain functions, institutions provide the framework within which that performance occurs.

2.3 Innovation systems approach versus the linear models to innovation

The linear approaches to innovation assume that innovation is a sequential process which originates from one set of actors and goes through the development and production phase before reaching the end users (the consumers). The linear models are represented by the technology push model and the market pull model. In the *technology push model*, innovation is seen as originating from basic science and R&D establishments with the market acting as a receptacle to the new products or processes that emerge from R&D. In the *market pull model*, emphasis is placed on the role of the market (demand) in shaping the direction of innovation with basic science (R&D) playing more of a reactionary role. Both these models were criticized for being too deterministic and simplistic as they failed to recognize: (i) that innovation emerges from all sectors of the economy (not just R&D and the market); (ii) the role of feedback in shaping innovation and; (iii) the role of interactions between generators the S&T / the R&D community, the suppliers, the consumers (market) and other intermediary/support organizations.

The innovation systems approach (ISA) emerged in the mid 1980s to address these shortcomings of the linear models of innovation. Innovation is viewed as a systemic (and not a sequential) occurrence and the role of interactions and interdependence amongst different actors in knowledge generation, knowledge sharing and knowledge application is emphasized. The ISA further emphasizes the role of learning and application of new/existing knowledge in the innovation process. Finally, the ISA emphasizes the importance of the policy and institutional context in shaping the behaviour of actors and regulating how the different actors respond to opportunities, changes and challenges in the environment.

3.0 REFLECTIONS ON THE ASTI METHODOLOGICAL FRAMEWORK

3.1 Why a case study approach using commodities

The CTA/UNU-INTECH/KIT methodological framework envisages a commodity based case study approach with a national level of analysis. The choice of commodities in the case studies supported by CTA (2004 – 2009), was based on certain criteria: the commodities had to be important for; export earnings, export diversification and/or national food security or under threat from loss of preferential markets. The criteria for choosing case studies may vary depending on the objective of the research and the problems to be addressed. However, whatever the criterion used, the commodities had to be strategic to the national interests of the country. This makes the findings of the case studies relevant to national development and the recommendations can be taken up by the policymakers.

Having identified the crop/commodity of choice, the methodology envisages a case study approach to the analysis. As used in this context, the term “case study” has a dual meaning: (i) as an epistemological approach to research i.e. a method of social inquiry (in this case contrasted to experiments and surveys) and; (ii) as a phenomenon about which data is collected and analysed. In the CTA case studies, both meanings

are invoked i.e. the commodities/crops are the object of analysis and the research follows a case study approach.

3.2 The anatomy of the ASTI methodological framework

The methodological framework proposes a six-step approach to the analysis including:

- Reviewing the historical background of the sector;
- Reviewing the policy environment;
- Mapping the key actors;
- Assessing the actor competencies, habits and practices;
- Analysing the performance of the key functions;
- Assessing/mapping the linkages.

Conclusions and recommendations are made based on the results and after consultations with stakeholders.

3.2.1 Reviewing the historical background of the sector

Historical analysis allows the researcher to understand the trends in the sector/sub-sector over a period of time. The trends/shifts and evolutions over time may help in explaining the changes in approaches/methods used in the sector's development but at the same time, they could be a consequence of those changes. These trends may explain the dominant thinking at the time (e.g. a focus on import substitution industries, export-oriented development, structural adjustment programmes, entry into force of a major international convention etc.). They could also explain the major climatic shifts that the sector may have had to respond to. The focus on the historical trends helps the researcher to explain if there have been periods of burst/dip in production, markets, sales; whether the trends have remained largely the same/decreased/increased and what factors may explain the changes. For example, the observed trends could be attributed to; shifts in policies, new investments, research or technologies, market factors or other causes.

3.2.2 Reviewing the policy environment

The innovation systems approach lays emphasis on the role of policies in shaping the direction of innovation for example by providing incentives as well as allocating resources for innovation. In reviewing the policy environment, the researcher asks two main questions: (i) what constitutes policy in this context and; (ii) what should be considered in terms of drivers or hindrances to innovation? In terms of the first question, there are varied definitions of policy but Young and Quinn (2002) provide key elements of what constitutes policy including:

- An authoritative government action;
- A reaction to real world needs/problems;
- A course of action;
- A decision to do something (or in some cases, nothing);
- A decision made (as opposed to an intention).

It is to be appreciated that different countries will have defined their policies differently and those definitions may include some of these elements (or some different other forms entirely). The important point is that researchers should identify the relevant policy instruments which are relevant to the case study under consideration. A list of policies that impact on innovation is provided for consideration within the framework of the methodology used.

In terms of the second question (what to consider), the ASTI methodological framework broadly expects researchers to evaluate the policies with respect to whether they support/facilitate or hinder/undermine innovation within the sector. Such policies could have any of the following effects:

- Create new actors/organizations e.g. a new commission, parasitical, regulator etc;
- Set new institutions e.g. a new IPR policy, new taxes, new regulations etc;
- Change how actors interact e.g. towards a more participatory approach;
- Expand/limit knowledge sharing/flows;
- Shift power balances/dynamics and;
- Affect funding/investments/access to resources etc.

In the analysis of the policy environment, the researchers should explain whether there is a link between the evolution of the policy environment, the sector performance and innovation in new products, processes etc. and if there have been any changes in the “innovation enabling factors” i.e. has there been a shift towards more/better participatory approaches, learning, investments? Has the policy evolved to encourage more interactions; increased knowledge sharing; increased investments in the sector or increased application of S&T?

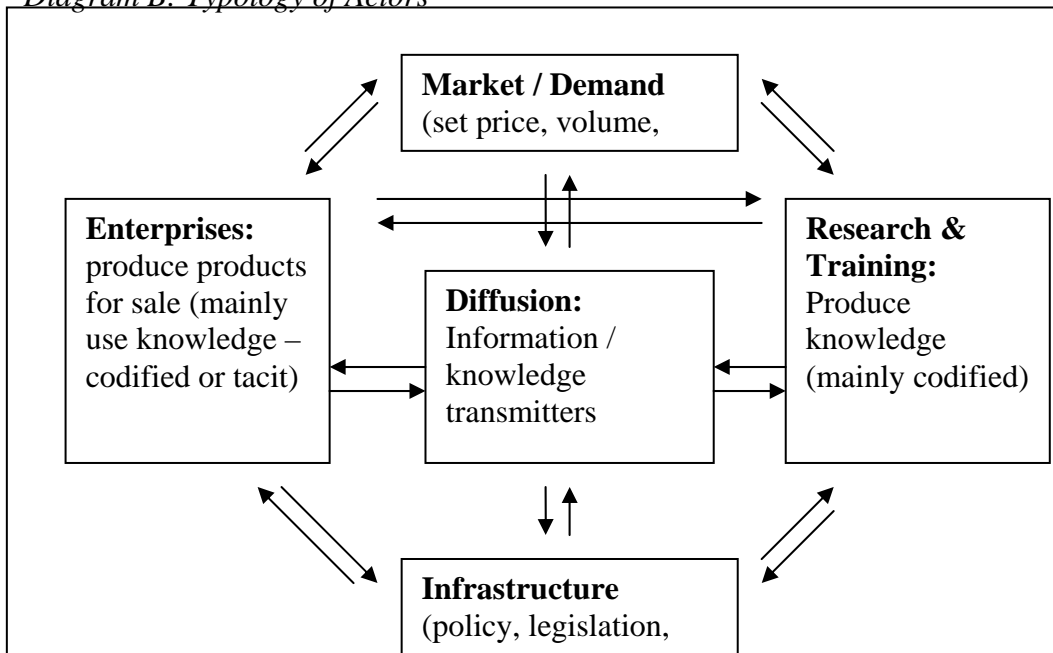
3.2.3 Mapping the key actors

Actors are the ‘players’ in the ‘innovation game’ i.e. they perform the functions/duties/activities that result in innovation. Their actions (or inactions) determine the rate and direction of innovation within the sector. Because of their importance in the ‘actual doing’, it is important to map out who the key actors are in the sub-sector and what their key functions are. In mapping out the key actors, there are two key issues to look out for: (i) which actors should be included and why; (ii) how to ensure that some actors are not missed out?

As regards the first issue, Arnold and Bell (2001) have provided a typology of the different actor domains as; (a) Diffusion sector, (b) Market/demand sector, (c) Enterprise sector, (d) Research/training sector and, (e) Infrastructure. The different actors grouped under these domains are shown in diagram B below. Other analysts including CTA, International Food Policy Research Institute (IFPRI), and the World Bank etc. have modified the Arnold and Bell diagram. This categorization of the actors is based on the actors’ main activity/ primary role in the innovation system. Researchers could further modify these categories or indeed come up with new categories altogether. As for the second issue, the researchers could use a number of strategies to ensure all the key actors or as many as possible are captured. For example, literature review/policy review will reveal some relevant actors; key informant interviews with industry practitioners are equally useful and a pre-study consultative stakeholders meeting could verify/identify any missing actors. In the

ACP case studies, all approaches were applied, resulting in an exhaustive list of actors.

Diagram B: Typology of Actors



Source: Arnold and Bell (2001) as modified by CTA

3.2.4 Assessing the performance of key functions

Innovation systems are seen as performing a number of functions in fostering development. Johnson (2002) summarizes these functions as; (a) identifying problems and, (b) developing solutions to the problems that have been identified. Paterson et al. (2003) have also identified a number of functions in their case study of South Africa including: policy making and resource allocation; regulatory; financing; implementation; human resources / capacity building; and provision of infrastructure. Other authors have included advocacy, market development and creation of technological knowledge as functions of the system.

Given this wide diversity of functions of the innovation systems, it is important for the teams to identify and agree on a list of key functions for the innovation system that is the object of analysis and check if the functions are being performed and by whom? Reviewing the actors' mandates and roles has provided some of this information as well as determining if all the necessary actors are present (missing) to perform these functions. Could the functions be performed by other actors? The results of this analysis could be presented in an actor-function matrix format or using other options provided.

3.2.5 Assessing competencies, habits and practices

In order to perform their functions effectively, the actors need to have access to knowledge and resources as well as the technical expertise (know how) and experience in their relevant fields. They also need the right attitudes and mindsets as

regards what is considered ‘normal practice’. This mix of competencies (skills, talents and experiences) with the right attitudes and mindsets (habits and practices) determine how the actors will respond to different signals of change (innovation triggers). The analysis therefore should focus on whether the actors have the appropriate competencies; whether there are mechanisms (whether in-built or externally accessible) for building new competencies and how these new competencies do get built. As regards their habits and practices, it is important to note that these are shaped largely by the political, historical and cultural contexts within which the actors are embedded. As such, it is important to take these into account when analyzing habits and practices.

3.2.6 Assessing and mapping linkages

Interactions are key to learning and innovation. In the case studies, the nature and quality of linkages between and among the different actors and actor groups should be considered. This is done mainly through a survey using a structured questionnaire in which actors are asked to rate their linkages with other actors. The survey reveals the “real account” of the status of the innovation system and is an indication of what actually obtains on the ground i.e. how other actors view/rate each other’s performance.

In the analysis, it is important to link the results of the survey to the other analyses undertaken. For example, researchers should explain: how the policy environment relates to the actor competencies; whether there is disconnect between what the actors say they do (i.e. their roles, functions and mandates) and what actually happens in the innovation system (how other actors rate them).

Researchers should consider: whether the results can be explained on the basis of actors’ known habits and practices and how these habits and practices have been influenced by/or if these habits and practices have influenced the policy and institutional framework. Finally, the analysis should point out what other issues cannot be explained by the methodological framework as currently designed. This attention to the ‘unexplained issues’ hold the key to improving, refining and advancing the use of methodological framework and the results for informing future policy and action.

3.2.7 Conclusions and recommendations

It is important that the recommendations build on the findings and conclusions and provides guidance for future policies and institutions, actors and their functions; interactions and linkages; learning and knowledge flows; competencies, habits and practices. It is equally useful to comment on how the findings of the study can inform future application the innovation systems approach; its strengths and weaknesses. Are there issues which are not clearly addressed by the framework? Are there any conceptual and methodological challenges that need to be addressed?

4.0 REFLECTIONS ON CASE STUDIES

This section presents the key issues and lessons from seven selected ASTI case studies and experience of the sub-Saharan challenge (SSA-CP) programme in setting up innovation platforms based on presentations made during the Experts’ meeting.

The case studies included: (i) rice in Senegal; (ii) fisheries in Ghana; (iii) dairy in Zambia; (iv) cut flowers in Kenya; (v) rice in Papua New Guinea; (vi) nutmeg in Grenada and; (vii) bananas in St. Vincent and the Grenadines. The findings of the seven case studies are organized along the following sub-headings: (a) background to the sectors; (b) the policy environment; (c) key actors and their functions; (d) competencies, habits and practices and; (e) interactions and linkages. This is followed by the case of the SSA-CP.

4.1 ASTI Case Studies

4.1.1 Background to the sectors

The case studies demonstrate the importance of the agricultural sector to ACP economic development. In most cases, the sector contributes a significant amount to the national GDP (around 25 – 30 percent); employs about 70 – 80 percent of the population mainly in the rural areas and provides a source of livelihoods to households and communities. The specific commodity sectors have had mixed growth in the last decade or so in many of the countries. For example, cut flowers in Kenya have shown an upward trend in volume, value and acreage (see Annex; Figure 1) while fish production in Ghana has been fluctuating (see Annex; Figure 2). Nutmeg and bananas; two major export commodities in Grenada and St. Vincent and the Grenadines respectively have shown a declining trend (see Annex; Figures 3 and 4). These trends have been attributed to hurricane Ivan (2004) in Grenada and changes in WTO rules in St. Vincent and Grenadines. The dairy industry in Zambia is performing below capacity, producing only 190 million litres against a total demand of 253 million litres annually.

4.1.2 The policy environment

Most of the studies have noted that many policies are in place. In cases where some exponential growth in output was reported, these have been attributed to a supportive policy framework. For example, in Kenya's cut flower sector, a supportive policy environment enabled robust private sector involvement in the industry and is viewed as a key pillar in the success of the industry. This was supported by IPR legislation which facilitated access to external knowledge. In some instances, for example in Papua New Guinea, policies were reported to be in place but lack of funding was a key impediment to implementation. In Senegal, new policies were introduced in response to the 2008 food crisis and reforms led to reversing the financing levels from over-dependence on external funding. In Ghana, there was little attention to fisheries from independence to the era of structural adjustment programmes (1957 – 1981). However, there has been increased attention to fisheries in the national policies from the 1990s culminating in the Fisheries Act of 2002 and a fully fledged Ministry of Fisheries in 2005. Specific instruments targeting national fisheries and aquaculture development were introduced between 2001 and 2007.

The influence of the international environment also came to the fore and the need for countries to be aware, prepared and responsive to developments in the international arena were emphasized. For example, in the case of bananas in St. Vincent and the Grenadines, it was reported that the coming into force of the WTO agreements and subsequent erosion of preferential treatment, banana exports were affected leading to a sharp decline in production. However, this change in trading regime (removal of

protections) sparked new innovations and the banana processing industry took off. Banana chips and ketch-up and other banana based products were introduced into the market; however, there was no significant improvement in banana production and sale to make up for the shortfall in export markets. In Kenya, the end of preferential treatment accorded to its products under the Lome IV agreement ended in 2007. This led to panic in the industry with some growers moving farms to neighbouring Ethiopia.

4.1.3 Key actors and their functions

In general, most case studies identified a diverse group of actors within the innovation systems. In many cases, these actors were categorized using their key/primary functions and organized (in many cases) alongside the Arnold and Bell typology (with various modifications). The diagrams in the Annex (see Figures 6 – 9) show the different sets of actors identified.

4.1.4 Competencies, habits and practices

The case studies examined the competencies - based on qualifications and the changes in the “traditional habits and practices of the actors” with respect to gauging how actors learn, connect and attract and sustain investments (see Annex; Figures 10 – 11). While the data was captured, the analysis of competencies, habits and practices did not provide a full picture. It only explained the broad patterns witnessed in the sectors but failed to account for any observed shifts in habits and practices that actors exhibit when faced with different situations and their innovativeness.

4.1.5 Interactions and linkages

In Senegal, the rice ASTI study found that universities are more interested in academics and basic research and do little in development – oriented research. Most collaboration with research is connected to teaching (courses and supervision). There are very few applied research projects being carried out together with the rural communities. The study also noted that the producers do not have any relationships with the universities and the private laboratories.

In Papua New Guinea (PNG), the rice ASTI study noted that there’s a strong research base in the country but there’s poor coordination and weak integration between research and the productive sector and other relevant sectors. Similarly in Kenya, there were very weak interactions between the national R&D system (comprising research institutes and universities) with the farmers. Instead, there was a corresponding stronger linkage between the farmers and the international R&D actors (laboratories, private consultants and university departments).

These trends are repeated in many other cases (see Annex; Figures 12 – 15). As these examples show, having an adequate policy framework, markets, research and development capacity and a conducive environment are not sufficient for spurring and sustaining innovation. A functional innovation system also requires interactions between and among the actors. It is through these interactions that knowledge is exchanged and learning takes place. When interactions are weak or non-existent, even with a favourable policy environment and other resources, the innovation system remains dysfunctional. The outputs of research similarly do not benefit the intended

users. Indeed, nearly all the ASTI studies have identified these weak interactions between research and farmers/ entrepreneurs as the main gaps undermining the functioning of ACP agricultural innovation systems.

The role of power relations/dynamics in influencing the extent of interactions between and among actors has not been (fully, if at all) explored in the ASTI case studies. This may be one of the factors that could potentially account for the weak interactions observed in many of the case studies.

4.2 Innovation platforms and innovative partnerships

The case of the sub-Saharan Africa Challenge Program (SSA-CP) emphasized the key principles and relevance of the innovation systems approach. The case underscored the importance of partnerships in overcoming constraints in agriculture including technological, institutional, policy and infrastructural constraints. The presentation further emphasized the importance of the integrated agricultural research for development (IAR4D) approach that is being piloted by the Forum for Agricultural Research in Africa (FARA) and its relevance to partnerships for the generation of technologies, overcoming constraints and for innovation. The case identified challenges of applying the IAR4D concept and setting up innovation platforms; including the lack of soft skills required for effective interaction, resistance to change by some partners and the need for to have a champion, facilitator or convenor for it to be successful. The importance of overcoming institutional constraints by altering the innovation landscape was illustrated. The issue of who should lead the process (coordinate the platform) was raised and it was suggested that this decision should be based on consensus.

5.0 SUMMARY OF ISSUES AND LESSONS LEARNT

This summary of lessons focuses on two main themes of the meeting: (i) improving the methodological framework and; (ii) mainstreaming the innovation systems approach in the ACP region. It captures key highlights of the recommendations of the meeting regarding these two themes.

5.1 Improving the methodological framework

Policy Analysis: There were discussions on as to what period the policy review should cover and whether enough attention is given to the external environment. It was suggested that a time frame should be agreed on by the various actors and that the external policy environment should also be considered.

Representation of actors: There were discussions on whether the identification of key actors should be based on robust representation or include all relevant stakeholders. There were also concerns on how to ensure that the voices of the weak actors are captured as well as the views of the actors who are not represented.

Organizational versus individual focus: There were inconclusive discussions on whether data collection during surveys should focus on the organizational level or the individuals within these organizations. However, since organizations influence the behaviour of individuals in much the same way as individuals reinforce

organizational cultures, researchers should choose based on the specific focus of the analysis. In other words, it depends on whether the research looks for the ‘official position’ or individual views from the organization’s employees.

Mapping the actors: There were concerns as to which actor should be placed at the centre of the innovation system when mapping the linkages in the system. Where commodities or industries are being studied, then the farms/firms/enterprises should be at the centre.

Assessing linkages: Participants pointed out that even though various studies had mapped the linkages between and among actors and actor groups, explanations on the importance of the need for such interactions were thin. Even though it is generally understood that interactions lead to information and knowledge sharing that facilitate learning, it is still questionable whether it is necessary (even feasible) to have strong linkages between various actors or among all actors all the time.

Competition, power and vested interests: The weak linkages/interactions are characteristic of the innovation systems in the ACP region. In response to the ASTI case study findings, CTA supported training workshops and follow up case studies focusing on “bridging the gaps” in the innovation systems. Emphasis was on two key areas: demand-led research and farmer innovation. The rationale behind this response was that research from the R&D actors was not addressing the pressing needs of farmers and other industry actors and at the same time, the researchers/scientists did not recognize farmer research/experimentation and innovations. CTA also introduced new modules in the training programmes to address issues of managing multi-stakeholder processes, conflict resolution and monitoring and evaluating performance of the innovation system. While these were invoked as a response to the weaknesses of the innovation systems, it may be useful to integrate into the methodological framework, analysis of power relations and explore these explicitly if needed.

Linking conclusions to recommendations: There was concern that some of the conclusions were not fully supported by the available evidence i.e. evidence as presented in the case studies. Participants emphasized the need to use evidence to support the conclusions reached for example, when studies conclude that “farmers don’t trust researchers”, there should be evidence in the analysis to support this position. However the major concern was on the substance of the recommendations as in many instances, they were very generic, not linked to the evidence presented in the case study, nor did they provide guidance for enhancing innovation or suggestions on future options. It was suggested that cost benefit analysis and trade offs for choosing best bet options could be considered for inclusion in the future.

Regional/comparative and other studies: Participants raised questions regarding: How can the methodological framework be applied at a regional level or to study a technology e.g. biotechnology? Can it be used for comparative analysis across countries/regions? How would the same issues play out? CTA and her partners had started piloting cross-country studies using banana and fisheries but the meeting agreed that there was need for more of such studies in the ACP region to allow for learning across regions and sectors.

Rigour and flexibility: Other recommendations emphasized the need to ensure that the framework is applied with rigour to improve theoretical understanding but also

applied flexibly to allow inclusion of other issues. The participants observed the need to apply network analysis and use available software to plot linkages and interactions. One such software is UCINET – available free on the internet. Participants also underscored the need for more case studies incorporating the lessons learned and that the focus of the conclusions should pay more attention to issues of creating a fertile ground for innovation – the application of knowledge to add value – and for improving policies and the institutional framework.

5.2 Mainstreaming the innovation systems approach

In educational and training: Participants recommended that the ASTI training and methodology should be used more in teaching and training in universities and research institutes. For example in Ghana, the meeting learned that the approach is already being used for teaching students in rural economy, marketing and rural development.

Publishing and dissemination: participants observed the need to introduce the ASTI studies into the scholarship arena e.g. by publishing results in refereed journals and considered what kind of additional support/incentives may be necessary to achieve this. For example, it was reported that FARA is discussing with some three journals to publish studies from various meetings/forums and publish them. A series of studies (such as from ASTI case studies) could be considered for publication in a special issue of a journal. It was further observed that ASTI researchers/coordinators may need mentorship/capacity building especially in the area of scholarly publishing in journals. Participants were also informed that there are plans within CTA to publish the ASTI training manual and selected case studies were being synthesized for publication into a book/edited volume.

Expanding training: Participants observed that the innovation systems approach is relevant for the ACP region and the demand for training on ASTI is increasing. To meet this demand, the participants encouraged CTA to consider devolving the training to the regions so that national organizations could be in charge of the trainings. There were discussions on sharing roles e.g. who should be in charge of sensitization, funding etc. Some suggested that partner organizations could be encouraged (where possible) to contribute matching funds/additional resources. Participants noted that proper buy-in from implementing partners is crucial for the future success.

Policy uptake: participants noted that attempts are always made to include policymakers from the inception of the case studies and that results are always shared with policy audiences during feedback workshops but still noted that more needs to be done to ensure policy uptake. Some of the recommendations included ensuring that the conclusions and recommendations are more specific and focus on improving institutions and the enabling environment. Such recommendations could also be published as policy briefs to ensure they are user-friendly to the policymakers.

6.0 CONCLUSIONS: THE LEARNING PROCESS CONTINUES...

David Kolb (1984) has written extensively on the four key stages in the experiential learning cycle: Doing, Reflecting, Connecting and Testing. In his model, Kolb notes that learning starts by taking action i.e. “just get it done; start with the knowledge and

resources you already have”. Then reflections on the outcomes of your actions – what have you learned from your actions? The third stage involves connecting what you have learned from your actions with what you already know and understand i.e. how does it fit/not fit with your daily experiences? How could this other knowledge and experiences improve your actions? Having made this connection, you take your new and improved ideas for further testing (again through more action).

Collectively, ASTI experts have gone full cycle. The process began with the first training of selected experts and conduct of case studies (2004) when few were convinced of the applicability of the innovation systems approach to the ACP agricultural sector. The understanding of the concepts was still evolving and everyone was going through a steep learning curve. Over time, the number of converts has grown, and the concepts have become clearer both to the ACP professionals and to others in the innovation systems bandwagon. The knowledge generated through the ASTI case studies has informed these processes in no little way. Yet, as the capacity of the professionals improves, more issues have come to light necessitating constant reflections on the approach to capacity building, the methodological framework for analysing the ASTI system and the applicability of the results generated to policymaking. This expert meeting was intended to add to the process of reflection, making connections and preparing for further testing. To that extent, the expert meeting has highlighted a number of areas that require further insight and more in-depth analysis and dialogue. The recommendations are geared towards informing and improving future work on innovation systems as well as mainstreaming the innovation systems approach in the ACP region.

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ANNEXES

Historical development of the sectors...

Floriculture vis-à-vis horticulture

Year	Total horticulture Values (Kshs. billion)	Total flowers Values (Kshs. billion)	Total horticulture Volumes ('000 tons)	Total flowers volumes (000 tons)
1997	8.7	4.9	84.2	35.9
1998	13.5	5.9	78.4	30.2
1999	14.2	7.2	99.0	37.0
2000	13.9	7.3	99.2	38.7
2001	20.2	10.6	98.8	41.4
2002	26.7	14.8	121.1	52.1
2003	28.8	16.5	133.2	61.0
2004	32.6	18.7	145.6	70.7
2005	38.8	22.9	163.0	81.2
2006	43.1	23.6	163.2	86.5

Fig 1: Growth of floriculture in Kenya

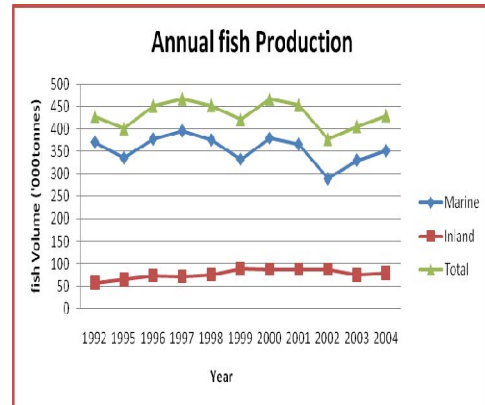


Fig 2: Annual fish production in Ghana

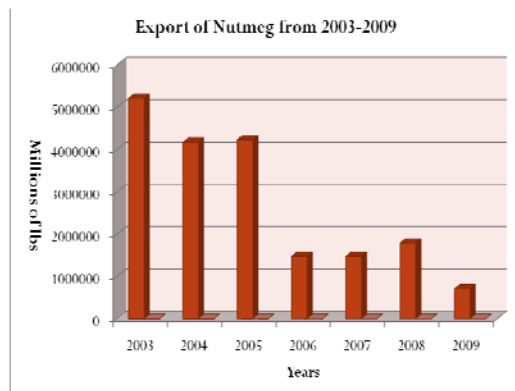


Fig 3: Trends in the export of nutmeg (Grenada)

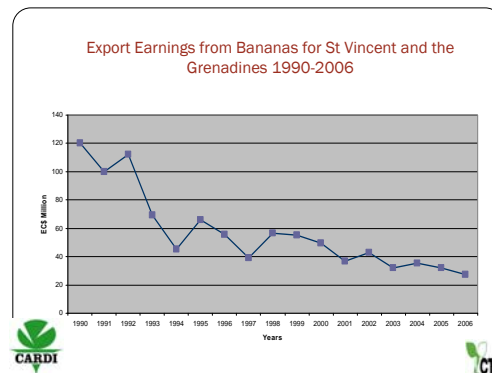


Fig 4: export earnings from bananas (St. Vincent and Grenadines)

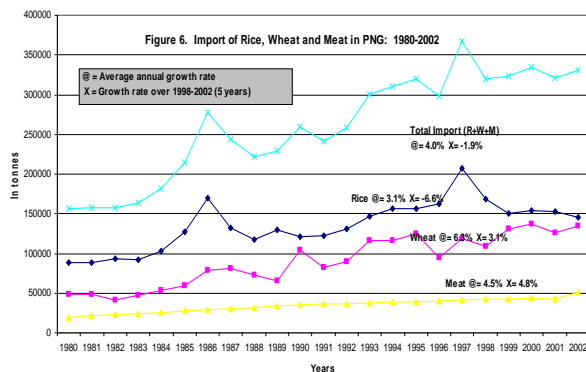


Fig 5: Comparison of rice, wheat and meat in PNG

Key actors in the innovation systems...

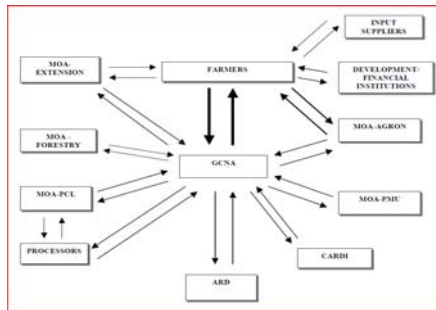


Fig 6: Key actors in the nutmeg industry

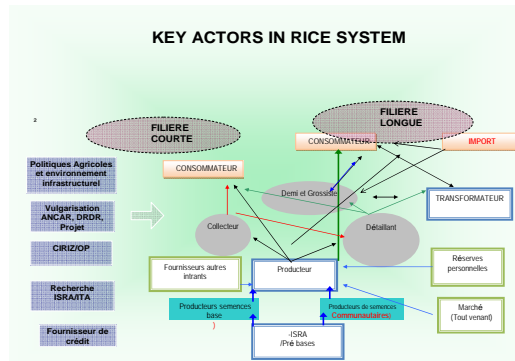


Fig 7: Key actors, rice in Senegal

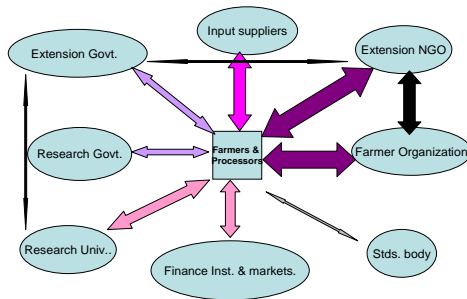


Fig 8: Key actors, livestock in Zambia

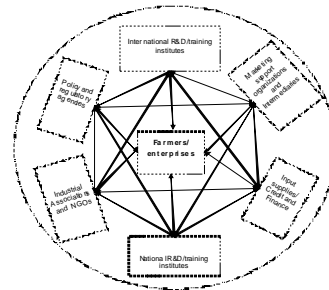


Fig 9: cut flower actors in Kenya

Competencies, habits and practices...

Competencies, Habits and Practices

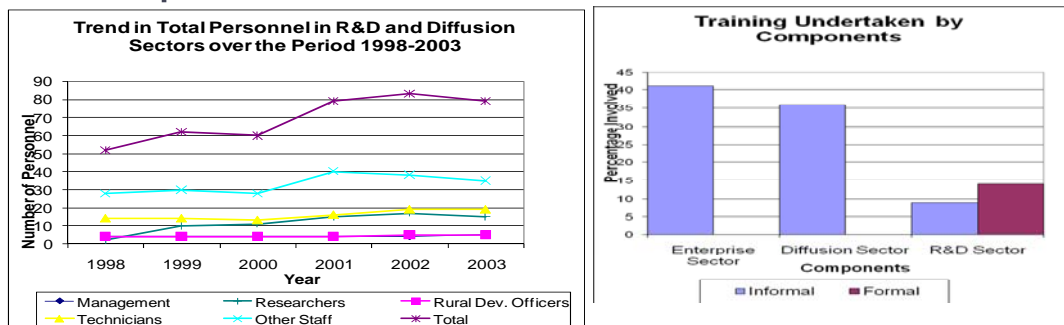


Fig 10: Competencies in the rice sector in PNG



Changes in the habits and practices of fishermen from the 19th -21st Century, as recalled by artisanal fishers in Chorkor, 2008 (Quaye, 2008)

Element of change	Before 20 th century	20th century	21st century
Gear/Net	Rokpokpo net	Set net, Ali, Watsa, Pursing net	Ali/Poli/Watsa
Technology	Smaller canoes, sails	Outboard motor, paddles, Chorkor Smoker	Chorkor Smoker
Means of communication	Shouting, horns	Whistles	Mobile phones
Sources of information	Experienced fishers, family	Migrants	Ministry of fisheries,
Sources of labor	Family members,	Friends and family members	Labour market
Number of crew	5-8 people	15-20 people	15-20 people
Sources of initial capital	Sales of family property	Joint investment	Personal income
Working capital required/trip	GH¢0. 20	NA	GH¢15000-30000
Landing sites	2	2	4
Types of products	Small pelagic	Large pelagics	Round and flat sardines, anchovy.

Fig 11: Changes in habits and practices in fisheries in Ghana

Interactions and linkages...

Producteur-Perception sur degré d'intensité de collaboration

	Degré				
	Pas	Faible	Moy	Bon	Tres B
Recherche	7	8	38	46	1
OP	2	17	5	21	55
Universites	86	8	4	2	-
Lab prives	100	-	-	-	-
Vulgarisat	1	8	55	36	-
Fourn equ	62	23	9	5	1
Union OP	1	10	13	8	68
Four sem	22	5	2	7	64

Fig 12: Rice in Senegal

Rating of domestic environment for Agriculture and Innovation performance (1= weak; 5=very strong)

	ORGANIZATIONS	FARMERS
Government incentives for innovation	3	3
Availability of trained & experienced workers	3	4
Local universities responsiveness to your needs	3	1
National R&D organizations responsiveness to your needs	3	1
Standard setting bodies and laboratory infrastructure	3	1
Intellectual property protection to support innovation	1	1

Fig 13: Dairy in Zambia

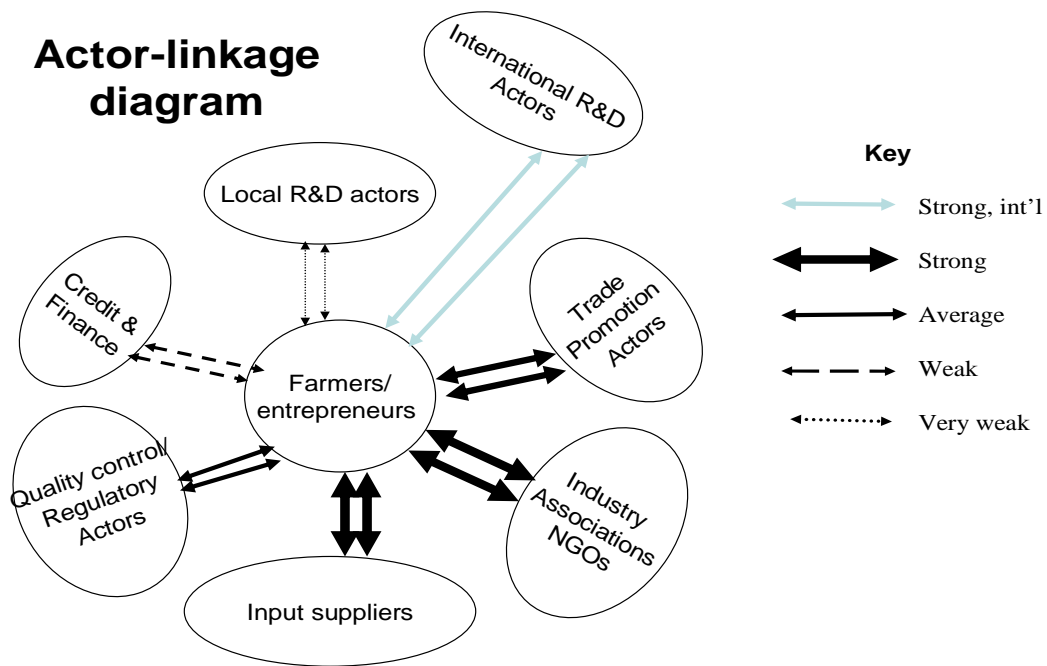


Fig 14: Interactions in the cut flowers industry in Kenya

Linkages Amongst Actors

Institutions		Diffusion Sector	Enterprise Sector	R&D Sector	Policy Sector
Public	Research	Weak link	Very weak link	Strong link	Weak link
Institutions					
Farmers Associations		Strong link	Weak link	Average link	Weak link
Universities		Average link	No link	Average link	Weak link
External/	Private	No link	No link	Weak link	No link
Laboratories					
Extension Agencies		Strong link	Very weak link	Strong link	Average link
Agricultural	Machinery	Strong link	No link	Average link	Average link
Suppliers					
Agricultural		Weak link	No link	No link	No link
Cooperatives					
Seed Companies		Average link	No link	Weak link	No link

Fig 15: Linkages in the rice sector in PNG