Performance Indicators for Agricultural Innovation Systems in the ACP Region

Synthesis Report

International Expert Consultation Workshop

CTA Headquarters
Wageningen, The Netherlands
15-17 July 2008

Compiled by

J. Daane (ICRA), J.Francis (CTA), O.Oliveros (GFAR) & M.Bolo (ATPS Network)

May, 2009

TABLE OF CONTENTS

1. INTRODUCTION

1.1. Challenges to measuring agricultural innovation system performance

In 2004, The Technical Centre for Agricultural and Rural Cooperation (ACP-EU) CTA launched its competence-building programme in Africa, the Caribbean and Pacific (ACP) to build capacity to understand and apply the innovation systems framework for analysing agricultural science, technology and innovation (ASTI) systems. The objective was to identify the strengths and weaknesses in the systems to support the ACP science and technology policy dialogue and decision making. CTA also collaborated with and supported ACP lead-organisations to conduct case studies on ASTI systems using a methodological framework based on the innovation system approach. The results have been shared with national, regional and international stakeholders. Complementary modules (influencing policy processes, mainstreaming farmer innovation, demand led research priority setting, facilitating information and knowledge flows, IPR and emerging technologies) were subsequently integrated into the training programme.

Within the period 2004 – 2008, the innovation systems approach has become increasingly important in the context of agricultural development. Several regional and international organisations including FARA, NEPAD, GFAR, the European Commission and the World Bank have endorsed the innovation system concept for agricultural development. Efforts are now focussed on mainstreaming the approach for enhancing agricultural innovation.

In 2006, the Advisory Committee on S&T for ACP Agricultural and Rural Development which is supported by CTA, recommended that a mechanism be developed and implemented for collecting quantifiable and qualitative data to substantiate changes in innovation system performance in the agricultural sector given the acceptance of the approach.

An indicator is a measure that provides information on a characteristic of a system at a given time (e.g. the traded volumes of the products of a given value chain in existing markets) or of the change in a characteristic over time (e.g. growth of value added and profit margins in a given value chain). Indicators can be used to monitor, evaluate or predict change in a system and can provide information for policy and decision-making.

The classical indicators used for measuring innovation performance of agricultural research and development (R&D) systems are aggregated at national level and focus on: human resources (e.g. number and education level of researchers); investments in research programmes and infrastructure; knowledge generation and transfer (e.g. number of patents or publications); and knowledge use (e.g. number of users or rate of technology uptake). These classical indicators pose challenges in the context of the innovation systems approach, not only in ACP-countries, but also in Europe.

The ASTI case study reports commissioned by CTA, which focus on specific commodity sectoral systems rather than on the entire national-level agricultural innovation systems (AIS), suggest the need to look beyond the classical indicators and find indicators that are more context-specific for AIS in ACP countries, especially with reference to benchmarking, guiding and monitoring the contribution of science, technology and innovation to the transformation of agricultural enterprise development. ACP policymakers need information on the performance of the AIS and

the actors involved must gather and evaluate the relevant data. However, the indicators must not only be context-specific, but in the medium to long term support cross-country comparisons and this poses another challenge.

1.2. Building consensus on AIS performance indicators

Experts have not arrived at consensus on several issues concerning AIS and more specifically on AIS performance indicators and the mechanisms for monitoring and evaluating the contribution of actors to the system performance. There is need to agree on the indicators to judge the performance, and select and define the data needed and methods of collection, analysis and interpretation. This can only be arrived at by consultation involving experts and stakeholders from various disciplines and organisations. Consensus building allows for exchange of information and shared learning.
This workshop, organised by CTA at its headquarters in Wageningen, The Netherlands, 15-17 July 2008, was a step in this direction. It involved 22 experts from 11 ACP countries, France and The Netherlands. CTA plans to organise follow-up workshops and support case studies to develop the process.

A summary of the workshop programme and the list of participants are provided in Annexes 2 and 3.

Workshop Objectives:

1. To consider, **review and agree on key concepts** – innovation, innovation system, innovation system framework, innovation system performance – in the context of ACP agriculture.
2. To **identify** – input, output and process – **performance indicators** and **mechanisms for monitoring and evaluating** performance such that they can be piloted by ACP national organisations.

Expected Output:

A working document on performance indicators for monitoring and evaluating the contribution of S&T/ARD actors to enhancing innovation in ACP agriculture within the framework of AIS.

1.3. About this synthesis report

This synthesis report presents the outputs of the workshop in two main parts, each corresponding to one of the workshop objectives, and ends with a section on the way forward as suggested by the workshop participants. It also includes a first attempt to come to a consolidated generic framework on AIS performance indicators, based on the outputs of the different working groups. This will be improved on the basis of feedback from workshop participants and their partners in ACP-countries and Europe during subsequent meetings and support for case studies on monitoring and evaluating contributions to innovation performance.

The report aims to provide a synthesis and not complete proceedings of the workshop. It focuses on the common ground that was found, the main remaining differences and the suggested way forward. Although the report tries to do justice to the rich diversity of the exchanges and presentations, it is obviously impossible to capture them all.

2. REVIEWING AND AGREEING ON KEY CONCEPTS

The first objective of the workshop was to consider, review and agree on key concepts – innovation, innovation system, innovation system framework, innovation system performance – in the context of ACP agriculture. In order to achieve this objective, participants exchanged views on these concepts in Innovation Theatres and plenary discussions. The innovation system concept was also illustrated by presentations of three ASTI-system case studies on the cut flower industry in Kenya presented by Maurice Bolo, ATPS Network, Kenya; the maize innovation system in Malawi, presented by Andy Safaloah, Bunda College, Malawi; and the banana innovation system in Papua New Guinea, presented by Rosa Kamuou, NARI, Papua New Guinea (see Section 2.3). These studies had used a methodological framework based on the innovation system approach.

Paul Engel, ECDPM, presented the state of the art regarding the key concepts and Pieter Gildemacher and Bart de Steenhuijsen Piters, KIT, introduced some new ideas on indicators for measuring innovation system performance by focusing on functions of the system. Judith Francis, CTA, underlined the disappointing performance of ACP agriculture to further emphasise the need to adopt the innovation systems approach. As well as highlighting the diversity of points of view and interpretations of the key concepts among the participants, the exchanges allowed them to find some common ground. This common ground is synthesised in the following sub-sections.

2.1. What is innovation?

There was overall agreement among participants that innovation is a process in which all types of knowledge (and not just scientific knowledge and technology) are applied to achieve desired social and economic outcomes. Innovation emerges from multiple interactions and joint learning among individuals and organisations possessing different types of knowledge within a particular social, political, policy, economic and institutional context. It is an iterative, evolving process with complex feedback mechanisms. The simple definition that Paul Engel gave in his presentation ("innovation is the process by which social actors create value from knowledge") is perhaps a good way of summarising this consensus.

On the other hand, mixed views were expressed in response to statements suggesting that innovation is invention, or a product, or a new creation of economic significance, or that innovation is technological. Disagreeing participants felt that inventions can lead to innovation, i.e. when they are put to economic or social use, but that this does not always happen. Some felt that innovation is not necessarily a product, but that it can also refer to e.g. changes in a production process, re-use of waste (see picture) or just simply to new ways of doing things. Participants objecting to the suggestion that innovation is a new creation indicated that innovation, while by definition new to the context in which it is introduced, does not need to be newly created, but can also be borrowed from other contexts where it is already used. To some, innovation does not necessarily have to be of economic significance, but can also be

This is innovation!!!

of social, environmental or policy significance. Finally, some participants emphasised that innovation was not necessarily technological, but could also relate to e.g. new financial or policy instruments, social and organisational practices, etc.

The urgency of boosting agricultural innovation in the ACP Region was convincingly demonstrated by Judith Francis, who presented a range of statistics showing the disappointing performance of the agricultural sector of the region relative to other developing and developed countries. This called for a new and more comprehensive approach to innovation, the innovation systems approach, and the integration of the work of ACP S&T/R&D organisations into such systems.

Participants agreed that innovation in the ACP Region is spurred by a range of drivers and triggers (see Table 1) and hindered by a range of factors (see Figure 2). Addressing these various factors calls for a systems approach that addresses all factors in a coherent and concerted manner. The innovation systems approach holds this promise.

Table 1: Summary of Innovation Triggers and Drivers Identified by Participants

Innovation Triggers	Innovation Drivers
• Demand • Market opportunities and constraints • Needs • Challenges • Competition • Crises (food, energy and water shortages, climate change, epidemic diseases)	• Political will, enabling policies • Adequate resources and infrastructure • Leadership and facilitation, sector development champions • Stakeholder linkages and interaction • Private sector involvement • Common vision, partnerships, alliances • Shared learning leading to “buy in” • Education • Technologies • Credit

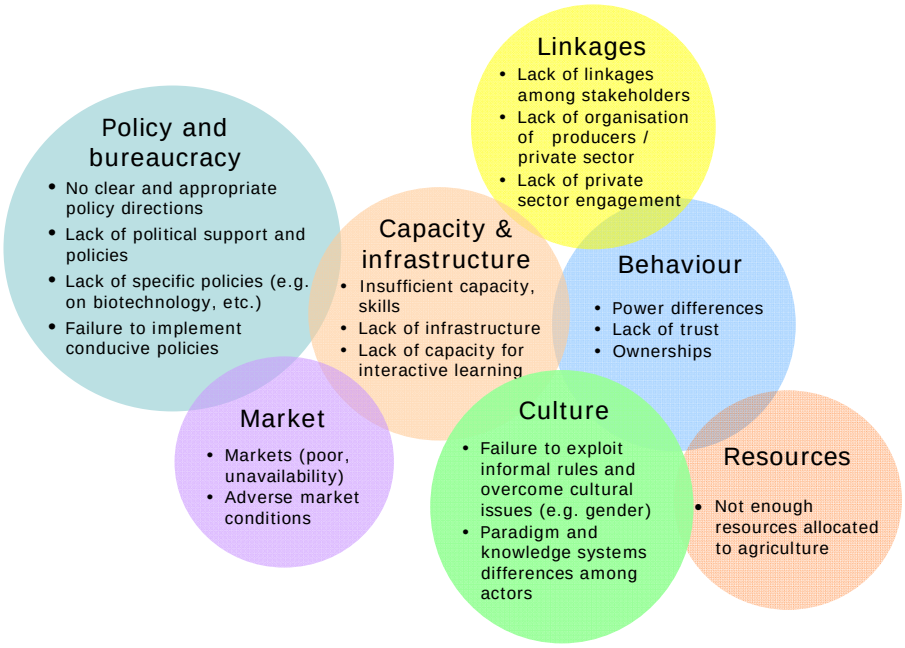


Figure 2: What Factors Could Hinder Innovation in ACP Agricultural Development (presented by O. Oliveros, GFAR)

2.2. What is an innovation system?

Innovation systems are complex, open and dynamic human activity systems in which actors (individuals, networks, organisations) apply their minds, energies and resources to innovation in a particular domain of human activity. They are not simple input-output systems. This has several important implications.

One is that, like all human activity systems, innovation systems do not exist "out there" as objective entities or realities – they only exist "in the minds of those who define them", i.e. as social constructs. It is good to realise that, as a social construct or heuristic devise, the innovation systems concept is used in two different ways with distinct objectives:

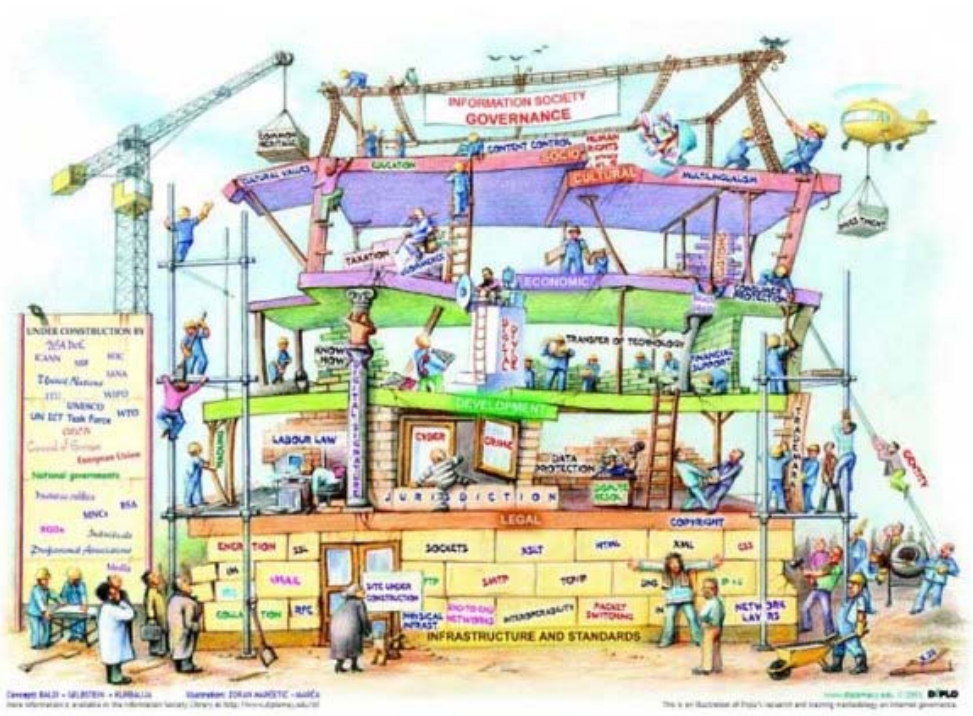
1. As an *analytical framework* used by *observers* (either from outside the system or from within) and which helps them see things, or realise the absence of things, that the observed actors themselves are not necessarily aware of or that they do not put into the same perspective or context. i.e., most of the actors involved in the innovation systems that analysts observe are often not themselves aware that they are actors in such a system, or even that such systems exist. The ASTI-system case studies presented at the workshop are using the innovation system concept in this way.
2. As a *framework to achieve social change,* where the concept is introduced to and *used by the actors themselves* in an attempt to learn to look at their own reality in a new way and discover hitherto unperceived opportunities for joint action and synergies. This use of the concept refers to the soft system methodology (SSM) developed by Checkland *et al.*[1] and used by Paul Engel and others in RAAKS. Practical experiences of this use of the concept are illustrated by the ICRA, DURAS and ASARECA presentations at the workshop.

Whatever the use made of the concept – for analysis or for social change – the boundaries of the innovation system are not fixed. Different actors may have different views on what and who is "in" or "out". These views are influenced by social perceptions, interests and power relations, which may lead to exclusion of certain actors, notably the poor and disadvantaged (among whom women are often overrepresented) and calls for special measures to promote that innovation is "pro-poor".

Given this "social construct nature" of human activity systems, it is not surprising that participants found it difficult to reach agreement on a statement that suggested that "the boundaries define the [innovation] system". In fact, if innovation systems are perceived at all, the boundaries of these systems are defined by the actors involved through a messy and often implicit negotiation process that may or may not lead to consensus and inclusiveness. In actual practice, there is seldom full consensus among the actors on where the boundaries lie. Also, their definition of the boundaries evolves over time, as some actors opt out and others become included, based on changing needs, opportunities and interests. This inherent lack of clarity of where the boundaries lie and this continual change of these boundaries over time obviously pose challenges to the measurement of the performance of such systems.

[1] Checkland, P.B. and Scholes, J. (1990): Soft Systems Methodology in Action, Wiley, Chichester.

Innovation systems are sites under permanent construction!



There is no one architect or blue-print, no coordinating building constructor, and the masons, plumbers and carpenters do their individual jobs, often without seeing themselves as part of a common site (Presented by P. Engels).

A second implication of the definition given above is that innovation systems can only be defined in relation to a particular domain of human activity. Thus, one can e.g. define a system for innovation in a specific commodity, value chain or business cluster, or in specific (agro) eco- or farming systems. By aggregation of these, one can also define the innovation system for the agricultural sector, but that becomes already more of a theoretical abstraction with less concrete reference in reality on the ground. It is logical, therefore, that the ASTI-system case studies promoted by CTA focus on specific commodities, a situation for which the analytical framework used is most appropriate. If participants failed to agree with the suggestion that "an innovation system can be sectoral, local, national, regional, global or supranational", this is perhaps partly because sectoral supposes a fairly abstract level of aggregation. For another part this may be because innovation systems are seldom limited to one level. For instance, food safety regulations of European supermarkets trigger innovation in local food production in the south. Innovation systems typically span across different scales.

A third implication of the realisation that innovation systems are social constructs on which – given the different perceptions of actors – there is seldom explicit agreement, is that there is often no formal relation between the actors involved (or only between some of them) and thus – inherently – no clear hierarchy. For instance, in none of the three ASTI-system case studies is there a coordinating instance. Where collaboration does not happen spontaneously, e.g. due to bureaucratic obstacles or distrust among

actors, this “institutional vacuum” existing at the inter-organisational level makes innovation difficult and raises complex questions on governance and management of innovation systems as some argue that innovation systems cannot be created. In such situations, if it is already a challenge to negotiate mutually agreed action plans between the different independent actors involved, the concerted implementation of these plans is an even bigger one. It requires the development and appropriation by all actors involved of new ways of working together, new rules and regulations, new codes of conduct and conflict resolution, etc., i.e. new institutions. This can result from a process of institutional and behavioural change that requires an enabling environment and external facilitation. Participants strongly agreed that leadership and the existence of champions was very important to form innovation partnerships and make them work.

A final point discussed by participants to clarify the concept of innovation system concerns the role of R&D organisations in such systems and in enhancing agricultural innovation. There was general agreement that public agricultural R&D organisations in the ACP region need to develop a much stronger focus on enhancing innovation for improving agricultural performance than is currently the case. They need to move from R**&**D to Agricultural Research **for** Development, i.e. to integrate research much more into transforming a sector, e.g. agriculture, and move away from the present linear interpretation of the research-development continuum. Participants also agreed that, even if public R&D organisations change in this direction, they are by no means the only drivers of innovation. Innovation is driven and triggered by many factors (economic, policy, social, environmental - Table 1).

Taking an innovation systems perspective means accepting that innovation can result from new knowledge, technologies, crises, new challenges, new market opportunities, changes in consumer behaviour etc. that provoke new combinations of entrepreneurship, policy change and applications of knowledge (scientific and endogenous, codified and tacit). Public R&D is only one of the actors in innovation and it can only oversee a limited part of the playing field, where the game is directed by market and other opportunities, access to external knowledge and new financial arrangements to list a few. The point made is that public R&D should be more responsive to and integrated in the efforts of other actors that often play a more important role in innovation to enhance the performance of the agricultural sector. It was also found important that the normative systems that R&D organisations or private sector research use to appreciate and value knowledge do not dominate the innovation system to the exclusion of the appreciative culture of other actors. The current emphasis on the market value and private ownership of knowledge has already led to the erosion of “knowledge commons”.

In this context, participants discussed if public R&D organisations should play a leading or facilitating role in agricultural innovation systems or if that role should be with other actors. Many participants felt that the public R&D system should not be seen as the core of the innovation system and should not play a leading role. No conclusion was drawn as to which other actor should lead or facilitate agricultural innovation systems, as it was probably realised that the choice would need to be context-specific and pragmatic, and that the leading or facilitating role could also change from one actor to another as an innovation system evolves. Sometimes this essential “intermediary” or knowledge broker role is performed by frustrated researchers who have resigned from their jobs.

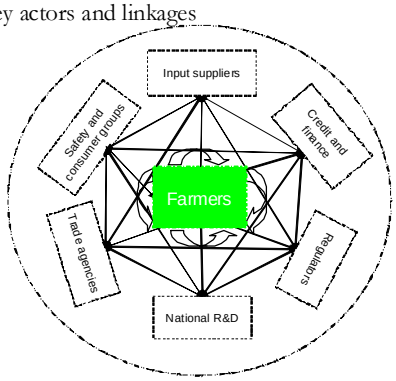
2.3. ASTI case studies of innovation systems

The three ASTI-system case studies helped to illustrate the innovation system concept and analytical framework and the insight that these provide into the limitations of the performance of these systems and the improvements needed. The main insights from the three studies are presented here.

The export-oriented cut flower industry in Kenya

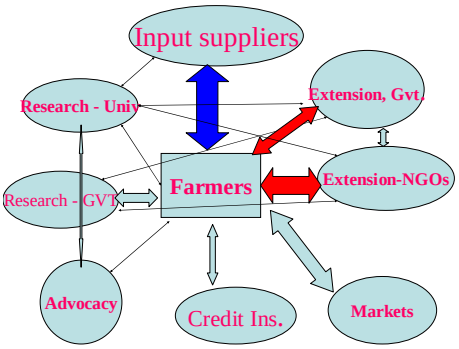
The major shortcomings of the Kenya cut flower innovation system identified were weak interactions between the national R&D, universities and the growers (e.g. large growers relied on external knowledge and had established forward and backward export market linkages); inadequate attention to the needs of smallholder farmers, failure to recognise and harness farmer innovation and a weak extension system. These weaknesses were attributed to organisational cultures and procedures, attitudes and perceptions and weak operational capacity of the public institutions. Capacity strengthening in demand-led research and priority setting was recommended to improve the performance of the system (M. Bolo).

Cut flower innovation system:
Key actors and linkages



The Malawi maize staple crop innovation system

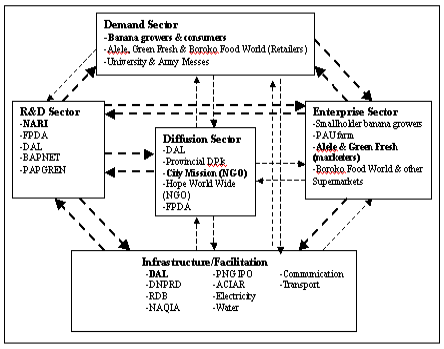
Despite political will, donor support and successes in technological, organisational and institutional/policy innovations, considerable remaining challenges were reported from this study. These include high costs and poor access to credit, inputs and product markets, inadequate R&D capacity and funding, weak participation of actors in policy formulation, weak public-private sector collaboration and poor information flows and linkages between actors. The system needs to promote the creation of a more enabling environment for investments in the maize sector and in more responsive and proactive R&D. It also needs to create innovation platforms involving all actors, recognise endogenous knowledge and farmers' ability to innovate, and stimulate more participation and collaboration and the integration of the innovation systems approach in education at secondary and tertiary level (A. Safaloah).



Linkages among actors in the maize

The banana ASTI-system in Papua New Guinea

The study clustered actors by sector (demand, enterprise, infrastructure/facilitation, diffusion and R&D. An analysis of linkages between and within actor clusters showed that the only strong linkages were within the demand cluster and among the smallholders, while linkages between clusters were generally weak. There needs to be more specific policy emphasis on R&D support to the banana sector and on facilitating interaction between clusters. There is also need to enhance capacity of human resources in the sector (R. Kambuou).



2.4. What is innovation system performance?

Participants have used two different, but not necessarily contradictory, definitions of innovation systems performance. Although discussed, this difference was not always made explicit during the workshop; as it results in indicators being defined from somewhat different, but complementary, perspectives, it is useful to mention it here.

One ("function-oriented") definition defines the performance of a system in terms of how well it fulfils specific functions (see box). Some participants considered that this list might not be generic enough and that actors might want to define other functions as well.[2] This function-oriented definition was implied in the presentation by Pieter Gildemacher (KIT), which also suggested measuring innovation performance in terms of resources invested in each of these functions (inputs), the implementation of each of these functions (process) and the results.

> The following functions, which are assumed to be generic (i.e. relevant for any innovation system) were mentioned in the KIT presentation:
>
> 1. Identification of needs and opportunities for innovation
> 2. Developing, testing and adapting of opportunities
> 3. Knowledge and information exchange
> 4. Provision of an enabling environment for innovation
> 5. Market formation
> 6. Resource mobilisation
> 7. Creation of legitimacy / counteract resistance to change.
>
> (Adapted from Hekkert *et al*, 2007)

The other ("result-oriented") definition is that the performance of a system is the extent to which it meets specified targets (outputs) by mobilising, processing and transforming resources (inputs) and the extent to which these targets contribute to desired outcomes and impact. This "result-oriented" definition of AIS performance,

[2] One of the working groups (Group 1) based its identification of AIS performance indicators on this list of functions and thus on the "function-oriented" definition of performance (see Section 3.3. and Annex 5). This group also added a function to the list.

(which seems to have been used by Group 2) thus leads to indicators that measure change in what participants consider to be outputs, outcomes and impact of innovation systems. There was general consensus among participants that **results** expected from agricultural innovation systems comprise:

- tacit and codified **knowledge** (or knowledge-products) and the **new or improved products/artefacts, technologies, services, policies,** etc. in which this knowledge is embodied;
- the results of the **utilisation** of these products, technologies, services, policies, etc. in terms of **enhanced agricultural sector performance** as shown by increased market access, value added, productivity, efficiency, cost-effectiveness, profitability, competitiveness, food security and food safety, more sustainable use of natural resources and enhanced agro-ecosystem functioning; leading in their turn to:
- improved **quality of life** and **reduced poverty** levels.

In addition, participants agreed that innovation systems are expected to contribute to the production of **skilled and knowledgeable people** and **empowerment** of actors and to **improve their own capacity**.

However, the definition of which of these results are outputs, outcomes and impact is bound to remain somewhat arbitrary and open to discussion, depending on where one puts the boundaries of the innovation system. Some participants equated the innovation system to the knowledge system and thus defined the outputs of AIS as knowledge or knowledge-products, whereas others put the boundaries of the AIS more widely to include everything that is needed to put knowledge into use. In the first perspective, the utilisation of e.g. a technology may be seen as an outcome of the AIS and the resulting increased productivity as an impact. In the second perspective, uptake and utilisation may well be seen as parts of the innovation process, with enhanced productivity as an output.

Another factor complicating the categorisation of results in such a linear progression of inputs-process-outputs-outcomes-impact is that innovation systems involve complex feedback mechanisms and iterations, so that some outputs are improvements of inputs, e.g. when successful innovation leads to enhanced resource mobilisation or more skilled human resources, including better equipped researchers. In systems, the dog sometimes bites its own tail.

A final important aspect of the results of innovation systems that has implications for performance assessment is that these results are never static. What is an innovation today is no longer novel tomorrow and the life-span of innovations is getting shorter and shorter as knowledge and markets become more dynamic. A result like “competitiveness” is thus a moving target that is never “achieved” or, putting it differently, that needs to be achieved again everyday. This means that the capacity of the innovation system to keep up with the competition and respond to change or initiate change is perhaps a more important result than the current state of competitiveness, which may be gone tomorrow. This complexity of results is difficult to capture in the traditional inputs-process-outputs-outcomes-impact model.

The issue of the difficulty of attributing outcomes and impact to specific outputs was touched upon during the workshop, but not discussed in depth.

2.5. Factors influencing innovation systems performance

Notwithstanding the somewhat implicit differences in perceptions, participants agreed that innovation system performance is influenced by many factors, of which the following were identified during the workshop:

1. The policy, institutional, economic, social, cultural and natural **environment** in which the system operates – but also the capacity of the system to influence this environment through e.g. policy advocacy, lobbying, protest actions, raising gender awareness, etc.

   Important aspects of this environment are the level of **engagement of research, education and other knowledge organisations** with actors in society and innovation processes, **regulatory frameworks**, the **rule of law**, **fiscal frameworks**, international **trade agreements**, etc.

2. The information & communication, transport, storage, processing, market and financial **infrastructure** available to the system.

3. The **capacity** of the innovation system to:

   a. Define a shared **vision** and set realistic and motivating **targets** that best reflect the needs of the actors involved and enable them to make optimal use of opportunities (which implies trade-offs and negotiated compromises between the interests of different actor groups and between inclusiveness and exclusiveness).

   b. Identify, access and mobilise relevant external and internal **resources** (e.g. external and endogenous knowledge, know-how, skilled people and organisations, financial resources, entrepreneurship).

   c. Achieve functional **linkages**, networks and interaction among diverse actors – as co-producers, sources and users of knowledge, as partners in a change process, as support services – to **generate** and **exchange knowledge** and information, develop and **test new applications** of knowledge that create more value and **scale up** their use.

   d. Create the required **trust** for these interactions and exchanges, manage power differences and **empower** its actors, build and maintain joint **"ownership"** and keep actors **motivated**.

   e. Improve its performance by **learning** from experience, critical reflection, documenting lessons, formulating and applying improved practices.

   f. **Adapt** its targets, actor-configuration (boundaries) and process in a timely manner and continuously in response to changing needs and opportunities.

   These system capacities are dependent on **leadership, institutions** and **competencies** of the actors.

This clustering of factors is clearly inspired by the systems perspective. It recognises that the system operates in a complex and changing environment, uses an evolving infrastructure, defines and redefines its boundaries in response to changing conditions, and processes internal and external resources to achieve desired and shared targets. The result of the complex interaction of different elements (actors, rules, resources and sources of knowledge) in terms of emerging knowledge and applications is clearly more than the sum of the parts. This clustering also recognises that the system

needs to constantly transform itself and improve its own capacity to keep up and enhance its performance. This clustering thus helps to identify systemic interventions to improve innovation systems performance. It has inspired the identification of AIS performance indicators, specifically those related to monitoring and evaluating the quality of the innovation process and the capacity of the system to learn and improve.

3. IDENTIFYING PERFORMANCE INDICATORS

The second objective of the workshop was to identify – input, output and process – performance indicators and mechanisms for monitoring and evaluating performance of agricultural innovation systems and of ARD/S&T organisations within the context of AIS, such that these indicators and mechanisms can be piloted by ACP national organisations. To introduce this topic, Jon Daane, ICRA, Oliver Oliveros, GFAR, and Leonard Oruko, ASARECA, presented examples of concrete experiences of performance assessment that may have relevance to AIS performance measurement. Nienke Beintema, IFPRI-ISNAR, presented the Agricultural Science Technology Indicators initiative which measures national-level human and financial resource investments in agricultural R&D in developing countries. These presentations were followed by discussions on the purpose of AIS performance assessment in general, by whom it should be done, at which level, who should benefit, etc. and some of the implications of these choices. Finally, participants worked in three working groups to suggest a framework of performance indicators for later pilots. Due to time constraints, the working groups focused on indicators of AIS performance. Some of these are obviously also of use for measuring the performance of ARD/S&T organisations within the context of AIS, but this part of the objective was not explicitly addressed. Also, there was little time to reflect on and suggest mechanisms for monitoring and evaluation that can be piloted.

3.1. Examples of AIS performance assessment presented at the workshop

The three concrete examples of AIS performance assessment presented at the workshop concerned ICRA's Learning-Oriented Monitoring and Planning System (LOMPS); the DURAS-project's indicators for analysing and evaluating multi-stakeholder partnerships; and the ASARECA M&E strategy and plan.

The LOMPS is a work-in-progress at the level of ICRA's national multi-stakeholder Agricultural Research for Development (ARD) learning partnerships in 11 ACP-countries. It focuses on assisted self-assessment of progress towards desired outcomes in terms of enhanced capacity of these partnerships to promote ARD learning and of working in an innovation systems mode. The six desired outcomes of such ARD learning partnerships that are pursued in different combinations depending on the context and needs in each country are shown in Figure 3. For each outcome, ICRA has developed a generic menu of progress indicators from which partners can choose a few to assess change towards the desired outcomes. This self-assessment is accompanied by reflection sessions aimed at drawing lessons from experience, formulate improved practices and apply these in practice. The focus is primarily on process indicators and outcomes of learning in terms of changed behaviour.

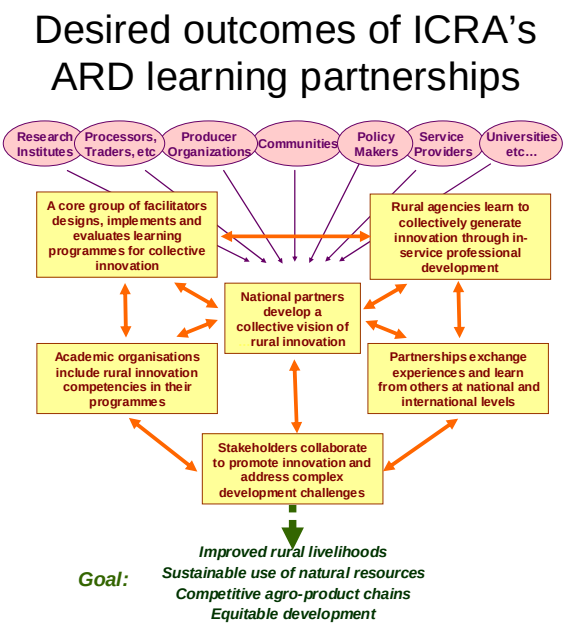


Figure 3: ICRA Generic LOMPS Framework

GFAR's DURAS-project supports 12 multi-stakeholder research projects through a competitive grant scheme. As part of its monitoring and evaluation it has defined two sets of indicators, one at the level of outcome/impact that measures each project's emerging contribution to sustainable development (see Figure 4) and one at the level of process that measures the project's "partnership quality" in terms of stakeholder participation and empowerment; knowledge sharing and learning; and institutionalisation of multi-stakeholder partnerships.

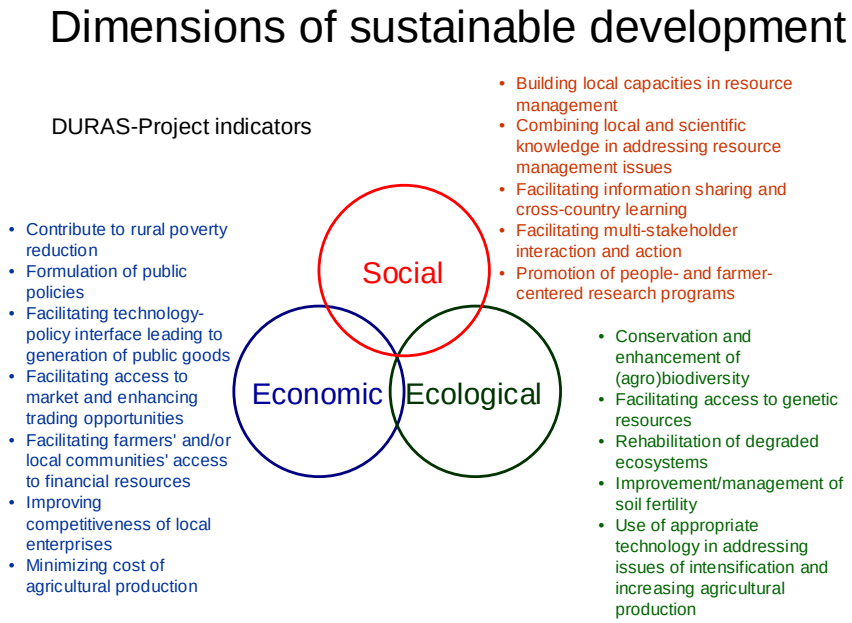


Figure 4: GFAR's DURAS Project Indicators

ASARECA's M&E strategy and plan is a work-in-progress aimed to extend its M&E beyond research results to also include uptake and getting research into use, in line with the Integrated Agricultural Research for Development (IAR4D) paradigm, which integrates ARD into innovation systems (see Figure 5).

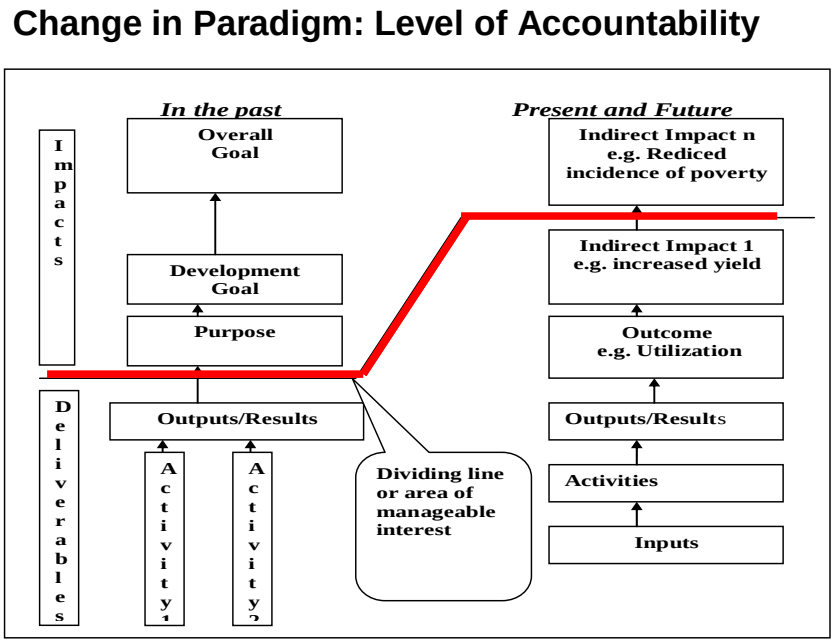


Figure 5: ASARECA's M&E Strategy

Apart from these three examples of AIS performance measurement, the more classical example was presented of the Agricultural Science & Technology Indicators (ASTI) Initiative of IFPRI-ISNAR. Focusing exclusively on agricultural R&D, the ASTI Initiative does not cover all elements of innovation systems and it does not for the moment assess performance. The Initiative collects national-level investment and capacity data on agricultural R&D ("input/resources data") with the aim to provide internationally comparable information to inform policy decisions around the world. There is interest to include performance aspects in the data collection and analysis.

3.2. Measuring AIS performance – Why? For whom? By whom? How?

Participants felt that there is perhaps no unique, single answer to the question which indicators are appropriate to assess the performance of agricultural innovation systems in ACP-countries and how best to measure these. A lot depends on the **purpose** for which the assessment is done, either for accountability (to external funders and/or to the actors involved in the system) or for learning. The purpose also influences to a large extent who are the beneficiaries of the assessment, who are doing the assessment, the kind of indicators on which the assessment focuses, the time-frame on which these indicators are assessed, how the assessment is done, what is the product of the assessment process and how this is used (see table 2). Moreover, M&E mechanisms often pursue several purposes at the same time, so that reality is more complex than the clear cut dichotomy in the table. Whatever the purpose, participants stressed the importance of taking the different perspectives of the various actors into account in the assessment and of ensuring that the less influential actors can have their say.

Table 2: Summary of "Why Measure Innovation Performance?"

Why? (Purpose)	Accountability	Learning
For whom?	Funders/policy makers – Actors involved in system	Actors involved in system
Who assesses?	External evaluators	Actors involved in system, based on their different perceptions
What kind of indicators?	Primarily output, outcome, impact, also input indicators	Primarily process indicators
Time frame	Short to medium (output), medium (outcome) to long (impact)	Continuous, periodical
How is assessment done?	Independent measurement, "objective" tools	Self-assessment, group reflection, interaction
What is the product?	External report, redefined objectives if needed	Lessons learned, improved practices, redefined objectives if needed
For what use?	Track progress, show results, justify investment decisions, adapt policy, feed into planning	Track progress, improve performance, strengthen capacity, advocacy, feed into planning

The choice of indicators is also influenced by the **scale** or **aggregation level** at which the assessment is done (e.g. commodity-value chain-business cluster-agricultural sector-national economy; or project-programme-sector-national system; etc.).

The feeling among many participants was that the kind of aggregated national-level indicators of investments in and results of innovation (such as e.g. those of OECD and the European Innovation Scoreboard) and the ASTI-indicators of IFPRI, while useful for international comparison, do not provide policy makers and actors involved in specific AIS with adequate information to take informed decisions on interventions to help improve their performance. The high level of aggregation of these indicators does not allow insight into innovation at local, regional and sector level. Due to their strong focus on investments, they do not provide insight into the effects of other inputs such as efforts to facilitate innovation. Also, due to their strong focus on technological innovation and patents, these indicators fail to record other forms of innovation (e.g. in policies, finance, insurance, contracting, marketing, modes of organisation, communication, etc.). Last but not least, these indicators fail to measure soft assets and the "culture of innovation", such as the participation of actors – both public and private – in the innovation process, the learning between them and the facilitation of the process. This concern with the shortcomings of the traditional national-level indicators was not only expressed relative to AIS in ACP-countries, but was also felt in Europe, where the European Science Foundation is looking for indicators that help improve innovation capacity in Europe. This offers opportunities for exchange between the group of participants in this workshop and their European counterparts.

A final issue discussed concerned the degree to which the selected indicators should allow **international comparison**. While some participants felt that this was very important, others expressed concern that pursuing this objective would limit the

flexibility to adapt the indicators to specific contexts and to the needs of the actors involved.

3.3. The different approaches followed by the working groups

For their suggestions of indicators of AIS performance, all three working groups of participants started from a concrete commodity-based innovation system selected from the ASTI-system case studies presented. Each group then felt the need for some sort of conceptual framework of AIS performance to orient the selection of indicators and tried out several self-defined options.

Group 1 started to develop its list of indicators using the banana ASTI-system case study as a point of reference. To orient the selection of indicators, the group chose important "elements of innovation performance" and then suggested indicators for these. The elements chosen are:

1. Enhanced linkages among actors
2. Improved institutions/policy environment
3. Enhanced skills and knowledge (including technology generation)
4. Organisational transformations
5. Enhanced market access

The group intended to separate what they called measuring innovation *performance* (output, outcome, impact) from measuring innovation *process*, but finally integrated both kinds of indicators into a single framework. The group then scaled up the selected commodity-system level indicators to indicators at the general system level. This group seems to have leaned more towards the "result-oriented" definition of AIS performance. The result of the group's work is presented in Annex 5.

Group 2 also started to develop its list of indicators from the banana ASTI-system case study. The group's selection of indicators was based on the assumption that the purpose was to improve the innovation system, that the actors involved would self-monitor and evaluate change in system performance relative to actor-defined ambitions and that the measurement of change would focus on priority aspects chosen as a result of system analysis. To orient the selection of indicators the group first tried to start from specific problems identified through the presented analysis of the AIS. As the group found that this did not give them clear enough orientation, they then chose "innovation system function" as a handle and this helped the group to give more focus. The group identified indicators for each function related to the banana ASTI-system, by formulating specific questions regarding these functions. The functions used were those presented in the KIT presentation (see box in Section 2.3) to which the group added the function of network formation and management. However, they did not use the functions in the way suggested in the KIT presentation, i.e. to systematically define resource (input), process and result indicators for each function. The group had also planned to apply the same approach to the Kenya flower case and to extrapolate the approach to the level of the "national innovation system", but did not enough time to do that. The result of the group's work is presented in Annex 5.

4. THE WAY FORWARD

4.1. Suggested actions

The working groups presented their approach and the resulting tables of indicators (see Annex 5), as well as their views on the way forward. This was followed by a plenary discussion that led to the following suggestions:

Integrate the indicator frameworks of the working groups

Participants felt that the outputs of the groups were complementary and could be harmonised in a comprehensive framework of indicators that could accommodate both the more "result-oriented" assessment of AIS performance for accountability purposes – at project or programme level, with a medium term time-frame and a smaller scale, and at organisational or system level, with a long term time-frame and a larger scale – and the more actor-perspective and "function-oriented" concept of AIS performance for learning, empowerment and capacity strengthening of the actors. This consolidated framework would comprise a generic set of indicators, a "menu" from which actors/evaluators could select the most appropriate ones depending on their context, purpose and priorities. It was also suggested to cluster the indicators in this generic framework along the input-process-output-outcome-impact continuum and apply a temporal scale for outcomes and impact. Participants proposed that a first draft of this consolidated generic framework be circulated to them so that they could share it with their partners and give feedback (this framework is presented in Section 4.2). Some also suggested testing this generic framework on documented case studies.

Identify which proposed indicators are essential

It was considered important to focus AIS performance assessment on what is essential in each specific case, i.e. to select and prioritise indicators related to key opportunities and/or blockages for innovation in the system and that help to recognise dynamic patterns in the social organisation of innovation. Exhaustive coverage of all elements and linkages of AIS was considered to be counterproductive as it would prevent users from seeing the wood for the trees and would not be cost-effective and feasible.

Determine how to collect and analyse the necessary data

Once indicators have been prioritised and selected, it is necessary to define how the baseline and target situations and progress of change towards the target situation are going to be measured. The issues to be addressed relate to the kind of data to be collected/generated, whether these can be sourced elsewhere or not, the methods of data collection (e.g. surveys, consultations, collective self-assessment by the actors, etc.), who will be responsible for data collection and analysis, and to what extent it is feasible to collect these data and realistic to expect that this will be done. The time and other resources needed to collect these data should not be underestimated and can easily become an important constraint. The actors who are expected to collect these AIS performance data already have to collect and analyse different sets of M&E data – one at project level for their donors and one at the level of their organisations for national funders. They are often overcommitted. Care needs to be taken therefore to avoid adding a third set of data at the AIS-level. Actors will only be motivated to collect these if they see an important direct benefit to themselves and share the burden. It was suggested to explore the possibility of collaboration with IFPRI' s

Agricultural Science & Technology Indicator initiative to generate national level data that can be used in AIS performance assessment.

Explore how to better assess specific key linkages

Participants suggested to explore how the integration of local/indigenous/endogenous/ traditional and formal knowledge in the innovation process could be better assessed. They also suggested exploring how to build linkages between local, national and international innovation systems and between the M&E systems at these different levels.

Stimulate exchange between European and southern efforts to measure innovation system performance

As the concern with the shortcomings of the traditional national-level innovation performance indicators that was part of the motivation for this workshop was not only felt in ACP-countries, but was also in Europe, participants suggested to exchange the results of the workshop and next steps with groups in Europe working on the same type of questions.

Next steps

Further to the above suggestions and to support their implementation, the following steps were proposed:

- Organisation (led by CTA) of a follow-up meeting to finalise the definition and design of the generic indicator framework, and formulate a strategy and plan, including resource mobilisation
- Preparation of a provisional document that outlines the generic indicator framework and the methodology to pilot and test it in specific case studies at different levels/scales (e.g. regional, national, sector, organisation, project/ programme)
- Planning and implementation of the pilots and tests in selected case studies
- Monitoring and evaluation of progress of the pilots/tests and document experience and lessons (within and across cases), formulation of improved practices
- Publication of case studies and of the final version of the framework and methodology that also summarises overall lessons of case studies
- Preparation of up-scaling.

4.2. Draft generic framework of AIS performance indicators

A first attempt to consolidate the lists of indicators suggested by the working groups into a generic framework is presented in Table 3. The merged list uses “dimensions of innovation systems performance” as the principle that orients the selection and clustering of indicators. These dimensions are inspired by the systemic representation of factors influencing innovation systems performance presented in Section 2.5. They attempt to integrate all indicators generated by the “elements of innovation performance” used by Group 1 and the “functions of innovation systems” used by Group 2, as well as other indicators suggested during the discussions and in the presentations. As indicated above, this list is to be seen as a “menu” that the actors

involved in the assessment of pilot AIS can use to orient their own context-specific selection of indicators. It is to be expected that actors will not just pick and choose from this menu, but will need to appropriate the underlying logic and principles that led to the composition of the menu first and then may want to adapt this to their own situation. Actors then need to agree on a strategy and implementation plan for data collection and analysis, including the responsibility of each actor in this.

The table does not cluster the indicators along the input to impact continuum, as this was found to lead to a rather arbitrary combination of indicators which makes little sense to the innocent reader. However, an attempt is made to link each indicator to a specific level (from input to impact). As indicated in Section 2.4, the definition of what is output, outcome and impact is rather arbitrary depending on where one puts the boundaries of the AIS.

Table 3: Dimensions of innovation system performance and performance indicators

Dimensions of innovation system performance	Performance indicators	Input	Process	Output	Outcome	Impact
1 Enhanced linkages, networking and knowledge sharing among different groups of actors	1.1 Number of innovation platforms /clusters					
	1.2 Diversity of actors and types of linkages					
	1.3 Diversity of knowledge sources and existing knowledge, accessed and used by the actors; degree to which endogenous knowledge and know-how is appreciated and used or combined with other knowledge to create value					
	1.4 Resources/time allocated by different actors to these platforms/ partnerships					
	1.5 Intensity of collaboration within and between actor groups (e.g., using social network analysis, linkage maps)					
	1.6 Improvements perceived by actors in: (a) the facilitation and functioning of the platform/ partnership as a whole, (b) their own role in this, and (c) the role played by other actors					
	1.7 Increase in useful knowledge products produced, packaged and made available					
2 Improved institutional & policy environment and increased resource mobilisation	2.1 Enhanced and more coherent policy support to innovation					
	2.2 Appropriate laws and regulations and enforcement of these (e.g. competition/protection, contract enforcement, intellectual property, protection of 'knowledge commons', sanitary and environmental regulations, land tenure, access to legal services/arbitration, etc.)					
	2.3 Growth of public, private and donor investment in agricultural R&D and in innovation					
	2.4 Adequacy of research personnel (education level, disciplines, age and gender composition) and research facilities					
	2.5 Education organisations include building agricultural innovation competencies in their programmes					
	2.6 Funding mechanisms for R&D, and financial and fiscal incentives for innovation and multi-actor partnerships (incl. public-private)					
	2.7 Adequate and accessible financial services					
3 Improved information, communication and marketing infrastructure	3.1 Improved physical infrastructure (e.g. state of roads, ICTs, storage facilities, transportation systems, processing capacity)					
	3.2 Decreased physical distance to markets					
	3.3 Improved and more accessible information and communication infrastructure, platforms (e.g. information on markets, prices, support and advisory services, technologies, policies, actor and chain organisation, etc.)					
4 Enhanced capacity						
a. At individual level (knowledge, skills, attitudes, uptake of innovation outputs)	4.1 Number of actors trained (new/improved knowledge and skills)					
	4.2 Number of actors applying new knowledge, skills and attitudes					
	4.3 Number of actors using new/improved technologies, business arrangements, protocols, etc. in each actor/user category					
b. At organisation level ('culture of innovation')	4.4 Increased participation of other actors in setting organisational priorities based on the different actors' needs and opportunities for joint innovation					
	4.5 Strategic importance attached to collaboration with other actors in innovation platforms/ partnerships					

Dimensions of innovation system performance	Performance indicators	Input	Process	Output	Outcome	Impact
	4.6 Time and space given to organisation's personnel/members to acquire and share knowledge within the organisation and with other actors					
	4.7 Personnel performance evaluation based on success in creating added value services, products					
	4.8 Capacity to learn and adapt to changed/new needs, opportunities, threats, problems					
c. At inter-organisational level ('governance of innovation')	4.9 Strengthened capacities to facilitate and improve inter-actor collaboration, joint learning and capitalisation of experience					
	4.10 Action plans and governance, management and implementation arrangements for joint innovation platforms/ partnerships endorsed by the different actors (ownership, trust)					
	4.11 Joint policy advocacy and resource mobilisation for shared interests of the collective innovation platforms					
	4.12 Increased coordination between public and private support services in scaling up innovation processes and technology use					
5 Increased value created[3]:						
a. Enhanced market access / opportunities; value chain development; and income growth	5.1 Growth in productivity and traded volumes in existing and new markets					
	5.2 New products and services created; product diversification					
	5.3 Strengthened organisation of value chains					
	5.4 Growth of value added and profit margins in the chain					
	5.5 Distribution of increased value added and profit margins between categories of chain actors					
	5.6 Increased competitiveness of value chains					
	5.7 Reduced poverty rates, income growth resulting from the innovation process					
b. Enhanced natural resource use and eco-system performance	5.8 Conservation, enhancement and use of (agro)biodiversity					
	5.9 Improved (agro)ecosystem performance and rehabilitation of degraded ecosystems					
	5.10 Improved management of soil fertility/health and water; reduced pollution from agricultural sector					

[3] Social, cultural and political/policy value created is measured by indicators of dimensions 1, 2, 3 and 4.

ANNEX 1 – ABBREVIATIONS AND ACRONYMS

ACP	Africa, Caribbean and Pacific
AIS	Agricultural innovation system
ARD	Agricultural research for development
ASARECA	Association for Strengthening Agricultural Research in East and Central Africa
ASTI-system	Agricultural science, technology and innovation system
ASTI-indicator	Agricultural science and technology indicator
ATPSN	African Technology Policy Studies Network
CTA	Technical Centre for Agricultural and Rural Cooperation
DURAS	Promoting sustainable development in agricultural research systems
ECDPM	European Centre for Development Policy Management
FARA	Forum for Agricultural Research in Africa
GFAR	Global Forum for Agricultural Research
IAR4D	Integrated agricultural research for development
ICRA	International Centre for development oriented Research in Agriculture
IFPRI-ISNAR	International Food Policy Research Institute, ISNAR-programme
IPR	Intellectual property right
KIT	Royal Tropical Institute
LOMPS	Learning-oriented monitoring and planning system
M&E	Monitoring and evaluation
OECD	Organisation for Economic Cooperation and Development
RAAKS	Rapid appraisal of agricultural knowledge systems
R&D	Research and development
SSM	Soft system methodology
S&T	Science and technology

ANNEX 2 – SUMMARY OF WORKSHOP PROGRAMME

Setting the stage – Key concepts

- Welcome by Thierry Doudet
- Self introductions, fears and expectations
- Workshop overview by Judith Ann Francis

- Innovation Theatre 1 – Key concepts
- Presentation: Relevance of the innovation systems approach and ACP agricultural performance by Judith Ann Francis

- Presentations of ASTI-system case studies
    - Kenya floriculture innovation system by Maurice Bolo
    - Malawi maize innovation system by Andy Safalaoh
    - Papua New Guinea Banana innovation system by Rosa Kambuou

Innovation performance

- Innovation Theatre 2 – Enhancing agricultural performance through innovation
- Presentation: Performance monitoring as a tool for innovations system improvement by Peter Gildemacher and Bart de Steenhuijsen Piters
- Presentation: Monitoring and evaluating performance in enhancing rural innovation – Lessons from building ARD capacity in the South by Jon Daane
- Innovation Theatre 3 – Innovation, innovation performance and ACP agricultural development

What performance indicators for agricultural innovation?

- Presentation: Agricultural innovation and performance measurement – What indicators? by Paul Engel
- Presentation: Agricultural Science & Technology Initiative – New directions by Nienke Beintema
- Presentation: Developing indicators for analyzing and evaluating multi-stakeholder research partnerships by Oliver Oliveros
- Presentation: Outcome and impact – Customising FAAP indicators for ASARECA by Leonard Oruko

What performance indicators for ACP agricultural innovation systems and ARD/S&T organizations within the context of AIS?

- Group work on input, process and output indicators
- Presentation and discussion of working group reports
- The way forward: Building consensus on next steps

Presentations, innovation theatres and group work were all followed by plenary discussion and the outputs of each day were recapitulated the next morning.

ANNEX 3 – LIST OF PARTICIPANTS

1	**FRANCE**	2	**FRANCE**
	Oliver OLIVEROS Coordinator, Project DURAS / Representative GFAR Agropolis International Avenue Agropolis F-34394 Montpellier Cedex 5, France Tel. : +33 (0)4 67 04 37 47 Fax : +33 (0) 4 67 04 75 99 E-mail: oliveros@agropolis.fr; www.duras-project.net		**Michel Dodet** Vice-President International Institut National de la Recherche Agronomique 147, rue de l'Université, 75338 Paris, Cedex 07 France Tel: +33-1 4275 9680 Fax:+ 33-1 4275 9377 Email: dodet@paris.inra.fr
3	**GHANA**	4	**JAMAICA**
	Gloria Essilfie Resource person with the SSA CP Programme Coordination Unit (PCU), FARA Secretariat PMB CT 173 / 2 Gowa Close, Roman Ridge Accra, Ghana Email: gtetteh@fara-africa.org Website: www.fara-africa.org Tel: +233 21 772823 Fax: +233 21 773676		**Marcia Blair** Principal Scientist & ASTI Coordinator National Commission on Science & Technology (NCST) 1 Devon Road, Kingston 10, Jamaica Fax: + 1-878 9608407 Email: marciajblair@hotmail.com, mblair@opm.gov.jm Tel: +1-876 929 8880 – 5
5	**KENYA**	6	**MALAWI**
	Maurice Bolo Senior Research Officer & PhD student African Technology Policy Studies Network. P.O. Box 10081-00100, Nairobi, Kenya Tel: 254-20-2714092/ 2723800 Email: mbolo@atpsnet.org / mbolo@open.ac.uk		**Andy Safalaoh** Deputy Head, Animal Science Department, Bunda College of Agriculture P.O. Box 219, Lilongwe, Malawi Tel: +265 1 277 226/ +265 01277 249 Email:andys@bunda.unima.mw/andysafalaoh@yahoo
7	**MALAWI**	8	**NIGERIA**
	Chimwemwe Selemani Chamdimba Monitoring and Evaluation Specialist, Programmes Coordinating Office, Bunda College, P.O. Box 219, Lilongwe, Malawi Tel: +265 1 277 281 / Cell: +265 9 955 560 Fax: + 265 1 277 281 Email: cchamdimba@yahoo.com; cchamdimba@bunda.unima.mw		**Agwu Ekwe Agwu** Department of Agricultural Extension University of Nigeria, Nsukka Enugu State, Nigeria Tel: +234 8034024251 Email: agwuekwe@hotmail.com / ekwe.agwu@unn.edu.ng
9	**ITALY**	10	**PAPUA NEW GUINEA**
	Nienke Beintema Head, Agricultural Science & Technology Indicators (ASTI) initiative, ISNAR division, International Food Policy Research Institute (IFPRI), c/o FAO Office in Rome Email: n.beintema@cgiar.org		**Rosa Kambuou** Plant Genetic Resources Scientist NARI Dry Lowlands Programme Laloki, P O Box 1828, Port Moresby Papua New Guinea Tel: +675 323 5511 Fax: +675 323 4733 Email : rosa.kambuou@nari.org.pg

11	**SENEGAL**	12	**TRINIDAD AND TOBAGO**
	Amadou Fall Senior Researcher & ASTI Coordinator Institut Sénégalais de Recherches Agricoles (ISRA), BP 3120 Dakar, Senegal Tel: 221 – 9611751 / 647 8612 (GSM) Fax: 221 – 832 – 24 – 27, 9611891 Email: aafall2@hotma.com		**Lisa Perez** Junior Specialist, Monitoring and Evaluation Caribbean Agricultural Research and Development Inst. The University of the West Indies St Augustine, Trinidad and Tobago Tel: 1-868-645-1205/7 Fax: 1-868-645-1208 Email:ic@cardi.org, lperez@cardi.org, cdefreitas@cardi.org
13	**UGANDA**	14	**ZAMBIA**
	Leonard Oruko Senior Technical Officer, Monitoring & Evaluation ASARECA Secretariat, Plot 5, Mpigi Road P.O. Box 765 Entebbe, **Uganda** **Tel:** 256-41-4-323424, 320422 **Fax:** 256-41-4-321126, 322593 Email: l.oruko@asareca.org		**Lackson Tonga** Ministry of Science Technology & Vocational Training P.O. Box 50464 Lusaka 10101 Zambia Tel:+ 260 211 252073 Fax:+ 260-211 251820 / 252089 Email: ltonga@mstvt.gov.zm
15	**NETHERLANDS**	16	**NETHERLANDS**
	Paul Engel Director, ECDPM Onze Lieve Vrouweplein 21 6211 HE Maastricht The Netherlands Tel +31 (0)43 - 3502 900 Fax +31 (0)43 - 3502 902 Email: info@ecdpm.org		**Bart de Steenhuijsen Piters** Royal Tropical Institute (KIT) Sustainable Economic Development Group Mauritskade 63, PO Box 95001 1090 HA Amsterdam, The Netherlands Tel +31 20 568 8481 Fax +31 20 568 8444 Email: b.d.steenhuijsen.piters@kit.nl
17	**NETHERLANDS**	18	**NETHERLANDS**
	Cecile Kusters Rural Development Specialist Wageningen International PO Box 88, 6700 AB Wageningen The Netherlands Tel: +31 317 495234 Fax: +31 317 474476 Email: Cecile.Kusters@wur.nl		**Jon Daane** Director ICRA P.O. Box 88 6700 AB Wageningen The Netherlands Tel: +31(317)422938 Fax: +31(317)427046 Email: jon.daane@wur.nl Website: www.icra-edu.org
19	**NETHERLANDS**	20	**NETHERLANDS**
	Peter Gildermacher Royal Tropical Institute (KIT) Mauritskade 63, PO Box 95001 1090 HA Amsterdam The Netherlands Tel +31 20 568 8481 Fax +31 20 568 8444 Email: P.Gildemacher@kit.nl		**Thierry Doudet** Head of Department Information & Communication, Management Skills and Systems, CTA, P.O. Box 380, 6700 AJ Wageningen The Netherlands Tel.: +31 317 467 127 Fax: +31 317 460 067 Email: doudet@cta.int

21	NETHERLANDS	22	NETHERLANDS
	Judith Ann Francis		**Uzo Klein Leugemors**
	Senior Programme Coordinator		Project Assistant
	Science & Technology Strategies Information & Communication Management Skills and Systems CTA, P.O. Box 380, NL - 6700 AJ Wageningen, The Netherlands		Science &Technology Strategies Information & Communication Management Skills and Systems CTA, P.O. Box 380, NL - 6700 AJ Wageningen, The Netherlands
	Tel.: +31 317 467 190		Tel.: +31 317 467 160
	Fax: +31 317 460 067		Fax: +31 317 460 067
	Email: Francis@cta.int		Email: uzo@cta.int
	Website: http://Knowledge.cta.int		

ANNEX 4 – LIST OF POWERPOINT PRESENTATIONS

1. Relevance of the innovation systems approach & ACP agricultural performance (Judith Ann Francis, CTA, The Netherlands)
2. Analysing the ASTI-systems: Lessons from the cut flower industry in Kenya (Maurice Bolo, ATPS-network, Kenya)
3. The maize AST-system, lessons from a national case study in Malawi (Andy Safalaoh, University of Malawi-Bunda College, Malawi)
4. Banana AST-system in Papua New Guinea – Results of a national case study (Rosa Kambuou, NARI, Papua New Guinea)
5. Indicators for rural innovation system functioning (Peter Gildemacher and Bart de Steenhuijsen Piters, Royal Tropical Institute/KIT, The Netherlands)
6. Monitoring & evaluating performance in enhancing rural innovation: Lessons from building ARD capacity in the south (Jon Daane, ICRA, The Netherlands)
7. Agricultural innovation & performance measurement – What indicators? (Paul Engel, ECDPM, The Netherlands)
8. Agricultural Science & Technology indicators (ASTI) initiative: Overview and new directions (Nienke Beintema, IFPRI, Italy)
9. Developing indicators for analysing and evaluating multi-stakeholder research partnerships: The DURAS project experience (Oliver Oliveros, GFAR, France)
10. Outcome and impact – Customising FAAP indicators for ASARECA (Leonard Oruko, ASARECA, Uganda)

A CD-ROM with these PowerPoint presentations and summary slide sets of the main discussions and group work was provided to participants at the end of the workshop.

ANNEX 5 – WORKING GROUP REPORTS

Group 1

Background discussion:
- Used Paul Engel's presentation as a starting point identifying innovation as a social process.
- Started to discuss from the banana case study example, and then to see how to scale-up these experiences up to indicators at the general system level
- Separation of measuring innovation performance and measuring innovation process and acknowledge that some process indicators are needed to provide context.

List of elements and indicators

Element	Indicators
1. Enhanced linkages among actors	1. Resources/time allocation to partnerships among actors (P) 2. Perception of actors involved (using a scale measure) (P) 3. Intensity of collaborations (e.g., using SNA) (P)
2. Improved institutions/policy environment	1. Public investment in R&D (I, O) 2. Financial and fiscal incentives (I, P, O) 3. Policy inconsistencies (trends) (I, O) 4. Appropriate laws and regulations and enforcement of these (I, O)
3. Enhanced skills and knowledge (including technology generation)	1. Number of actors trained in new/improved educational programs and training courses (O) 2. Number of actors applying new skills and knowledge (O) 3. New/improved technologies implemented (O) 4. Uptake of existing knowledge and technologies (e.g., indigenous/local) (I, O)
4. Organizational transformations	1. New innovation platforms formed (e.g., farmers groups; knowledge management platforms for dissemination/communication, sharing, transfer) (O)
5. Enhanced market access and opportunities	1. Physical infrastructure (e.g. state of roads, storage facilities, transportation systems, processing capacity) (O) 2. Physical distance (O) 3. Organized supply chain (O) 4. Creation of new products, services and new markets

I = input; P = process; O = Output/Outcome indicator

Group 2

Choices made

- Started at the level of a commodity based innovation system
- Used banana case PNG as an example
- Objective: commodity system improvement
- Monitoring and evaluation by actors
- Measure change in system performance over time compared to actor defined ambitions
- Measure change on specific points chosen as a result of system analysis
- Focus indicators on system learning

How it was done

1. Started out focussing on different problems from the presentation, which gave a 'messy' process
2. Shifted to using innovation system functions as a ' handle' which improved the focus
3. Discussed possible indicators for different innovation system functions in relation to the Banana case.
4. Converted the findings into this overview

What else the group wanted to do

1. Use the approach we made up for the Kenya flower case
2. Try to extrapolate the approach to 'national innovation system' level

The result

	Question	Indicator	Banana case
IS function			
Identification of needs and opportunities for innovation	1. Are the relevant stakeholders involved?	1. Identify relevant stakeholders, measure participation in stakeholder meetings. **(P)**	1. In first meeting media not present, but identified as important actor. Are they present after *xx* time?
	2. Can all the stakeholders express their opinion?	2. Stakeholder perception through interviews 'before' and 'after' **(P)**	2. asses stakeholder perception about their contribution to first meeting and meeting after *x* time
	3. Is there a common understanding of needs and opportunities?	3. A stakeholder endorsed action plan with agreed needs and opportunities **(o)**	3. asses whether after *x* time there is a stakeholder action plan
	4. Are opportunities and needs regularly discussed and adapted?	4. Regular interaction between stakeholders, reflected in adaptation of action **(P)**	
Developing, testing and adapting of opportunities	1. Is the system testing and adapting 'opportunities' identified in a first meeting?	1. Define opportunities and provide track record of testing and adapting **(P+O)**	1. Define opportunities in stakeholder meeting; track the faith of these opportunities over time.
	2. Is the system adding new 'opportunities' to be tested?	2. Record new 'opportunities' identified and added along the way and provide a track record **(I+P)**	
	3. Is the system responding to any new challenges?	3. Record new ' threats' to the sector, and record reaction to this threat **(I)**	
	4. Have any of the problems or needs identified 'disappeared' over time?	4. Difference in prioritized problems at the start and after *x* time. **(O)**	
	5. Is the system delivering new arrangements / technology in use?	5. New technology adoption; ways of doing things etc… **(O)**	

I = input; P = process; O = Output/Outcome indicator

The result (contd)

	Question	Indicator	Banana case
IS function			
Knowledge and information exchange	Have the prioritized bottlenecks in the knowledge and information system been reduced?	1. Set goals for improved information exchange **(O)**	1. Change in number of broadcasts presenting a specific 'new' technology (not banana limited). 2. Perception of extension staff about change in access to smallholders
	2. Do stakeholders have improved access to training?	2. Measure number of different stakeholders receiving training, compared to a target **(O)**	2. Number of banana PhD students; Number of extension staff trained on banana topics; Number of traders trained on banana topics Number of farmers trained on banana topics
Provision of an enabling environment for innovation	Does the system have a policy environment inductive of innovation?	Attention for the chosen commodity/ sector in policy documents **(O)**	Mentioning of the banana crop as an important and 2nd food crop in PNG in development policy documents
	Does the system have adequate research staff facilities?	Increase in dedicated research staff and improvement of facilities **(O)**	3 specifically dedicated banana researchers
	Are there strong network interactions?	Linkage map. Focus on before and after. **(P)**	Banana system linkage map, value interactions.
	Does the system have adequate marketing infrastructure?	**(O)**	
	Does the system have adequate general infrastructure?	**(O)**	

The result (contd)

	Question	Indicator	Banana case
IS function			
Market formation	Are new market opportunities explored and growing?	Identification of new market opportunities and tracking of efforts to develop them. Growth in traded volumes Change in profit margins in the chain Product diversification Value addition **(P)**	Is a new market Orange banana (Beta-carotene) explored? Are improved arrangements between buyers and transporters resulting in less empty shelves in shops in town? Are export opportunities to New Zealand and Australia explored? Are volumes traded in-country increasing?
Resource mobilization	Who is investing what in the different functions above?	Identification of private sector, public sector and donor investments in the commodity/sector compared to start and against a target. **(I)**	Is the government investing more in the banana sector? Is the private sector investing more in multi-stakeholder and R&D activities related to banana?
Network formation and management	1. Who initiates meetings? 2. Who pays transaction costs of networking? 3. Is there commitment for inter-actor collaboration? 4. How are 'rules' of networking decided? 5. How are conflicts resolved?	1. Is there a champion for network organization? **(P)**	
Creation of legitimacy / counteract resistance to change			

Lessons learned

1. Using innovation system functions helps organizing the search for indicators
2. A function on network formation and management was missing