Training on Transformation of Agricultural Education through Knowledge Management and Capacity Development for More Effective Agricultural Innovation System (AIS)

23-25 January 2019, Tamil Nadu Agricultural University, Coimbatore, India

Workshop Synthesis

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Executive Summary

Agricultural innovation is a precondition for meeting the challenge of feeding the world's growing population in the face of climate change and degradation of natural resources. It is also fundamental to achieving the Sustainable Development Goals (SDGs) of ending poverty and hunger, achieving improved food security and nutrition, and promoting sustainable agriculture. The higher education sector is playing an important role in agricultural innovation systems (AIS). Through agricultural education of youth, it brings fundamental changes to rural areas, institutions, policy and economy. Many universities are however not fully exploiting their innovation potential in order to prepare and equip their graduates with the skills and capacities they need to address the current and future challenges of AIS. As a result, graduates face low employability, which is largely due to their underdeveloped inter-personal and communication skills, lack of leadership and entrepreneurial skills, work ethics, time management and decision-making. To improve the employability of graduates in the agricultural sector, there is a need to strengthen universities' individual, organizational and enabling environment (institutional) capacities, adapt their curriculum and pedagogy, and integrate knowledge management (KM) into their business processes, to make AIS more effective. Reforms are needed to shift the current focus on teaching and testing knowledge to skill-based education, creativity and innovation to develop a new generation of leaders, who are inspired and able to create agricultural jobs, while addressing the complexity and dynamics of agricultural development.

From 23-25 January 2019, the Asia-Pacific Association of Agricultural Research Institutions (APAARI), in collaboration with the Food for Agriculture Organization of the United Nations (FAO), and Global Confederation of Higher Education Associations for Agricultural and Life Sciences (GCHERA), organized a three-day training workshop on Knowledge Management and Capacity Development for More Effective Agricultural Innovation System (AIS) at Tamil Nadu Agricultural University (TNAU), Coimbatore, India. The initiative was organized in partnership with the Tropical Agriculture Platform (TAP) hosted by FAO. Thirty nine participants from TNAU attended the workshop. This included professors, assistant professors, administrators and five PhD students, five of whom became innovation champions to lead the university advocacy efforts for educational transformation. The training methodology was based on the Common Framework on Capacity Development for Agricultural Innovation Systems (CD for AIS) developed by TAP, including engagement and interactive activities using KM and training-of-trainers' methodologies, with limited use of PowerPoint presentations and more of hands-on experience. The workshop aimed to:

(i) Develop knowledge of the key concepts and processes of Capacity Development for Agricultural Innovation Systems (CD for AIS) and KM, to guide transformation of agricultural education systems.
(ii) Develop understanding of the academic model of the EARTH's University in Costa Rica that has influenced university transformations all over the world and that is now being scaled up through the Kellogg-funded project on Transforming Higher Education in Mexico and Haiti, but also other countries and regions.
(iii) Develop greater understanding of the key elements of successful transformation of agricultural education systems, such as bringing business, ethical and value-based leadership and experiential development to agricultural universities.
(iv) Identify good practices and experiences based on the EARTH University model, as well as CD for AIS and KM practices, to be incorporated/adapted to TNAU.
(v) Build individual, organizational and institutional functional capacities of TNAU to enable the trainees to engage students through collective learning, joint analysis, and collaboration.
(vi) Take stock of TNAU's KM and CD practices, tools, and processes, and help them identify gaps and develop their own roadmap towards transformation.

(vii) Inspire transformation of teachers into leaders that promote career development in agricultural professions.

The desired outcome is that graduates have the ethical foundation, knowledge, soft skills (functional capacities) – especially ethical leadership, entrepreneurship, proper values and creativity - to succeed in their future careers as agents of positive change in addressing the twin challenges of global food and nutritional security, and environmental sustainability. With a strong ethical foundation, students can better commit to a vision of agricultural and forestry production compatible with the sustainability of natural environment and conservation of biodiversity. Functional capacities, such as strong entrepreneurial skills and spirit, as well as strong leadership, interpersonal and team building skills, can enable students better identify and optimize new business opportunities. Knowledge in the relevant natural and social sciences, and the technical and business principles that underlie practice, combined with practical experience can better develop their confidence and capability in delivering solutions.

One of the models of educational transformation is the EARTH University in Costa Rica, based on which GCHERA has developed a pilot project funded by W.K. Kellogg Foundation (WKKF) on Transforming Higher Education in Mexico and Haiti. Its key elements of success include: (i) experiential/participatory learning curricula; (ii) university engagement within the community; (iii) entrepreneurial education and business development; (iv) ethical and value-based leadership; and (v) decision-making based on problem solving, conflict resolution through dialogue. The university also strongly focuses on learning environment by emphasizing: (i) student learning (student-centred learning; experiential participatory learning processes; and student-led learning activities, particularly entrepreneurial projects); and (ii) professor's role (facilitator of learning; easily accessible to students; model for students; students participate with faculty in learning activities, extension and community outreach, and in research). GCHERA, in collaboration with APAARI and FAO is hoping to extend the project to Asia-Pacific, and involve TNAU as well.

The training workshop was framed around agricultural innovation system (AIS) perspective involving various actors and sources of knowledge whereby individuals and organizations, together with supporting institutions and policies in the agricultural and related sectors, bring existing or new products, processes, and forms of organization into social and economic use. The Common Framework that promotes the AIS perspective also promotes a shift of mind-set and attitudes through the development of functional capacities. As such, it identifies 4 + 1 key functional capacities for AIS to perform effectively – capacity to: (i) navigate complexity; (ii) collaborate; (iii) reflect and learn; and (iv) engage in strategic and political processes. This leads to the fifth capacity to adapt and respond in order to realize the potential of innovation. Technical and functional capacities must be seen as complementary and should be developed in an integrated manner across the three CD dimensions – individual, organizational and enabling environment. The Framework also proposes a CD cycle of 5 stages – galvanizing commitment, visioning, capacity needs assessment, capacity development strategy, and implementation, which was applied in the workshop programme. The Common Framework is presented in an interactive way on www.tapipedia.org. In terms of knowledge management (KM), the workshop emphasized the role of facilitation, reflection, learning, documentation or enabling agricultural innovation. KM goes much beyond publications, communication, information tools and processes. It focuses on tacit knowledge and fostering synergies by managing systemic interactions that link people and resources, enhancing their ability to make collective decision and implementation.

The workshop participants were able to explore these concepts by providing their own understanding of innovation, innovation examples, functional capacities relevant to their context, as well as asking what is needed to innovate and what makes innovation happen. It was stressed that while innovation often refers to technologies and practices, such as improved

varieties, sustainable land management techniques, methods to reduce post-harvest losses, etc., it also refers to processes and organizational forms. This includes: public-private partnerships, organizing farmers in cooperatives, performance contracts, or policies. The links between education and CD for AIS were explored by asking participants what a role of education in AIS should be and what is the role of the higher education sector in strengthening AIS.

KM processes with focus on facilitation of more interactive, participatory and engaging face-to-face meetings or lectures were also presented in the workshop. Such processes/approaches take into consideration various characteristics of adult learning – how adults learn best: (i) guiding participants to their own knowledge rather than supplying them with facts; (ii) connecting learning to participants' experience and knowledge base; (iii) providing opportunities for everyone to interact and engage; and (iv) using methods that support conversations and knowledge sharing among individuals and groups. Some key KM processes with associated methods explained included those to: (i) strengthen relationships and network; (ii) capture and disseminate; (iii) generate and share; (iv) explore a problem and identify options to solve it; (v) strengthen and sustain knowledge sharing. During the discussions on KM tools and processes, participants took stock of existing KM tools used in TNAU.

Social Media was presented as extremely important in higher education. Socio-conomic development and increasing emphasis on education are resulting in increased university enrollment throughout the world. Universities are increasinly realizing the need to "stand out in the crowd". As such, Social Media presence enables the creation of meaningful connections. TAPipedia and the Common Framework Interactive Page were demonstrated to allow the participants and other stakeholders to share their own applied and context specific CD for AIS resources and to discover such knowledge from different sources, partners and regions. Open online courses of the University of Wageningen, DEVCO Academy of the European Commission, as well as the Class Central Portal and Access Agriculture, and other online resources were shared to inspire the participants to enrich their teaching practices.

One of the major gaps facing AIS is the communication gap between researches/scientists and development practitioners. The challenge is how to create understanding between technical language of scientists and simple language of development practitioners. The session on communication for effective AIS focused on clarity in communication and ways to ensure that the right message is sent and received without ambiguity in various settings and contexts.

Innovative knowledge-sharing and CD practices implemented in TNAU were presented by three volunteers identified through the pre-workshop survey. The following was presented: (i) the value of the ICT tools introduced in education to teachers and students; (ii) collaboration with Dalhousie University, Canada, and Cornell University, New York, for dual degree agricultural research programme; (iii) correspondence courses providing flexible learning opportunities to farmer communities; and (iv) experiential learning courses, hands-on training and educational tours that have been included in the curriculum; (v) the use of Microsoft Office Tools, namely PowerPoint and Access along with Internet to ease day-to-day activities in handling classes as well as assisting in office administration (through online dissemination tools, MS-Office Access based software for maintaining Departmental Accounts and Procurement of Non-Recurring items, literature management software 'Endnote', personal website to share lecture materials with students, and online data management); and (vi) TNAU Agritech Portal as an integrated knowledge platform for sharing and learning.

Four of the five stages of the CD for AIS cycle were used as a framework to guide participants through the "transformation process". In **Stage 1 – Galvanizing Commitment**, the resource persons worked with trainees to create a sense of ownership; get their engagement and interest in the change process; identify innovation champions at the level of senior administration, professors and students; and determine and secure commitment from the participants for a

coordinated approach to their university transformation. Participants were asked to identify "things to keep doing" and "things to stop doing" and subsequently to conduct network mapping to map the different actors in the education system. The network analysis captured key actors and relationships between them. They enabled a focused discussion on the missing linkages, weak relationships and needs for transformation. **In Stage 2 – Visioning**, participants were asked to forge their consensus about their vision for the future by developing a vision statement and priority objectives for each of the main areas of work: administration, research, extension and education, based on the needs for transformation emerged through the previous session. The objective was also to agree what type of transformation they want for the university and to further secure their commitment. The following vision statement for TNAU was then agreed by the participants in the plenary: *"Institute of global excellence to ensure food and nutritional security, and environmental sustainability".* **In Stage 3 – Capacity needs assessment**, participants were asked to identify the capacities (both functional and technical), as well as changes in KM and administration needed by TNAU to achieve the vision. They used the three-dimension approach identifying the needs at individual, organization and enabling environment levels. Finally, in **Stage 4 – Capacity Development Strategy**, participants were asked to: (i) identify objectives, goals, priorities and options for change initiatives; (ii) frame an action plan; and (iii) validate the visioning exercise. Detailed action plans were developed for capacity development, advocacy, mobilization, and KM that are to be validated, refined and agreed on by the university to guide university transformation. The plans were also presented to the Senior Management. Five innovation champions (facilitators) have been identified among administrators, professors and PhD students. Their role will be to lead internal advocacy efforts for university transformation, monitor and report on progress, document and contribute to the internal meetings on proposed changes, and represent TNAU in KM meetings.

The following recommendations and next steps have been identified:

- APAARI to follow up with TNAU authorities with the support of Indian Council for Agricultural Research (ICAR) and the Indian Agricultural Universities Association (IAUA) to continue this initial process of transformation.
- APAARI in collaboration with TAP/FAO to explore the option of developing a credit course on CD for AIS in TNAU that could be introduced as a model to other universities.
- TNAU administration to share the results of the workshop with the Vice-Chancellor and undertake a follow up activity/workshop to further consolidate the draft Action Plan with other university staff, faculties and departments.
- The identified innovation champions of TNAU to lead advocacy efforts for university transformation, monitor and report on progress, document and contribute to the internal meetings on proposed changes, and represent TNAU in KM meetings.
- TNAU administration to maintain updated information on the TNAU website regarding the university changes and reforms.
- GCHERA to propose TNAU for inclusion in the Kellogg Project during the inception meeting in Costa Rica in early February 2019.
- FAO to continue the dialogue and collaboration with APAARI and GCHERA for future collaboration, and scoping for funds to expand the agricultural education programme.
- TNAU to attend the 10th GCHERA World Conference "Leadership for the Sustainable Development of Agricultural and Life Science Universities", April 25-26th 2019 in Bucharest, Romania.

The training outcomes are envisioned to lead to the initiation of a policy dialogue with respective national institutions on reforms as a means to create an enabling environment with improved agricultural education quality and relevance to the dynamic and rapidly changing context of agri-food systems. Improved education policies are envisioned to enhance the employability of graduates, enable youth to create decent, green agricultural jobs, and therefore strengthen AIS in the long run.

Introduction

Agricultural innovation is critical for increasing agricultural productivity and output. It is also crucial for improving farmers' incomes to ultimately reduce poverty, as well as ensuring food security and healthy nutrition, competitiveness and sustainability of the agricultural and related sectors. The higher education sector is playing an important role in transformation of societies, through education of youth, which brings fundamental changes to institutions, policy and economy. Though different countries face different issues in their higher education systems, one of the key common issues is that the agricultural university curriculum and pedagogy has not adapted to the dynamic and complex environment that the agri-food sector is facing. It is often prescribed and fixed by higher policy bodies, and as a result, in many education institutions it has not changed in decades.

Policy changes are urgently needed to shift the current focus on teaching and testing knowledge to skill-based education, creativity and innovation to develop a new generation of leaders to lead sustainable agricultural development. Institutional capacity is also needed to develop leaders in teaching positions to attract more students to agricultural profession, and teach them to think, learn and take risks. The industry feedback indicates that low employability of graduates are partly due to their poor inter-personal and communication skills, lack of leadership and entrepreneurial skills, work ethics, time management and decision-making. This is largely affecting their future career growth and work success. It is critical that higher education develops the skills enabling youth to become active agents of change and creators of agricultural jobs, while addressing the complexity and dynamics of agricultural development. The desired outcome is that graduates have the ethical foundation, knowledge, soft skills – especially ethical leadership, entrepreneurship, proper values and creativity - to succeed in their future careers as agents of positive change in addressing the twin challenges of global food and nutritional security, and environmental sustainability.

About the training

From 23-25 January 2019, the Asia-Pacific Association of Agricultural Research Institutions (APAARI), in collaboration with the Food for Agriculture Organization of the United Nations (FAO), and Global Confederation of Higher Education Associations for Agricultural and Life Sciences (GCHERA), organized a three-day training on Knowledge Management and Capacity Development for More Effective Agricultural Innovation System (AIS) at Tamil Nadu Agricultural University (TNAU), Coimbatore, India. The initiative was organized in partnership with the Tropical Agriculture Platform TAP hosted by FAO.

The idea for the workshop was developed after APAARI conducted a Webinar with Universities on Capacity Development for Agricultural Innovation - Bringing System-wide Change in Asia-Pacific on 17 November 2017, where TNAU expressed its interest in transformation of agricultural education to better develop young leaders for tackling the complex challenges facing agricultural and rural development. The idea was then presented to FAO in February 2018, and a concept note was developed to support the initiative in the context of the Capacity Development for Agricultural Innovation System project funded by the European Union. GCHERA agreed to provide substantive support for conducting the pilot initiative with TNAU. The proposed training was further discussed during the Knowledge Management Workshop (18-19 October 2018) organized by APAARI and the National Agriculture and Forestry Institute (NAFRI) in Lao People's Democratic Republic where Dr. U. Sivakumar, Programme Coordinator, TNAU, India, represented TNAU.

The training was in line with the APAARI Strategic Plan 2017-2022, specifically the Capacity Development Programme's Strategies to: "Strengthen institutional arrangements for effective

delivery of outcomes from agri-food research and innovation systems" and "Enhance organizational capacity for good governance, effective management and delivery of research and innovation". It was a response to the increasing need to strengthen higher education institutions (HEIs) and other professional agricultural education institutions in Asia-Pacific that have not kept pace with or invested in policies, teaching, curricula, research and public services that are required to address the existing challenges faced by agri-food systems.

The workshop was designed around engagement and interactive activities, with limited use of PowerPoint presentations and more of hands-on experience, using innovative KM processes and approaches to help galvanize participants' commitment for change, develop their university vision, assess the university needs, and prepare action plans for change. Each session included conceptual and engagement aspects. Personal logbooks were given to the participants to allow them to write down their reflection on what has been learned and what they planned to apply in their work. The workshop objective was to train the personnel of TNAU, who will be expected to act as trainers themselves and apply the learning in their work, as a way of initializing their university transformation. In particular, the training aimed to:

(viii) Develop knowledge of the key concepts and processes of Capacity Development for Agricultural Innovation Systems (CD for AIS) and Knowledge Management (KM) to guide transformation of agricultural education systems.
(ix) Develop understanding of the academic model of the EARTH's University in Costa Rica that has influenced university transformations all over the world and that is now being scaled up through the Kellogg-funded project on Transforming Higher Education in Mexico and Haiti, but also other countries and regions.
(x) Develop greater understanding of the key elements of successful transformation of agricultural education systems, such as bringing business, ethical and value-based leadership and experiential development to agricultural universities.
(xi) Identify good practices and experiences based on the EARTH University model, as well as CD for AIS and KM practices, which can be incorporated in or adapted to TNAU.
(xii) Build individual, organizational and institutional functional capacities of TNAU to enable the trainees to engage students through collective learning, joint analysis, and collaboration.
(xiii) Inspire transformation of teachers into leaders that promote career development in agricultural professions.

The training outcomes are envisioned to lead to the initiation of a policy dialogue with respective national institutions on reforms as a means to create an enabling environment with improved agricultural education quality and relevance to the dynamic and rapidly changing context of agri-food systems. Improved education policies are envisioned to enhance the employability of graduates, enable youth to create decent, green agricultural jobs, and therefore strengthen AIS in the long run.

Participants

Thirty-nine participants from TNAU attended the workshop. This included professors, assistant professors, administrators and five PhD students. The TNAU staff represented different university departments and faculties. Five innovation champions were selected among professors, administrators and students to contribute to a change process in their university and beyond. 31 % of the participants were women. Dr. U. Sivakumar, Knowledge Focal Point of TNAU coordinated the workshop organization with the support from APAARI, GCHERA, and FAO.

Methodology

Since 2013, APAARI is a partner of the Tropical Agriculture Platform (TAP) hosted by FAO, under which a **Common Framework on Capacity Development for Agricultural Innovation Systems (CD for AIS)** was developed. The objective of the Framework is to harmonize the diversity of approaches to CD for AIS of various development actors. It builds on an in-depth study of the innovation system literature and highlights the need to explicitly consider the role of the enabling environment, in addition to addressing the individual and organizational dimensions of CD. The Framework therefore calls for an integrated approach that addresses the inter-related individual, organizational and enabling environment dimensions – the strength of each depending on, and determining the strength of the others – to ensure the success of CD for AIS.[1]

The TAP partners realize that universities are not producing graduates with the requisite skills and personal attributes to promote innovation processes, and not sufficiently engaging with non-university actors in innovation and agricultural research for development (IARD). APAARI therefore joined hands with FAO and GCHERA to support TNAU in their goal to provide professionals with the competencies needed to promote agricultural and rural innovation. This training therefore used the training-of-trainers methodology to: (i) train the university staff in more interactive teaching methods using various knowledge management (KM) and CD processes; (ii) identify KM and CD gaps with specific focus on functional capacities (soft skills); (iii) take stock of KM tools, practices and innovative activities of the university; and (iv) prepare action plans for taking the first step towards the university transformation.

Setting the stage: Transformation of agricultural education

Education is the core mandate of universities, but undergraduate education does not get the same attention as research. Quality of undergraduate education has limited impact on many global university rankings. There is an increased student enrolment in universities, but graduates are often not well equipped to meet societal challenges and employer requirements. At the same time, evidence shows high unemployment of graduates in some countries at a time when there is a great need for graduates, who have the skills to help solve grand challenges, such as food and nutritional security and environmental sustainability.

> *"Education then, beyond all other devices of human origin, is a great equalizer of the conditions of men -- the balance wheel of the social machinery."*
> Horace Mann, pioneering American educator, 1848
>
> *"educating children is the straightest line to global peace and prosperity. It may not be the fastest route, but there is no more clear and direct way to resolve the tensions between people and cultures than to ensure that people are equipped with knowledge, creative thinking and a sense of global citizenship."*
>
> Winnie Byanyima, Oxfam International

As such, the desired outcome of the GCHERA Action Plan is that "*Graduates have the **ethical** foundation, **knowledge**, **skills** – especially **leadership**, **entrepreneurship** and **creativity** - to succeed in their future careers as agents of positive change in addressing global challenges in agriculture and life sciences".*

[1] Capacity Development for Agricultural Innovation Systems – Guidance Note on Operationalization, 2014, FAO, http://www.cabi.org/Uploads/CABI/about-us/4.8.5-other-business-policies-and-strategies/tap-guidance-note.pdf

To be able to better tackle the global challenges in agricultural development, the 21st Century leaders should have a number of characteristics. Firstly, they need to have **ethical values** and be guided by positive values, and high ethical standards. They should seek justice, peace and dignity for all, and posses a strong social consciousness. They should also be committed to a vision of agricultural and forestry production compatible with the sustainability of the natural environment and the conservation of biodiversity. Secondly, they need to posses certain **skills**, such as strong entrepreneurial skills and spirit, capable of identifying new business opportunities, as well as strong leadership, interpersonal and team building skills. They should be life-long learners capable of taking advantage of relevant information, as it is generated and existing and new information technologies in support of innovation. Thirdly, they need to have solid knowledge in the relevant natural and social sciences, and the technical and business principles that underlie practice. They also need to have the practical experience critical to developing confidence and capability in delivering solutions, and high-level cognitive skills in analysis, evaluation and synthesis of new solutions. Finally, they should be professionals with a holistic vision of the bioeconomy, though an interdisciplinary education and work experience, and the ability to build bridges between specialists to solve the global challenges

Models of educational transformation

W.K. Kellogg Foundation (WKKF) is funding a 3-year pilot Project on Transforming Higher Education. Although its funding will be primarily targeted at universities in Mexico and Haiti, GCHERA will work with interested GCHERA member associations to secure funding to expand the project across its global network of universities. GCHERA is partnering with the American University of Beirut and EARTH University in the delivery of the project. The project, that focuses on undergraduate education, was developed based on the EARTH University model, but also drawing on best practices from other university models.

The EARTH University in Costa Rica has become an international model for preparing ethical leaders who are agents of positive change in addressing social, economic and environmental challenges of the most vulnerable regions of the world. According to a recent university survey, 90 per cent of students work in their countries of origin after graduation; 75 per cent have a positive and direct impact on the agricultural sector, mainly by increasing the efficiency of agricultural production; 87 per cent have a direct and positive impact on environmental issues; 84 per cent of respondents reported having a direct and positive impact on social issues; and 20 per cent have their own company. The Earth University key elements of success include:

- Experiential/participatory learning curricula
- University engagement within the community
- Entrepreneurial education and business development
- Ethical and value-based leadership
- Decision-making based on problem solving, conflict resolution through dialogue

The university also strongly focuses on learning environment by emphasizing: (i) **student learning** (student-centred learning; experiential participatory learning processes; and student-led learning activities, particularly entrepreneurial projects); and (ii) **professor's role** (facilitator of learning; easily accessible to students; model for students; students participate with faculty in learning activities, extension and community outreach, and in research).

The WKKF project was designed to share the successes of EARTH University in educating leaders that are positively impacting their communities and the agricultural sector. The project will be implemented in four components. Firstly, the pilot project will focus on change in learning processes of participating universities inspired by EARTH University success. Secondly, the GCHERA Global Network will promote change on a global scale through GCHERA member associations' work to secure funding to expand the project. Thirdly, communications

and knowledge dissemination will be key to provide regular project updates throughout the life of the project, as well as webinars, workshops, and other media. Lastly, the project's evaluation framework will help measure success in institutional change in participating institutions.

GCHERA will engage with its member associations to maintain its current global network initiative on undergraduate education reform throughout the project and sustain it after this project is completed. A global taskforce of Subject Matter Experts (SME) in the key elements of success categories will develop expertise to use and share globally to address institutional change. Annual series of global conversations and dialogues on higher education's contribution to sustainability, ethical leadership, and community well-being will take place as well. Evaluation materials and case studies will be developed and disseminated to assist others to instigate institutional change after the initial project is completed. The following change process of participating universities is envisioned:

- The pilot universities will review curricula and pedagogy with a view to providing the optimal learning environment for students
- Participating universities will adopt new curricula, community engagement policies, and revise traditional resource allocations to reflect their accountability to community change and engagement.
- The universities will be broadly showcased so that their success prompts other universities to follow the model
- As the first institutions demonstrate their success we expect others will join so that eventually the change agenda will be adopted by many GCHERA universities around the world

The key envisioned project outcome is that students become agents of positive change and ethical leaders as entrepreneurs, job creators, technically and scientifically knowledgeable and socially and environmentally responsible innovators. GCHERA, in collaboration with APAARI and FAO is hoping to extend the project to Asia-Pacific, and involve TNAU as a pilot university.

Key Concepts

The training was framed around the agricultural innovation system (AIS) perspective whereby a network of actors – individuals and organizations, together with supporting institutions and policies in the agricultural and related sectors, bring existing or new products, processes, and forms of organization into social and economic use.[2] Such system thinking implies a shift from: (i) considering knowledge generation as a final objective, to using it as a means to achieve change; (ii) understanding of the parts to systemic understanding of the relationships between the parts; (iii) using mainly 'hard systems analysis' to including 'soft systems analysis'; (iv) seeing participation as a question of consulting beneficiaries to facilitating engagement for interactive learning between stakeholders, resulting in joint analysis, planning and collective action; (v) working individually to working with others; and (vi) teaching to learning, from being taught to learning how to learn; from individual learning to social learning. Finally, CD for AIS also means a shift in the culture of research and development (R&D) organizations from an exclusive focus on individual merit and competition to promoting collaboration and teamwork within and between organizations.[3]

[2] Capacity Development for Agricultural Innovation Systems – Synthesis, 2014, FAO, https://www.cabi.org/Uploads/CABI/about-us/4.8.5-other-business-policies-and-strategies/tap-synthesis-document.pdf

[3] ICRA – International Centre for Development Oriented Research in Agriculture

What is Agricultural Innovation System?

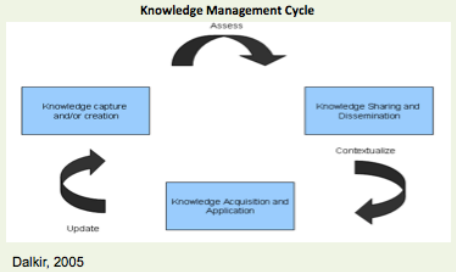
"A complex network of actors (individuals, organizations and enterprises), together supporting institutions and policies that bring existing or new agricultural products, processes and practices into social and economic use" (TAP/FAO).

The Common Framework that promotes the AIS perspective, also promotes a shift of mind-set and attitudes, and provides concepts, principles, approaches and tools to better understand the AIS architecture, assess CD needs, plan and implement CD interventions, and monitor and evaluate CD interventions. It also places focus on facilitation, learning, documentation and knowledge management for enabling innovation. The following key publications on the Common Framework are currently available: (i) Review Report: Review of existing resources on CD for AIS; (ii) Conceptual Background: Theory, concepts, principles, definitions; (iii) Guidance Note on Operationalization: Approach and tools; and Synthesis Document: Summary. The Framework identifies 4 + 1 key functional capacities for AIS to perform effectively – capacity to: (i) navigate complexity; (ii) collaborate; (iii) reflect and learn; and (iv) engage in strategic and political processes. The four capacities lead to the fifth capacity to adapt and respond in order to realize the potential of innovation. Technical and functional capacities must be seen as complementary and should be developed in an integrated manner across the three CD dimensions – individual, organizational and enabling environment. The Framework also proposes a CD cycle of 5 stages – galvanizing commitment, visioning, capacity needs assessment, capacity development strategy, and implementation, which was applied in the workshop programme.

In terms of the higher education sector, the Framework calls for integration of adequate functional capacities, teaching tools, training systems, participatory and experiential learning methods, leadership and business development in university curricula and pedagogy; and specific capacities to enable HEIs to engage students with stakeholders (including farmers) through interactive learning, joint analysis, collaborative research, and transform teachers into leaders that promote career development in the agricultural profession. HEIs could play a critical role by: (i) using the Framework methodologies and tools in teaching to develop capacities for innovation systems; (ii) helping to institutionalize the framework, methodologies, and lessons learned into education curricula; (iii) advocating for internal (university) and external (policy) changes with the help of innovation champions/facilitators. The concepts of the Common Framework are presented in an interactive way on www.tapipedia.org.

The Framework also emphasizes the crucial role of **knowledge management (KM)**, particularly the role of facilitation, reflection, learning, documentation or enabling agricultural innovation in developing country contexts. The concept of KM is often misunderstood as it tends to be associated with publications, communication, information tools and dissemination processes and logistics. However, KM goes much beyond these conventional processes, and encompasses facilitation that focuses on fostering synergies by managing systemic interactions that link people and resources, enhancing their ability to make collective decision and implementation. This is because in the real-life multidimensional AIS perspective, relevant knowledge is much more complex in terms of origin and content and all actors are becoming potential sources of knowledge and change. The focus is on tacit knowledge that represents the vast majority of knowledge that is difficult to codify. It is generally described as: subconsciously understood or applied, difficult to articulate, developed from direct action and experience, shared through conversation, storytelling.

KM can be presented and understood by perceiving it as a cycle of key processes, including knowledge capture and/or creation, knowledge sharing and dissemination, and knowledge acquisition and application (see figure). Through these processes, knowledge needs to be continuously assessed, contextualized and updated based on experience and lessons learned. KM tools, infrastructure, strategies, and open knowledge-sharing culture support these key processes.



Dalkir, 2005

Interactive exchange on the concepts

The participants were able to interact and discuss the AIS perspectives, TAP Common Framework, Dual Pathway approach, and the importance of functional skills needed by the market to support transformation of agricultural education. Examples of innovation, the types of innovations and innovation processes were also shared. They were asked: "What does innovation mean to you?" or "What role does higher education play in AIS?" The outcomes can be found below.

What is innovation?	Innovation examples
• Anything perceived as new by individual or society • New process, technology, solution, concept and practices • Novel ideas • Finding alternatives to old practices • Simplifying, refining and enhancing existing technology, concepts and methodologies • Out-of-the-box thinking • Creative destruction • Improvement of processes	• E-learning courses • Agritech portal • Price intelligence • Weather forecast • Diagnostic kit (nutrition) • Mechanized grafting technology – "Robot grafting" • e-Nose – a device that defects odours and flavours • Nano pesticides used to improve shelf life of fruits and vegetables • Crop doctor (ICT) • Exam pad • Automated irrigation • Funding (industrial contribution) • Neem coated urea • Fertigation through drip irrigation

It was stressed that while often *innovation refers to technologies and practices*, such as improved varieties, sustainable land management techniques, methods to reduce post-harvest losses, etc., it also refers to processes and organizational forms. This includes: public-private partnerships, organizing farmers in cooperatives, performance contracts, or policies.

What is Innovation?

"Agricultural innovation is the process whereby individuals or organisations bring new or existing products, processes or ways of organisation into use for the first time in a specific context in order to increase effectiveness, competitiveness, resilience to shocks or environmental sustainability and thereby contribute to food security and nutrition, economic development or sustainable natural resource management".

Tropical Agriculture Platform (TAP)

The participants were further asked: "What is needed for people to innovate?" "What makes innovation happen?". The outcomes are summarized below.

What is needed for people to innovate?	What makes innovation happen?
Internal: • Curiosity • Mindset • Knowledge • Change orientation • Venturesomeness • Perseverance • Lateral thinking • Principal knowledge **External** • Problem or constraint • Resources and financial support • Niche market (market opportunities) • Institutions • Ambience	• Necessity/need • Cost effectiveness • Time saving • Economic advantage • Technical skills • Experience • Understanding of pitfalls • Curiosity and interest to solve problems, and simplify and learn new things • Sufficient funding • Collaborative approach • Problem – solution • Effective leadership • Uniqueness (standing out) • Population pressure • Climate change • Food and nutrition insecurity • Unsustainable use of natural resources • Increased disasters • Labour shortage

During the presentation on CD for AIS, participants were asked to share examples of functional capacities that they thought are relevant in their context. Below are the outcomes.

Capacity to navigate complexity: • Motivation • Storytelling • Interaction • Group discussions • Brainstorming • Case studies • Problem management • Collaboration with students, farmers, scientists	**Capacity to collaborate:** • Exposure visits • Public-private-partnerships • Industry internship • Networking with stakeholders • Communication and interpersonal skills • Leadership development • Negotiation • Flexibility and adaptability • Team work • Resource utilization • Integrity • Decision making • Friendly approach
Capacity to reflect and learn: • Feedback • Evaluation • Monitoring • Assessment • Motivating students • Self-learning (distance learning, updating knowledge) • Participatory learning (exhibitions/farmers' markets)	**Capacity to engage in political processes:** • Fellowship • Syllabus formation • Institutional facilitation • Funding support • Leadership guidance • Communication skills • Demonstration capacity

The links between education and capacity development were stressed. Firstly, functional capacities, communication, leaderships and entrepreneurial skills, among others, are critical to enable youth to become **agents of change** in the AIS. Secondly, HE programmes should be skill-based, promoting creativity and innovation to equip new generations with capacity to adapt and respond in order to realize the potential of innovation. Thirdly, HE institutions should have capacity to develop functional skills and capacities of their staff to better advocate and influence their programmes, effectively communicate with their students, facilitate discussions, and partner with other actors in the system. Participants were then asked: "What do you think a role of education in AIS should be?" and "What are your views on the role of the HE sector in strengthening AIS?". The outcomes are summarized below.

What do you think a role of education in AIS should be?	**What are your views on the role of the HE sector in strengthening AIS?**
Education: • Makes students think, learn and innovate • Encourages students to start new research and take risks considering the outcome • Imparts knowledge in agriculture • Enables hands-on experience on adopted technologies and entrepreneurship • Facilitates problem analysis through exposure visits, and interaction with subject matter specialists and industrialists • Develops cognitive, psychomotor and affective domain • Facilitates creative thinking • Brings change in behaviour of an individual • Encourages diverse ideas • Emphasizes ethical values • Promotes change in attitudes • Makes students think rather than just learn • Ensures lateral thinking • Provides opportunities for knowledge sharing, documentation and dissemination of innovations • Develops practical skills • Creates awareness of existing systems • Create curiosity	**The Higher Education Sector:** • Develops human resources to meet job opportunities • Facilitates collaboration research engagement • Develops technologies • Enables cross learning • Provides opportunities for networking with other organizations • Needs to assure syllabus update and adaptation • Introduces need-based courses • Creates advanced infrastructural facilities • Provides periodical training and CD programmes • Provides free unlimited access to online resources and knowledge databases • Focuses on research • Mobilizes funding for infrastructure and student fellowship • Teaches employability skills, including entrepreneurship skills • Establishes global linkages • Enables problem identification • Develops alternatives and solutions to problems • Provides suggestions to policymakers • Reduces the risk of failure by motivating students to take up specialized courses that they want to conduct research on • Supports the dual degree programme and student exchange programme that could help in exchange of cultural and technological innovations between countries, which would strengthen AIS.

Higher education is therefore an important and integral part of AIS. Specifically, it is a knowledge and information hub for the system, source of future human capital, neutral body that provides objectives and evidence-based solutions for decision making, source of up-to-date information and education to the system stakeholders, and facilitator of multi-stakeholder platforms and linkages between knowledge and practice and scaling up innovations. Its biggest role is to improve general education level of all actors, education and train professional in the agricultural sector, develop better knowledge and associated skills for farmers and other actors,

facilitate investment in human resources for process and product development, and develop approaches and methods of experiential and multi-actor learning.

Good practices in TNAU

Through the pre-workshop survey, some participants were identified to share innovative practices and success stories that are contributing to TNAU transformation and making a difference whether in terms of administrative efficiencies or education of staff and/or students.

Dr. D. Shoba, Assistant Professor (PBG) AC&RI Killikulam, shared some recent developments of TNAU. Firstly, she pointed out that the methods of teaching have improved for undergraduate, postgraduate and Ph.D. courses in TNAU. Fifteen years ago, there was only board teaching and hence subject understanding was poor for both teachers and students. When Internet-based information technologies became available, ICT tools were introduced in education. As a result, communication between teachers and students has enhanced tremendously. Secondly, TNAU started collaboration with Dalhousie University, Canada, and Cornell University, New York, for dual degree programme in agricultural research for undergraduate and postgraduate courses. This has improved subject understanding of students and developed mutual understanding between the partner universities. Thirdly, TNAU also offers many correspondence courses to farming communities through open and distance education. It provides flexible learning opportunities to farmers to enable them to learn about solutions to their practical problems and improve the crop productivity in the field. Lastly, experiential learning courses, hands-on training in practical classes and educational tours have been included in the curriculum, and thus students are able to experience practical learning atmosphere.

Dr. P. Meenakshisundaram, Assistant Professor (Biotechnology), Department of Biotechnology, Agricultural College and Research Institute, Madurai, a constituent College of TNAU, shared how he exploited Microsoft Office Tools, namely PowerPoint and Access along with Internet to ease his day-to-day activities in handling classes as well as assisting in office administration. As an academic batch co-ordinator, Dr. Meenakshisundaram takes care of dissemination of essential information to his students through Google based website. Because of this, students can access necessary information and do not need to approach staff with requests for information. Since every individual has an Internet-enabled smartphone, dissemination of information is very quick, easy and available on demand at all times. Furthermore, Dr. Meenakshisundaram has developed MS-Office Access based software for maintaining Departmental Accounts and Procurement of Non-Recurring items, for enhancing infrastructural facilities of the organization. Introduction of Microsoft Access based software implied a onetime set up and routine data entry, such as accounts maintenance and cashbook entries. This facilitated 'tension free' execution of assignments and more efficient administration overall. Regarding Office Accounts, the software use has avoided the routine of manual calculations to arrive at budget under different heads wherein chances of errors are high. Instead, once set up, the processes of calculations are automated and results are obtained at the click of a button. Regarding automation in procurement, the University has a lengthy process of purchase (every purchase file runs into several pages). The purchase proposal file basically consists of around 15–20 pages (created after making all comparisons of quotations) where in manual data entry was made to obtain the University Sanction Order (USO). Manual data entry is error prone and this delayed the sanction process. Automation of data entry enables the right data to sit in the right place and make the files error free. This has led to obtaining the USO's in a short time. Using this software, Dr. Meenakshisundaram was able to get 56 USOs in a short time that hastened the process of ordering and setting up different infrastructural process, making a significant difference in administration. For teaching, Dr. Meenakshisundaram exploits the literature management software 'Endnote' for collecting and managing the literature and also to use the same during writing project proposals. He also trains post-graduate students in using such software effectively for carrying out tension-free research and writing their dissertation

without stress. The system makes a big difference by saving time, spending more time on thinking / writing projects rather than on formatting, and it also provides a centralized repository for project-related literature. Dr. Meenakshisundaram has also developed a personal website to share information about his activities, teaching materials (PowerPoint presentations and notes), and practical materials, such as protocols and manuals. Students are able to access the learning materials at their convenience from their mobile phones. The system does not imply printing cost and loss of data since the information is always available on the website. It contributes to more efficient education system. Lastly, he contributed to more effective research-related processes, particularly project execution and online project data management.

Dr. N. Anandaraja, Assistant Professor, Agricultural Extension, presented the Integrated Knowledge Platform: TNAU Model focusing on the flow of information and technology between research, extension and farmers. It started with a realization that there are multiple information systems and actors, that often leads to confusion and distress. The TNAU Agritech Portal was developed that ingrates resources on agriculture, horticulture, seed, marketing, engineering, organic farming, sericulture, forestry, fisheries and animal husbandry. The portal available both in English and Tamil enjoyed increasing viewers from 652,345 in 2011-2012 to 11,432,879 in 2017-2018.

Galvanizing Commitment

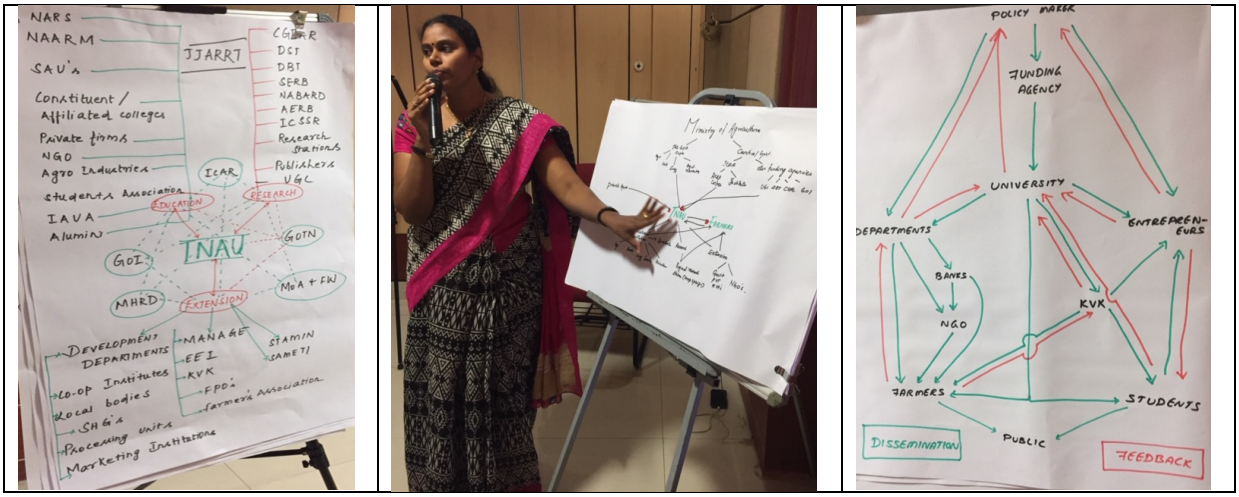
During the workshop, four of the five stages of the CD for AIS cycle were used as a framework to guide participants through the "transformation process". In Stage 1 – Galvanizing Commitment, the resource persons worked with trainees to create a sense of ownership; get their engagement and interest in the change process; identify innovation champions at the level of senior administration, professors and students; and determine and secure commitment from the participants for a coordinated approach to their university transformation. In this phase, face-to-face meetings using semi-structured presentations and interviews are most appropriate. The following instruments can be used (but are not limited to): scoping study; inception workshop; policy dialogue.

The group exercises used in the workshop helped to open up a discussion that led to the collective understanding of the current situation in the university. Participants were asked to identify "things to keep doing" and "things to stop doing" and subsequently to conduct network mapping to map the different actors in the education system. The results are summarized below.

Things to keep doing	Things to stop doing
• Motivation of students for leadership and entrepreneurship e.g. through motivational talks, guest lectures, video demonstrations • Field and exposure visits, industrial trips for experiential learning • Accessing e-library resources • Participatory learning • Encouraging students to learn • Periodic evaluation and self analysis • Team building and inter-personal activities • Plagiarism check • Hands-on-training for each courses • Continuous self-learning of staff to keep themselves updated • Sharing knowledge and ideas	• Procrastination/postponement of things • Ineffective planning • Tolerating biasness • Reliance on class notes • Uneven distribution of workload • Inefficient time allocation and management (e.g. scheduling of courses, research activities) • Negative attitude • Records for PhD (repetition to social sciences) • Publishing the findings that can be patented • PowerPoint presentations in lecture classes • Stressful activities that overburden staff and overload students

• Inter-disciplinary approach • Smart class • Assessing needs of stakeholders to identify solutions • Stress management for students and faculties	• Overdependence on electronic gadgets (use of mobiles) • Use of printed materials • Lengthy process for getting approval for any academic research and extension activities • Studying only books and concepts • Building walls between teachers and students (but get closer to students) • Use of out-dated instruments

The network analysis captured key actors and relationships between them. They enabled a focused discussion on the missing linkages, weak relationships and needs for transformation. Below are examples of three maps produced by the different groups.



Five innovation champions (facilitators) have been identified among administrators, professors and PhD students. Their role will be to lead internal advocacy efforts for university transformation, monitor and report on progress, document and contribute to the internal meetings on proposed changes, and represent TNAU in KM meetings. These persons include: (i) Dr. J. Renugadevi, Professor (SST), Department of Seed Science and Technology, Seed Centre, TNAU Coimbatore; (ii) Dr. P. Meenakshisundaran, Assistant Professor (Biotech), Department of Biotechnology, AC&RI, Madurai; (iii) Dr. S. Jeyarajan Nelson, Professor, Department of Agricultural Entomology, Centre of Plan Protection Studies, TNAU Coimbatore; (iv) Ms. Kavithambika S., PhD Agribusiness Management, TNAU Coimbatore; and (v) Mr. S. Vigneshkumar, PhD Agriucltural Extension and Communication, TNAU Coimbatore.

Visioning

In the following session on visioning, participants were asked to forge their consensus about their vision for the future by developing a vision statement and priority objectives for each of the main areas of work: administration, research, extension and education, based on the needs for transformation emerged through the previous session. The objective was also to agree what type of transformation they want for the university and to further secure their commitment. The following vision statement for TNAU was then agreed by the participants in the plenary: *"Institute of global excellence to ensure food and nutritional security, and environmental sustainability".* The photos below show students presenting the visioning outcomes of two groups.

The KM tools that can be used for this stage include: Network Analysis; Rich Picture; SWOT Analysis; Timeline; and (but not limited to) World Cafè.

Capacity Development

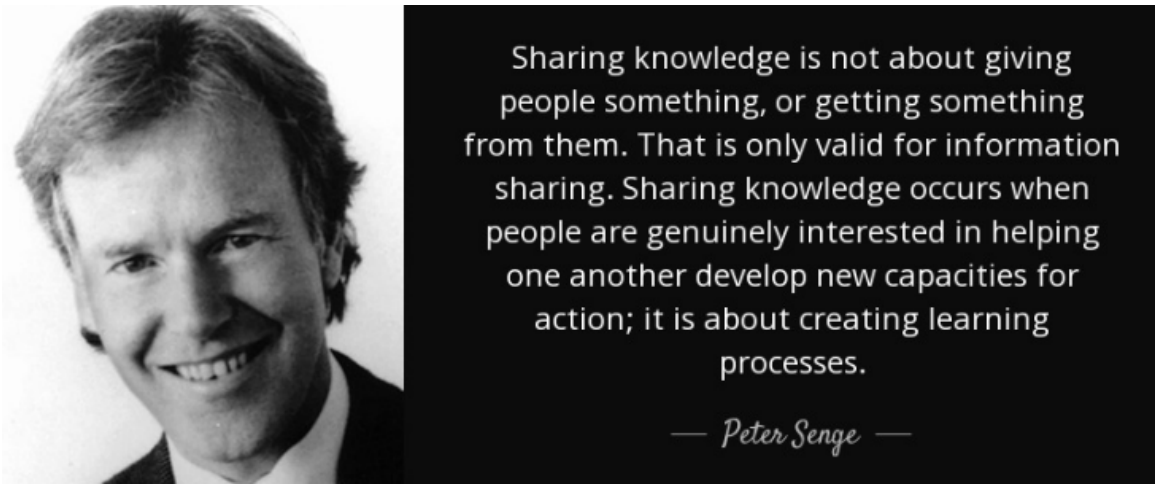
Following the formulation of the vision, participants were asked to identify the capacities (both functional and technical) needed to achieve the vision. Using the World Café methodology, three groups were formed according to the three levels of CD (individual, organization and enabling environment). They then identified key capacities that need to be strengthened, as well as other changes needed in order to achieve the TNAU Vision and the long-term goal of transforming the agricultural education system. The World Café allowed participants to interact, provide feedback in each group and to validate the identified capacity gaps. Below is the summary of the outcomes.

Individual capacities	**Organizational capacities**	**Enabling environment**
Functional capacities:		
• Interpersonal skills • Teamwork • Recognition of individual efforts • Transparency in interpersonal relationships • Leadership quality • Capacity to keep abreast of latest technologies • Planning and execution • Perseverance • Adaptability to new environment	• Simplification of complex hierarchy • Effective monitoring and evaluation • Prioritization and execution of work • Time management • Performance-based evaluation and academic auditing • Openness to change • Responsibility • Development of second line functionaries	• Teamwork • Coordination among functional units (KVKs, research stations) • Improved utilization of man power • Performance-based promotions • Collaboration • Networking
Technical capacities:		
• Linking basic research to applied research • Interdisciplinary research • Advanced statistical tools • Handling of advanced equipment • Advanced laboratory instruments	• Research and analysis of the farmers' situation • Programmes for scaling up • Continuous refinement of released equipment and technologies • Popularization of newly released technologies and	• Better utilization of specialization field

• Improvement of the quality of research outputs	varieties • Interdisciplinary research	
Changes in KM:		
• Periodical updates of knowledge in advanced research • Regular exchange and sharing of knowledge and ideas • Regular follow up and rectification • Availability of technical documentation and scientific publications	• Availability of common platforms and convergence • Appropriate dissemination tools • Centralized instrumentation facility • Effective mechanism for technology flow and feedback among research, extension and farmers	• Awareness and knowledge on technologies within and outside of the organization • Timely updates of the portal
Changes in administration:		
• More effective distribution of work	• Availability of skilled manpower and resources • Simplified procedures or university sanctions	• Resources and infrastructure facilities for education and research • Improved infrastructure at remote and hill stations • Improved amenities (library, Internet)

Knowledge Management Processes and Tools

KM processes imply the role on facilitation of more interactive, participatory and engaging face-to-face meetings or lectures. Integration of KM in existing learning systems needs to become the "way of doing business" – different ways of working, rather than add on. More focus needs to be placed on critical reflection that leads to learning aiming at greater impact of all activities (including administration and management), which means moving beyond collecting, processing, reviewing and sharing of data and information. KM implies questioning and analysing experiences, observations, theories, beliefs, assumptions, things that are normally taken for granted – What did not work or is not working? Why? What are the implications? What do we do next?



All face-to-face workshops, lectures, consultations, and policy dialogue should be supported as part of a larger KM/learning strategy of an organization. At the planning process, it is important to understand what drives such an event and what needs should be addressed. Questions to

help clarify those needs and expectations include: What are the felt needs? What do we want this event to become? What can be offered to the participants? Who are the right people to take part? What kind of qualities and experience should they have? Potential learners/participants need to have some kind of support from their own organizations so that they can apply what they learn and work in the context of a conducive environment to piloting the approaches and methods, reflecting on what might work or might not[4].

The innovative KM processes/approaches take into consideration characteristics of adult learning – how adults learn best: (i) guiding participants to their own knowledge rather than supplying them with facts; (ii) connecting learning to participants' experience and knowledge base; (iii) providing opportunities for everyone to interact and engage; and (iv) using methods that support conversations and knowledge sharing among individuals and groups. Some key KM processes explained are described below:

KM processes to strengthen relationships and network
Strong relationships and networks help get things done. They help get information to make a decision, learning about a new way to tackle a challenge, linking with the person who has the know-how. They help understanding where our linkages are strong and weak help focus information and knowledge-sharing efforts. For such efforts, KM processes and approaches may include: Network Maps drawn by participants can analyse networks, surface learning, and generate ideas on how to strengthen them; Visioning Exercises; Peer Assists; and People Bingo.

KM processes to capture and disseminate
Learning from lessons and good practices is important to help replicate and institutionalize innovative practices, and a void duplicating past mistakes. For such efforts, KM process and approaches may include: Storytelling.

KM processes to generate and share
Documentation of successful practices and lessons learned can improve future activities, projects, and programmes. It can also facilitate better processes of reflection, which can draw our tacit knowledge and generate new knowledge. KM processes and approaches may include: Speed Sharing, Chat Show, After Action Review, Appreciative Inquiry, Experience Capitalization, KM Self-Assessment, Most Significant Change, Peer Assists, Storytelling, and Knowledge Fairs.

KM processes to explore a problem and identify options to solve it
There are many issues and many diverse stakeholders implying cultural issues. Some participants find it difficult to discuss problems in large groups. In small groups they can better understand issues and collectively find/agree on solutions. KM processes and approached may include: World Café, Peer Assists, Round Robin, Open Space (Technology) and Knowledge Fairs.

KM processes to strengthen and sustain knowledge sharing
Integration of KM in organizations' business processes is only done over time. Sustaining the use of KM processes promotes a culture of knowledge sharing, which takes a long time. Efforts need focus on building awareness of which knowledge-sharing behaviours nurture the knowledge-sharing culture. KM processes/approaches may include: KM Self-Assessment, Peer Assists, Appreciative Inquiry, Experience Capitalization, and Most Significant Change.

During the discussions on KM tools and processes, participants took stock of existing KM tools used in TNAU. These have been summarized below.

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[4] Introducing Knowledge Sharing Methods and Tools – A Facilitator's Guide (2010) A. Hewlitt, L. Lamoureux https://asia.ifad.org/enrap/resources/development-themes/knowledge-management/introducing-knowledge-sharing-methods-and-tools-a-facilitators-guide/KS%20Facilitators%20Guide%20FINAL.pdf

Online portals	TNAU Website, Agri Tech Portal, Weather Forecast Portal,
Databases	Domestic and Export Market Intelligence Cell (DEMIC), NCBI – database of rice varieties released from TNAU, Mendeley Data, Endnote, Statistical Package for the Social Sciences (SPSS)
Multi-media	Distance learning programme, Community radio,
Face-to-face knowledge-sharing processes	Agri-clinics – Information Technology Kiosks in rural areas for access to various agriculture related portals; exhibitions; 'zonal meetings', scientific work conferences; Farmers' Day; field days (demo field); postgraduate and undergraduate students conferences; Crop Scientist Meeting
Mobile-based	TAB-based teaching, Whatsapp,
Google sites	Scopus Research and Publishing Tool
Printed and/or online tools	Success stories, TNAU Newsletter, Technology leaflets, E-journal, E-library resources (web of science)
KM infrastructure	Insect museum, Agricultural Technology Information Centre (ATIC), Consortium for e-Resources in Agriculture (CeRA) – an e-Consortium of Agriculture Libraries of ICAR

Social Media in higher education

Social Media is extremely important in higher education. Firstly, evidence shows that socio-conomic development and increasing emphasis on education are resulting in increased university enrollment throughout the world. Universities are increasinly realizing the need to "stand out in the crowd". As such, Social Media presence enables the creation of meaningful connections e.g. highlighting interesting courses, university results and student success stories, staying connected with students, promoting research and innovation endaviours, attracting partners. The challenge however is to provide each faculty with the ability to manage their own social media efforts while maintaining some type of "brand" and content regulation. Social Media policy could be created to be followed by all faculties, designating a community manager for all university Social Media accounts, using a monitoring and reporting tool, to address this issue. Social Media strategies are normally embedded as part of the university KM strategy. The Social Media content must speak to students, alumni, researchers, partners and prospects, and focus on faciltation of community engagement. Faculties should lead their Social Media channels with their unique experiences, keep social media content interesting and engaging, increase engagement by including administrative functions and other users, and take opportunity to attract future students, staff, partners and projects. The Social Media scope could also be brodened beyond Facebook, Twitter and Instagram, e.g. by trying a webinar on Facebook live to discuss TNAU with interested prospects, create a YouTube channel and unique faculty videos.

TAPipedia and the Common Framework Interactive Page

TAPipedia developed within the context of TAP, is an information sharing system designed to enhance knowledge exchange in support of Capacity Development (CD) for Agricultural Innovation Systems (AIS). TAPipedia aims to be a global information system for good CD practices, innovation outputs, success stories and lessons learned. It allows TAP partners and other stakeholders to share their own applied and context specific CD for AIS resources and to discover such knowledge from different sources, partners and regions. TAPipedia also assists TAP members to present, explain and promote the Common Framework on CD for AIS, so that it may be more easily tested, improved, adopted and implemented by stakeholders. TAPipedia is key to fulfil TAP's goal of increasing farmers' income, improving food security and allowing for a sustainable management of natural resources. These objectives can be achieved by promoting agricultural innovation. As agriculture increasingly involves complex interactions of environmental and socio-economic factors with stakeholders at multiple levels, innovation needs an AIS perspective. www.tapipedia.org

Open Online Courses

- **University of Wageningen** – Free courses (MOOCs) in agriculture can be accessed for free on their website. This is a valuable resource with at least 4,000 people benefitting every year. The courses are particularly relevant for universities that are understaffed, offering topics e.g. nutrition and disease, food production. Certificates can be obtained upon completion. https://www.wur.nl/en/Education-Programmes/online-education/MOOC.htm
- **DEVCO Academy of the European Commission** – Many courses on different topics to develop technical and functional capacities. E.g. Course on agriculture, rural development and fisheries covers a wide range of issues related to agriculture and rural development, extending to climate change, water, land, innovation, risk management, livestock, access to markets, and many others https://webgate.ec.europa.eu/devco-academy/
- **Class Central** – Portal compiling links and providing reviews of free online courses in agriculture from top universities e.g. University of Western Australia, Indian Institute of Technology, University of Adelaide, Swedish University of Agricultural Sciences, etc. Offering courses from agribusinesses, to agroecology, agri-food system analysis, value chains, urban agriculture. https://www.class-central.com/tag/agriculture
- **Access Agriculture** – An NGO that is teaching farmers to make videos on any agricultural practices that they are proud of. They have a range of videos on how to use various technologies in different languages including Hindi. www.accessagriculture.org.

The following resources have been recommended for future guidance of KM methods to be used in agricultural education:

- **KM Course:** www.imarkgroup.org
- **KM Toolkit:** http://www.kstoolkit.org/
- **CTA KM and communication programme:** http://www.cta.int/en/our-programmes.html **and tools and cases at** http://knowledge.cta.int/
- **Introducing Knowledge Sharing Methods and Tools – a facilitator's guide** https://asia.ifad.org/enrap/resources/development-themes/knowledge-management/introducing-knowledge-sharing-methods-and-tools-a-facilitators-guide/KS%20Facilitators%20Guide%20FINAL.pdf
- **The new e-learning course: "Experience capitalization for continuous learning" is now available in English and French** http://www.fao.org/in-action/kore/news-and-events/news-details/en/c/881412/
- **The Knowledge, Attitude, Practice Evaluation Model** https://www.spring-nutrition.org/publications/tool-summaries/kap-survey-model-knowledge-attitudes-and-practices, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5021266/, http://www.scielo.org.mx/pdf/tsa/v13n1/v13n1a9.pdf, http://kasetsartjournal.ku.ac.th/kuj_files/2014/A1403261001427343.pdf, https://www.adaptation-undp.org/sites/default/files/resources/knowledge_attitude_practices_behaviour_kapb_study_on_climate_change_st.lucia_final.pdf

Communication for effective AIS

One of the major gaps facing AIS is the communication gap between researches/scientists and development practitioners. Usually, researchers and scientists focus on the technical aspects for generating useful technologies, complain that practitioners ignore them, and claim that even if research is used, practitioners do it wrong. On the other hand, development practitioners, such as extension workers and farmers focus on the acceptance and adoption of those technologies by users, complain research is irrelevant and impractical, and claim that even if relevant,

research is not in any form that can be readily translated into practice. The challenge is how to create understanding between technical language of scientists and simple language of development practitioners.

The brief session on communication for effective AIS focused on clarity in communication and ways to ensure that the right message is sent and received without ambiguity in various settings and contexts. Practical examples were used to illustrate problems with language, and how to communicate with different audiences without the use of jargon and technical words. These examples identified the different audiences, including: policy makers, scientists, farmers, fishers and extension workers. The underline message was that what we are trying to say should be tailored to the type of audience.

TNAU Action Plans for Change

This last substantive session aimed to: (i) present Stage 4 of the CD for AIS cycle; (ii) identify objectives, goals, priorities and options for change initiatives; (iii) frame an action plan; and (iv) validate the visioning exercise. The plans were developed for capacity development, advocacy, mobilization, and knowledge management. The detailed action plans developed by the participants in four groups, were presented to the Senior Management: Dr. Krishnamoorthy, Registrar; Dr. K.S. Subramanian, Director of Research; and Dr. J. S. Kennedy, Dean of Post-Graduate Studies, the Graduates Dean and the Registrar of TNAU, who also provided their feedback and remarks. Other management staff were present as well. Detailed action plans are included in Appendix 6.

After-Action Review

Participants were asked to assess the workshop against its objectives and expectations, capturing lessons learned, and what could be done to improve future workshops on transformation of agricultural education. The views are captured in the table below.

What actually happened	What should be done differently
• Teaching methods were not covered sufficiently • Ambiance for learning was created • 'Open mind' was created to improve existing practices • Everyone participated • Good reflection on innovation and other concepts • Practical exercises	• Interaction of participants with policy makers • Sufficient time for discussion • Before the workshop, there should be communication with government agencies to get their interest in the programme • More pre-workshop communication on expectations

Closing

The workshop was closed with inspiring statements of Dr. U. Sivakumar, Programme Coordinator, TNAU; Dr. A.S.Krishnamoorthy, Registrar, TNAU; Dr. Ravi Khetarpal, Executive Secretary, APAARI; and Dr. J. S. Kennedy, Dean SPGS, TNAU. The following recommendations and next steps have been developed to continue the implementation of the pilot project with TNAU and expansion of activities on transformation of agricultural education:

- APAARI to follow up with TNAU authorities with the support of Indian Council for Agricultural Research (ICAR) and the Indian Agricultural Universities Association (IAUA) to continue this initial process of transformation (ICAR has agreed to provide full

support to this initiated pilot with TNAU under the National Agricultural Education Programme of the World Bank).

- APAARI in collaboration with TAP/FAO to explore the option of developing a credit course on CD for AIS in TNAU that could be introduced as a model to other universities.
- TNAU administration to share the results of the workshop with the Vice-Chancellor and undertake a follow up activity/workshop to further consolidate the draft Action Plan with other university staff, faculties and departments.
- The identified innovation champions of TNAU to lead advocacy efforts for university transformation, monitor and report on progress, document and contribute to the internal meetings on proposed changes, and represent TNAU in KM meetings to share lessons learned.
- TNAU administration to maintain updated information on the TNAU website regarding the university changes and reforms.
- GCHERA to propose TNAU for inclusion in the Kellogg Project during the inception meeting in Costa Rica in early February 2019.
- FAO to continue the dialogue and collaboration with APAARI and GCHERA for future collaborations in the area of CD for AIS in HEIs, and scoping for funds to expand the agricultural education programme.
- TNAU to attend the 10th GCHERA World Conference "Leadership for the Sustainable Development of Agricultural and Life Science Universities", April 25-26th 2019 in Bucharest, Romania

Appendix 1: Workshop Programme

22 January 2019			
Time	**Session**	**Session Objective**	**Speaker, facilitator**
15:30-16:30	**Official opening**	**Welcome and opening remarks**: Dr. U. Sivakumar, Programme Coordinator, TNAU, India **Keynote address**: Ms. Martina Spisiakova (MBA), KM and Project Development Specialist, APAARI, Thailand **Special address**: Ms. Manuela Bucciarelli (MSc), Capacity Development and Monitoring Specialist, FAO Agriculture Research and Extension Unit Dr. John Kennelly, President, GCHERA **Presidential address**: Dr. N. Kumar, Vice-Chancellor, TNAU, India **Inaugural address**: Dr. Narendra Singh Rathore, Deputy Director General (Education), ICAR, India Present: Dr. M. Kalyanasundharam **Vote of thanks**: Dr. J. S. Kennedy, Dean (SPGS), TNAU	
16:30-16:45	**Official Photo Session**		
Day 1 – 23 January 2019			
8.30-9:00	**Introduction of the participants** and taking a photo	To introduce participants.	Ms. Martina Spisiakova
9:00-10:00	**Session 1: Training introduction**	To explain training objectives, clarify the agenda, and setting individual and university expectations.	Ms. Martina Spisiakova
10:00-10:30	Tea break (Combined with media briefing)		
10:30-12:00	**Session 2: Setting the stage for the training** – Why and how we need to transform agricultural education	To explain the importance of bringing business, ethical and value-based leadership and experiential development to agricultural universities as implemented by the Kellogg-funded project on Transforming Higher Education, based on the Earth University model in Costa Rica.	Dr. John Kennelly
12:00-13:00	Lunch break		
13:00-13:15	**Energizer**: Match the cards with key concepts playing role in transformation of agricultural education	To energize after lunch and get ready for next sessions	Ms. Martina Spisiakova All participants
13:15-14:15	**Session 3: Capacity Development (CD) for Agricultural Innovation System (AIS)**	Interactive presentation to improve the understanding of the AIS perspectives, TAP Common Framework, Dual Pathway approach, and the importance of functional skills needed by the market to support transformation of agricultural education. Examples of innovation, the types of innovations and innovation processes will also be shared.	Ms. Manuela Bucciarelli

14:15-15:00	**Session 4: KM in agricultural education to strengthen AIS** – Key concepts and applications of KM in agricultural education	To learn about the basic KM concepts, its application to agricultural education and implications on AIS	Ms. Martina Spisiakova
15:00-15:30	Tea break		
15:30-16:30	**Session 5: Good practices in TNAU**	To share good practices and success stories of TNAU transformation – innovative processes that made a difference on students and AIS.	Pre-selected participants
16:30-17:00	**Reflection**	To reflect on the learning acquired on Day 1 – Filling in personal logbooks	Ms. Martina Spisiakova All participants
Day 2 – 24 January 2019			
8:30-8:45	**Reflection** on Day 1 and energizer	To start the day fresh and focused on the topic	Ms. Martina Spisiakova All participants
8:45-10:00	**Session 6: Galvanizing commitment**	Presentation of the Stage 1 concept of the CD for AIS cycle, and group work to: (i) create a sense of ownership; (ii) identify champions at the level of senior administration as well as among professors and students to act as catalysts for reinforcing AIS processes; and (iii) determine and secure commitment from the participants for a coordinated approach to their university transformation. **Exercise**: To open up discussions that help participants reach a broad and collective understanding of the current situation in their university in the context of the AIS as a baseline for change: (i) to identify 3-5 things to keep doing, and 3-5 things to stop doing in an exercise of 5 groups; (ii) to conduct network mapping to map different actors and identify their needs. Results to be discussed in a plenary discussion focused on gaps and needs for transformation.	Ms. Manuela Bucciarelli Martina Spisiakova - facilitators Dr. Kennelly and Dr. Khetarpal – resource persons for the groups
10:00-10:30	Tea break		
10:30-12:00	**Session 7: Visioning**	Presentation of the Stage 2 concept of the CD for AIS cycle and group work to: (i) forge consensus among the participants abut their vision of the future; (ii) agree on what type of transformation they want; and (iii) secure their commitment. **Exercise**: Small groups to formulate a common vision for the university based	Ms. Manuela Bucciarelli Ms. Martina Spisiakova – facilitators Dr. Kennelly and Dr. Khetarpal – resource persons for the groups

		on the needs for transformation emerged through previous session.	
12:00-13:00	Lunch break		
13:00-14:00	**Session 7: Visioning (cont.)**	Discussion to agree on the common vision for TNAU	Ms. Manuela Bucciarelli Ms. Martina Spisiakova – facilitators
14:00-15:00	**Session 8: Capacity Development**	**Presentation** to introduce the topic and group work to: (i) identify the capacity needs (capacities needed to get to the vision); (ii) identify other changes needed to achieve the objective of transforming the education system; and (iii) use scoring to prioritize the capacity needs. **World Café exercise**: The groups to be divided either according to the individual, organization and enabling environment level, or the following categories: education, administration, research, and enabling environment.	Ms. Manuela Bucciarelli Ms. Martina Spisiakova – facilitators Dr. Kennelly and Dr. Khetarpal – resource persons for the groups
15:00-15:30	Tea break		
15:30-16:30	**Session 8: Capacity Development (cont.)**	Presentations of the group work and discussion around functional capacities.	Participants
16:30-17:00	**Reflection**	To reflect on the learning acquired on Day 1 – Filling in personal logbooks	Ms. Martina Spisiakova All participants
Day 3 – 25 January 2019			
8:30-8:45	**Reflection** on Day 2 and energizer	To start the day fresh and focused on the topic	Ms. Martina Spisiakova All participants
8:45-10:00	**Session 9: Key KM processes and tools supporting transformation of agricultural education and strengthening AIS, including TAPipedia and Social Media**	**Presentation** to understand key KM facilitation methods, processes and tools that support learning, creativity, engagement, collaboration and knowledge-sharing culture to accelerate agricultural innovation. **Exercise**: (i) To understand what tools the participants are using in their university work that support education transformation; (ii) the understand the problem of complex language in publications.	Ms. Martina Spisiakova Ms. Manuela Bucciarelli
10:00-10:30	Tea break		
10:30-12:00	**Session 10: Transformation strategy / Roadmap**	**Presentation** to introduce the Session and group work to frame an action plan/ road map to achieve the transformation that was framed in the visioning exercise **Exercise**: Action planning	Ms. Manuela Bucciarelli Ms. Martina Spisiakova – facilitators Dr. Khetarpal – resource persons for the groups
12:00-13:00	Lunch break		
13:00-14:30	**Session 10: Transformation**	Presentation of action plans and discussion among participants	Participants

	strategy / Roadmap (cont.)		
14:30-15:00	**Session 11: After Action Review**	To assess what happened during the workshop and what could have been done better **Exercise:** After Action Review, completing the workshop evaluations	Ms. Martina Spisiakova All participants
15:00-15:30	Tea break		
15:30-16:30	**Session 13: Presentation of the Strategy to Senior Management of TNAU**	Presentation of the Strategy/ Road map developed by the participants to the Senior Management	Participants
16:30-17:00	**Closing**	To close the workshop	Dr. U. Sivakumar, Programme Coordinator, TNAU Dr. A.S.Krishnamoorthy, Registrar, TNAU Dr. Ravi Khetarpal, Executive Secretary, APAARI Dr. J. S. Kennedy, Dean, SPGS, TNAU

Appendix 2: Organizing institutions' profiles

Asia-Pacific Association of Agricultural Research Institutions (APAARI)

APAARI is an apolitical, regional organization established by the Food and Agriculture Organization of the United Nations (FAO) in 1990. It is working as a vibrant network of 77 members and numerous partners from national agricultural research systems (NARS), international agricultural research centres – Consultative Group on International Agricultural Research (CGIAR) and Association of International Research and Development Centers for Agriculture (AIRCA), higher education, civil society – farmer and women organizations, non-governmental organizations (NGOs), and the private sector. Our collaboration in the areas of knowledge management (KM), capacity development and advocacy on issues of critical importance to Asia-Pacific drives APAARI towards realization of its Vision – "Strengthened Agri-food Research and Innovation Systems" for achieving Sustainable Development Goals (SDGs). APAARI works at two levels. Firstly, based in Bangkok, Thailand, the APAARI Secretariat plays key role in coordination, facilitation, mobilization and liaison for its members in Asia-Pacific. Secondly, APAARI works as a Community that helps APAARI diversify and enhance its role by capitalizing on the strengths of its members and partners to collectively deliver results that contribute to the achievement of the APAARI Vision and the SDGs. www.apaari.org

Food and Agriculture Organization of the United Nations (FAO)

FAO is a specialized agency of the United Nations that leads international efforts to defeat hunger. Its goal is to achieve food security for all and make sure that people have regular access to enough high-quality food to lead active, healthy lives. With over 194 member states, FAO works in over 130 countries worldwide. We believe that everyone can play a part in ending hunger. To meet the demands posed by major global trends in agricultural development and challenges faced by member nations, FAO has identified key priorities on which it is best placed to intervene. A comprehensive review of the Organization's comparative advantages was undertaken which enabled strategic objectives to be set, representing the main areas of work on which FAO will concentrate its efforts in striving to achieve its vision and global goals. These objectives are: (i) help eliminate hunger, food insecurity and malnutrition; (ii) make agriculture, forestry and fisheries more productive and sustainable; (iii) reduce poverty; (iv) enable inclusive and efficient agricultural and food systems; and (v) increase the resilience of livelihoods to threats and crises. www.fao.org

Global Confederation of Higher Education Associations for Agricultural and Life Sciences (GCHERA)

Established in 1998, GCHERA is a membership organization consisting of national or regional associations. Through these member associations, GCHERA represents over 900 agriculture and life science universities/faculties across six continents. In Asia, its members include: Asian Association of Agricultural Colleges and Universities (AAACU); Central Asia and South Caucasus Consortium of Agricultural Universities for Development (CASCADE); Education Professional Committee (EPC), of the Chinese Association of Agricultural Science Societies (CAASS); Indian Agricultural Universities Association (IAUA); Society of Arab Colleges of Agriculture (SACA); and APAARI. Its mission is to: encourage mutual understanding and global co-operation among higher education associations and their constituent member universities; provide leadership in education, research innovation and outreach in agricultural and life sciences; and be a catalyst for the sharing and adoption of best practices across its membership. GCHERA is included in international organizations' strategies leading to single voice for advocacy and local execution of global challenges. www.gchera.com

Appendix 3: Resource Persons

John J. KENNELLY, PhD.
President GCHERA,
Dean and Professor Emeritus
University of Alberta, Canada

John J. Kennelly served for 10 years as Dean of the Faculty of Agricultural, Life & Environmental Sciences at the University of Alberta. He has served as President of GCHERA (Global Confederation of Higher Education Associations for Agricultural and Life Sciences) since 2013. GCHERA member associations represent over 900 agricultural and life science universities across five continents and its mission is to encourage global co-operation and leadership in education, research and outreach in agricultural and life sciences. Dr Kennelly serves on a number of international boards and committees including the Steering Committee of GFAR (Global Forum on Agricultural Research) and the Global Task Force for the Tropical Agriculture Program (TAP). Awards include the 2011 Distinguished Agrologist Award, the Arthur G. McCalla Professorship, the American Society of Animal Science Ruminant Nutrition Award and the Earl W. Crampton Award for Distinguished Service in Nutrition. He was inducted into the Alberta Agriculture Hall of Fame in 2016 and he is a Fellow of the Agriculture Institute of Canada, the Canadian Society of Animal Science and the International College of Nutrition.

Ravi KHETARPAL, PhD.
Executive Secretary, APAARI, Thailand

Ravi Khetarpal serves as Executive Secretary of the Asia Pacific Association of Agricultural Research Institutions (APAARI) based at Bangkok, Thailand. Previously, served the Centre for Agricultural Bioscience International (CABI) – South Asia (India) as its Regional Director and Regional Advisor on Strategic Science Partnerships for more than seven years. Prior to this he worked for the National Agricultural System in India for three decades. He holds PhD in Life Sciences (Plant Pathology) from University of Paris and was a Visiting Scientist in a collaborative project of the European Union at INRA, Versailles, France for three years. His areas of interest include research, development, policy issues and capacity building in areas of biosecurity, biosafety, seed certification and biodiversity. He has also worked as a consultant of twelve projects supported by the Food and Agriculture Organization of the United Nations (FAO), World Bank, and United States Department of Agriculture (USDA), notably in Indonesia (as Team Leader), India, Bangladesh, Thailand, Nepal, Mauritius and Cambodia. He also represented Asia as a Developing Country Sanitary and Phyto-Sanitary (SPS) Expert in a Working Group of the Standards and Trade Development Facility (STDF) in the World Trade Organization (WTO) between 2016-2017. He has published 110 research papers, 18 books, 59 book chapters, 16 review articles and policy papers.

Martina SPISIAKOVA, MBA
Knowledge Management Specialist, and Project Development and Partnership Liaison, APAARI

Martina Spisiakova posses rich experience in knowledge management (KM), serving organizations such as the International Fund for Agricultural Development (IFAD) in Rome, Italy; United Nations Economic and Social Commission for Asia and the Pacific (ESCAP) based in Bogor, Indonesia; and APAARI in Bangkok, Thailand. In APAARI, she started working in 2015 as Knowledge Management Coordinator responsible for the Association's KM and partnership programme, as well as the development of APAARI Strategic Plan 2017-2022. She currently works on the development of new projects and partnerships for APAARI. She is a certified trainer passionate about learning and capacity development in the agricultural sector. Ms. Spisiakova is a Slovak national with over 18 years of international experience in knowledge and network management, South-South Cooperation, programme management, training, communications, and monitoring, evaluation and learning (MEL) in the context of rural and agricultural development. Ms. Spisiakova holds a Master's degree in Business Administration from Robert Kennedy College and a Bachelor degree in Social Sciences with Economics from The Open University.

Manuela Bucciarelli, MSc
Capacity Development and Monitoring for Agricultural Innovation System Specialist, FAO Agriculture Research and Extension Unit

Manuela Bucciarelli has an academic background in development economics (Master Degree in International Economics and Development) and more than 10 years experience working for several international organizations, including UN Agencies and NGOs, mostly based in the field, on evaluation, monitoring and capacity development. She is a Capacity Development and Monitoring Specialist in the FAO Agriculture Research and Extension Unit where she works on the Tropical Agriculture Platform and in particular on Capacity Development for Agricultural Innovation System Projects since 2017. She provides technical support in the areas of capacity needs assessments, capacity development implementation, monitoring and evaluation. Previously she worked for the CGIAR Independent Evaluation Arrangement managing the evaluation of Capacity Development of the CGIAR. Before then, she worked for the Evaluation Division of UNRWA in Jordan, with the World Bank and with Innovations for Poverty Action (IPA) in Kenya and Malawi as a Field Coordinator for Impact Evaluation assessments.

Appendix 4: List of Participants

Faculty

No.	Directorate/Colleges	No.	Name	E-mail
1	Centre for Plant Breeding and Genetics, Coimbatore	2	**Dr. R. Sasikala,** Asst. Prof. (PBG), Dept. of Oilseeds	sasikalacpbg@gmail.com
			Dr. N. Kumari Vinodhana, Asst. Prof.(PBG), Dept. of Millets	soundhini@yahoo.co.in
2	Crop Management, Coimbatore	2	**Dr. T. Selvakumar,** Asst. Prof. (Agronomy), Dept. of Oilseeds	selvakumarT@tnau.ac.in jtselvakumar@gmail.com
			Dr. S. Srinivasan, Asst. Prof. (Crop Physiology), Dept. of Crop Physiology	srinivasan.s@tnau.ac.in
3	Natural Resource Management, Coimbatore	2	**Dr. A. Renuka Devi.** Asst. Prof. (SS & AC). Dept. of Soil Science and Agrl. Chemistry	renu_remsen@yahoo.co.in
			Dr. R. Jayashree, Asst. Prof. (ENS), Dept. of Environmental Sciences	jayashree.r@tnau.ac.in
4	Centre of Plant Protection Studies, Coimbatore	2	**Dr. P.A. Saravanan,** Asst. Prof. (Entomology), Dept. of Entomology	entosaravanan@gmail.com
			Dr. V. Bharanidharan, Professor (Pathology)	agriparani@yahoo.com
5	Centre for Plant Molecular Biology, Coimbatore	1	**Dr. R. Raghu,** Asst. Prof. (Microbiology), Dept. of Biotechnology	raghu.r@tnau.ac.in
6	Centre for Agricultural and Rural Development Studies, Coimbatore	1	**Dr. P. Balaji,** Asst. Prof. (ARM) Dept. of ARM	pbalaji@tnau.ac.in
7	HC & RI, Coimbatore	2	**Dr. T. Sumathi,** Asst. Prof. (Horticulture), O/o the Dean (Horticulture)	sumathihort@gmail.com
			Dr. L. Nalina, Asst. Prof. (Hort.), Dept. of Medicinal and Aromatic Plants	lnalina_hort@rediffmail.com
8	AEC & RI, Coimbatore	2	**Dr. B. Suthakar,** Asst. Prof. (FMP), AMRC	Suthaaa@gmail.com
			Dr. A. Arulmari, Asst. Prof. (FPE), Dept. of Food Process Eng.	r.arulmari@gmail.com
9	Seed Centre, TNAU Coimbatore	1	**Dr. J. Renugadevi,** Prof. (SST), Dept. of Seed Science and Technology	jrenu-seed@yahoo.com
10	CSC&RI, Madurai	1	**Dr. K. Jothilakshmi,** Asst. Prof. (FSN), Dept. of FSN	joeselva05@gmail.com
11	FC&RI, Mettupalayam (1-Forestry, (2-1- Sericulture)	2	**Dr. Sivaprakash,** Asst. Prof. (Forestry), Dept. of Silviculture and NRM	sivaprakash.m@yahoo.co.in
			Dr.K.A.Murugesh, Asst. Prof. (Sericulture), Dept. of Sericulture	murugeshka2002@yahoo.co.in
12	AEC&RI, Kumulur	1	**Dr. P. Dhananchezhiyan,** Asst. Prof. (FMP), Dept. of Farm Machinery	kpdhana@gmail.com
13	HC&RI, Periyakulam	1	**Dr. I. Muthuvel,** Assoc. Prof. (Horticulture), Dept. of Fruit Crops	im74@tnau.ac.in
14	ADAC&RI, Trichy	1	**Dr. N. Sreenivasan,** Asst. Prof. (Nematology), Dept. of Plant Protection	seeni_nema@yahoo.com

No.	Directorate/Colleges	No.	Name	E-mail
15	HC&RI(W),Trichy	1	**Dr. A. SabirAhamed,** Prof. (SST), Dept. of Veg. Science	asatnau@gmail.com
16	AC&RI,Madurai	3	**Dr. R. Velusamy,** Assoc. Prof. (Agrl Entn), Dept. of Agrl. Extn and Rural Sociology	velusamy.r@tnau.ac.in
			Dr. P. Meenakshisundaram, Asst. Prof. (Biotech), Dept. of Biotechnology	pms@tnau.ac.in
			Dr. S. Harish, Asst. Prof. (Plant Pathology), Dept. of Plant Pathology	sankarshari@rediffmail.com
17	AC&RIKillikulam	2	**Dr. D. Sobha,** Asst. Prof. (PBG)	shobatnau@gmail.com
			Dr. V. Ramamoorthy, Asst. Prof. (Plant Pathology)	rvrmoorthy@yahoo.com
18	AC & RI, Eachangkottai,	1	**Dr. J. Thilagam,** Asst. Prof. (Agricultural Extension)	thilagamextn@gmail.com
19	AC & RI, Kudumiyanmalai	1	**N. Anandaraja,** Asst. Prof. (Agricultural Extension)	na75@tnau.ac.in
20	AC & RI, Vazhavachanur	1	**Dr. C. Sivakumar,** Assoc. Prof. (Agronomy)	sivachi15@yahoo.co.in
	Total	**30**		

Administrators

No.	Directorate and Colleges	No.	Name	E-mail
1	Horticulture College and Research Institute, Coimbatore	1	**Dr. K. Rajamani,** Prof. and Head of Department of Medicinal and Aromatic Crops	rjmanicbe@rediffmail.com
2	Crop Management, Coimbatore	1	**Dr. P. Jeyakumar**, Prof. and Head of Dept. of Crop Physiology	jeyakumar@tnau.ac.in
3	Centre for Plant Breeding and Genetics, Coimbatore	1	**Dr. R. Ravikesavan**, Prof. and Head of Dept. of Millets	chithuragul@gmail.com
4	Centre of Plant Protection Studies, Coimbatore	1	**Dr. S. Jeyarajan Nelson**, Prof., Dept. of Agricutural Entomology	
	Total	**4**		

Student champions

No.	Students	No.	Name	Email ID
1	Ph.D Agribusiness Management	3	**Anandh M**	iamanandh3@gmail.com
			Senthil Nathan TS	ts.senthil1993@gmail.com
			Kavithambika S	Kavithambika11@gmail.com
2	Ph.D Agricultural Extension and Communication	2	**S.Vigneshkumar**	vgnshkumar3545@gmail.com
			S. Elakkiya	elakkimohanur@gmail.com
	Total	**5**		
	Total participants	**39**		

Appendix 5: Action Plans

Capacity Development

Expected Outcome (Priority Objective)				Resources Required		
Actions	**Who is the lead?**	**With which partners?**	**By when?**	**Time inputs (person days)**	**Equipment**	**Funding**
Individuals						
Motivational lectures / talks	Administrative Head (Head of Office)	Professional Motivational Speakers / Successful Entrepreneurs	Periodical intervals (Beginning of every semester (students) /year (staff))	Two days	Trainers / Resource persons	Required @ Rs. 2.5 lakhs per training
Brain storming meetings	Administrative Head (Head of Office)	Inter and Intra – Departments / College / Organizations	Periodical intervals (Beginning of every semester (students) /year (staff))	Annual group meets / When in need	n.a.	n.a.
Periodical workshops / trainings	Administrative Head (Head of Office)	Subject matter specialists from academia / industry	Periodical intervals	Max 1 week	n.a.	Needed for registration, food, accommodation and travel
Producing more number of student JRFs	Deans of all faculties and Student's Welfare	Teaching faculty; Successful TNAU JRF's in other ICAR institutes	Yearly	Throughout the year	Study material; Special Coaching	To meet the expenses of candidates from other ICAR institutes.
Organization						

Learn and Adopt better models; Setting up a working group for simplifying administrative procedures	All University Officials	-	One year from now	Periodical meetings at different levels	n.a.	n.a.
Creation of inventory of instrumentation facilities available; Establishing Regional central instrumentation facility	Director of Research	All Technical Directors and Deans	Six months from now	10 days	n.a.	Requires funding for transport
Enabling environment						
Collection of information from various stake holders viz., farmers, employers, policy makers and refining our triple mandates	Deans of Different faculties, SW, DRR, DE	All stakeholders	One year	Periodical meetings	n.a.	n.a.

Advocacy

Expected Outcome (Priority Objective)				Resources Required		
Actions	**Who is the lead?**	**With which partners?**	**By when?**	**Time inputs (person days)**	**Equipment**	**Funding**
Facilitation of interdisciplinary research and streamlining the research objectives	DR	Dean, concerned dept. directors, P&H, respective scientists	Once in 3 months	1 month	Proposal specific	Public & private sector funds
Conducting trainings / workshops on advanced statistical tools	PS & IT	Dean, Directors concerned	Once in 6 months	2 weeks	Computers with software	In house funding
Publication of research findings and reports	Concerned Project guides	Staff and students	Completion of objectives	1 month	NA	Scheme funds
Initiating outreach programs	DEE	Extension workers, NGOs, KVKs, state depts.	Need based	1 month	Digital gadgets	Public and private sector

Mobilization

Expected Outcome (Priority Objective)				Resources Required		
Actions	**Who is the lead?**	**With which partners?**	**By when?**	**Time inputs (person days)**	**Equipment**	**Funding**
Creating Employment opportunities (Job fair/Campus recruitment/Creation of TNAU Job portal)	Dean, Students Welfare	Private /Public sectors	Three months	MoU signing/	10.00 lakh	Creating Employment opportunities (Job fair/Campus recruitment/Creation of TNAU Job portal)
Establishing multilingual lab (Hindi, French, German)	Dean, Students Welfare	Outsourcing	6 months	Audiovisual, language software	20.00 lakh	Establishing multilingual lab (Hindi, French, German)
Providing Fellowships to all PG students (inviting partners for students assessment)	Dean, SPGS	Public/Private sector/ Alumni association/ ABC	Academic year	NA	-	Providing Fellowships to all PG students (inviting partners for students assessment)
Fostering entrepreneurship skills	Director, ABD	Business consortium partners/ commodity boards	Six months to one year	Trainings/ workshops	-	Fostering entrepreneurship skills
Inviting startup companies /Incubation centres	Director, ABD	Business consortium partners/EDII/ Angel investment/ Business School	One year	Infrastructure and machineries	1.00 lakh	Inviting startup companies /Incubation centres

Proposing Research Projects for deliverable technology/product	Director of Research/ Director (ABD)	National and International funding agencies	Two to three months for project preparation	Pre workshop /Inter disciplinary	1.00 lakh	Proposing Research Projects for deliverable technology/product
Creating Infrastructure facilities for research	Director of Research	DST-FIST/ UGC-SAP/CSIR	Two to three months	Field and lab facilities	1.00 lakh	Creating Infrastructure facilities for research
Organizing exposure visits to industries and incubators for students (Knowledge development)	Deans of UG and PG programmes	Agro Industries /B schools	Two weeks	Hired Vehicle	10.00 lakh	Organizing exposure visits to industries and incubators for students (Knowledge development)
Strengthening Infrastructure facilities/ amenities for students	The Registrar	NABARD/ World bank/GOI/ TN govt/ICAR	One year		Donor	Strengthening Infrastructure facilities/ amenities for students
Organising Student exchange programmes	Deans of PG/UG	International and national institutes		NA	Donor	Organising Student exchange programmes
Employing external experts/Adjunct faculties	Registrar	Intl. agencies/ Institutes	One year	NA	2.00 lakhs per visit	Employing external experts/Adjunct faculties
Capacity building for soft skills for staff and students	Registrar	NAARM/AIM/MANAGE/IRMA/DHAN/NIPHM	Two to three weeks	NA	Donor (Intl) 2.50 lakhs (10 persons)	Capacity building for soft skills for staff and students

Establishing Innovative partnership to transform TNAU for global excellence	Registrar	With regional and global actors	One year	NA	Donor	Establishing Innovative partnership to transform TNAU for global excellence
Establishing Centre for Patenting	Director (CARDS)	Outsourcing – Legal Experts	Continuous	-	-	Establishing Centre for Patenting

Knowledge Management

Expected Outcome (Priority Objective)				Resources Required		
Actions	**Who is the lead?**	**With which partners?**	**By when?**	**Time inputs (person days)**	**Equipment**	**Funding**
Developing Academic module from Admission to Alumini	Dean (Agri) Dean (SPGS), DSW	Registrar, Physical Education CoE, Warden (Students Hostel)	1 year	10 Staff	Computer, Servers and Connectivity	TNAU
Strengthening of Communication Centre	DEE	DSW, PRO, DPM and DR	6 months	5 Staff	Computer, Servers and Connectivity, Camera and accessories	TNAU
Online platform and Knowledge Repository (Student, Researcher, Extension Functionaries)	DPM	Dean(Agri) Dean(SPGS), DEE and DR	1 year	5 Staff	Computer, Servers and Connectivity	GOTN and ICAR

Centralised Online Purchase	Comptroller	All Centres	6 months	3 Staff	Computer, Servers and Connectivity	TNAU
Online TNAU web TV Channel	DEE	DR and All Centres	1 year	5 Staff	Video Camera and accessories	TNAU, ICAR, Planning Commission
Introduction of Institutional Social Media	PRO	DEE, Physical Science, DPM, DR, Dean (Agri) and Dean(SPGS)	6 months	5 Staff and 5 Students	Computer, Servers and Connectivity	GOTN and TNAU
Ensure uniformity in TNAU website navigation	P&H , Physical Science and IT	All TNAU Centres	6 months	2 Staff from each centre	Computer, Servers and Connectivity	ICAR, GOTN and TNAU
Strengthening of video conferencing facilities with all TNAU centres	DEE	All the centres, ODL, DR and Dean (Agri) and Dean(SPGS)	6 months	1 Staff from each centre	Video conferencing accessories and connectivity for all centres	ICAR and GOTN
Regular updating of e- resources	Dean (Agri) Dean (SPGS) and Dean (SW)	P& H of all Dept.	1 year	5 Staff	Computer, Servers and Connectivity	ICAR, GOTN and TNAU
Sharing of E library resources to all TNAU centres	DSW	DR, Dean (Agri), Dean (SPGS), DEE	6 months	1 library staff at each centre	Computer, Servers and Connectivity	ICAR, GOTN and TNAU
Information on TNAU facilities (Centralised lab, instrument and	DR	Physical Sciences, All Directorates and TNAU Centres,	6 months	1 Staff for each centre	NA	NA

service facilities)						
Periodic updating of the Agritech portal	DEE	All TNAU Centres	6 months	5 Staff	NA	GOTN, ICAR
Introduction of TNAU online courses	ODL	Dean(Agri) Dean(SPGS)	1 year	5 Staff	Computer, Servers and Connectivity	IGNOU, TNOU,COL
Village adoption by TNAU	DEE and DR	All Centres of TNAU	6 months	2 Staff / Centre	NA	NABARD Planning commission

Appendix 6: Workshop Evaluation

1. How would you rate the usefulness or quality of this workshop in terms of the following?

36 respondents		**Excellent**	**Good**	**Average**	**Weak**
Writeshop content	• Transformation of agricultural education	28% (10)	**67% (24)**	5% (2)	
	• Capacity development (CD) for AIS	42% (15)	**55% (20)**	3% (1)	
	• KM in agricultural education to strengthen AIS	39% (14)	**58% (21)**	3% (1)	
	• Good practices in TNAU	**58% (21)**	42% (15)		
	• Galvanizing commitment (network mapping)	36% (13)	**64% (23)**		
	• Visioning (statements and objectives)	**55% (20)**	42% (15)	3% (1)	
	• Capacity development (needs assessment)	42% (15)	**58% (21)**		
	• Change strategy and action planning	33% (12)	**61% (22)**	5% (2)	
	• Key KM processes	33% (12)	**58% (21)**	8% (3)	
	• KM and communication tools	**44% (16)**	**44% (16)**	8% (3)	3% (1)
Workshop process	• Working groups	**75% (26)**	28% (10)		
	• Agenda and flow	**53% (19)**	36% (13)	8% (3)	3% (1)
	• Facilitation and feedback	**50% (18)**	47% (17)	3% (1)	
Logistical matters	• Facilities	**58% (21)**	39% (14)	3% (1)	
	• Food	**44% (16)**	**44% (16)**	11% (4)	

***2.* What are the key abilities (knowledge and/or skills) that you acquired in this training that will enable you to work more effectively?**

- KM tools, processes and techniques (17 participants)
- CD tools, processes and concepts (15 participants)
- Interpersonal skills with stakeholders for networking and interdisciplinary research (5 participants)
- Cooperative (team) work through groups (5 participants)
- Action planning (4 participants)
- Innovation theory and processes (3 participants)
- Sharing of ideas (3 participants)
- Visioning (2 participants)

One participant each also mentioned: galvanizing commitment; creative thinking; understanding innovation as a step-by-step process; network mapping; World café methodology; knowledge about different concepts; presentation skills; team building; participatory approach; and time management.

3. What are you planning to change/improve after this training?

- "I will improve my communication skills and my interaction with higher officials and students. This would be meaningful to achieve some desirable results in AIS."
- "Improve my staff skills, especially decision making."
- "Sharing of knowledge among the staff and students."
- "Motivate students to acquire different skills."
- "Adoption of reflection tools and orientation of my class to the students."
- "Planning to conduct a meeting in our department to change our department vision and objectives."
- "Pass on the knowledge to other people in the university."
- "To be proactive and open to change and learn good management and KM practices."
- "Plan to focus more on changing conventional or traditional pedagogic methods by use of KM tools."
- "Teaching and research."
- "Way of teaching to students, participatory approach will give good results."
- "To incorporate the capacity building in our regular teaching and research."
- "Knowledge management and KM attitude."
- "Planning process and KM, also in my own life."
- "Update myself in various aspects, proper planning and execution of work by setting objectives."
- "Teaching methods and extension strategy."

- "I try to communicate the needs for lectures to the management, and improve the vision.
- "As a senior level officer, I will motivate students and staff for CD and KM for AIS."
- "Set priority areas for the development in the areas of research, education and extension."
- "Tools with approaches used in education, extension and communication activities."
- "Impart functional skills."
- "Motivate and evaluate (myself)."
- "Trying to change my teaching method."
- "Improve functional capacity and motivate the young minds."
- "Capacity planning action in my areas of specialization i.e. development, entomology/agriculture."
- "Way of work."

4. How much of what you learned (knowledge and skills) are you planning to use in your work?

All	Most of it	About half	A little	Nothing
14% (5)	72% (26)	11% (4)	3% (1)	

The person, who answered 'a little' said: "I have to understand step-by-step process of innovation, starting with TAPipedia. Innovative teaching methods of the training are not easily understandable".

5. Are you planning to train others or share your newly-acquired knowledge?

Thirty-five participants (97%) mentioned that they train others or share new knowledge after the workshop. One person did not answer this question. Twenty-seven persons mentioned they will train their students, and 26 participants are planning to train their colleagues (university staff).

6. Do you have any comments on the usefulness of the training and its actual application?

- " A mix of new and old concepts in a most convincing way."
- "Gained lot of practical experience. Actual application would be real transformation of agricultural education system."
- "Learning environment was good. Group discussions and working on charts were very useful."
- "This training is very much useful for my carrier in research, education and extension."
- "I have acquired knowledge to improve the existing system."
- "Useful in terms of eye openness for innovation on education, research and extension tools."
- "The training was very useful and I would for sure apply it before bringing a change in any aspect."
- "Need more practical materials and modules."
- "It helps to vision the future and how to attain through action plan."
- "What you have done is super and excellent – group works and strategic plans."
- "It is an eye opener for me to do the things innovatively."
- "We can improve ourselves in our personal life and also in my career."
- "Please give pre-ample before starting the workshop."
- "The workshop was useful provided an opportunity to learn about various topics."
- "Really impressive, enhanced my understanding to a new level."
- "As an educator, the process learned will be used."
- "I have obtained the knowledge about how to improve the students' learning process."
- "It made me realize who we are and what are all actions that need to be done for the benefits of students, farmers and university."
- "Through skill development, I gained confidence and effort to transform, which helps in scaling up individual and organizational capacity."
- "Good and useful for institution building activity."
- "Really useful for institutional development."

7. Did the workshop meet your expectations?

Thirty-one persons (86%) mentioned that the workshop met their expectations. For four people, the workshop exceeded the expectations. For one person the workshop did not meet the expectations. The reason given: "It did not cover how it will be carried out in the respective places by the trainers."

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