Final report on Virtual Institute for Systems Analysis (VISA)

SI-MFS-WP5

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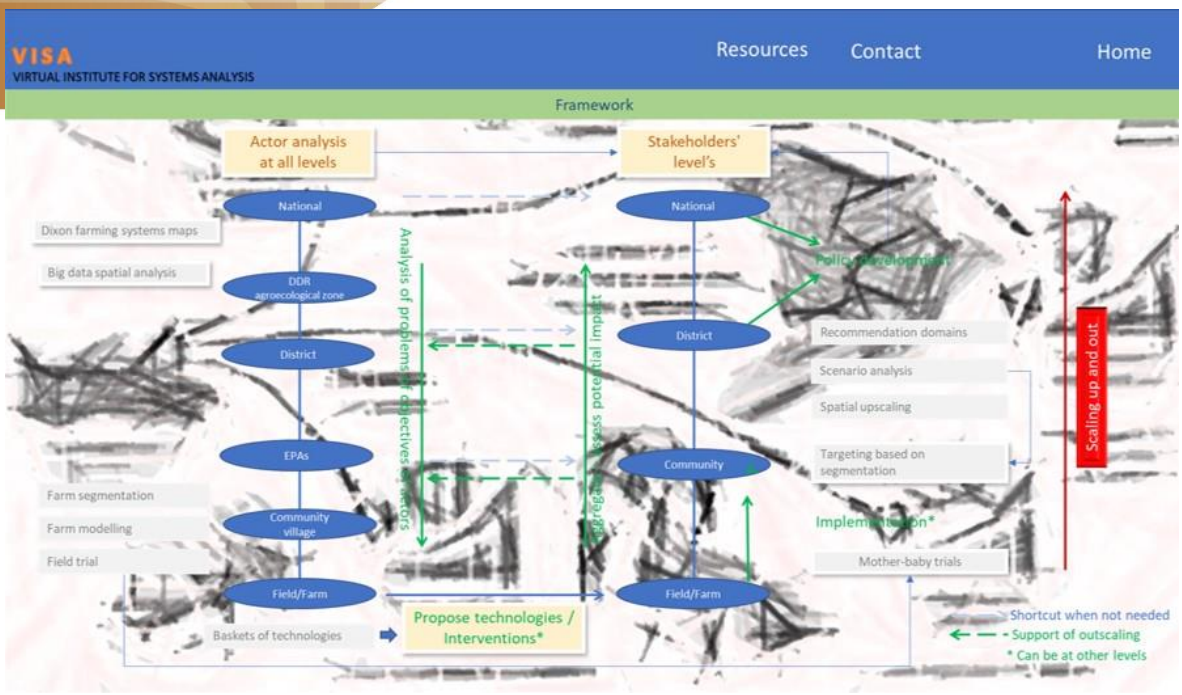

Figure 1: VISA an open virtual institute for Capacity Development of Actors in systems thinking, assessment and design for a sustainable transformation of agrifood systems.

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The Sustainable Intensification of Mixed Farming Systems Initiative aims to provide equitable, transformative pathways for improved livelihoods of actors in mixed farming systems through sustainable intensification within target agroecologies and socio-economic settings.

Through action research and development partnerships, the Initiative will improve smallholder farmers' resilience to weather-induced shocks, provide a more stable income and significant benefits in welfare, and enhance social justice and inclusion for 13 million people by 2030.

Activities will be implemented in six focus countries globally representing diverse mixed farming systems as follows: Ghana (cereal–root crop mixed), Ethiopia (highland mixed), Malawi: (maize mixed), Bangladesh (rice mixed), Nepal (highland mixed), and Lao People's Democratic Republic (upland intensive mixed/ highland extensive mixed).

Contents

Abbreviations and acronyms

ABC	Alliance of Bioversity International and the International Center for Tropical Agriculture (CIAT)
CGIAR	Consultative Group on International Agricultural Research
CIHEAM	Advanced Mediterranean Agronomic Studies
CIMMYT	International Maize and Wheat Improvement Center
IITA	International Institute of Tropical Agriculture
ILRI	International Livestock Research Institute
IT	Information technologies
MOOC	Massive Open Online Course
R4D	Research for Development
SI-MFS	Sustainable Intensification of Mixed Farming Systems Initiative
SPs	Science Programs
UM6P	University Mohammed VI Polytechnic
WP	Work Package
WUR	Wageningen University , Netherlands

Context

This work was conducted between 2022 and 2024, in WP5 (Capacity Development) of the CGIAR Mixed Farming Systems initiative (SI-MFS[1]). It has been coordinated by Katrien Descheemaeker (WUR), Ann Notenbaert (CIAT/CGIAR), Santiago-Lopez Ridaura (CIMMYT/CGIAR) and Jacques Wery (L'Institut Agro) and supported more particularly by Matthew Brandon, an Education & Research Assistant of the Plant Production Systems group of Wageningen University.

[1] https://www.cgiar.org/initiative/mixed-farming-systems/

1. Objectives

Transforming Agri-food systems into more resilient, sustainable and climate smart systems in the global south requires to develop the capacities of actors in systems thinking, assessment and design[2].

This implies to go beyond the current efforts of several universities in training and education of researchers and post graduate students in this domain[3] and to target all actors of the value chains (including farmers and advisors), regional development and policies with formats and contents adapted to each type of actor.

For decades there has been a significant effort in research to develop concepts, methodologies and tools (models, indicators…) that allow to analyse, assess and design agrifood systems at various scales (farm, landscape, region), but there is a lack of operational tools and methods adapted to the needs and capacities of actors, which is a major limit to put systems thinking into action.

The SI-MFS initiative of the One CGIAR[4] aimed to bridge this gap for the global south in the specific case of Mixed Farming Systems and had dedicated a WP to «Capacity building for MFS design and analyses» (WP5) supported by a WP developing operational tools and methods (WP2) and a WP implementing them in a co-design process with stakeholders in selected countries (WP3).

This initiative, as well as others from the One CGIAR, was a unique opportunity to develop south-south learning on agrifood systems design and scaling of innovation in a regional and cross-regional collaboration.

While SI-MFS started to develop materials and approaches for capacity development of actors for its own needs it was important to discuss with other One CGIAR Initiatives, with other international projects and with universities around the world to set the scene for a global effort on systems science.

Therefore, the objective of this activity was to conceptualize what could be a **worldwide effort to develop an open virtual institute for Capacity Development of Actors in systems thinking, assessment and design for a sustainable transformation of agrifood systems (VISA)** and start implementing a prototype serving the goals and domain of SI-MFS.

[2] This assumption is also at the core of the Theory of Change of most of the One CGIAR initiatives.

[3] See for example the MSc courses offered by Wageningen University and Research (https://www.wur.nl/en/Research-Results/Chair-groups/Plant-Sciences/Laboratory-of-Plant-Production-Systems/Education.htm) or the PhD course offered by the Farming Systems Design network (https://fsd7.sciencesconf.org/resource/page/id/33).

[4] https://www.cgiar.org/news-events/news/new-cgiar-initiative-on-sustainable-intensification-of-mixed-farming-systems-launched/

2. Development of the VISA concept

Activities (2022-2024)

The **VISA concept** was first discussed during the SI-MFS kick-off meeting[5] in Ethiopia in june 2022), followed by SI-MFS regular meetings until November 2024.

- A Concept Note was developed and shared in September 2022 with SI-MFS scientists and with key international partners.
- On this basis, a specific session dedicated to the VISA concept[6] was organized during the 7th Farming Systems design workshop co-organized with CIHEAM and UM6P in Marrakech (Morocco) in November 2022. This allowed to share the objectives and vision of VISA[7] with several CGIAR initiatives and major universities and research centres working on systems science in Africa, Europe and USA.
- A work plan for the development and testing of a first version of a VISA prototype adapted to SI-MFS needs and capacity was defined for 2023-2024, including a mock-up of an on-line platform (developed with the IITA IT team) and the collection of typical examples of tools and methods for systems science conducted in collaboration with WP2.
- The concept and mock-up were discussed and refined during the International Workshop on Systems Sciences co-organized by CGIAR (SI-MFS and the RAFS Science Group) and L'Institut Agro in May 2024 in Montpellier[8] and recommendation were made to the CGIAR writing teams for the strengthening of Systems Science in the 2025-2030 portfolio[9].
- Because of limited IT resources in WP5 of SI-MFS it was not possible to develop and populate a fully functional on-line platform for VISA, but additional funding has been secured from France and The Netherlands to conduct this activity in 2025 in collaboration with the CGIAR.

The **VISA concept** was defined (Figure 2) with the following attributes, and their implication for the structure and functionalities of the on-line platform have been analysed:

- **Scope:** Capacity Development of agri-food systems actors in systems thinking, assessment and design for a sustainable transformation of these systems under climate-change.

[5] https://www.cgiar.org/news-events/news/new-cgiar-initiative-on-sustainable-intensification-of-mixed-farming-systems-launched/

[6] https://fsd7.sciencesconf.org/resource/page/id/46

[7] Notenbaert, A.; Descheemaeker, K.; Lopez-Ridaura, S.; Wery, J. (2022) Can we join our efforts into a "Virtual Institute for Capacity Development of Actors in systems thinking, assessment and design for a sustainable transformation of agrifood systems"? Presentation prepared for the 7th Farming Systems Design Workshop, 31 October – 2 November, Marrakech, Morocco. 8 sl.

[8] https://hdl.handle.net/10568/162918

[9] https://hdl.handle.net/10568/159712

- **Target audience:** in the short term the priority target audience is young scientists and phD but on the medium term there will be specific features and products for each type of actors to be engaged in the transformation of agri-food systems: farmers, farm advisors, managers, students (bachelor to phD), teachers, researchers, development agents, policy makers and donors. The development of the VISA audience types will be progressive depending on sources of funding additional to those of SI-MFS/WP5.
- **Virtual:** VISA will work as an online platform with easy access for each type of users and open without charge and worldwide. VISA will offer direct access to a wide range of *knowledge* products (e.g. documents, videos, tutorials, course material, analytical tools (framework, models, indicators), etc.) as well as organized *courses* (e.g. MOOC, Summer Schools) and *knowledge exchange platforms* either hosted on the platform or through link to the websites of universities and partners which are developing, updating and delivering the training.
- **Collective Intelligence and on the ground application:** VISA aims also to support knowledge sharing and collective intelligence among each type of actors and across these types (e.g., co-learning and co-design between farmers, value chain actors, policy makers and researchers): chat, blogs, webinars, co-design or co-assessment exercises, etc. Particularly for students and teachers, VISA will offer opportunities to support the « internationalization at home (I@H) » strategy of universities for example on co-design of transformative pathways of agri-food systems in a multicultural and multilingual context. By its strong anchorage with R4D projects in the global south VISA will also strengthen the possibilities of exchanges of students and scientists to apply the systems methods and tools of VISA with local actors.
- **Science-based and Action-oriented:** the governance of VISA will ensure that all education materials, methods and tools available in the platform have been previously assessed for their **scientific basis** (e.g. based on peer reviewed publication) and tested for their **operationality** to support actors in the transformative pathways of agri-food systems.
- **Public goods:** The platform in itself, and all the contents developed and managed by VISA, will be free of charge and accessible worldwide. Nevertheless, VISA implementation and management will have a cost. An economic model and a financial plan will be developed and potential donors will be approached when we have a first operational prototype. Some of the contents (especially courses, MOOC and Summer schools) are likely to be charged by the universities which develop and support them. In that case VISA will support in the search for grants and funding especially for youth and women from the global south. Private sectors technicians, engineers and managers are also among the key targets of VISA and some of the materials hosted by the platform may be charged.

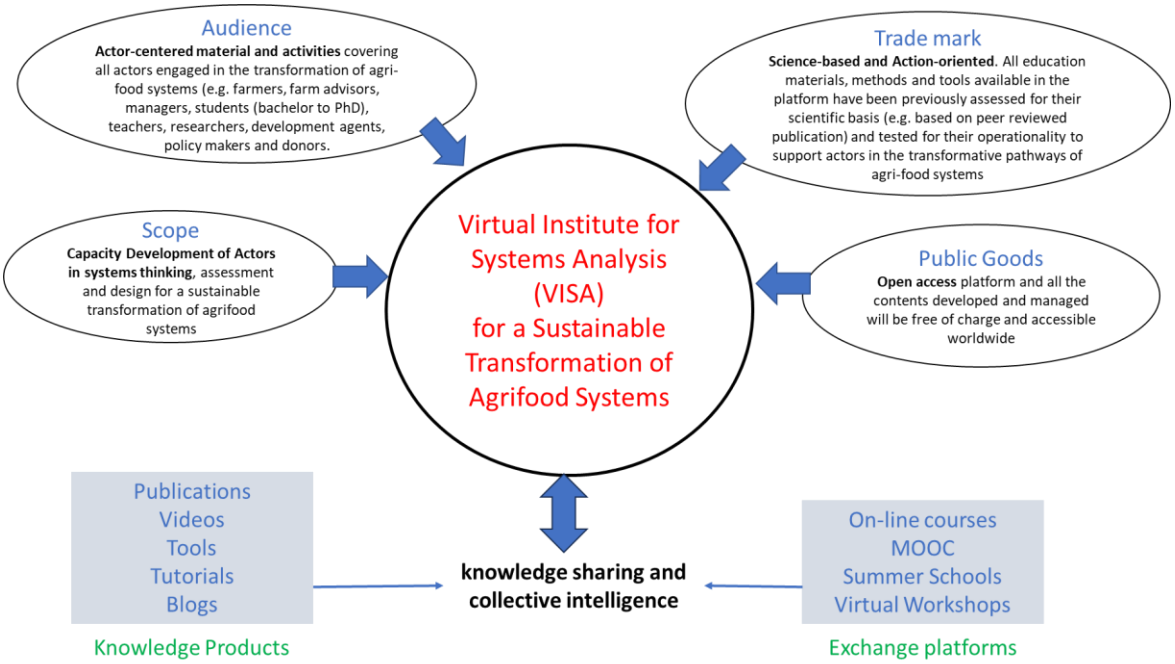

Figure 2: the VISA Concept with attributes and services.

3. Collection of typical teaching material to start populating VISA

- Typical examples of methods and tools supporting systems analysis, assessment or design, adapted to the needs of SI-MFS, has been collected in 2023 in collaboration with WP2. They have been used to refine the VISA concept in term of structure and functionalities.
- A first set of papers, video and teaching materials has been collected in 2024 to be used as practical examples to populate the first prototype of the VISA on-line platform in order to test its functionalities and demonstrate the added-value to users and donors. This will be done in 2025 with additional funding secured from France and The Netherlands.

4. Community of Practice on Systems Science for Land, Water, Food and Agricultural Systems

During the expert workshop in May 2024 in Montpellier it was decided to launch an international **Community of Practice (CoP) on Systems Science** for food, land, water, and agricultural systems. The scope in term of systems is broader than SI-MFS which will enrich the capacity sharing activities across the 2025-2030 CGIAR research portfolio. Based on the discussion about the objectives and activities of the CoP it was concluded that the VISA concept has all the attributes to support the development of this CoP with a worldwide ambition.

Communities of Practice are defined as "groups of people who share a concern, a set of problems, or a passion about a topic, and who deepen their knowledge and expertise in this area by interacting on an ongoing basis".

As described by Lopez et al. (Lopez et al., 2023) [10] with respect to the CGIAR Community of Practice on Gender-Transformative Research Methodologies:

The core elements of a CoP are the:

1. Domain or purpose (e.g., the motivation that acts as a unifying call for action);
2. Practice (i.e., the actual tools, methods, frameworks or narratives that the CoP develops and uses)
3. Community itself, representing people who are passionate about and committed to the domain, and want to improve their practice (i.e., the composing members).

Value Proposition

The Systems Science CoP aims to advance and mainstream systems science for the design of food, land, water, and agricultural systems. Emphasizing collaborative innovation, the CoP will promote integration of systems approaches across disciplines, providing mechanisms to achieve goals that are prioritized for systems science in the CGIAR 2030 Research and Innovation Strategy. The CoP will provide a dynamic platform for knowledge exchange, skill development, and engagement of early scientists, students, agri-food systems stakeholders and the public. The CoP values the diversity of systems thinking approaches, promoting interdisciplinarity and transdisciplinarity, supported by integrated approaches and methodologies. By enhancing capacity and application of systems science, the CoP will promote transformative innovation and impact that improve the resilience and sustainability of human and natural elements of agri-food systems.

[10] Lopez DE, Bailey A, Farnworth CR, Rietveld A and Gartaula H (2023) Designing for change through "reflecting and doing": the CGIAR Community of Practice on Gender- Transformative Research Methodologies. Front. Sustain. Food Syst. 7:1179503. doi: 10.3389/fsufs.2023.1179503

Objectives

- **Knowledge exchange and capacity building**

  The community of practice will facilitate the exchange of system science knowledge and experiences through organizing workshops, seminars, and conferences. This will connect people with relevant expertise and interests to support collaboration, life-long learning and professional development. Methodological exchange will be a key component of the community. The platform can also promote existing educational resources to enhance systems science capabilities.

- **Harmonize systems science approaches**

  The community of practice will foster a unified approach to systems science. This will contribute to more coordinated research to enable agri-food system transformation. The community will recognize the heterogeneity of systems science approaches but will focus around common principles and processes. The CoP will provide a platform for discussion and collaboration to harmonize and standardize systems science approaches, including through sharing methodologies, tools, and approaches more effectively.

- **Support strategic collaborations and networking**

  The community of practice will strengthen linkages between CGIAR centers and external partners and institutes. It will develop clear functional pathways to integrate systems thinking across CGIAR activities. The Virtual Institute for Systems Analysis (VISA) will generate broader promotion and application of systems science principles across diverse actors. Expanding the community beyond CGIAR will be done to include diverse global perspectives and expertise.

- **Visibility and advocacy for systems science**

  The community of practice will communicate systems science approaches to a diverse range of stakeholders, including farmers, policymakers, researchers, and development actors. This visibility and advocacy can promote the application of systems science to other sectors and can attract actors working with systems science in other sectors to promote co-creation of methodologies.

Structure & Functionality

- **Leadership and governance**

  The community of practice development is currently being steered by the Capacity Sharing Accelerator (CapSha) of the 2025-2030 portfolio in collaboration with Science Programs (SPs) (especially Sustainable Farming and Multifunctional Landscapes) and a core group of universities with expertise in Systems Science. This core group will provide leadership to the community to launch it during its early phase in 2025. During this phase a provisional and adaptable organizational structure will be designed that supports rotating leadership to reflect the evolving needs and priorities as the community develops. Protocol will be established to maintain flexibility while ensuring that the community remains active and aligned with its goals. It may be considered

to embed the community of practice within the Capacity Building Accelerator to strengthen linkages within the CGIAR.

- **Collaboration and membership**

  Membership to the community of practice will extend beyond systems scientists of the CGIAR. Membership should be open and promoted to any researchers, practitioners, and students working with or interested in systems approaches for food, land, water, and agricultural systems. Linkages will be developed with external partners, institutes and networks to promote systems science.

  Different levels of engagement will be possible within the community, such as the steering group, expert groups, and various working groups. The responsibilities and/or purpose of these groups will vary. Working groups may manage the organization of events, activities, and development of resources (such as the digital platform). The working group for networking can join representatives from external partners such as universities and research institutes. A youth network group can be developed to support students and early scientists in career development and engagement with the scientific community. Expert groups assemble smaller groups of individuals on specific areas of interest to streamline the knowledge exchange.

5. Next steps

It was not possible during the SI-MFS initiative (2022-2024) to achieve the objective of implementing and testing a first functional version of the VISA on-line platform because of limited IT resources allocated to WP5. But the VISA Concept and the associated CoP on Systems Science for Land, Water, Food and Agricultural Systems have been conceptualized in collaboration with several other CGIAR Initiatives[11]. They provide a solid ground for integration and development into several of the 2025-2030 CGIAR SPs and accelerators (https://hdl.handle.net/10568/159712) in collaboration with NARIS and the European Life Science University (https://www.sustainlife-university.eu/). Bridging funds have been secured from France and The Netherlands to launch a first version of VISA and the CoP in 2025.

[11] https://hdl.handle.net/10568/162918

cgiar.org/initiative/mixed-farming-systems