

What is our idea?

Generating proof-of-principle and guidelines of using ICT and citizen science to advance individual and collective action for human, crop and animal pest and disease management.

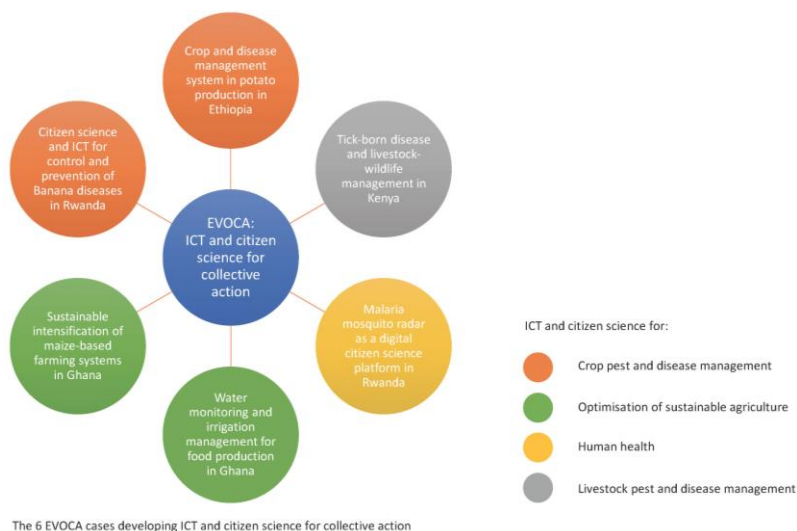
In 2016, Wageningen University (WUR) in partnership with the CGIAR launched a research program that aspires to develop [Environmental Virtual Observatories for Connective Action \(EVOCA\)](#). EVOCA cuts across 3 CGIAR Research Programs (CRPs), has 6 case studies in 4 African countries. It develops the research and leadership capacities of 11 PhD-students. It is the largest agricultural research for development (AR4D) science program in which the CGIAR is involved.

Why is the idea unconventional, creative and why does it need to be funded?

The project will generate proof-of-principle of how citizen science and big data can facilitate collective action and more (cost)effective human, crop and livestock pest and disease monitoring and management. It will deliver guidelines for citizen science in R4D covering conceptual, methodological, analytical and ethical dimensions.

The project assumes a large-scale, cross-cutting, comparative analysis of 6 case studies mapped against 3 CRPs (MAIZE, LIVESTOCK and RTB) and co-funded by different CGIAR-centers (IITA, ILRI and CIP):

- Crop and disease management system in potato production in Ethiopia;
- Water monitoring and irrigation management for food production in Ghana;
- Malaria mosquito radar as a digital citizen science platform in Rwanda;
- Tick-born disease and livestock-wildlife management in Kenya;
- Sustainable intensification of maize-based farming systems in Ghana;
- Citizen science and ICT for control and prevention of Banana diseases in Rwanda.



In each of the case studies, ICT-based platforms (Environmental Virtual Observatories) enable the users to share environmental information (e.g. water levels, spread of plant pests, malaria vector densities) across networks, facilitating connective action among – otherwise – dissociated populations. In addition, they allow the integration of local knowledge and lived experience with scientific forecast and modelling, providing a more nuanced understanding and analysis of the complex socio-environmental issues.

While each of the case studies provides a unique insight into the processes of agricultural knowledge co-creation, invaluable lessons can be learnt from a cross-case comparison. Generating proof-of-

principle and identifying cross-cutting opportunities and obstacles for the use of ICT and citizen science in R4D is urgently needed, and requires investment to explore questions related to its conceptual, methodological, analytical and ethical dimensions. We will leverage the cross-disciplinary nature of EVOCA across CRPs, CGIAR centers and other R4D partners to create a flexible and adaptive set of tools, protocols and concepts to promote the use of ICT and citizen science in AR4D.

Hypothesis for the proposal and why EVOCA will succeed:

Integrating citizens' knowledge and experience with sophisticated scientific modelling results in a more nuanced understanding of complex socio-environmental problems, and what solutions are technically feasible, economically viable and socio-culturally acceptable. The comparative study creates an evidence-base of the perils and prospects of ICT and citizen science and its relevance for AR4D.

This project will succeed as it builds on existing cases of ICT and citizen science by the CGIAR and its partners. In doing so, the project provides guidelines in how conceptual (user-centered design) and technological (ICT) innovations can be leveraged to implement demand-driven, interactive and integrated approaches to accelerate responsible innovation and their scaling in agri-food systems.

Implementation plan and performance within timeframe (12 Months) and budget (US\$100,000):

Implementation plan	Timeframe	Budget
1. Case team consultations on the study design for (i) case-oriented comparison, and (ii) variable-oriented comparison of collective action	Month 1-2	\$5,000
2. Develop a framework for cross-case data collection, analysis and storage	Month 2-3	\$10,000
3. Data collection across the 6 EVOCA cases (\$7,500 per case)	Month 3-9	\$45,000
4. Workshop with representatives of the case teams to interpret cross case findings and discuss proof-of-principle and citizen science guidelines	Month 10	\$20,000
5. Develop guidelines for ICT and citizen science applications for collective action for human, crop and animal pest and disease management	Month 11-12	\$10,000
4. Open Access publication in a peer-reviewed ISI-Thompson journal that provides proof-of-principle of ICT citizen science in AR4D	Month 11-12	\$10,000

Essential data generation:

Data on key conceptual, methodological, analytical and ethical opportunities and constraints for ICT and citizen science for collective action in the domains of human, crop and animal pest and disease management; data resulting from cross-case comparison; interview and focus group discussion data on stakeholder satisfaction and added value of applying ICT and citizen science for collective action.

Post-pilot ideas and projections:

There is no global repository of ICT and citizen science initiatives by the CGIAR and its partners, nor a global inventory of the conceptual, methodological, analytical and ethical opportunities and constraints. Based on the pilot, an online data base and user interface of ICT and citizen science projects conducted by the CGIAR and its partners across the world will be developed in collaboration with the CGUAR Platform for Big Data in Agriculture. The platform will guide and harvest AR4D investments in ICT and citizen science for sustainable AR4D.