Responsible life-sciences innovations for development in the digital age.

Environmental Virtual Observatories for Connective Action in crop, water, livestock and disease management (EVOCA)

First International Workshop

May 11-13, 2016

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Responsible life-sciences innovations for development in the digital age: Environmental Virtual Observatories for Connective Action

- Welcome
- The core idea in a nutshell
- Where are we now?
- Purpose of this workshop
- Programme in brief
- First introduction partners

Context

- Radical change in ICT availability in Africa
- New opportunities for connectivity
- New opportunities for data-collection through ‘citizen science’
- Programme 2015 - 2020

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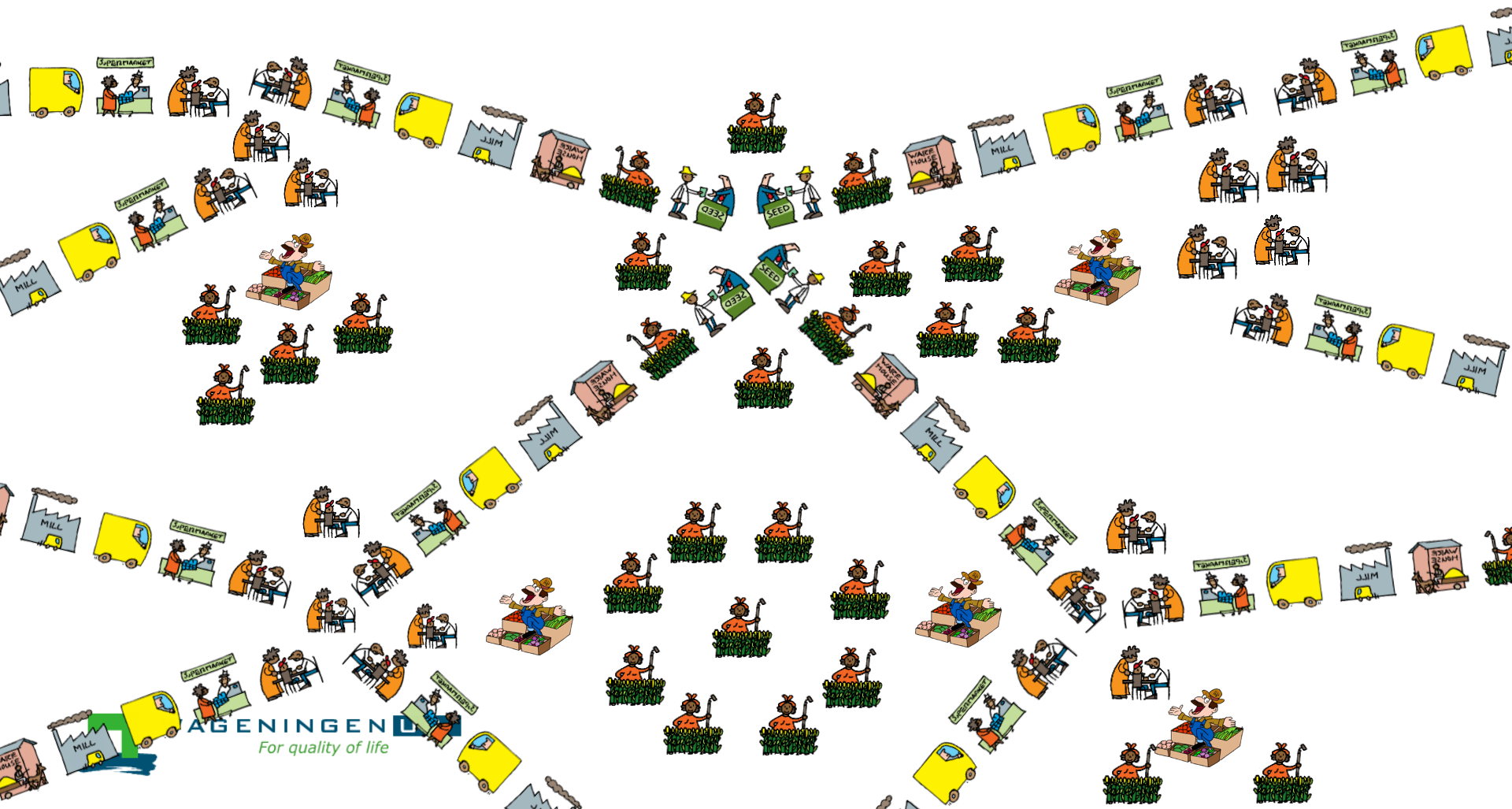
The core idea in a nutshell: Central Research Question

- How can life-science knowledge, digital technologies and responsible innovation concepts be leveraged to build inclusive virtual platforms for environmental information that enable connective action for addressing development challenges in crop, water, health and wildlife management?

Addressing problems in crop, water, livestock and disease management often requires **collective responses** – interdependence !



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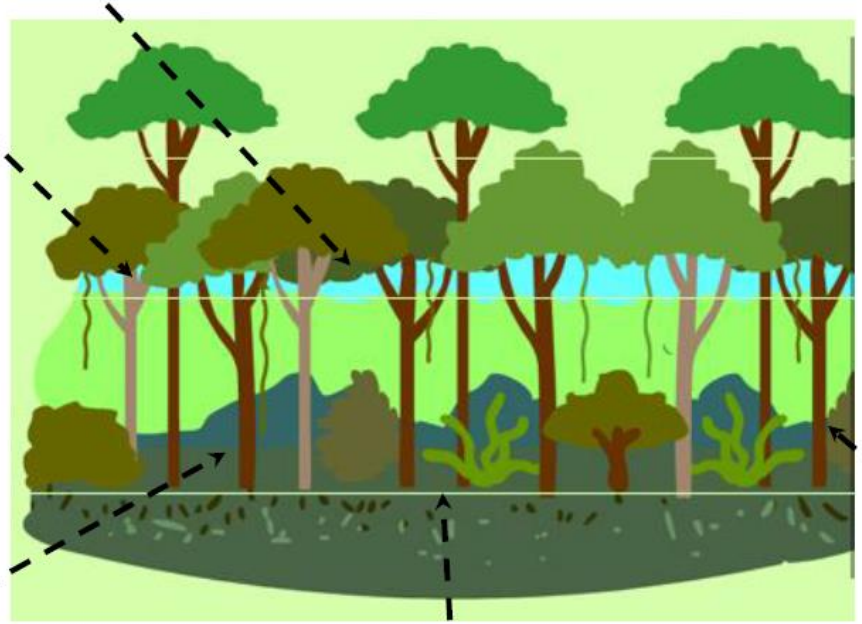
ICT-use may contribute changing the logic of individual / collective decision-making

image from Arun Pratihast



They may help foster can foster new forms of **'connective action'** , through

- Bringing together knowledge/information from dispersed sources
- Citizen science / crowd sourcing of information
- Generating new kinds of information and insight
- Enhancing transparency
- New modes of processing / visualisation / tailoring
- Discussion platforms and diffusion
- Etc.

e.g. visualising / integrating different kinds of information about e.g. forest change

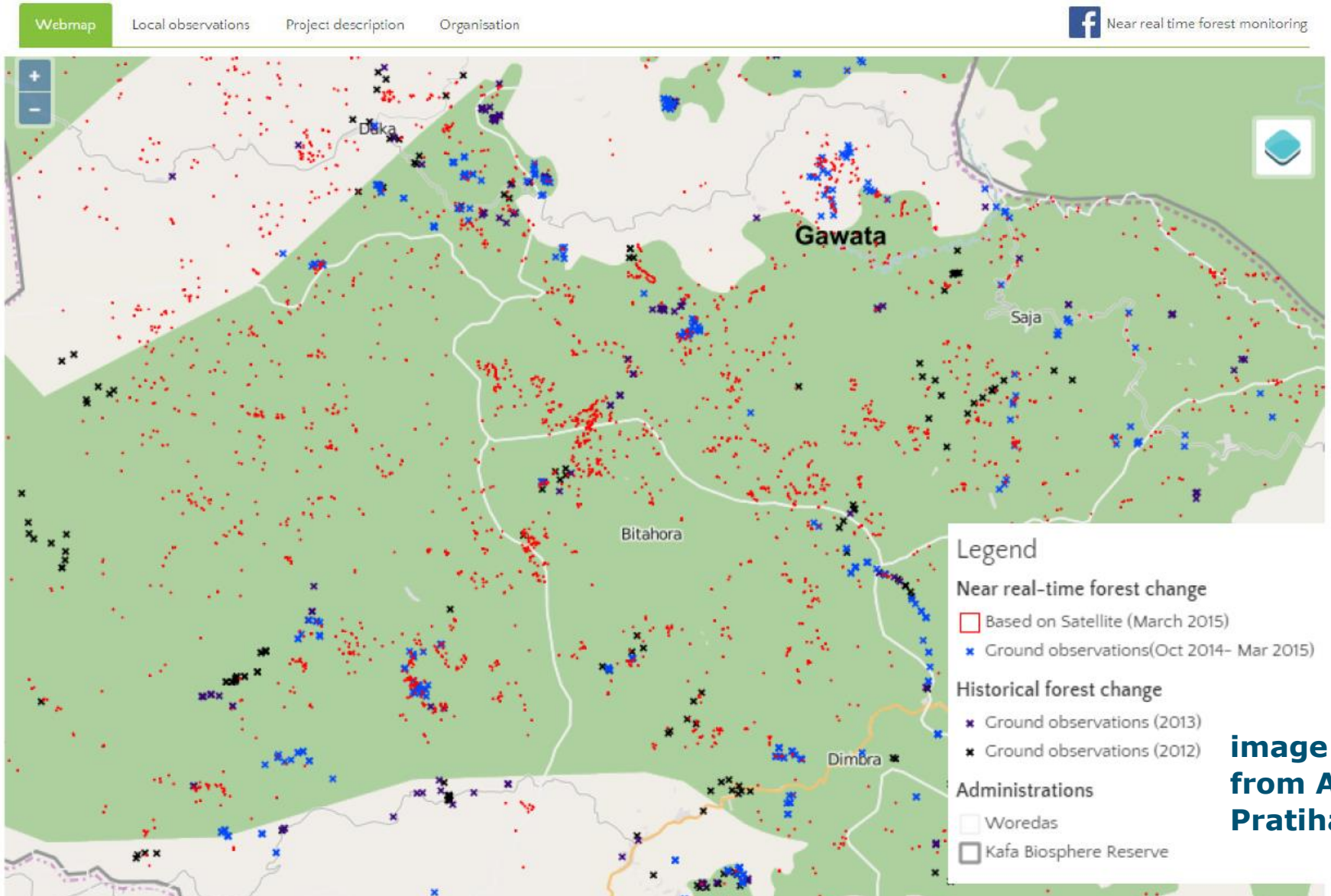


image from Arun Pratihast

5 cases – 5 interdisciplinary teams - 11PhDs - 4 countries

Case 1

A crop and disease management expert system in potato production in Ethiopia

Case 2

Water monitoring and irrigation management for food production in Ghana

Case 3

The malaria mosquito radar as a digital citizen science platform in Rwanda

Case 4

Tick-born disease and livestock-wildlife management in Kenya

Case 5

Sustainable intensification of cocoa and food crop farming systems in Ghana

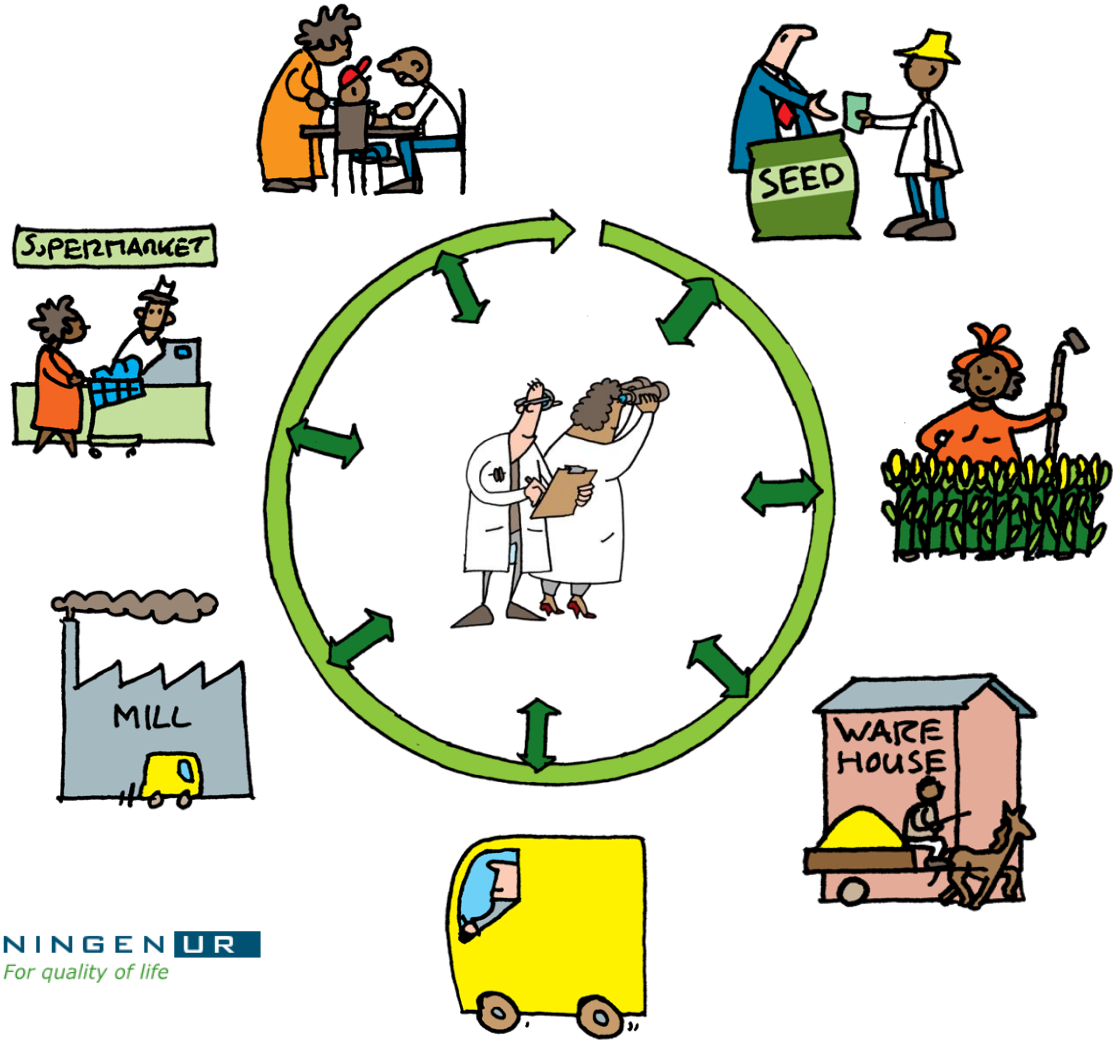
Designing solutions to life science issues requires research and innovation on:

- Bio-physical phenomena and technical strategies ('hardware')
  - e.g. efficacy of alternative technical interventions
- Social phenomena and social strategies ('orgware')
  - e.g. role of relationships, institutions, organisation
- Role of knowledge and information ('software')
  - e.g. data, information, knowledge, visions, communication, mental models, **ICT**

Moving beyond the use of ICT for dissemination and individual advice

- Interactive and iterative co-design of EVOCAs with multiple stakeholders
  - of 'hardware', 'orgware' and 'software'
  - based on good understanding of the relevant bio-physical and socio-political context

Not only: Research FOR Development
Partly: Research IN Development



Key assumptions:

Research FOR Development	Research IN Development
Research findings/outputs are the basis for impact	Research process creates conditions for impact
Research phase precedes impact phase	Research and impact phase are inseparable
Relevant research questions are evident to science	Relevant research questions emerge in the process
Societal partners integrate research findings	Societal partners co-produce research findings

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Applying questions and principles from 'Responsible Research and Innovation'

- Who is likely to benefit? Who is not?
- Who will control new solutions, including ICT?
- What are possible risks involved?
- What intended and un-intended impacts may occur?
- Who will take responsibility?
- What is it we do not know?

- And: what does this mean for our design choices now?

Where are we now?

- PhD students have worked extremely hard in the last 4 months
    - Courses and initial proposal development
- Postdoc and team have developed a ‘programme framework’ plus tailor made EVOCA course

Where are we now?

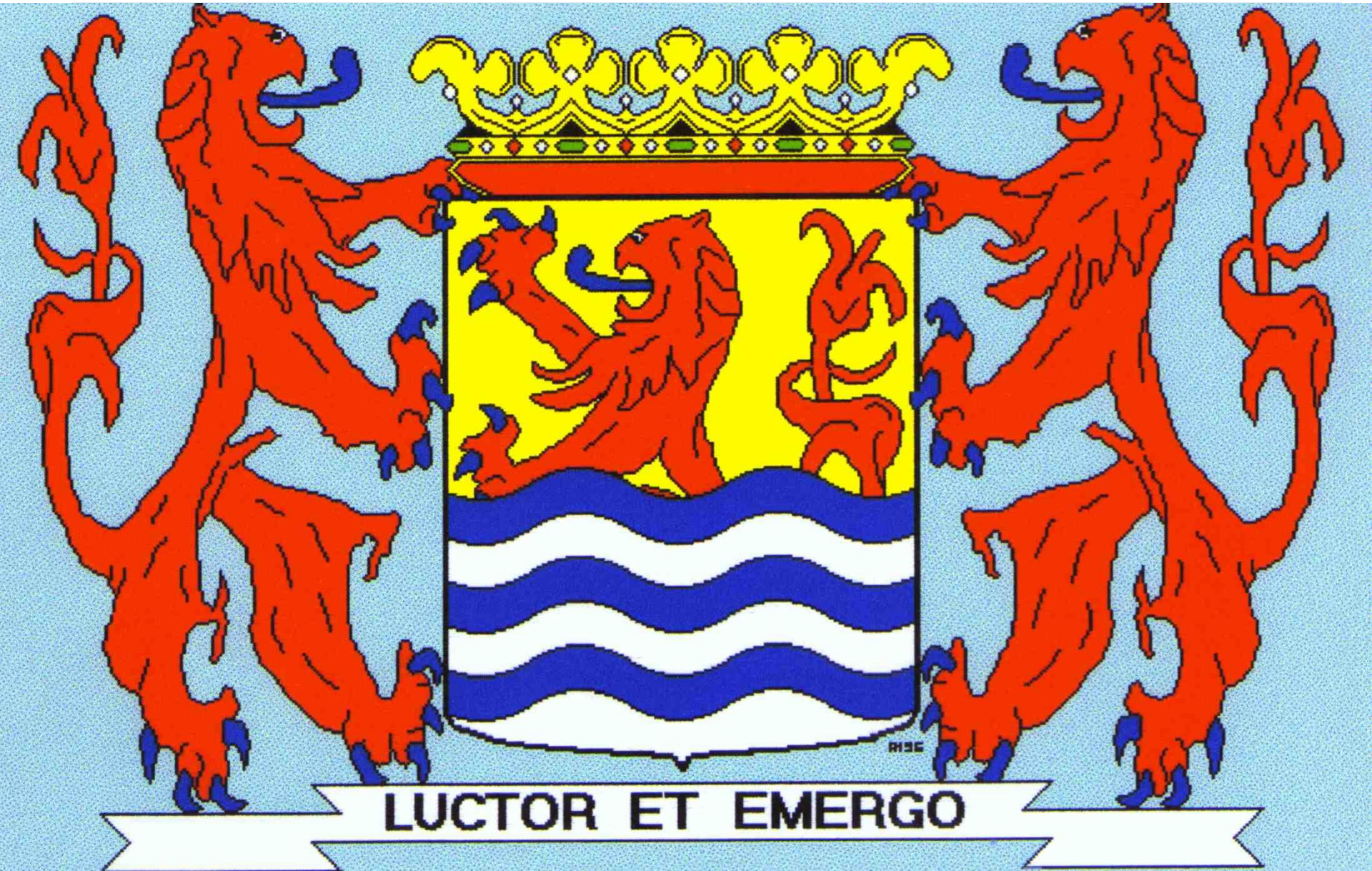
Where are we now?

- Most (?) PhD students are still in the 'divergence' stage

- There is still need to clarify the role of ICT-based EVOCA

  - A means or an end?
  - A solution in search for a problem?
  - An data-collection tool, or a system that supports chosen solutions?
  - What if it 'fails' / does not get off the ground?
  - How to link it to theory?
  - How to combine it with (PhD) research?

‘I struggle and will surface’



Purpose of this workshop

- All partners get to know each other
- Get substantive input from partners
- Help students to make choices & find their unique focus
  - angle, conceptual emphasis, academic debate
  - we need 11 different projects owned by students
- Create good conditions for field work
- Discuss programme level issues

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Programme in brief

- Day 1:
  - Getting to know each other
  - Introduction to the programme
- Day 2:
  - PhD students present and get constructive feedback
  - Inaugural lecture on 'responsible innovation'
- Day 3:
  - General observations and implications
  - Supervisory teams & PhD students (on proposals, practical issues)
  - Business meeting on programme level issues

Partners & some special people

- INREF: Interdisciplinary Research and Education Fund (INREF)
  - Erik Frederiks & Lesley Janssens

Prof. Peter Feindt

co-leader

Dr. Katarzyna Cieslik

postdoc

Vera Mentzel

financial manager

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International Agricultural Research partners / PhD employers

- The International Institute of Tropical Agriculture (IITA)
  - Marc Schut (and Laurence Jasogne)
- International Livestock Research Institute (ILRI)
  - Catherine Pfeiffer (and Barbara Wieland)

International Agricultural Research partners / PhD employers

- International Potato Centre (CIP)
  - Elmar Schulte-Geldermann
- Forum for Agricultural Research in Africa (FARA)

  Oluwole Fatunbi (and Augustin Kouevi)
- CGIAR Research Programs on:
  - Integrated Systems for the Humid Tropics
  - Roots Tubers and Bananas

Country-based partners / PhD employers

- College of Medicine and Health Sciences, School of Medicine - University of Rwanda
  - Marie Chantal Ingabire (and Leon Mutesa)
- Kumasi Institute of Technology, Energy and Environment (KITE)
  - Ishmael Edjekumhene

Country-based partners / PhD employers

- MDF Training & Consultancy (West Africa wing)
    - Richard Yeboah
- Veterinary Services Kenya (not represented)

Other partners / sponsors

- Grameen Foundation
  - Esi Sekyiamah (and Whitney Gantt)
- Technical Centre for Agricultural and Rural Cooperation (CTA)
  - Ken Lohento

Other partners / sponsors

- Foundation for Sustainable Development (FSD, not represented)
- Integrated Water & Agricultural Development Ghana LTD. (IWAD, not represented)

Wageningen University Chairgroups

- Strategic Communication
- Earth System Science
- Environmental Systems Analysis
- Public Administration and Policy
- Resource Ecology
- Laboratory of Entomology
- Laboratory for geo-information science and remote sensing (GRS)
- Centre for Crop Systems Analysis
- Knowledge, Technology and Innovation

Getting to know each other via rotating tables

Five tables WU staff & PhDs	**Five pairs rotating over tables**
1. Tick control case, Kenya	Catherine Pfeiffer (ILRI) Ken Lohento (CTA)
2. Sustainable intensification case, Ghana	Marc Schut (IITA) Esi Sekyiamah (Grameen)
3. Water nexus case, Ghana	Ishmael Edjekumhene (KITE) Richard Yeboah (MDF)
4. Potato diseases case, Ethiopia	Elmar Schulte-Geldermann (CIP) ???? (CTA)
5. Malaria mosquito radar, Rwanda	Marie Chantal Ingabire (University of Rwanda) Oluwole Fantunbi (FARA)

Let’s make this an inspiring programme!

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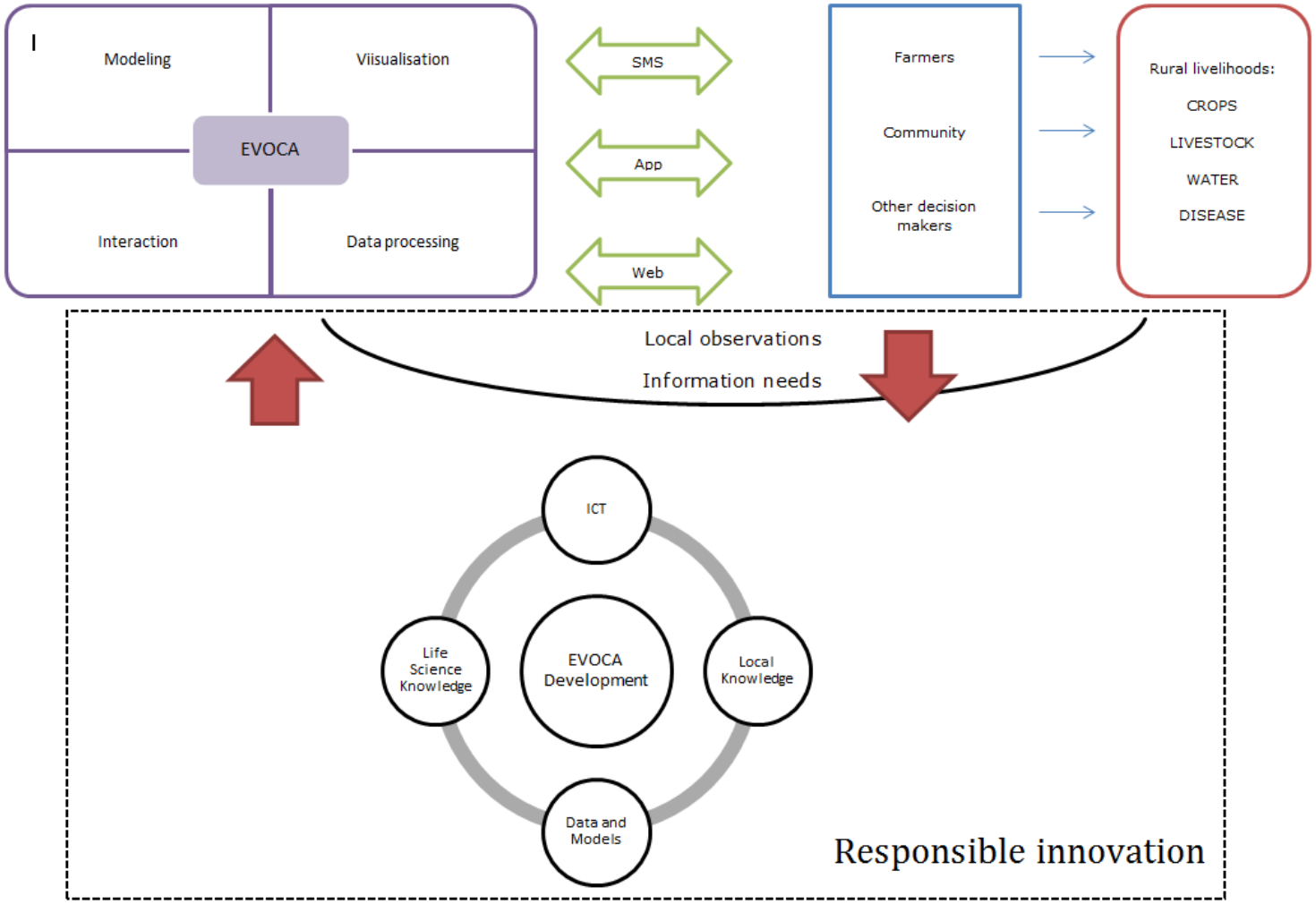
Mindmap EVOCA



Sub Research Questions

- Technology characteristics: What capabilities of digital technology (real-time access, crowdsourcing of data, personalisation, social media integration, etc.) are most significant and promising?

- Design choices: What combinations of life-science knowledge, technology and social organisation are effective to address development challenges?

- Innovation context: How are design choices enabled or constrained by the broader societal and innovation support environment in which the EVOCA is embedded?

Sub Research questions

- Impact: How does the use of EVOCAs affect crop, water, livestock and disease management in the experimental pilots, and what are intended and unintended outcomes?

- Responsible innovation: What is the contribution of responsible innovation methods and principles in different stages of design / different degrees of technology readiness?

Core objectives

1. to develop and apply a design framework for responsible digital innovations for development
2. to develop promising participatory virtual platforms and digital applications for resource management in African rural communities
3. to study the systemic conditions for the successful embedding of such innovations in development contexts
4. to compare five cases and draw lessons for successful digital innovations for connective action in crop, water, livestock and disease management
5. to assess how digital applications depend on and/or change innovation and research for development R4D systems

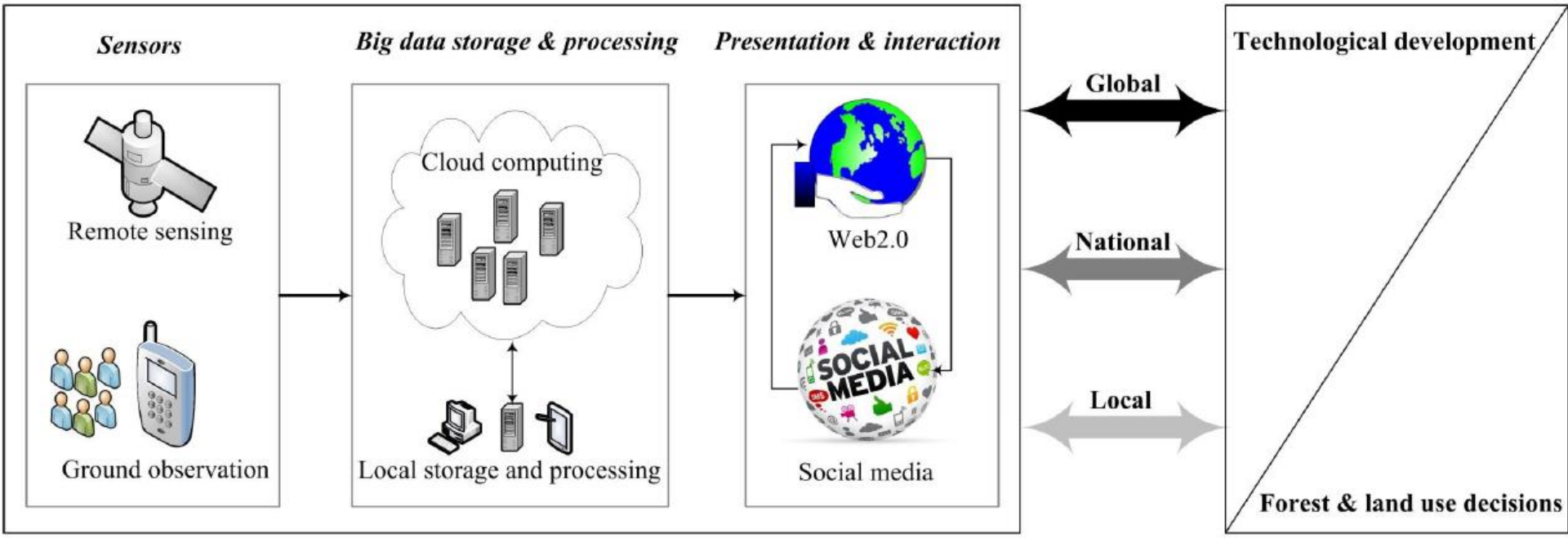
Important questions to consider in the responsible design of EVOCA

Product questions	Process questions	Purpose questions
How will the risks and benefits be distributed?	How should standards be drawn up and applied?	Why are researchers doing it?
What other impacts can we anticipate?	How should risks and benefits be defined and measured?	Are these motivations transparent and in the public interest?
How might these change in the future?	Who is in control?	Who will benefit?
What don't we know about?	Who is taking part?	What are they going to gain?
What might we never know about?	Who will take responsibility if things go wrong? How do we know we are right?	What are the alternatives?

- Dealing with such questions requires:
  - anticipation, reflexivity, inclusion, responsiveness

Four dimensions of process design are central to responsible innovation

- *Anticipation* of potential consequences of the innovation
- *Reflexivity* on values and assumptions underlying design choices
- *Inclusion* of relevant parties and viewpoints
- *Responsiveness* to changing societal demands and concerns


Sensors
Big data storage & processing
Presentation & interaction
Remote sensing
Ground observation
Cloud computing
Local storage and processing
Web2.0
SOCIAL MEDIA
Social media
Global
National
Local
Technological development
Forest & land use decisions

1 programme, 11 projects?

- The overall programme document contains common elements:
  - key concepts and ideas relevant to all
  - overarching research questions
  - interdisciplinary & transdisciplinary orientation
  - action orientation
  - communication with stakeholders

1 programme, 11 projects?

- Common building blocks per case, e.g.:
  - Socio-technical diagnosis
  - Assessment of existing information, knowledge & communication landscape
  - Interactive design and prototyping of EVOCA
  - Piloting and further design of EVOCA
  - Studying consequences

1 programme, 11 projects?

- However, the programme and case proposals are not meant to be a straitjacket!

- Each student must find his/her own unique emphasis, angle, selection, conceptual framing, academic debate, etc.

- Moreover, starting points will be very different:
  - The nature of the issue and context at hand
  - Stakeholder networks that we can link with
  - 'Technology readiness'
  - Etc.

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1 programme, 11 projects?

- For sure some things will ‘fail’ miserably in your project
    - an opportunity for asking new research questions! E.g: Why and for whom did it ‘fail’?
- So even if an ICT-based EVOCA never gets off the ground, you can do very interesting work!
- Answering questions at programme level is the task of the supervisors!