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Linking East and West African farming systems experience into a BELT of sustainable intensification

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INNOVAFRICA
Food security through smallholder adaptability

EU H2020 PROJECT
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Linking East and West African farming systems experience into a BELT of sustainable intensification

EWA-BELT in numbers…..

- Funds: H2020 - Sustainable Intensification in Africa
- Project budget: ~ 7,500,000 Euros
- Coordinator: NRD-UNISS - Italy (https://en.uniss.it/nrd)
- Starting date: 1 October 2020 (48 months)
- 20 partners (8 EU + 12 Africa)
- 38 case study areas in six African countries

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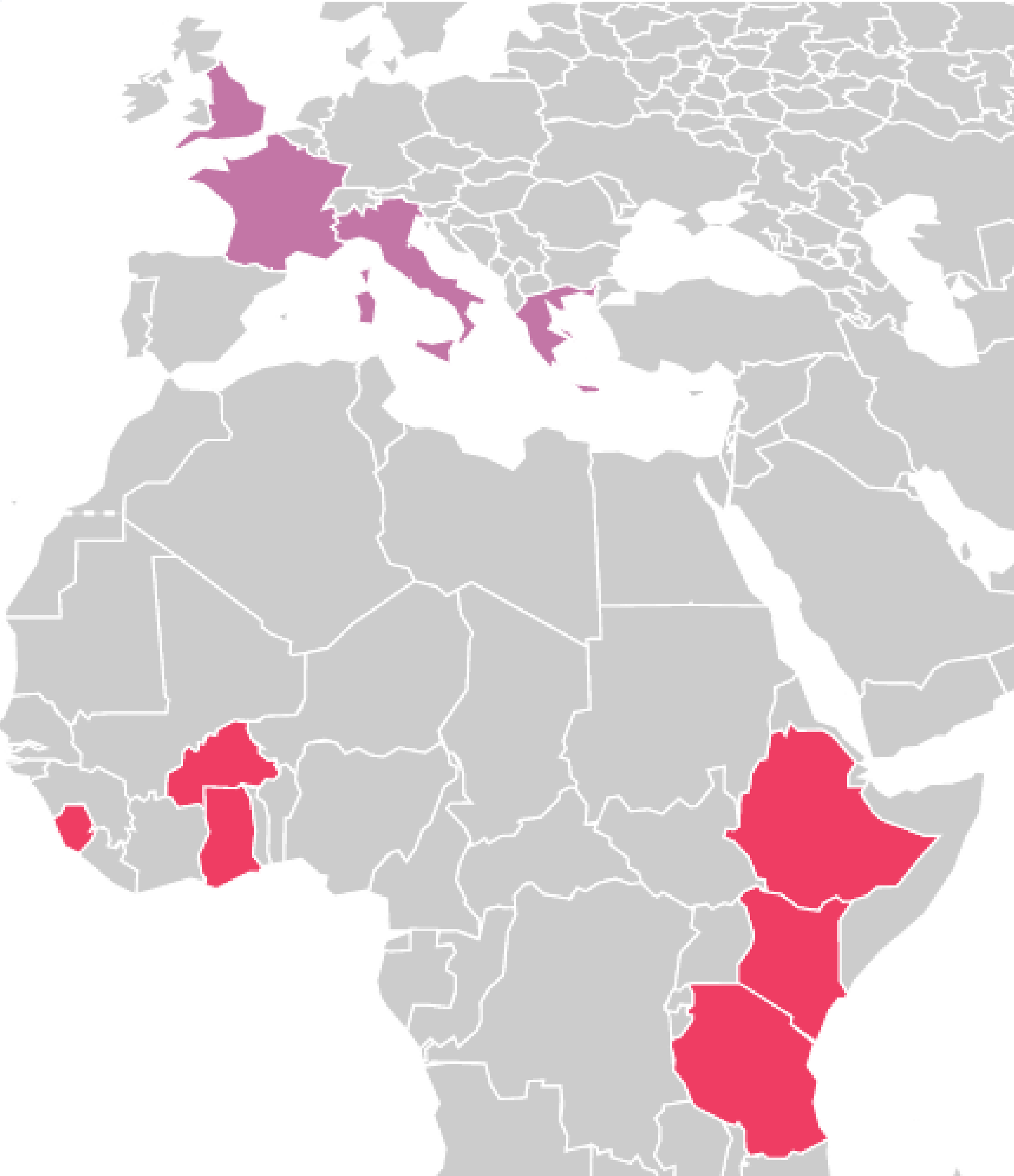

Consortium

20 partners (8 EU + 12 Africa)

Research and Academic institutions

Five from *EU*

- Italy-UNISS
- France-IRD and CIRAD
- Greece-AUTH
- UK-CRAN

Four from *West Africa Region*

- Burkina Faso-UNB and INERA
- Ghana-CSIR-SARI
- Sierra Leone-UNIMAK

Seven from *East Africa Region*

- Ethiopia-HU and JU
- Kenya-UoN, KALRO and ICRAF
- Tanzania-NM-AIST and TARI

Two **NGOs** (Italy-ACRA and OCCAM)
Two **Private companies** (Italy-ST and Ghana-KDC)

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Overall objective

To develop food production systems promoting Sustainable Intensification in representative farming systems of different agro-climatic areas of East and West Africa through integrated participative researches and innovative ICT tools

and

to realize an interregional African "belt" able to promote SI by assessing and exchanging best practices and experiences among different contexts

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The concept of «Sustainable Intensification»

Production systems and crop management technologies that **increase productivity without adverse effects**:

- protecting natural resources
- enhancing climate change resilience and input-use efficiency
- enabling an environment so farmers can competitively participate in markets
- eco-friendly reducing in pre- and post-harvest losses from abiotic and biotic stresses
- conserving and sustainably using plant genetic resources for development of improved crop varieties and their deployment through pro-smallholder seed systems

(FAO definition)

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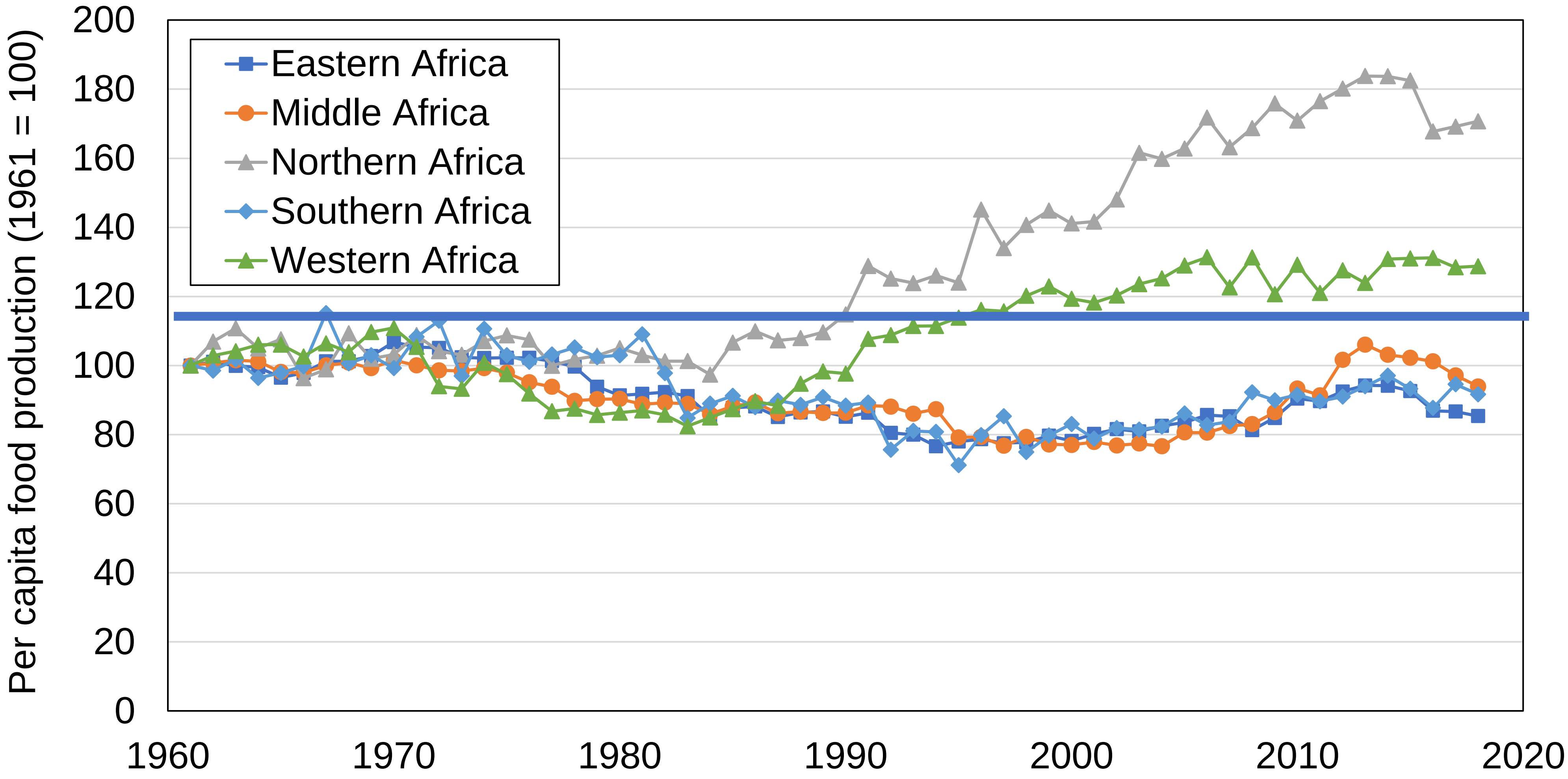
Why Sustainable Intensification in Africa?



Food and Agriculture Organization of the United Nations. FAOSTAT Statistical Database: FAO, 2020.

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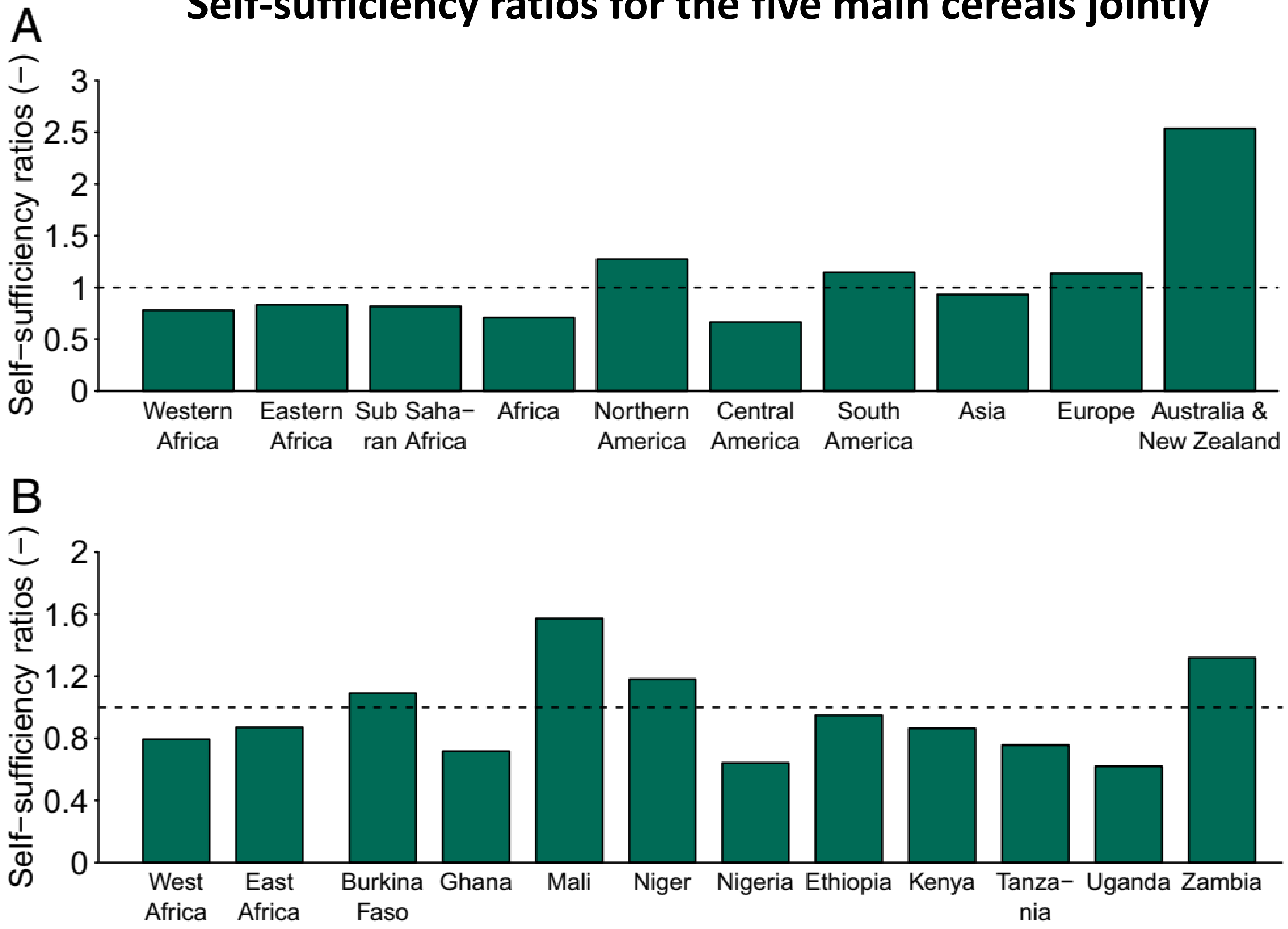
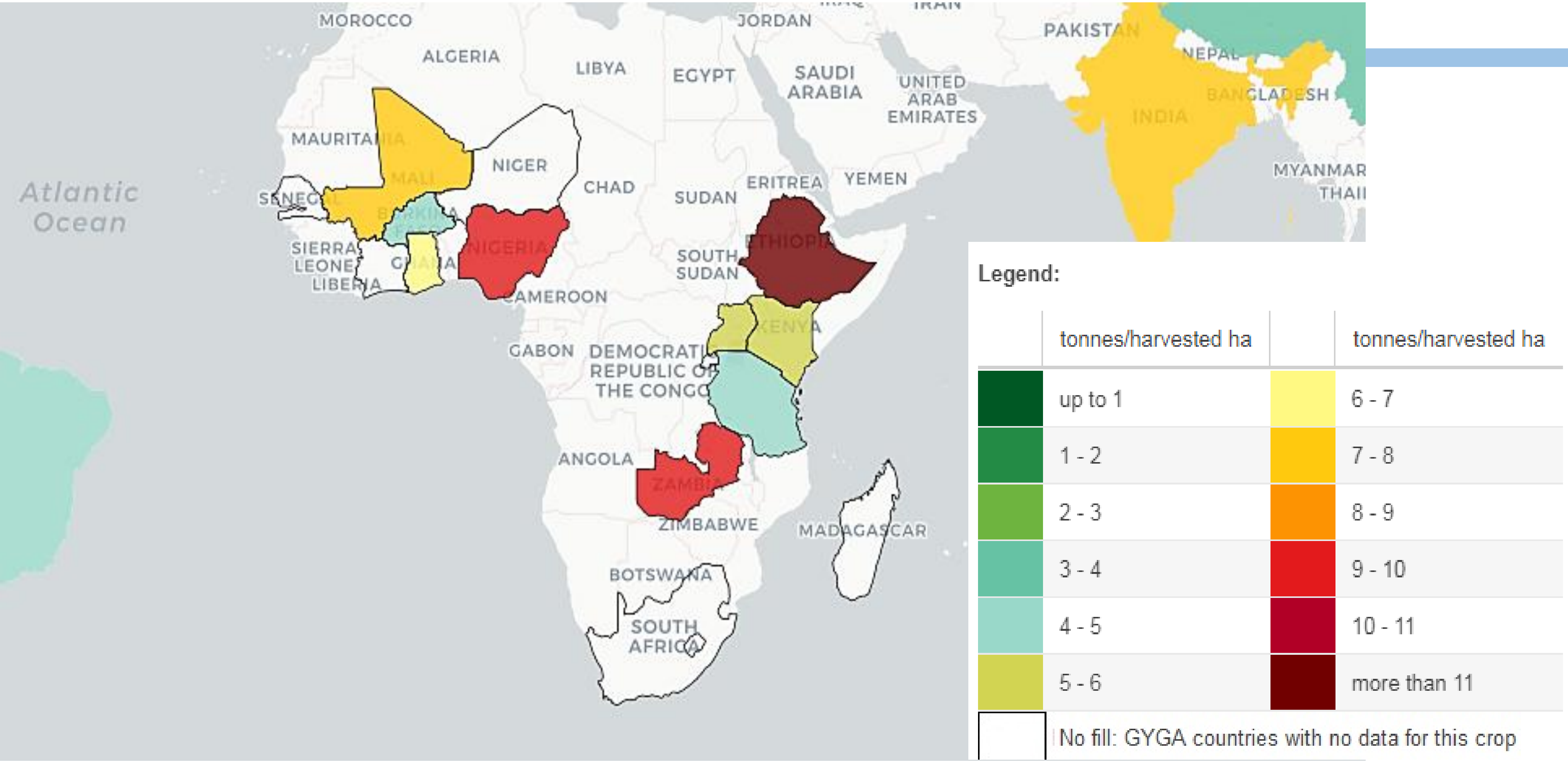
Why Sustainable Intensification in Africa?

Self-sufficiency ratios for the five main cereals jointly



van Ittersum et al., 2016, PNAS, 113, 14964–14969

Rainfed maize yield gap



Source: Global Yield Gap, www.yieldgap.org

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Sustainable intensification: the scientific debate

Food Sec. (2015) 7:199–208
DOI 10.1007/s12571-015-0424-2

ORIGINAL PAPER

The debate over sustainable intensification

H. Charles J. Godfray

Available online at www.sciencedirect.com
ScienceDirect
ELSEVIER
Current Opinion in Environmental Sustainability

Deconstructing and unpacking scientific controversies in intensification and sustainability: why the tensions in concepts and values?

PC Struik[1], TW Kuyper[2], L Brussaard[2] and C Leeuwis[3]

CrossMark

Available online at www.sciencedirect.com
ScienceDirect
ELSEVIER

Epilogue: global food security, rhetoric, and the sustainable intensification debate

Thomas W Kuyper[1] and Paul C Struik[2]

Current Opinion in Environmental Sustainability

Ecological Indicators 74 (2017) 73–97
Contents lists available at ScienceDirect
ELSEVIER
Ecological Indicators
journal homepage: www.elsevier.com/locate/ecolind

Review

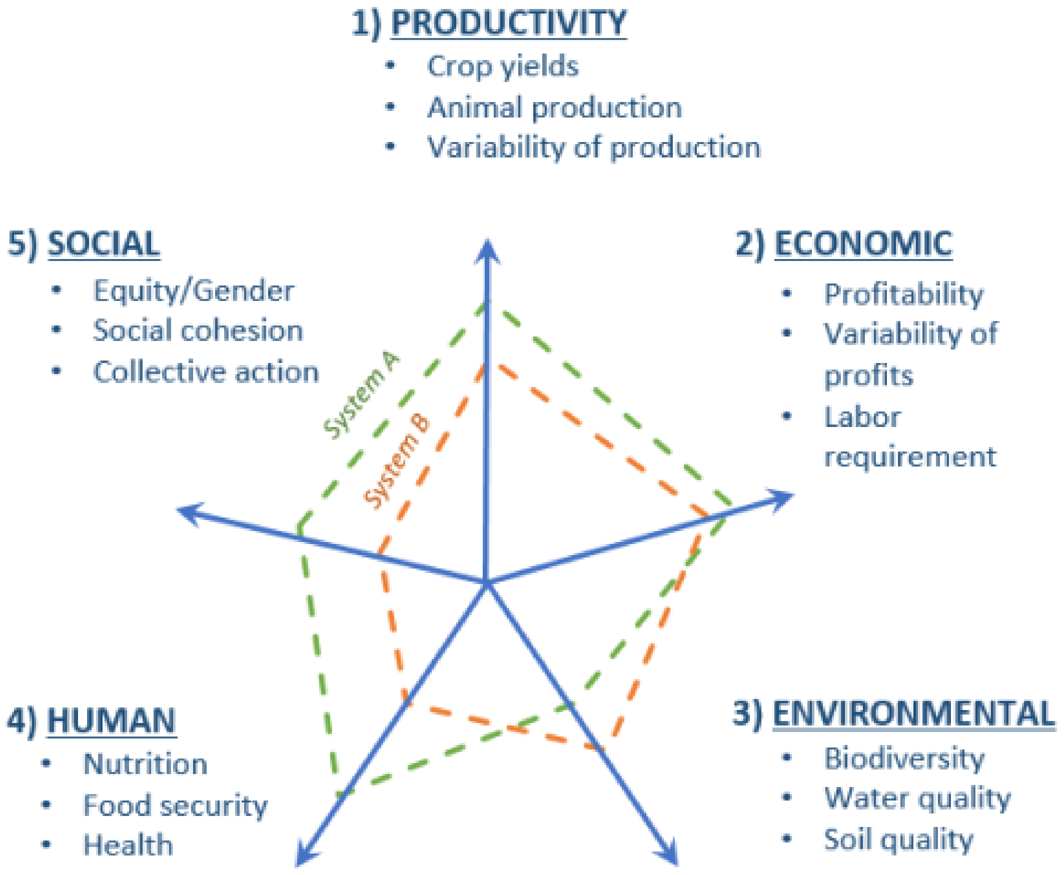
Sustainable intensification – “oxymoron” or “third-way”? A systematic review

CrossMark

Niamh Mahon[a], Ian Crute[b], Eunice Simmons[c], Md. Mofakkarul Islam[d,*]

Sustainable intensification: the scientific debate!

- What SI really means?
- How it might be measured and implemented?
- What indicators and methodologies can be used to monitor and assess whether SI has been achieved?



Musumba et al., 2017. Guide for the SI Assessment Framework. Feed the Future. The US Government's Global Hunger & Food Security Initiative

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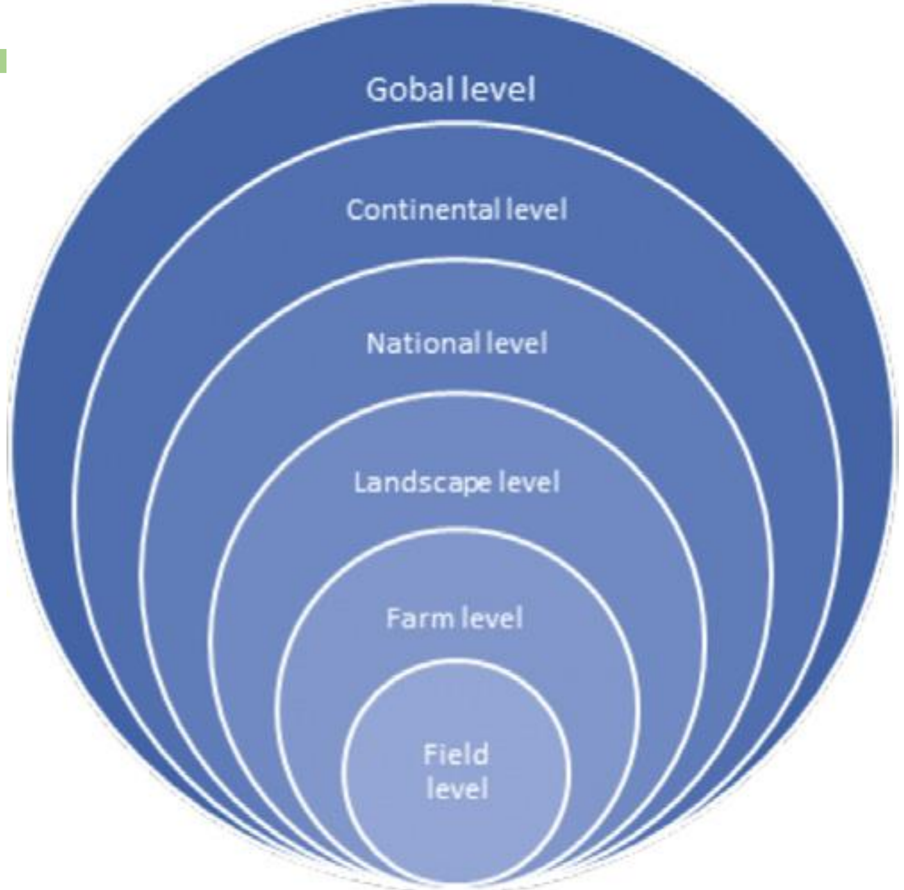
Sustainable intensification: the scientific debate

- Are practices specified as SI can be applied to all types of agriculture?

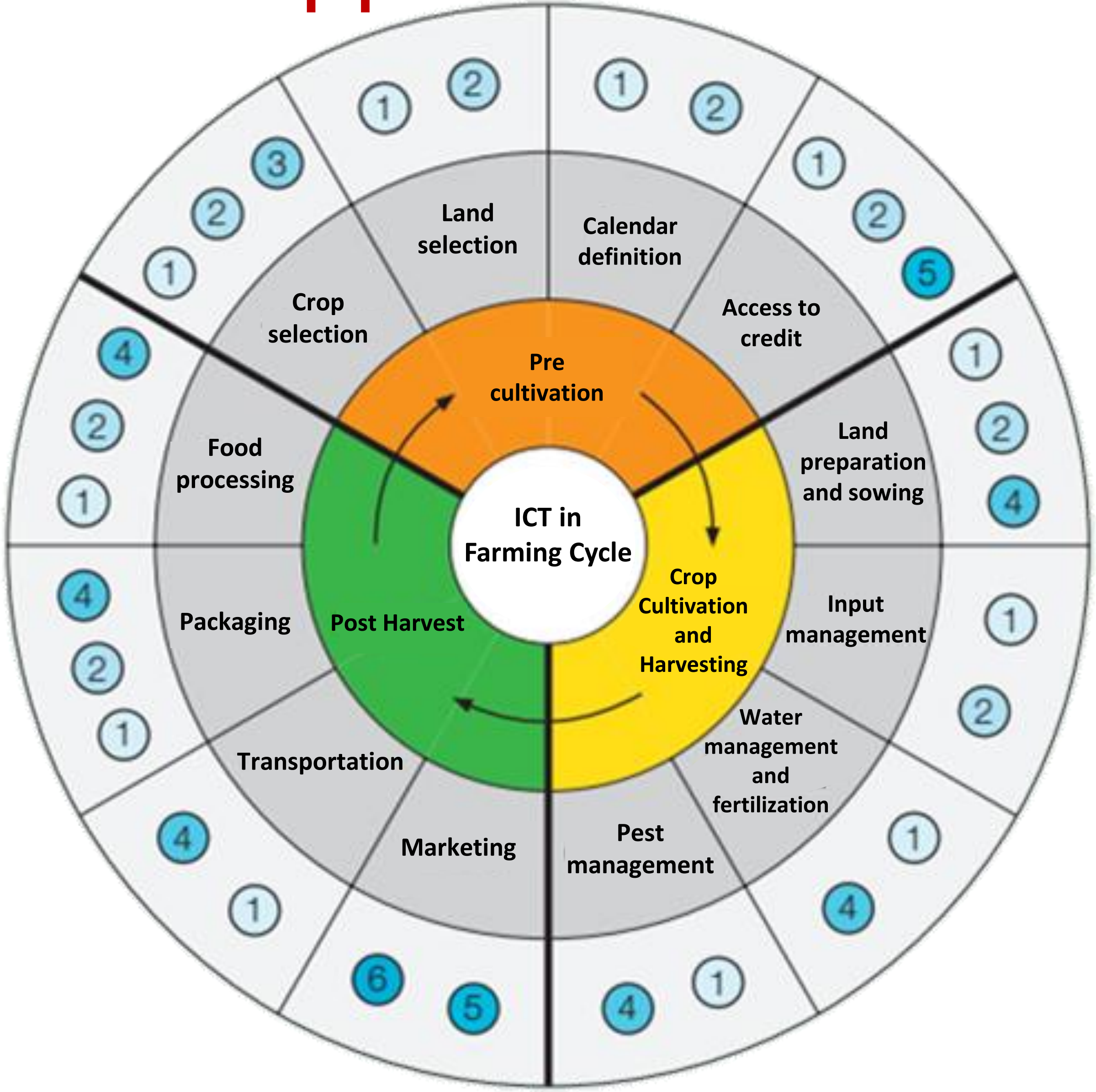
- What the potential trade-offs associated with SI implementation might be and how these should be quantified?

The scale matters!



Mahon et al., 2016. Ecological Indicators 74, 73–97.

ICT approaches for SI in African agriculture



1. Information systems including DSS/MISS/GIS etc
2. ICT-enabled learning and knowledge exchange
3. Modelling solutions
4. Sensory and proximity devices
5. ICT-enabled networking solutions
6. Online commerce tools (eCommerce/mCommerce)

Source: Zyl, Omri Van; Alexander, Trish; Graaf, Liezl De; Mukherjee, Kamal. 2014. ICTs for Agriculture in Africa. World Bank, Washington, DC. © World Bank. https://openknowledge.worldbank.org/handle/10986/19032 License: CC BY 3.0 IGO.”

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ICT approaches in EWA-BELT

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Farmers Field Research Units

Co-learning spaces (physical or virtual), where research, restoration, innovation, demonstration, SI education, extension and capacity building are realized and implemented

1. Information systems including DSS/MISS/GIS etc
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ICT approaches in EWA-BELT:
Farmers Field Research Units

Neglected and Underutilized crop Species

Coccinia abyssinica

Intercropping

Conservation agriculture

Land recovery of abandoned land

Integrated soil fertility management

Agroforestry

Integrated water management

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ICT approaches in EWA-BELT

1. Information systems including DSS/MISS/GIS etc
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PLANTHEAD network

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ICT approaches in EWA-BELT:

PLANTHEAD (PlantHealth Diagnostic) Network

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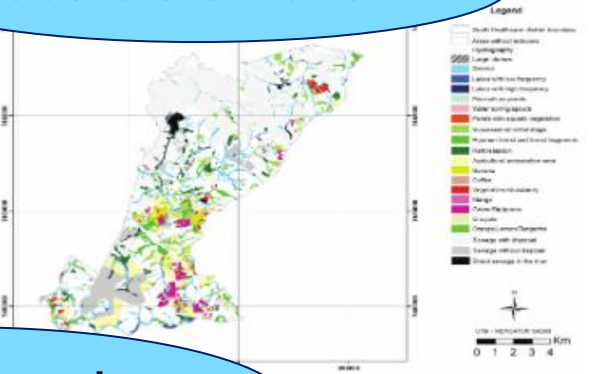
Level 3 (university or international research center)

Level 2 (local university or national research center)

Level 1 (local extension service)

Photographic database and AI-machine learning

Georeferentiation



Diagnosis and suggested therapy

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ICT approaches in EWA-BELT

1. Information systems including DSS/MISS/GIS etc
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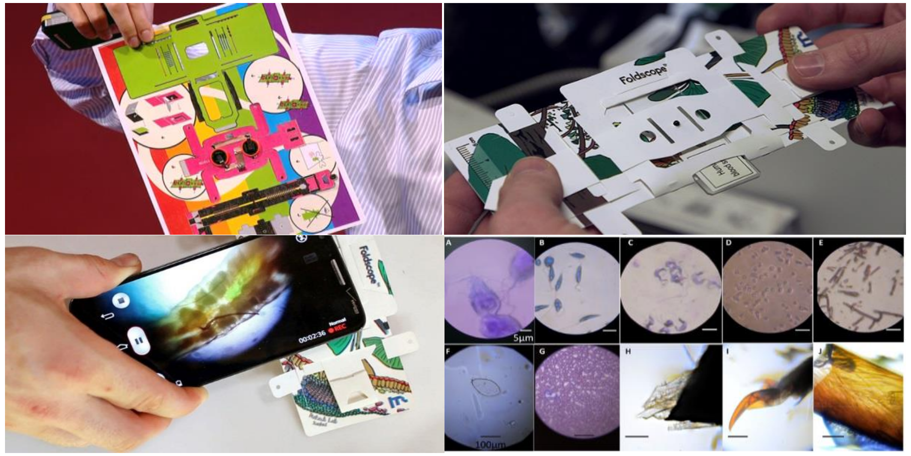
ICT-based tools for detection and quantification of plant pests and pathogens



Foldscope® (https://www.foldscope.com/), a low cost (one dollar) paper microscope

Q3 system Lab-on-chip quantitative real-time Polymerase Chain Reaction (ST Microelectronics)

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ICT approaches in EWA-BELT

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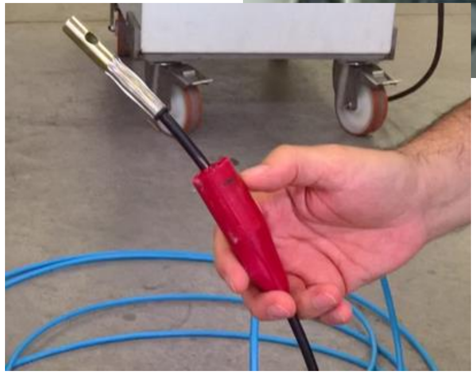
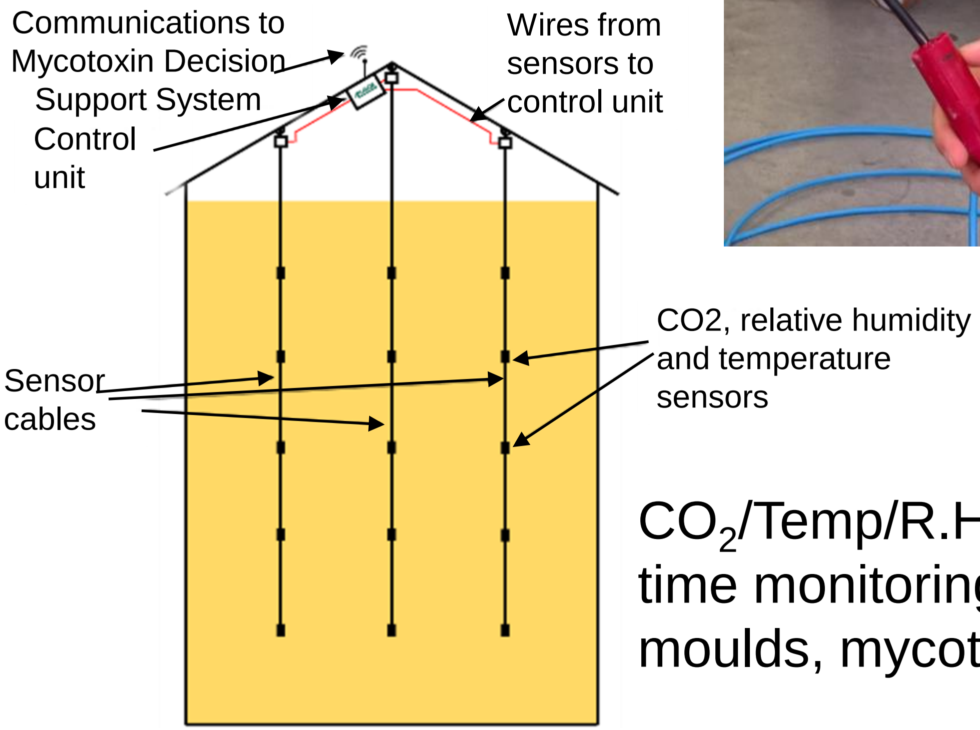
Real time CO_2 monitoring in grain silos to minimise mycotoxin contamination





CO_2/Temp/R.H. sensors for real time monitoring to minimize moulds, mycotoxins and pests

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