

Cultivating Connections: A Sociological Exploration of Tissue Culture and Participatory Crop Varietal Selections at the CSIR-CRI.

Joyce Koranteng-Acquah and Sabina Leonelli; jk677@exeter.ac.uk, S.Leonelli@Exeter.ac.uk.
University of Exeter, UK & Technical University of Munich, Germany.

Background

- ❖ Crop science in Ghana is a collaborative endeavour involving scientists, agriculture extension officers and farmers.
- ❖ **Tissue culture (TC)** is a laboratory technique in agriculture that facilitates propagation of plant tissues outside their natural environment under sterile conditions.
- ❖ **Participatory crop varietal selection (PCVS)** entails actively involving farmers in the process of selecting and evaluating crop varieties.

How can these two distinct approaches complement each other to enhance plant breeding and agriculture development efforts?

The CSIR-Crops Research Institute

- ❖ CRI is the largest of the thirteen institutes under the Council for Scientific and Industrial Research.
- ❖ It conducts research on cereals, legumes, root and tuber crops, vegetables, fruits, among others.
- ❖ CRI focus on developing high-yielding, disease-resistant, and climate-smart crop varieties suited to Ghana's agro-ecological zones.
- ❖ Addresses agricultural challenges and provides technical assistance, training and extension services to farmers and extension officers, contributing to Ghana's food security and agricultural development (CRI, 2023,2024).

What are the socio-economic and cultural impacts of TC on local communities and agricultural traditions?

Does PCVS enhance collaboration among scientists, agriculture extension officers, and farmers?

What are the implications of these practices?

Methodology

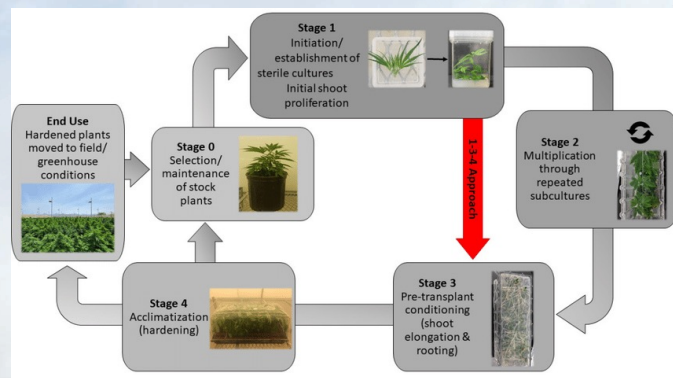
- ❖ Data Collection
 - Participant observation at the CSIR-CRI at Fumesua, Kumasi-Ghana.
 - Conducted interviews with scientists, technicians and administrators.
- ❖ Data Analysis
 - Systematic interpretation to explore sociological dynamics of scientific practices and impact on agricultural innovation and collaboration.

References

- CRI in Brief, (2023). <https://cropsresearch.org/building-resilience-csir-cri-ricowas-workshop-equips-stakeholders-for-climate-smart-agriculture/>. Accessed on April 2024.
- (2023). <https://cropsresearch.org/nurturing-nature-to-tame-nature-csir-cri-introduces-crop-officers-and-farmers-to-bioagents-in-the-battle-against-fall-armyworms/>. Accessed on April 2024.
- (2024). <https://cropsresearch.org/towards-advancing-crop-production-csir-crops-research-institute-signs-mou-with-nana-otukwa-vi-anidaso-farmers-association/>. Accessed on April 2024.
- Leonelli, S. (2022). How Data Cross Borders: Globalizing Plant Knowledge through Transnational Data Management and Its Epistemic Economy. In: Krige, J (ed) *Knowledge Flows in a Global Age: A Transnational Approach*. Chicago, IL: University of Chicago Press, pp. 305-343.
- Leonelli, S. (2024, in press). Globalising plant knowledge beyond bioprospecting? *History of Anthropology Review*. <https://histanthro.org/tag/ethnoscience/>.
- Monthony, A.S., Page, S.R., Hesami, M. & Jones, A.M.P. (2021). The Past, Present, and Future of Cannabis sativa Tissue Culture. *Plants*, 10, 185. <https://doi.org/10.3390/plants10010185>.
- Williamson, H. & Leonelli, S. (eds.) (2022) *Towards Responsible Plant Data Linkage: Data Challenges for Agricultural Research and Development*. Cham: Springer Open Access.

Acknowledgements

This project has received funding from the European Research Council (ERC) under the European Union's Horizon 2020 research and innovation programme (grant agreement No. 101001145).



Tissue culture process, Monthony et al., 2021

TC Dynamics: Intersecting Tradition and Innovation

- ❖ TC technology alters traditional farming practices by introducing new methods of crop propagation and management.
- ❖ It is particularly useful for mass propagation of plants with desirable traits, such as disease resistance, high yield, or specific biochemical properties.
- ❖ While TC is valuable for the rapid multiplication of selected plant material, it is often criticized for its high cost and the potential loss of genetic diversity compared to traditional breeding methods.
- ❖ Challenges in integrating tissue culture methods into traditional farming systems include limited resources, technical expertise and cultural resistance.

Can TC technology exacerbate inequalities among farmers based on socio-economic status or access to technology?

Engaging Farmers in the Selection of Indigenous Leafy Plant Varieties at Kwadaso-CRI



A Shift Towards Co-Production

PCVS holds significant importance for crop research in several ways:

- ❖ Improved adoption rate of newly developed crop varieties.
- ❖ Enhanced relevance--varieties align with farmers' preference and local condition.
- ❖ Increased sustainability.
- ❖ Knowledge exchange and capacity building.
- ❖ Builds trust and strengthen partnerships between CRI and local communities.

While PCVS empowers farmers and enhances their engagement and adoption rates, some of its findings remain in tension with scientific research methods, evaluative criteria and breeding objectives.

