# ICT, Agricultural Development and Environmental Justice


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## Introduction

Within the context of accelerating **ecological crises** and **technological change**, information and communication technologies - **ICTs have the potential to transform decision-making in environmental management**. While there are opportunities for strengthening participatory processes in data collection and information access, the **dangers of emerging ICT-centered environmental monitoring are profound**. One risk is the ossification of already deep divides in access to and control over natural resources. We **focus on data sovereignty and decision-making criteria** embedded within nontransparent systems, specifically in the use of ICTs in **data collection for agricultural development, often ostensibly within a narrative of environmental sustainability.**

### Global Environmental Monitoring: Soil as Matrix

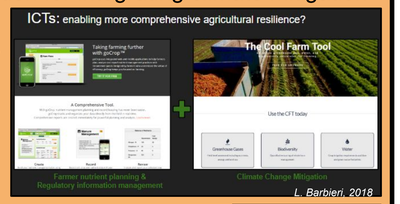
**All of the complexities of modern politics, power, and technology are evident in the way soil information is assembled, how, by whom, and for what purpose.**

*L. Barbieri, 2018*

Soil is a flashpoint for governance, as soil management is a (deep) subset of land management. Soil information is an expression of what humans know about land, the consequences of their actions on it, as well as tacit relationships with each other; who is 'allowed' to do what on the land.

## Projects laying the groundwork for soil & agricultural data hyperconnectivity in an AI era

**goCrop:** Desktop and mobile app for nutrient management planning. Created by University of Vermont Extension for farmers to input data for creating a nutrient management plan. There is current consideration for integrating climate mitigation into goCrop to enable more comprehensive agricultural & environmental decision-making. *http://gocrop.com/ & https://coolfarmtool.org/*




**GlobalSoilMap:** Global effort to create a new digital soil map using state-of-the-art & emerging technologies for predicting soil properties. *http://globalsoilmap.net/*

**Africa Soil Information Service:** $18 million grant from Gates Foundation and Alliance for a Green Revolution in Africa (AGRA) to map soils of Africa South of the Sahara and make all data publicly available. *http://africasoils.net/*

**Ethiopia Soil Information Service:** Country-wide digital soil mapping effort to develop site specific fertilizer recommendations undertaken by the Ethiopian Agricultural Transformation Agency. *http://www.ata.gov.et/*

***Example problems we've encountered within these projects:***
Privacy and data sharing concerns; farmer pushback, *e.g.* may be comfortable with planning tools but not with the potential for regulatory use; technology and knowledge access, implications for land ownership and land tenure.

## What social-ecological challenges are ICTs employed to solve?

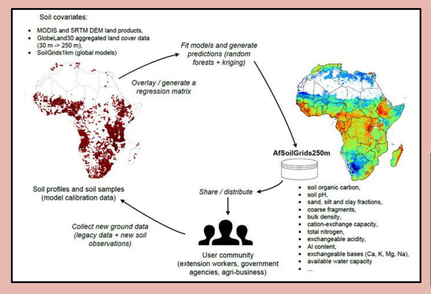
*Production -- Adaptation -- Mitigation -- Resilience -- Efficiency -- Conservation -- Participation*

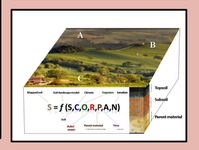
**While ICT creates new opportunities for sustainability, there are many ways in which it can be problematic.**

**Natural resource extraction:** Accelerating on massive scales, while leveraging computerized operations, sophisticated equipment and robotics (e.g. precision agriculture; shale oil & gas hydraulic fracturing; logging industry). **Here we propose that ICTs can fall along two potential axes of tension by enabling:** (1) further exploitative resource extraction ←→ efficient use of resources, effective conservation (2) deep inequities in resource access, control, & decision-making ←→ increased access and participation in information generation and use.

This leads to **broader questions of information systems in the context of global sustainable development:** Sacrifice Zones, global land grab / data grab as a form of dispossession, whereby users lose control of the data they generate (Fraser, 2018).

*"Information and communication have always mattered in agriculture. Ever since people have grown crops, raised livestock, and caught fish, they have sought information from one another."* (World Bank, 2017)




### Key points in the data life cycle:

1. Data collection and fieldwork
2. Data management, curation, and use / access / sharing
3. Creation of ontologies

## Through the lens of global environmental justice: Data as the 'new soil'

*Environmental Justice: "Equitable distribution of environmental risks and benefits; fair and meaningful participation in environmental decision-making; recognition of ways of life, local knowledge, and cultural difference; capability of communities and individuals to function and flourish" (Schlosberg 2007).*

**Deciding what to measure** is a formative act in the construction of environmental monitoring systems, setting the foundation for future systems.

Environmental measurement and monitoring feed into existing paradigms dealing with **global resources and highly concentrated decision-making** (*e.g.* Sustainable Development Goals).

The **local and regulatory context is important** e.g. private land ownership and land rights issues. What protections are in place around the world?

**Within interlinked systems much can be extrapolated** and people with information access can make decisions based on connected knowledge, which can exacerbate already unjust power dynamics.

**Data Concerns, Environmental Justice Concerns:** ***Data as 'cash crop'*** that can be mined for information (e.g. soil mapping for land & real estate grabs) to identify valuable areas for agriculture and resource control. ***Data sovereignty:*** "'Data grab' as a component of 'land grabs' in the 'global south'" (Fraser 2018).

**Environmental justice within ICT: How can we do the least damage and support concerns about data sovereignty?**

Barbieri and Ahamed are continuing this work, drawing from their interdisciplinary research experience and professional networks. Please get in touch!


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*Image sources: http://www.ata.gov.et/download/, http://africasoils.net/, https://www.slideshare.net/FAOoftheUN/digital-soil-mappingcapacity-building-course-introduction, https://www.fiedler.company/en/solutions/environmental-monitoring/monitoring-soil-humidity-and-temperatures*

*background photos, L. Barbieri*