Digitizing Agriculture

Sustainable Development Discourse of Big Data Agriculture in California and India

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Background

In what ways does new technology adoption further or inhibit sustainable development?

- ❖ The proposed **Fourth Industrial Revolution** promises radical societal changes as a result of emerging technologies such as artificial intelligence, 3D printing, and advanced biological synthesis.[1]
  - ➢ **Big Data**, one such technology, is the collection of extremely large data sets in order to optimize efficiency and make informed decisions.
- ❖ **Sustainable development** links human rights with economic growth and environmental preservation as described in a set of goals outlined in the UN's 2015 report *Transforming Our World*.[2]
  - ➢ **Technology** is the main driver for economic growth and is a way to meet many of the sustainable development goals. However, there are bound to be drawbacks to any technology.[3]
- ❖ **Modern agriculture** presents an interesting intersection of sustainable development issues and big data technologies that are already being implemented in farms around the world.

To what extent are sustainable development goals addressed by big data agriculture companies in California and India?

Situated Context

Global Investment: Number of Deals per Country

0 — 416

Location of global AgTech investment[4]
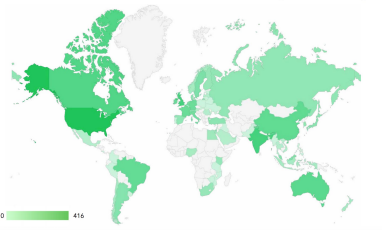
> "Providing actionable insights into crop production will ensure global food security for future generations"
> *Vinsight - Mountain View, CA*

California
- ❖ Global leader for AgTech development and investment
  - ➢ Focus on bio and data technologies[4]
- ❖ 1% of employment in agriculture
  - ➢ Greater emphasis on industrial and single crop farming

India
- ❖ Significant AgTech investment
  - ➢ Focus on supply chain and distribution technologies[4]
- ❖ 50% of employment in agriculture
  - ➢ Greater emphasis on small and diverse farms

Methods

1. Used Crunchbase database to find information on Ag Data companies in California and India. Conducted **statistical analysis**.
2. **Content analysis** for websites of 17 Ag Data companies in California and 7 in India for expressions of UN's sustainable development goals. Analyzed all main webpages that expressed values.
3. **Discourse analysis** of select company websites and promotional material: Climate Corporation (San Francisco, CA) and CropIn Technologies (Bengaluru, India).

Results

California

Top sustainable development values expressed by California-based Ag Data Companies

Common words in value expression of California-based Ag Data Companies

Bringing Silicon Valley to the Farm

Selected screenshots from The Climate Corporation website. Demonstrates humanizing technology and the prevalence of tech company culture and values.

India

Top sustainable development values expressed by India-based Ag Data Companies

Common words in value expression of India-based Ag Data Companies

INCREASE EFFICIENCY. SCALE PRODUCTIVITY. STRENGTHEN SUSTAINABILITY.

Selected screenshots from CropIn website. Demonstrates difficulty in defining sustainability and measuring impacts

Discussion

- ❖ Primary advertised **benefits**: increased profits, decreased pesticides and water use, investments for technological progress and decreased labor costs.
- ❖ **Equity** concerns
  - ➢ Will big data serve to further divide farmers by size and resource access?

"The cost of data collection, processing, and information delivery must be drastically reduced so that the benefits...can accrue even to the smallest farmers"
Slantrange - San Diego, CA

- ❖ **Labor** concerns
  - ➢ How will labor conditions change with increased automation? Especially in the context of India's high agricultural employment?

"Due to mass urbanization, getting an agriculture labour is big challenge"
Avanijal Agri Automation - Bengaluru, India

- ❖ **Data Security** concerns
- ❖ Key differences between California and India:
  - ➢ Values correspond to differences in sustainable development issues in each location
  - ➢ Focus on technology advances vs. telling a story about farmers
  - ➢ Big data can be a useful tool in either location, but depends on farm specific variables

Implications

Ag data is a useful tool that may help nations meet sustainable development goals, but it is not without drawbacks as expressed above. Farmers, scientists, governments, and businesses could all take steps to better promote responsible, proactive technology adoption. These concerns and actions extend to many forthcoming technologies, particularly in the context of the Fourth Industrial Revolution.

Selected References

1. Schwab, Klaus. 2017. *The Fourth Industrial Revolution*. Crown Publishing Group.
2. "Transforming Our World: The 2030 Agenda for Sustainable Development." 2015. United Nations.
3. Sachs, Jeffrey D. 2015. *The Age of Sustainable Development*. Columbia University Press.
4. "AgFunder AgriFood Tech Investing Report - 2017." 2018. AgFunder.