



October 22-23, 2021

Study Group : Sustainable Agricultural Mechanization in Africa
Some reflections

Josse De Baerdemaeker

Agricultural Mechanization and the Evolution of Farming Systems in Sub-Saharan Africa



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A World Bank Publication

1987 The International Bank for Reconstruction
and Development / THE WORLD BANK
1818 H Street, N.W., Washington, D.C. 20433,
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<i>10 Prospects for Tractorization in Sub-Saharan Africa</i>	<i>153</i>
Replacing Animal Draft with Tractors: The Choice of Techniques	<i>154</i>
Effects of the Transition from Animal Draft to the Tractor	<i>157</i>
Tractorization at the Late Bush-Fallow and Early Grass-Fallow Stages	<i>166</i>
Direct Transition to the Tractor in a Treeless Environment	<i>169</i>
<i>11 Mechanization Choices for the Humid Tropics</i>	<i>173</i>
Technological Choices with Tree Crops	<i>174</i>
Technological Choices without Tree Crops	<i>175</i>
Systems without Trees	<i>177</i>
<i>12 Public Tractor-Hire and Equipment-Hire Services</i>	<i>179</i>
Background and Historical Perspective	<i>179</i>
Operations for Which a Tractor-Hire Service Is Provided	<i>182</i>
Overriding Problems of the Tractor-Hire Service	<i>182</i>
Can Private Tractor-Hire Services Do Better?	<i>187</i>
Conditions Necessary for Successful Contract-Hire Operations	<i>190</i>

The slow pace of agricultural mechanization in Africa has long been a puzzle. This book begins to solve this puzzle by looking at the conditions in Sub-Saharan Africa that have led to only sporadic use of the plow rather than the hand hoe, very limited use of tractors and even oxen, and the failure of many projects seeking to move directly from hand hoes to tractors.

Among the issues discussed in the book

- The effect on yields of substituting plows for hoes
- The cost-effectiveness of using draft animals as opposed to tractors
- Conditions under which tractors can be used more efficiently than oxen
- The negative consequences of government interventions to encourage the use of tractors beyond what is economically justified

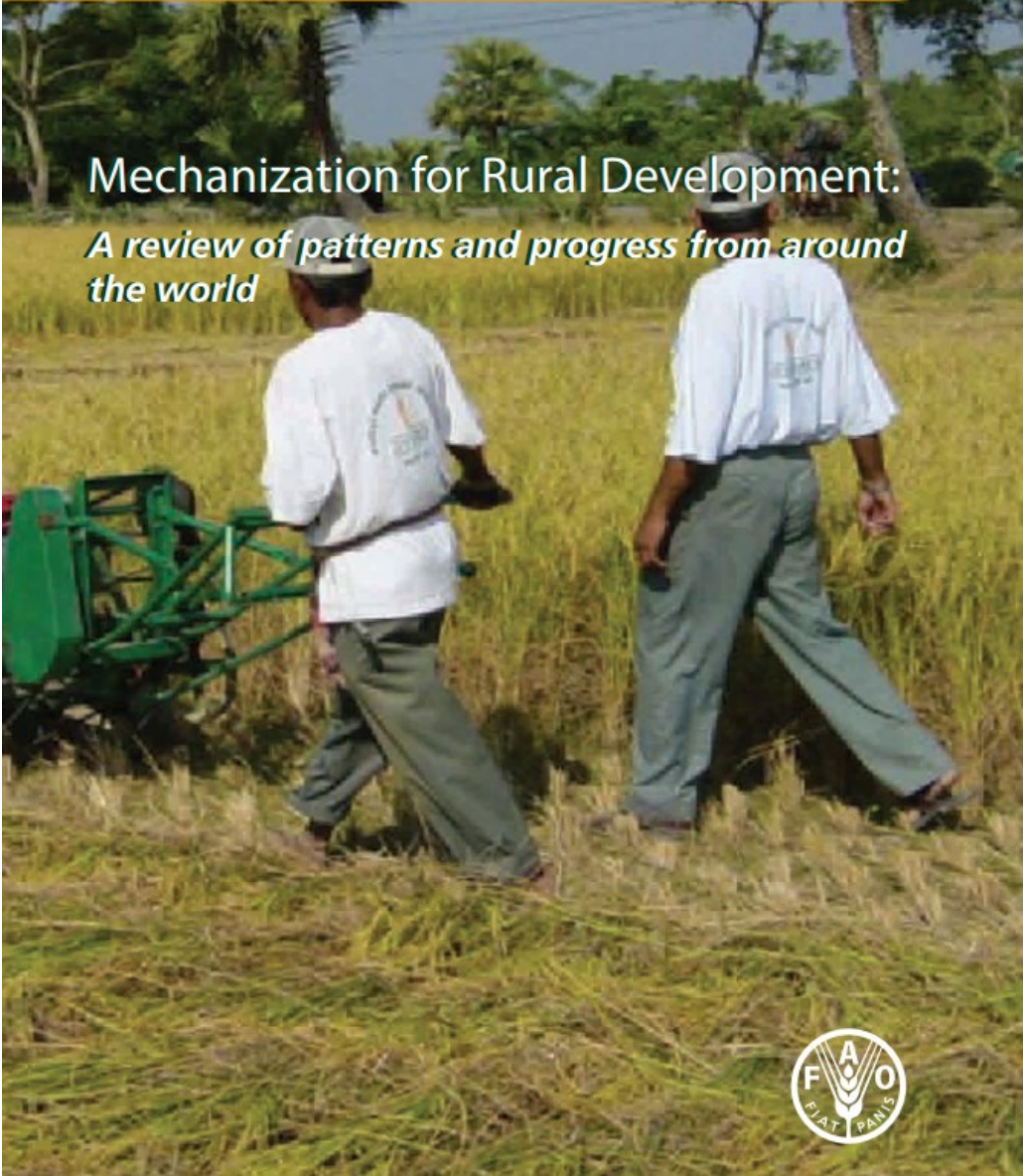


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Mechanization for Rural Development: *A review of patterns and progress from around the world*



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Editors

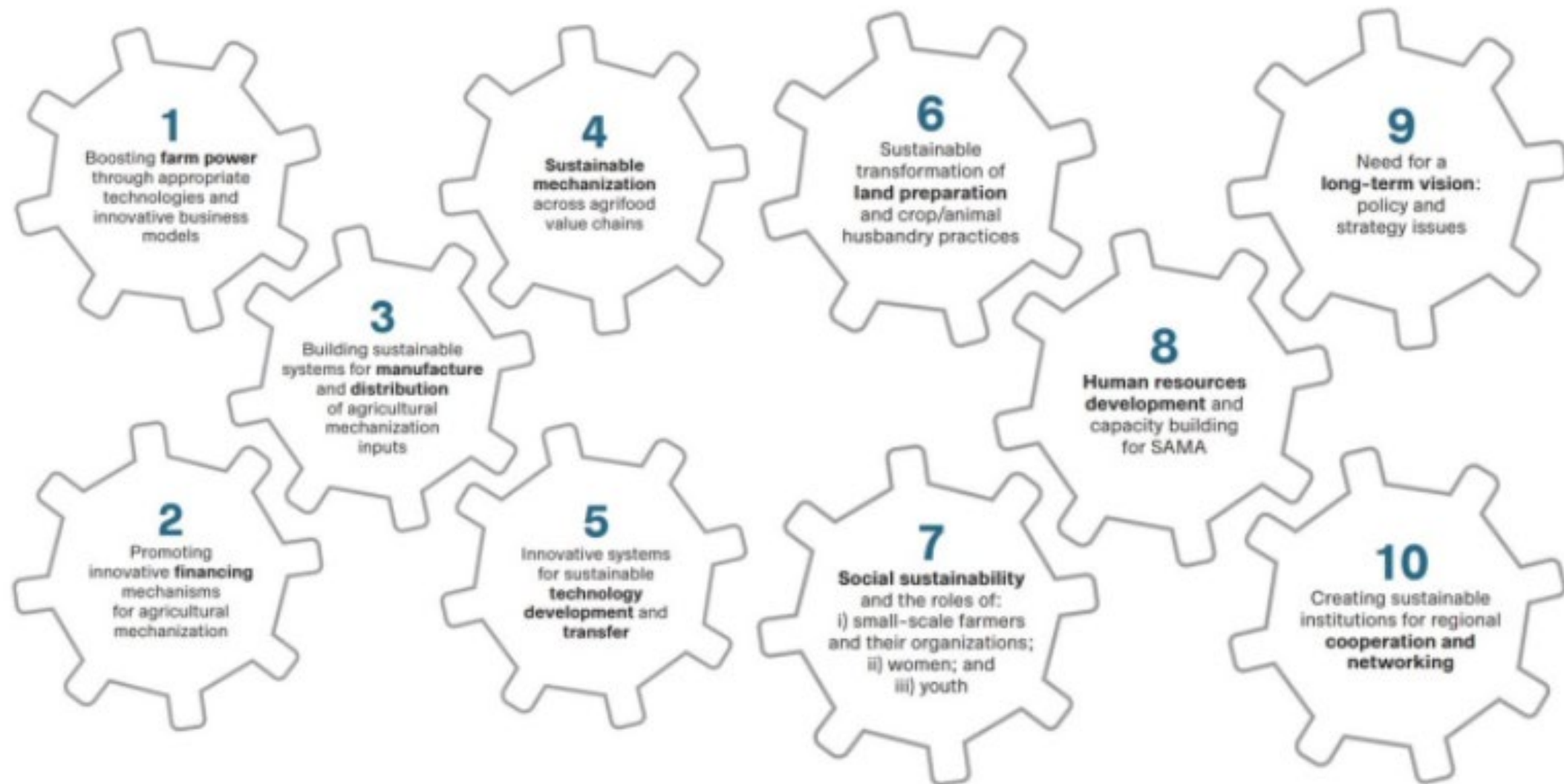
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Rome, 2013



From "Sustainable Agricultural Mechanization – a Framework for Africa" (FAO)

- Sustainable mechanization involves the application of different forms of skills, power sources (from manual to engine), equipment, along the agri-food value chain.
- As a result, mechanization must meet farmers' needs effectively while improving productivity and competitiveness.
- The recommended dual approach brings with it a significant value since it considers economic, financial, social, environmental and cultural issues at stake.
- It recognizes that mechanization can be provided to smallholders in a number of different ways if both the public and private sectors work together to nurture an attractive environment where the private sector can do business and provide the necessary financial and appropriate training support.

Agricultural mechanization in Africa: Myths, realities and an emerging research agenda

[Thomas Daum and Regina Birner](#)

[Global Food Security](#)
Volume 26, September 2020, 100393

<https://doi.org/10.1016/j.gfs.2020.100393>

The analysis of popular myths shows that Africa's mechanization efforts need to be accompanied by a new research agenda that comprises several key research areas:

- What are the employment effects of mechanization?
- How can it be ensured that smallholder farmers and women benefit?
- What is the potential of digital solutions in this regard?
- How can an enabling environment for mechanization be created?
- How can it be ensured that mechanization efforts are environmentally sustainable?

Table 2. State-led mechanization and training in selected countries.

<https://doi.org/10.1016/j.gfs.2020.100393>

Country	Time period	Number of machines imported	Number of persons trained in 2017 on mechanization in regular or project-funded programs
Mali	2016–2018	1500 tractors + implements as well as water pumps, <i>motocultors</i> , threshers, dehullers	None
Nigeria	2010–2018	950 tractors +150 implements as well as groundnut and melon threshers, water pumps, power tillers	560
Kenya	2016–2020	Unspecified number of tractors, implements and other machinery worth US\$ 100 million	Unspecified number of persons trained on ad hoc basis (no regular training courses)
Benin	2008–2018	1040 tractors as well as 360 rotor tillers	100
Burkina Faso	2015–2018	800 tractors + implements	300

CIMMYT and young agripreneurs

- The example of Zimbabwe's young agripreneurs is instructive. Three years ago, the International Maize and Wheat Improvement Center (CIMMYT) loaned Gift Chawara, Shepard Karwizi and Pinnot Karwizi a planter and a sheller with which they started a business.
- Their company is now offering shelling and planting services to almost 150 family farms in Mwanga village, northwest of the capital Harare.
- They had graduated from an agricultural mechanization training programme managed by CIMMYT. Last season, the trio earned about \$7,000 just from shelling over 300 tons of maize, according to CIMMYT.
- But these young Zimbabweans could be outliers, asserts Frédéric Baudron, a senior systems agronomist at CIMMYT, who finds mechanization by smallholder farmers in Zimbabwe still low.
- CIMMYT's mechanization training programme is implemented under the Farm Mechanization and Conservation Agriculture for Sustainable Intensification project and supported by the Australian Centre for International Agricultural Research.
- The project has benefitted over a hundred young people from Ethiopia, Kenya, Tanzania and Zimbabwe.

[\(/africarenewal/magazine/april-2019-july-2019/mechanizing-agriculture-key-food-security\)](http://africarenewal/magazine/april-2019-july-2019/mechanizing-agriculture-key-food-security)

Agricultural Mechanisation, Farm Productivity and Food Security in Sub-Saharan Africa

Mervyn Piesse,

Future Directions International, Australia, April 2019

Key Points

- ▶ Sub-Saharan Africa has the least mechanised agricultural system in the world and increasing access to labour-saving machinery would help to raise farm productivity.
- ▶ Agricultural mechanisation is a powerful developmental tool, but it cannot address all of the factors that contribute to Sub-Saharan Africa's food insecurity.
- ▶ If the political, social and economic factors that also contribute to food insecurity are to be ameliorated, a broader suite of policies would need to be adopted.
- ▶ China appears to want to maintain its position as the main supplier of agricultural machinery in Sub-Saharan Africa, with Beijing indicating that agricultural assistance will remain a key component of its Africa policy.

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- Chinese companies are the main suppliers of agricultural machinery in Sub-Saharan Africa and they are more likely to receive state support in exporting their equipment than companies based elsewhere.
- China sees African agricultural mechanization as a way to **generate business opportunities** for Chinese companies and sell Chinese-made products into new markets, rather than as an opportunity to improve Chinese food security through the exploitation of African land.
- Indian tractor manufacturers, however, also see the region as a desirable export market and aim to **significantly increase** their presence there.

Use of information and communications technology tools for tractor hire services in Africa

- Where demand for mechanization services exists, tractor owners have formed private hiring markets to provide the required services.
- The main challenge is related to high transaction costs – incurred by
 - farmers due to information distortion concerning the availability of tractor hire services and how to access them,
 - and by tractor owners due to the difficulties locating farmers in need of their services and aggregating demand over distant, scattered, smallholder farm plots.
- This paper seeks to identify the benefits and challenges of such approaches by examining three ICT-based models in different African countries (Hello Tractor in Nigeria, Tinga Rentals Store in Kenya and TROTRO Tractor in Ghana)

<http://www.fao.org/3/cb2151en/cb2151en.pdf>

Anidi, O., Mayienga, S.M. and Mpagalile, J. 2020. Use of information and communications technology tools for tractor hire services in Africa - Opportunities and challenges. Integrated Crop Management No. 25. Rome, FAO.

First webinar of the Collective Action “Inclusive Digital Transformation of Agriculture”

Talking: Foteini Zam



- The Partners in this Collective Action recognize that the key driver towards the full realization of the benefits of the digital transformation of agriculture is the **inclusion of farmers in the design and governance of digital solutions, and in the negotiation of related data practices and business models.**
- We need to strengthen the recognition of **farmers as central actors and innovators themselves**, generators of valuable agricultural knowledge and holders of intellectual property rights, not just recipients of others' solutions, knowledge, and data.

This webinar addresses legal and ethical aspects of an essential aspect of digital agriculture:

governance of data generated by digital technologies on the farm

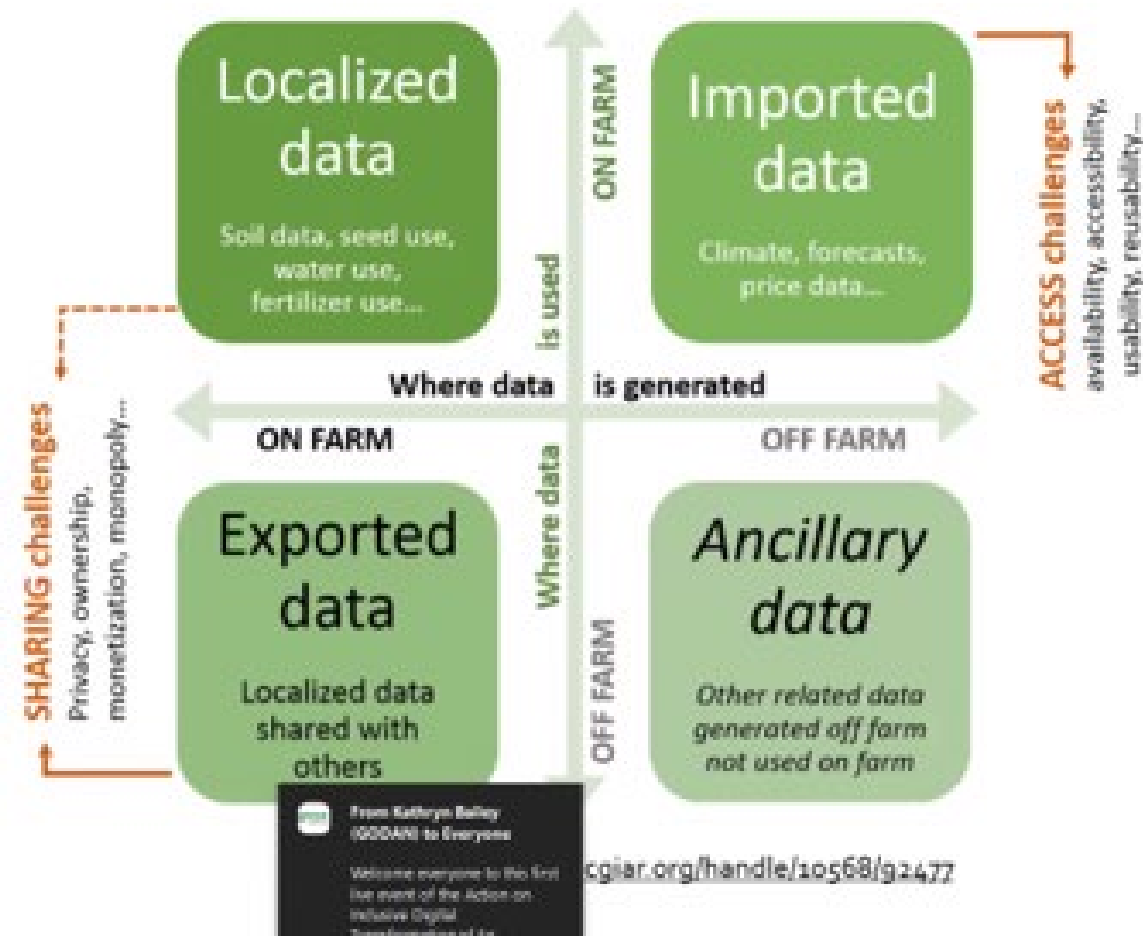


From Chloé Alexandre to
Everyone

Farmers' challenges in sharing and accessing data

What happens with the **data generated by digital technologies** used on the farm?

With whom is it shared, who can use it, whom does it belong to, what is its value?



Where does the **d** **informing digital technologies** come from?

Is it accessible, affordable, reliable, relevant?

Who provides it?

Digital Agriculture & Data

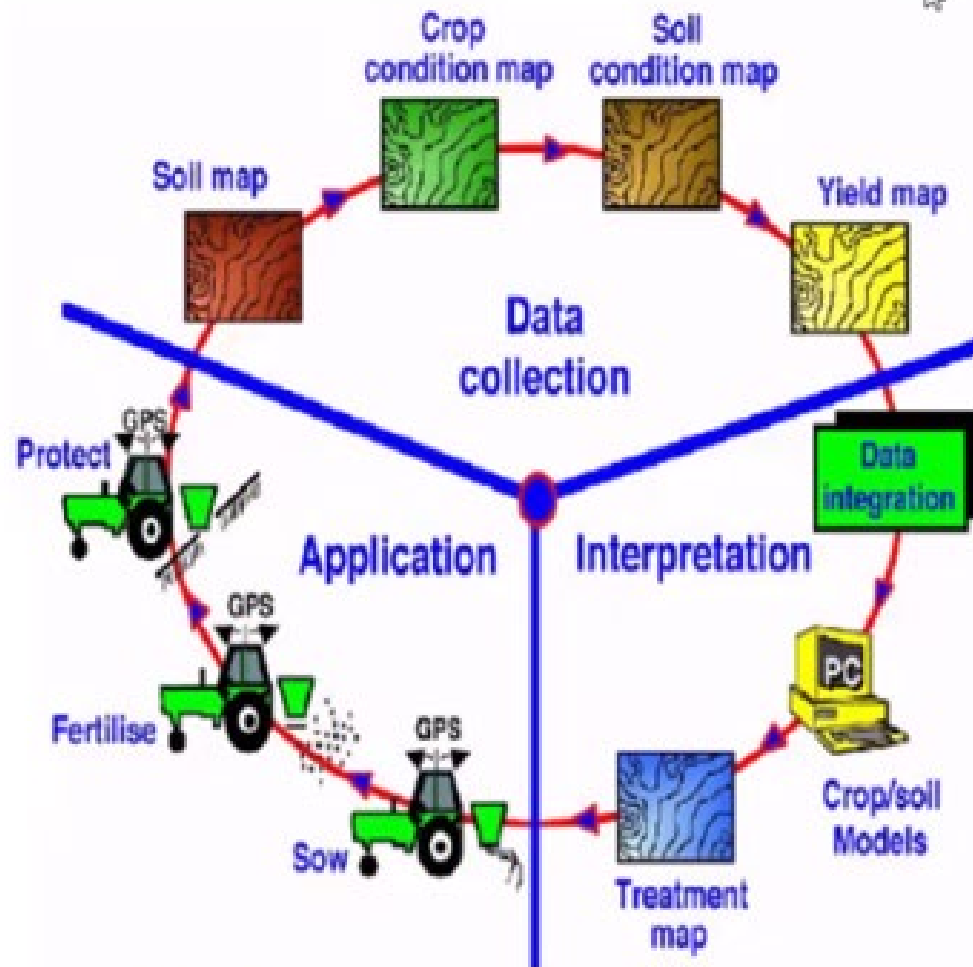


Image Source: Antonio Comparetti, Research Gate 2011

- The use of digital technologies in agricultural prodn.
- Reliance on on electronic data & information
- Tool used
- Precision farming
- Site/crop specific; Precise field data