



Smallholders and Digital Agriculture

Improving productivity and resilience
through ICT-enabled Sustainable
Agricultural Mechanization

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“Empowering Smallholders through Sustainable
Agricultural Mechanization in the Digital Era”*

What is Sustainable Mechanization?

Sustainable mechanization considers technological, economic, social, environmental and cultural aspects when contributing to the sustainable development of the food and agricultural sector.

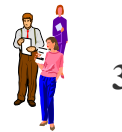
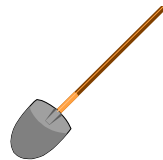
It encompasses all levels of production technologies, including:

- Simple hand tools
- Use of draught animals
- Motorized equipment
- Solar, wind and water powered equipment and machinery
- Autonomous equipment (drones, robots and bots)

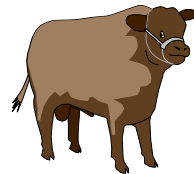
It has the potential to create employment along the value chain and improve the livelihood of the rural poor

Why mechanize developing countries?

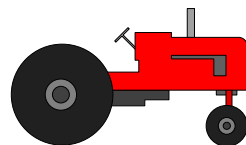
How many People can a Farmer Feed?



3



6



50

After Legg 1993

Why mechanize developing countries?

United Nations Sustainable Development Goals



- “ Improve livelihoods
- “ Food sovereignty and adequate nutrition
- “ Rural – urban migration
- “ Create qualified employment and new business
- “ Close the technological divide
- “ Sustainable production intensification (climate-smart agriculture)
- “ Sustainable resource management

Mechanization Challenges

- “ Can profitability of agricultural production be increased in a sustainable manner through mechanization?
- “ Can agricultural mechanization be sustainable itself?
- “ How do we create more jobs and build adequate capacity in the agricultural sector?
- “ How can we improve rural livelihoods?
- “ How can we achieve it and protect the environment?
- “ How can developing countries close the technology divide?

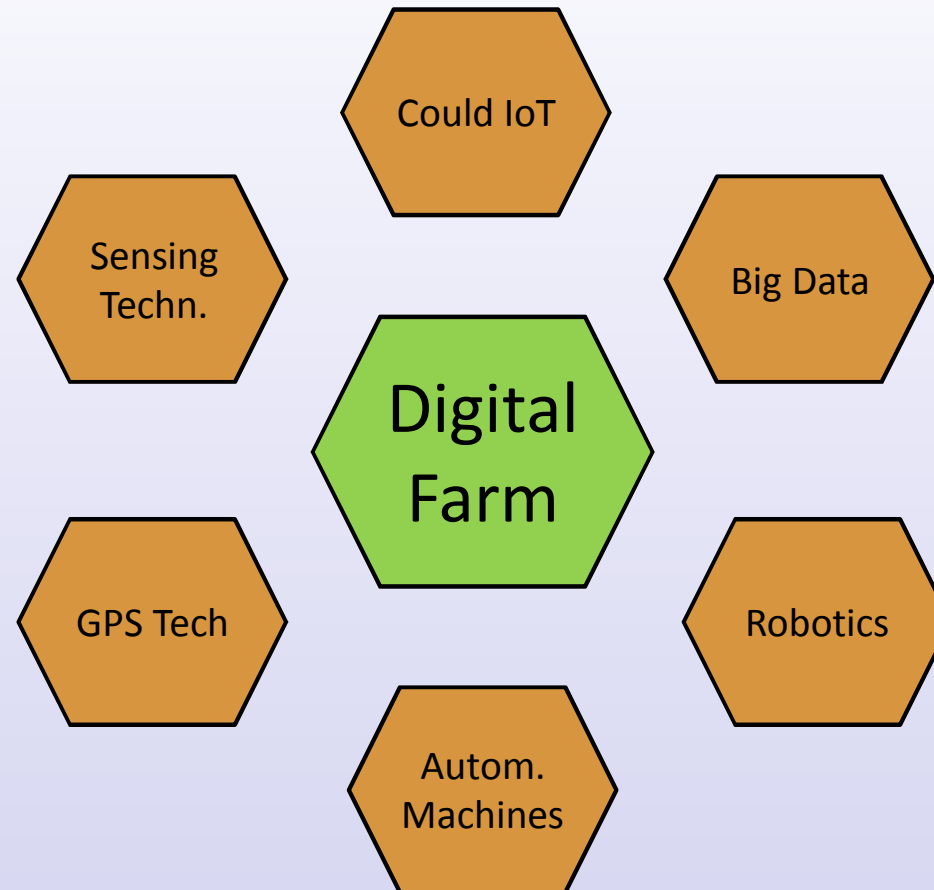


Mechanization and technification myths

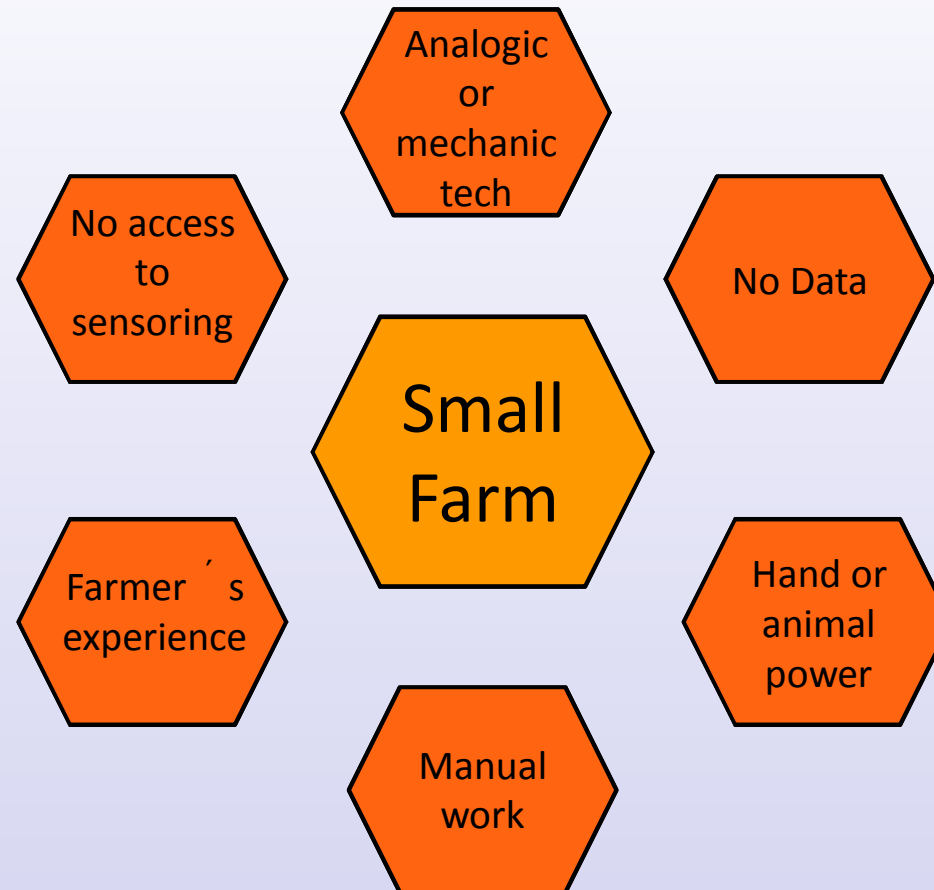
- “ New job types, mitigates effects of migration
- “ Diversification and multiple farming possibilities
- “ Technological solutions for all sort of farms and crops
- “ Local workshops, sales representations, etc.
- “ Private sector initiative brings innovation, public provides enabling environment
- “ Efficiency, new energies, sustainable agricultural practices



Digital Agriculture



Agriculture in developing countries



Digital Agriculture

The new agriculture is characterized by:

- “ Data collection and management
- “ Specialized equipment = specialized manpower
- “ Resource efficient
- “ New business models
- “ Dependent on reliable ICT infrastructure
- “ Needs adequate technical support and service

It is easier to supply technology, than it is to set a system to make it sustainable



Digital mechanization in developing countries

- “ Adoption negligible
- “ Capacity building should be the first step
- “ Infrastructure requirements can be a burden
- “ May alleviate labour shortages
- “ Technology costs are lowering
- “ Combination with other technologies (3D printing i.e.) could help to solve logistical issues
- “ Main contribution will be sustainable crop intensification
- “ Service provision can be the entry point for the technology

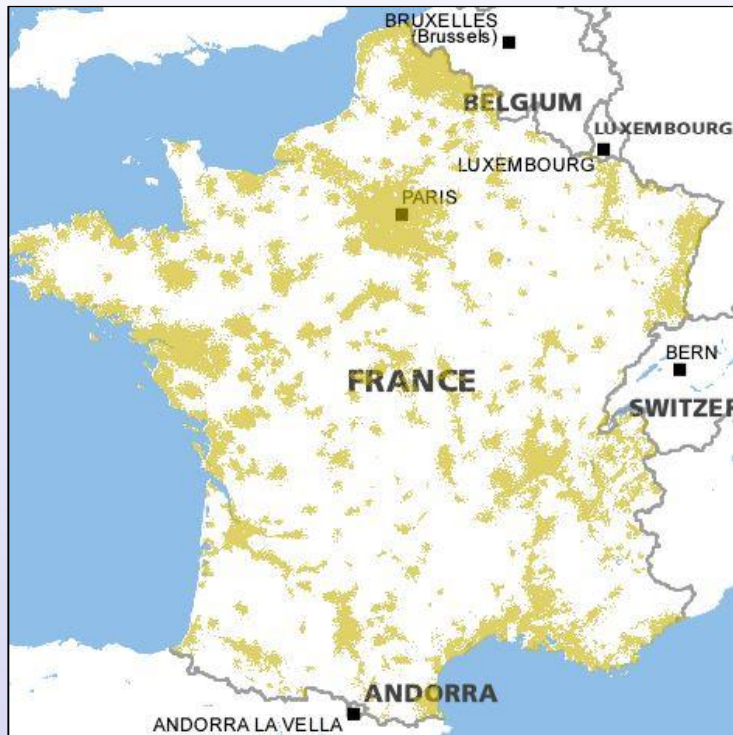
Challenges

- Human capacity and knowledge (farmers, service providers, operators, customers, law makers)
- Access to ICT infrastructure
- Reliable technical support and service for data management
- Access to adequate finance
- Public sector support
- Needs adequate technical support and service on the spot for the equipment and the infrastructure

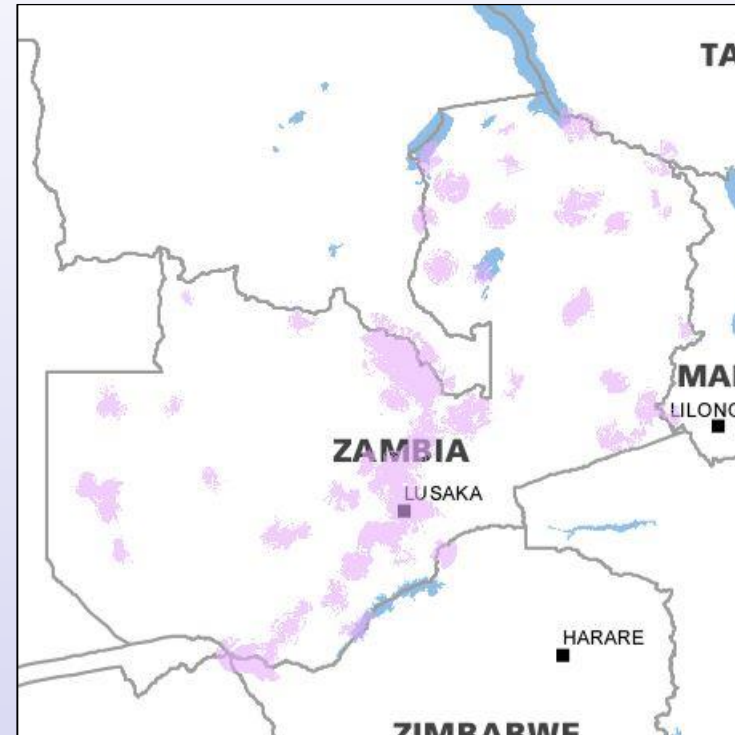


Challenges (3G signal example)

France: 675,417 km²



Zambia: 752,614 km²



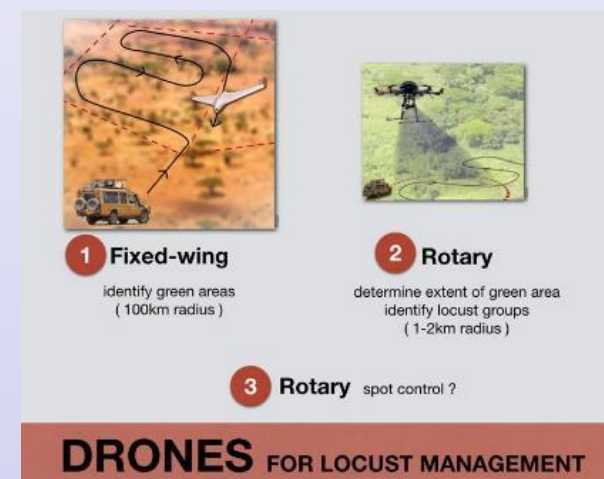
Source: <http://maps.mobileworldlive.com>

Lessons learned

- “ Public only or private only led initiatives do not succeed in time
- “ There is no general solution to increase production with mechanization
- “ Inadequate equipment and practices can damage severely natural resources
- “ Without capacity, technology is not adopted
- “ Technology adoption happens when it has an economic advantage
- “ Current social and environmental concerns can favor adoption of particular technologies

Opportunities for small scale farmers

- “ Increase efficiency of agricultural production
- “ Create new job opportunities in rural areas for qualified manpower
- “ Close the technological gap with developed countries
- “ Reduce drudgery of agricultural work
- “ Enable new business and research ideas adapted to the context
- “ Strengthen the use of ICT technologies, renewable energy
and monitoring devices



Thank you very much for your attention

www.fao.org/sustainable-agricultural-mechanization