





# Critical Transition 8.

## Harnessing the Digital Revolution

 Harnessing the Digital Revolution	 Better Futures Additional Investment Requirements 2030 (USD billions)	 Better Futures Business Opportunity (USD billions)	 Economic Prize from Hidden Cost Reductions (USD billions)	
	2030	2030	2030	2050
	\$15	\$240	\$540	\$935

A digital revolution is unfolding across food and land use systems and from end-to-end of their value chains. New technologies make it possible to monitor land use from afar, to trace changes in forest boundaries and to spot deliberate deforestation immediately. Digital precision agriculture tools can lead to significant reductions in input requirements for a given yield by integrating data across whole crop production systems.

The same techniques could be used to scale regenerative farming, which is particularly data-intensive. For example, it requires the farmer to combine variations in soil and weather patterns with the appropriate selection of inputs and outputs for local circumstances – tasks that precision agriculture tools are particularly well suited to perform. In fact, big data, regenerative farming and agrobiodiversity seem made for one another.

Further downstream, digitisation is creating e-commerce routes for farmers to get to market, to offer more specialised products and to capture more of those products' final value. For consumers, access to online data tracing the journey of foods from field to market offers more power to choose products that meet health, ethical and sustainability standards. Meanwhile, activist organisations are enabled to hold companies and governments to account.

Digital technology promises to be a powerful positive multiplier of the other transitions. It can shine a light on existing concentrations of power and the injustices in current food and land use systems. And digital tools themselves can be used by civil society organisations to ensure that digitisation opens up food and land use systems, empowers consumers and smaller producers, enables the sharing of data, and encourages enlightened larger companies to drive positive change.

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The potential benefits of digitisation in food and land use systems can be summarised as:

- **Environment.** Digitisation is an input into all ten critical transitions. It enables real-time forest protection and ocean management and regenerative and precision farming. It contributes to improved logistics for reducing food loss and waste and will enable consumers to make conscious purchasing decisions.
- **Health.** Digital tools can help consumers link wellbeing with diet by informing purchasing decisions and enabling them to self-monitor. They can also reduce pollution-related health hazards by enabling more judicious use of chemical inputs.
- **Food security.** Digitisation can make predictions of food security risks more accurate and the distribution of food stocks more transparent, even where governments and companies are not providing all the distribution data.
- **Inclusion.** Digitisation can help small farmers to access key information about weather and the optimal choice of crops and inputs and give more direct access to consumers through e-commerce channels.

The total value of these benefits is hard to quantify but is conservatively estimated at \$540 billion by 2030.

The thrust of this transition is not so much about scaling the digital transition. Digitisation is already at scale. There has never been more access to information in food and land use systems. A constellation of new technologies – from open ledger and tracking technologies like blockchain to advances in remote sensing, digital mapping and weather prediction – are combining with mobile phone penetration and rural connectivity. For the first time, the means exist to track and trace trading prices, future demand shifts, weather patterns, greenhouse gas emissions and biodiversity impacts, farming practices, labour conditions and nutrition information from farm to factory to fork and back. It is possible to identify who does what and where, and by whom they are financed.

In addition, there are tools that provide a broadly accepted framework of definitions, norms and consistent guidance around specific commitments, such as the Accountability Framework Initiative, a common set of norms and guidelines for eliminating ecosystem destruction and human exploitation from commodity supply chains.<sup>168</sup>

In principle, therefore, digitisation could lead to more equitable and sustainable food and land use systems by solving many of the problems that have plagued the food industry for decades. However, historic evidence – and trends from other parts of the digital economy – suggest a more complex, disturbing outcome is possible. In the food sector, consolidation has already concentrated market power among a small number of players with entrenched interests. Value chains are optimised for massive economies of scale but often neglect basic standards of care for nature and people.<sup>169</sup> Unequal, asymmetric access to information across long, linear supply chains has exacerbated existing inequalities in market power, allowing the many iniquities they harbour to go unaccounted for. These range from unhealthy products being marketed as a natural choice, to implication in environmental crime and slave labour. It is not unreasonable to assume there is a risk of big data being deliberately used to reinforce these unfortunate tendencies.

Moreover, many small farmers in the developing world cannot access or interpret data. Thus rolling out digital technologies will not by itself improve inclusion. That will depend on training potential users to benefit from the technologies as well, especially those among the world's poorest producers. Without such support, this population will not be able to compete against producers who can access and use technology to supply a market of well-informed businesses and consumers.

The challenge for this transition is therefore simple to state, and hard to solve: how to digitise food and land use systems in a way that creates transparency and corrects its embedded inequalities and injustices? If the data architecture remains closed and guarded, everything from seed genomes to field micro-topography and consumer micro-segmentation will reinforce monopolies, further weaken the position of small independent producers and artificially engineer consumer choices.

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## Goals and benefits

If data is opened up, it can empower:

- **Governments** to incorporate appropriate incentives, regulations and enforcement into national agricultural, public health and international trade policies
- **Farmers** and small producers with best practices, natural capital data, market access, pricing information and efficient logistics
- **Consumers** to make better informed, healthier and more environmentally friendly choices
- **Companies** to account for the true value of natural and human capital in their supply chains as well as legal, reputational and security of supply risks
- **The international community** to prepare for and respond to transnational food system challenges such as disease outbreaks, environmental crime and price shocks
- **Civil society** to hold all players in supply chains to account

The annual economic gain from this transition is an estimated \$540 billion by 2030, and \$935 billion by 2050. A reduction in public health costs of \$360 billion a year by 2030 would be the biggest driver of the gain.

## Priority actions

To harness the full beneficial potential of the digital transition in food and land use systems, all the system actors above should work on the following priorities.

**Governments** must walk the walk on digital transparency. They should provide the governance foundations for:

- Open access to public sector data on national land registries, fisheries, agriculture, soil health, water basin systems, land use, subsidies, transportation and extension service curricula
- Redefinition of anti-competitive practices and implementation of stronger anti-trust rules to take account of how big data and artificial intelligence are changing market structures and conduct, upstream and downstream
- Mandatory, holistic product labelling that presents information on food safety, origin, nutrition and environmental and labour rights in a standardised, comparable way for end-consumers. Governments should require the same standards from marketing.
- Minimum standards for chain-of-custody certification for food and land use commodities, and for unprocessed fish, fruit, vegetable and meat products
- Open source communities in key areas of public research, so that information is widely available especially in fields that have high consumer sensitivity. These include research on gene-editing or in areas where there is risk of IP lock-in by a few dominant companies (for example, advanced, climate-resilient seed technologies).

**Investors** can hasten these positive disruptions if they:

- Follow strict transparency and sustainability guidelines in their investment decisions. Farm Animal Investment Risk and Return (FAIRR), an investor network, is one group providing such guidelines. It advocates for sustainable animal farming backed by 180 fund managers with assets worth \$10.5 trillion.<sup>170</sup>
- Support, and help shape, the development of nutritional, social and environmental monitoring, reporting and evaluation standards by WHO, the Rio conventions, and the International Labour Organization
- Support the development of standardised and auditable disclosure standards and parameters for major enterprise risks resulting from unsustainable and unjust operating practices

**Food companies and retailers** can make digitisation socially productive if they:

- Require suppliers to provide chain-of-custody information that is sufficiently granular to track deforestation, illegal fishing, environmental crime and labour conditions

- Support government efforts to develop food labelling schemes that provide complete nutritional, social and environmental information
- Make better use of consumer data to drive the growth of healthier food categories and to help consumers make healthier purchasing decisions

**The international community** can better manage transnational risks if:

- Trade regimes include transparency standards. They should encourage countries to cooperate in setting private sector “commodity-neutral” (i.e., covering all relevant commodities) compliance standards on deforestation, legal compliance and human rights, working through the Rio conventions for the environment and the International Labour Organization for labour rights issues.
- NDCs to the UN climate change convention and commitments to the UN convention on biodiversity include improved monitoring, reporting and evaluation standards for food and land use
- Members launch a Global Alliance Against Environmental Crime that combines the capacities of national law enforcement, Interpol and the United Nations Office on Drugs and Crime to crack down on environmental crime and human rights abuses in food and land use systems
- Disaster response planning for disease and food price shocks is convened by international institutions to help governments to plan responses and ensure that national trade policy smoothens rather than exacerbates volatility

**Civil society**, supported by philanthropy can help encourage transparency throughout food and land use systems by:

- Creating, maintaining and communicating results from real-time platforms for transparency, as is currently done through Global Forest Watch
- Holding governments, business and the private sector firmly to account using real-time information flows on their food and land use system activities
- Driving hard-hitting campaigns against serial offenders, whether governments, businesses or financial institutions

#### BOX 36

### Cocoa Cloud project shares data among cocoa farmers<sup>171</sup>

The cocoa sector, centred on Ghana and Côte d’Ivoire, is particularly sensitive to climate change-related disruption. In Ghana, lack of adaptation is predicted to create income losses to cocoa farmers of up to \$410 million a year. Therefore, companies along the value chain have targeted the region for tech-driven, sustainable intensification projects in order to address productivity challenges, deforestation and requirements for better livelihoods and working conditions. A paramount concern is the lack of easily accessible and accurate weather data. An estimated 1.5 million farming households in key growing areas in west Africa cannot make data-driven agricultural management decisions.

The CocoaCloud project, led by the World Business Council for Sustainable Development and Outputs Insights BV, seeks to fill this knowledge gap with a five-year pre-competitive data platform. Data is collected from ground sensors across the region. CocoaCloud sends local weather forecasts and farm management alerts based on agronomic algorithms and location data. The platform also allows exchanges of knowledge and feedback between farmers and extension services. Today, CocoaCloud supports 7,500 cocoa farmers, community members and extension workers in Ghana’s Western Region. The target is to make data available for more than 1 million smallholder farmers in Ghana and Cote d’Ivoire by 2024.

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## References

168. See: [www.accountability-framework.org](http://www.accountability-framework.org)
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170. See: <https://www.fairr.org/>
171. See: <https://cocoacloud.org/>