Equitable digital innovations

KISM guidance series: Implementing credible and innovative practices in food markets

Paper 2: Practical considerations for agri-food actors adopting or investing in digital innovations

Evidensia, ISEAL, and CGIAR

December 2024

Contents

Purpose of this guidance note

This guidance note is the second in a series developed by Evidensia and ISEAL for the Knowledge Platform for Inclusive and Sustainable Food Markets (KISM), as part of the CGIAR Rethinking Food Markets Initiative[1]. This draws on the initiative's "Creating more and better employment in agrifood systems" meta-study to explore key interventions that are fundamental to creating and promoting inclusive employment and decent work in agri-food systems. Each note focuses on one of three interventions: gender-positive action; equitable digital innovations; food standards that include labour provisions.

Within this guidance note, we present the employment and inclusion effects of digital innovations found in the meta-study and supplement this with additional contextual information on the potential benefits, challenges, trade-offs, and common equity issues involved with adopting or implementing digital innovations. Building from this platform, we then discuss a framework for ensuring more equitable outcomes when working with digital innovations so agri-food actors can safeguard some of the most vulnerable value chain stakeholders. We finally use the interventions from the Rethinking Food Markets initiatives as examples to practically apply the framework.

The information in this note is valuable for all agri-food value chain actors, but those working directly with designing or involved in "rolling out" digital innovations in agri-food value chains, such as technology firms, or local and national agricultural ministries, may find it a particularly useful resource. We also encourage those actors to explore advancing on data equity by engaging with the World Economic Forum's recently-published data equity framework.

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[1] *Please note that we anticipate further insights and updates will emerge on this topic following the completion of the Rethinking Food Markets Initiative, and its CGIAR sister initiative Digital Innovations. These initiatives are expected to yield critical data and refined strategies that are of value to agri-food system actors.*

We are committed to keeping all stakeholders informed and will share detailed findings and recommendations through the open-access KISM platform as research is published.

For more information visit www.kismfoodmarkets.org or sign up to the KISM mailing list here. Thank you for your engagement, and please look out for forthcoming communications on these developments.

Main conclusions and recommendations:

Below is an overview of the main issues explored within this briefing. A non-prescriptive framework for thinking through equity issues is **presented in Section 2** and **applied in Section 3** to case studies from the Rethinking Food Markets Initiative.

Conclusions:

- **The promise of digital innovations:** Though agriculture is one of the least digitised major industries, digital transformation holds significant promise for the sector. Digital advancements offer opportunities for value chain actors, including smallholders, to improve productivity, efficiency, and livelihoods.
- **Evidence gaps:** However, the research on the applicability and effectiveness of digital tools for marginalised groups remains at an early stage, leaving critical gaps in understanding across the value chain. Key questions remain about their role in supporting decent work, protecting workers, addressing youth precarity in developing countries, and promoting equity at scale.
- **Unintended consequences on equity:** Despite their potential, digital innovations risk deepening existing socio-economic disparities if implemented without an equity-sensitive approach. Evidence is currently largely insufficient, but there are indications that digitalization may reinforce structural inequities, particularly for women and marginalised communities in rural economies. This makes a systematic, equity-focused approach essential to ensure digital tools drive inclusive growth rather than entrenching inequity.
- **Introducing the equity framework:** To address these challenges, this briefing introduces an equity framework designed to guide value chain actors in leveraging digital innovations responsible. It covers considerations on equitable procedures, recognition of all stakeholders, and equitable distribution of impacts, as well as the enabling environment and the dynamics between stakeholders.

Recommendations:

Here we summarise the recommendations made while presenting the equity framework. However, this is a non-exhaustive list, and the non-prescriptive framework should be used by stakeholders to consider the most pertinent issues confronting them.

- **Technology developers – both hardware and software -** could focus on issues of programme accessibility, returning value to data providers, ensuring informed consent, designing more circular or long-lasting products, incorporating user feedback or active participation into the development of products.
- **Internet providers** could focus on issues of digital access, such as affordability of service provision, and coverage of networks. Some innovations in this space are subsidising data banks, or providing toll-free call or SMS services.
- **Governments** - and regulators where appropriate – should lead on the structural issues preventing equitable outcomes, such as the "digital divide", and potentially realigning incentives in the business model of these companies by becoming a financing partner. They could also focus on addressing potential economic exclusion where digital innovations become influential in the market, on issues of environmental impact and sustainability where pollution is a concern, or on preventing exploitation of digital innovation users, especially in the trading of "big data".
- **Actors such as unions, civil society, and cooperatives** may wish to closely monitor the implementation of certain technologies to ensure the actors they are representing are themselves deriving value from digital innovations and avoiding harm. Where appropriate they could facilitate or take part in user testing to make sure marginalised actors are well-represented.

Section 1: An overview of digital innovations in agri-food systems

The promise of digital innovations in agri-food systems

The digital transformation of agricultural value chains holds significant promise for improving market access, communication, and financial services, particularly for smallholder farmers in developing countries (Smith et al., 2020). As the least digitised major industry, agriculture faces numerous challenges in adopting digital technologies, but there is growing enthusiasm for their potential to overcome traditional barriers, reduce transaction costs and address information asymmetries (Abate et al., 2023).

Digital innovations are increasingly recognised for their potential to improve the productivity and inclusivity of agricultural value chains. Digital tools such as mobile payment systems, weather monitoring services, and e-commerce platforms have been shown to enhance market access, reduce transaction costs, and improve bargaining power for smallholder farmers (Abate et al., 2023; Berdegué et al., 2023).

These technologies can bridge significant gaps in market integration, connecting farmers to buyers more efficiently, and helping overcome challenges such as limited access to information and market inefficiencies. Furthermore, by facilitating better price discovery and improving supply chain transparency, digital solutions are fostering more equitable trade, ensuring that smallholders have the opportunities to access fair prices for their produce (World Bank Group, 2023).

Moreover, digital innovations are increasingly contributing to the creation of new employment opportunities and enhancing livelihoods within rural communities (Berdegué et al., 2023). By streamlining financial transactions and improving access to credit and insurance, digital platforms are making financial services more accessible to farmers and "agri-preneurs", many of whom tend to be young and more technologically savvy (Schroeder et al., 2021). These changes not only increase farmers' profitability but also promote the development of inclusive and labour-intensive industrialisation in sectors such as agricultural processing and economy, further supporting rural economic development (GIZ, 2021).

However, despite their promise, evidence of the applicability and effectiveness of these innovations for smallholders remains at an early stage, requiring careful evaluation (Smith et al., 2020). While the digital transformation, especially in regions like Sub-Saharan Africa, offers an opportunity to reshape agricultural practices and increase access to markets, it also poses risks of exacerbating inequalities, particularly for rural populations and workers in agri-food systems (GIZ, 2021).

Nonetheless, the digital revolution is progressing at pace, with efforts to curtail or circumvent the adoption of digital technologies unlikely to be successful (World Bank Group, 2023). As such, navigating it for agri-food value chains demands a nuanced approach that considers equitable outcomes in terms of all actors.

What types of digital innovations are being used in agri-food systems?

A wide range of digital tools, such as AI, the Internet of Things (IoT), big data, blockchain, and GPS mapping, are being explored for and within the agriculture sector. With value chain actors bring brought together in new and different ways, and platforms offering several services at once, the landscape can sometimes be confusing. Abate et al. (2023), propose a typology for market-oriented digital innovations *(see table 1)*[2].

This typology focuses less on the technology itself, and more on the functions and services they are aiming to provide. Keeping this end goal in mind is useful when considering equity issues because software, and hardware are initially somewhat neutral tools. The stages of design and deployment is where the most significant equity impacts are literally and figuratively encoded, and "baked in".

Though this typology was developed to discuss market transformation in Africa, it provides a useful orientation for similar settings across the globe.

Table 1: Typology of market-oriented digital innovations

Type/class of innovation	Description	Functions
Market advisory and information services	Digitally enabled tools to deliver market information and advisories as a means of addressing different forms of market and institutional failures, particularly asymmetric information and high transactions costs **Examples:** 1. 8028 Farmer hotline (Ethiopia) 2. iCow (Kenya)	• Supply commodity and input price intelligence • Provide customised or precision market advisory services • Facilitate peer-to-peer market information-sharing platforms
Market linkages	Digital information-sharing tools to link farmers to suppliers of relevant farm inputs such as seeds or fertilisers; suppliers of production and machinery services such as tractors; or even to wholesalers/retailers **Examples:** 1. Hello Tractor (Nigeria) 2. SunCulture (Kenya)	• Link supply and demand for inputs, technology, mechanisation, and other services • Link supply and demand among supply chain actors

[2] The Abate et al. 2023 paper also presents a summary of empirical evidence on the impacts of digital tools on agricultural markets across Africa. Readers may find it useful to review their findings.

Agricultural financial services and transactions	Digital services that facilitate market transactions and financial services, aimed at lowering transactions costs and risks, or at improving efficiency and accountability in market exchanges, or improving quality assurance and traceability of agricultural products **Examples:** 1. M-Pesa (Kenya) 2. SmartMoney (Tanzania)	• Supply e-wallets and payment solutions • Provide lending and saving services • Manage product traceability systems • Provide quality assurance and certification • Supply insurance and credit solutions • Support enterprise resource planning
Agricultural market data collection, crowdsourcing services, and big data	Digital tools that can collect market data from farmers while also allowing interactions between farmers. These tools, although at an early stage, create unique opportunities to collect rich data in a timely manner **Examples:** 1. DigitalGreen (Multiple countries) 2. Farm.ink (Multiple countries)	• Provide business-to-business analytical services • Crowdsource data on pricing, agent performance, or other services • Provide market advisory services that integrate satellite-based remote-sensing and other data streams with machine learning and artificial intelligence

Source: Adapted from (Abate et al., 2023)

Challenges, trade-offs, and common equity issues

Digital technologies in agri-food systems face several challenges and trade-offs, particularly regarding their adoption, scaling, and regional applicability.

One major challenge is the commercial viability of many digital platforms. While some market linkage platforms rely on commission-based revenue models, others lack clear strategies for generating revenue, which raises concerns about their long-term sustainability (Schroeder et al., 2021).

Furthermore, emerging technologies like machine learning and AI-based market data tools are still in early stages, offering limited functionality. This limits their immediate impact despite the considerable interest in their potential to revolutionise market data access (Abate et al., 2023).

The risks associated with digital innovation also extend to issues of digital equity. While these technologies can help bridge economic, spatial, and social divides, they can simultaneously widen the so-called "digital divide". Rural communities, particularly those in isolated areas, often lack quality broadband access, while farmers with lower incomes may not have the devices or skills needed to benefit from digital tools (Berdegué et al., 2023; Schroeder et al., 2021). As a result, the advantages of digital technologies could disproportionately benefit farmers already positioned to adopt them, further entrenching existing inequities.

> **Box 1: Distinguishing equity from equality**
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> *While equality focuses on equal inputs, equity is concerned instead with equal outcomes – recognising that these may require different measures to reflect the varying needs of the people or groups involved.*
>
> *What sets equity apart from equality is taking external factors and individual needs into account to create equal outcomes. It is important to add that equity is a relational concept – it is concerned with assessing equal outcomes **in relation to** the outcomes of other actors, rather than from an "objective" perspective.*

Additionally, digital platforms commonly prioritise easily reachable users, while harder-to-reach groups – such as smallholders - face hurdles due to lack of internet access or lower mobile phone ownership. These issues are amplified among women (Abate et al., 2023) This exclusionary tendency restricts the broader scalability of these tools and tends to "bake-in" inequities. Indeed, financial services, like the popular Kenyan M-Pesa app, though widely available, remain underutilised by smallholders, limiting their potential to drive transformative changes in agricultural practices.

Gender inequality remains pronounced, as women face barriers in adopting digital tools due to systemic biases in agricultural value chains. Addressing these disparities requires gender-focused policies that promote inclusive technology access, enabling women to participate in innovation and value chains (Berdegué et al., 2023). Similarly, youth engagement suffers as younger individuals lack decision-making roles in agriculture, often due to hierarchical structures and limited public service access, further reinforcing rural exclusion (Berdegué et al., 2023).

In addition, the increased demand for skilled labour driven by digital technologies can exacerbate labour market inequalities and widen the gender gap, as women and girls in rural areas face additional barriers to digital inclusion, as outlined above (Schroeder et al., 2021). These challenges create bottlenecks that slow the scaling and equitable implementation of digital innovations in agriculture.

While the benefits of digitalisation are substantial, it is essential to address the risk that unequal access to – or inequitable outcomes of – these technologies could exacerbate existing socio-economic disparities, particularly for women and already marginalised communities (Berdegué et al., 2023). A careful, inclusive approach is necessary to ensure that the digital revolution benefits all stakeholders in the agri-food value chain.

Enabling policies for the diffusion of digital technologies

Successful digital transformation in agriculture value chains and rural areas require supportive policies that foster infrastructure, training, and governance.

Infrastructure investments are particularly impactful for obvious reasons. This includes both physical infrastructure such as roads and electricity, and digital infrastructure like mobile internet, which is critical for connecting rural areas to public and private services that support innovation, such as financial services and training (Berdegué et al., 2023).

These investments improve connectivity and stimulate rural employment by attracting further infrastructure bundles, such as water and connectivity resources, benefiting rural livelihoods. However, ensuring adequate fiscal resources and local implementation capabilities is crucial for the sustainability of these projects (Berdegué et al., 2023).

Beyond infrastructure, a supportive regulatory framework is essential to foster a thriving digital ecosystem that rural and urban areas alike can benefit from. Policies that promote data accessibility, privacy, and interoperability – while addressing issues like fair competition and consumer rights – are necessary for building trust and encouraging adoption among farmers and agribusinesses (Schroeder et al., 2021)

By supporting open data, digital entrepreneurship, and skill-building initiatives, these policies enable agricultural producers and technology developers to leverage digital solutions more effectively (Schroeder et al., 2021).

However, this kind of activity requires joined up thinking across multiple governmental departments and bodies. While several governments have adopted national digital strategies, these are slow moving endeavours, leading to a need for decision-making tools that are as much led by ethical considerations as empirical ones.

This need is compounded by several evidence gaps that persist. By way of example, though there is an active and lively debate conclusions are unclear on a) the effect of digital technologies on the "hidden middle" of agricultural value chains; b) how these technologies can enhance social protections and contribute to decent work debates; c) how these technologies contribute to youth precarity in developing countries; d) how these technologies affect smallholders farmers; gender equity and women's empowerment; and rural communities at scale e) systematic impact evidence for digital innovations deployed at scale (Abate et al., 2023; Berdegué et al., 2023).

Digital innovation offers substantial promise for transforming agri-food systems, but it is still an evolving field. An equity-sensitive approach is critical to avoid reinforcing existing inequalities within rural economies. As digital

tools progress, policies and research should aim to prevent inequity from becoming "baked in," ensuring sustainable and inclusive growth in the agri-food sector.

Section 2: A framework for considering equity and inclusion issues

A framework for considering equity

Given this context, we propose a possible framework for considering equitable outcomes, as value-chain actors navigate these thorny issues. We apply this framework to a selection of interventions currently being tested in the CGIAR Rethinking Food Markets Initiative in Section 3.

This framework is structured around three elements[3]:

- The **dimension** of equity that the action relates to
- The **context** influencing the situation
- In which **domain** (relationship(s)) is equity being reached for.

What sets equity apart from equality is taking external factors and individual needs into account to create equal outcomes, and these two latter elements of the framework help reach this goal. Consideration of all three steps will help to effectively address inequities within value chains.

Element 1: Dimensions of equitable actions

This framework focuses on three dimensions of equity:

- **Equitable distribution:** Equity in distribution of gains or benefits from activities (*e.g. distribution of profits or costs across a value chain. In the context of digital innovations this could mean spreading the cost of maintenance, or returning value to data providers, who are usually the users*)

- **Equitable procedures:** Equity in processes, policies and procedures for decision-making (*e.g. equity in whose voice and vote is brought into decision-making, or in the context of digital innovations, who is involved in the design of platforms or innovations*)

- **Equitable recognition:** Equity in whose knowledge or ideas we recognise and merit (*e.g. recognising indigenous knowledge, different cultural experiences that inform activities and decisions. In the context of digital ag-innovations, this could involve recognition of traditional farming techniques.*)
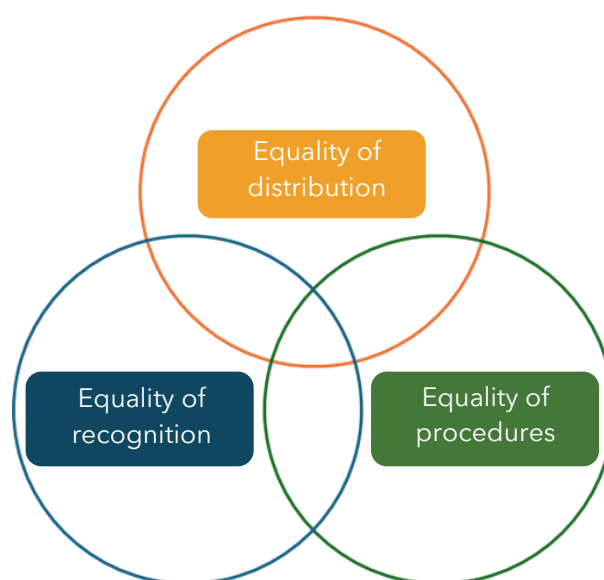

Figure 1: The dimensions of equity

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[3] This framework draws on existing academic frameworks to determine the dimensions of equity that are most relevant to areas of inequity applicable to sustainable value chains. Further details can be found in (McDermott et al., 2013); (Bennett, 2022); and (Schreckenberg et al., 2016). See the bibliography for full details of these papers.

The benefit of breaking down the dimension is to gain clarity on where equity is trying to be advanced, and to fully unpack the complexity of any intersections.

Element 2: Considering equity in the wider context

Contextual equity, sometimes called equitable enabling conditions, refers to the political, economic, or social conditions that affect how equitable outcomes can be reached, within the three dimensions outlined. Pre-existing systems of power, access and capabilities will affect what actions are possible. Conversely, the effectiveness of any action on equity will be highly dependent on the context.

Actions within sustainable value chains may look to improve equity along one or more of the dimensions outlined above, but it must also take into account, and ultimately aim to improve, equity at a contextual level to be impactful.

Actions aimed at improving distributional, procedural, or recognitional equity cannot progress if the context prevents these actions from being realised. In this sense, the context sits on its own as a dimension of equity surrounding the other three dimensions, both affecting and being affected by actions to advance equity.
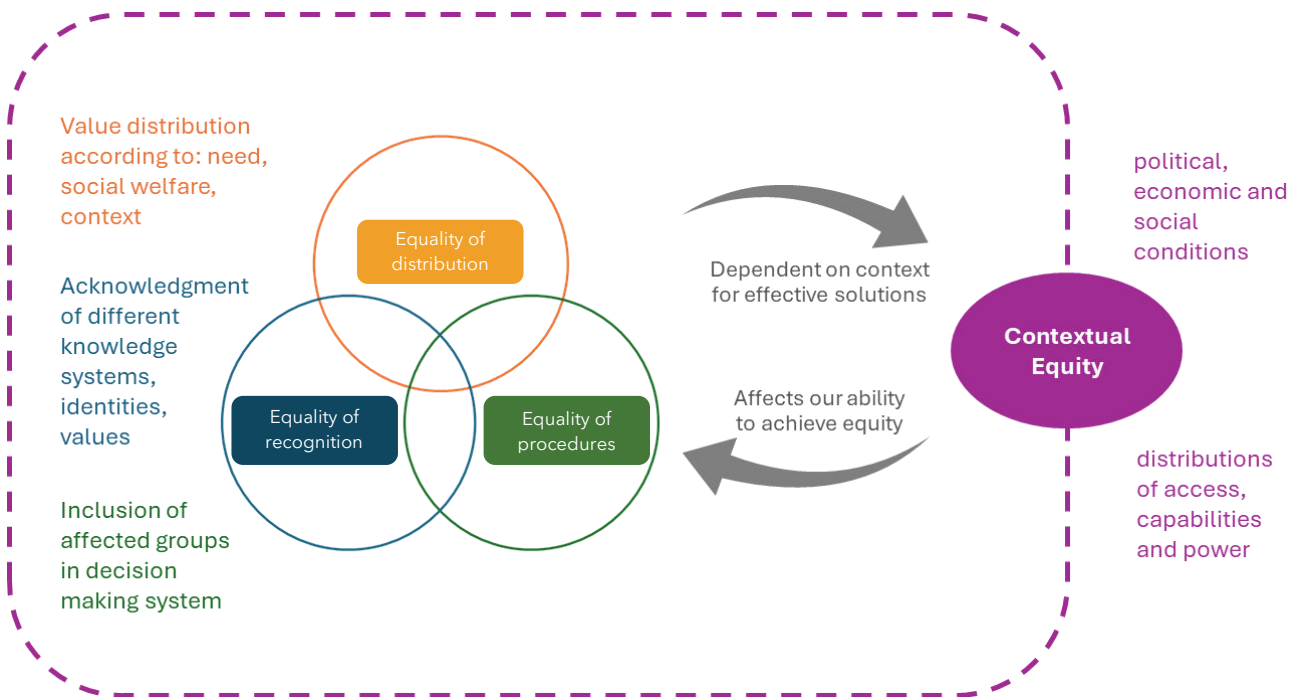

Figure 2: The dimensions of equity in relation to the equity of the context

Examples of contextual conditions that may enable or disable equitable outcomes can include (Franks and Adrian, 2016):

- Legal, political, and social recognition of all governance types and actors *e.g. are cooperatives and unions formally recognised and accepted in the operating area?*

- Relevant actors having awareness and capacity to achieve recognition and participate effectively *e.g. in the context of digital finance, are there actors that are barred from formal financial systems?*

- Alignment to statutory and customary laws and norms *e.g. in the context of agricultural settings, are traditional techniques valued at a policy level?*

In the context of digital innovations, this element involves not only the enabling policies covered in Section 1 but a whole host of wider considerations that become more or less pertinent depending on the context and interventions, as briefly shown in the above details.

Element 3: Domain

If the dimension helps to think through the equity of an action, then the domain qualifies where and for whom equity is being reached by taking that action. As mentioned in box 1, equity is primarily a relational concept, and this gets to the heart of this. Figure 3 below gives a non-exhaustive list of domains, from most individual to most collective, along with examples.

As with the dimension(s), the domain will also be affected by the context and enabling conditions, and the domain chosen will create in turn more contextual elements to take into consideration.
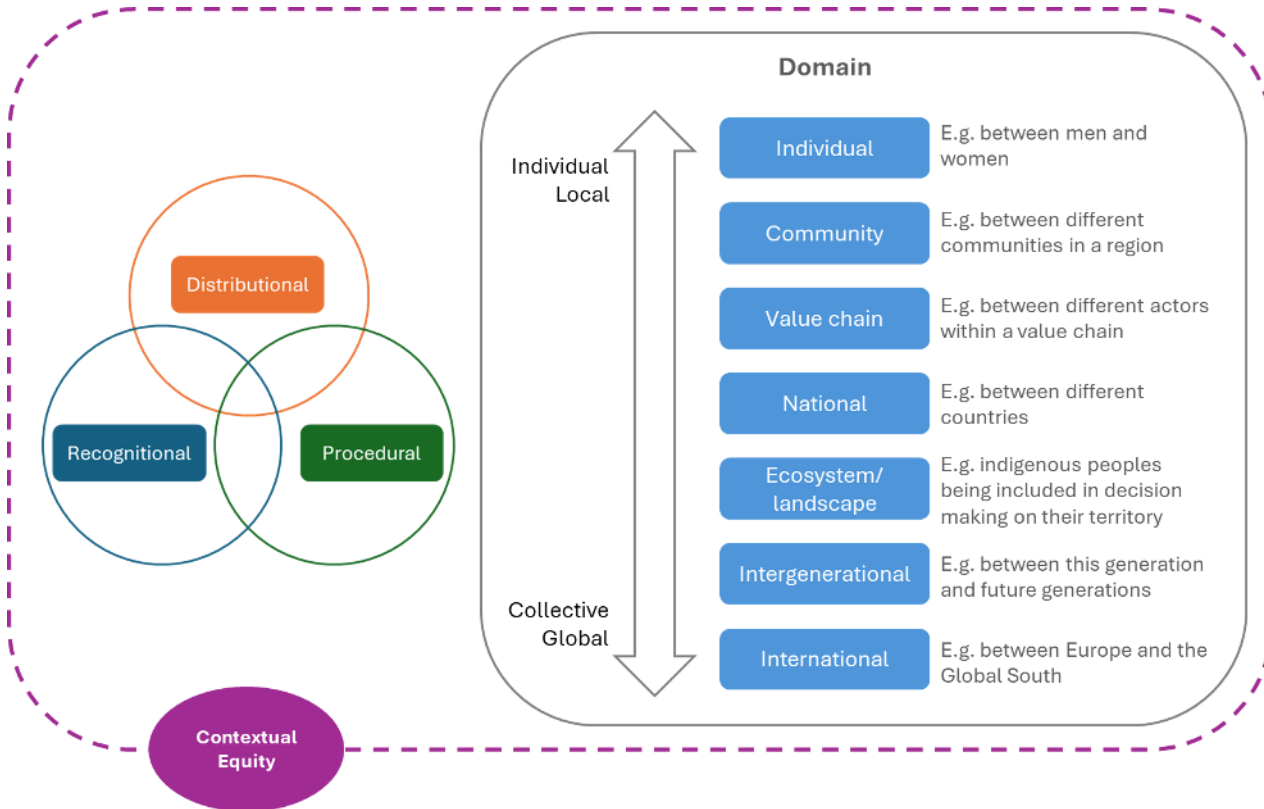

Figure 3: The full equity framework with a non-exhaustive list of domains

It is important to think about the domain, as focusing on different domains will create different equitable outcomes, for a similar action. For example, an action prioritising equitable distribution around ensuring decent livelihoods might have an outcome of gender equity if focusing on an individual level. If the same action focuses on a community, landscape, or national level, it might focus on avoiding pockets of wealth. If the domain is intergenerational, the focus will be on resource management to maintain livelihoods for future generations.

Use of the framework by digital agricultural value chain actors

Fundamentally the proposed framework can be used by any value chain actor to consider the actions of and interactions with any other supply chain actor. However, in the context of agriculture and, especially in the context of digital innovations, it is most likely that this framework will be used by more powerful actors – be that governmental or corporate players - to think through the impact of actions on more vulnerable actors – which is most often women, youth, and asset-poor smallholders and other on- and off-farm workers.

However, as Abate et al. (2023) set out, it is then important to recognise and address market constraint for smallholders specifically – like individual and collective marketing capabilities – by providing more end-to-end digital solutions and whole-of-value-chain coordination. This includes but is not limited to "identifying multiple suppliers and consumers of products and services along a value chain, coordinating post-harvest, transport, processing, and warehousing activities, and facilitating services such as price information, credit provision, and payments".

There is a need for a more collaborative and consultative approach to equity in this particular space in order to seriously appraise and deliver equitable outcomes. While public policies can focus on the enabling environment and complementary investment, the creation and use of these technologies is the domain of the private sector – in the form of digital developers and agricultural producers (Schroeder et al., 2021). Acknowledging these roles, special attention should be paid to power dynamics between parties as part of an appraisal of the equity of the context.

Section 3: Applying the equity framework to digital tools in agri-food systems

In this section we cover some of the main equity issues associated with the most popular digital tools (mobile apps, websites, and digital platforms), as a way of familiarising readers with the framework. We then introduce three case studies of digital interventions that are being tested as part of the CGIAR Rethinking Food Markets Initiative, which are supporting the development of more inclusive and sustainable agri-food value chains.

Smartphone app-, website- and platform-based interventions

Table 2 shows a non-exhaustive list of distribution, recognition, and procedure-based equity issues that could be considered for these kind of digital tools

Table 2: Examples of equity issues split by dimensions of distribution, recognition, and procedures

Dimension	Issue	Description
	Digital access	Digital access issues - such as affordability - impacts how the benefits derived from using one of these tools are distributed (e.g., financial results, market insights, quality assessment results).
		Actors, like technology developers and internet providers, could target disparities in access in order to unlock more equitable outcomes.
	Returning value to data providers	Often valuable data is collected from technology users, aggregated and sold on.
		For more equitable and inclusive outcomes, actors such as technology operators and intermediaries involved in trading "big data", should look at equitably sharing benefits and insights derived from data with the communities or individuals who provide it.
Equity of distribution	**Economic and/or employment disparities**	This focuses on ensuring equitable economic gains, as users should not be forced into disadvantageous employment or economic situations due to tech use or requirements (e.g., exclusion from the market if they don't use an app).
		Actors, like governments, unions, and cooperatives, could focus on addressing potential economic exclusion if access to or participation in an influential platform is limited for some groups.
	Environmental impact and sustainability	Communities can experience unequal and unfair environmental impacts related to technology end of use (e.g. disposal of hardware). Issues like the carbon footprint of data centres can also cause negative international and intergenerational impacts through their contribution to climate change.
		Actors, like manufacturers of technology, could focus on designing hardware to last or be more circular, for example through implementing buy-back schemes. Governments can complement these efforts through expanding recycling infrastructure. This would support consumers' abilities to dispose of equipment responsibly, especially when geographically dispersed.

Equity of distribution	**Inclusivity of non-smart phone users**	All actors should be able to benefit regardless of device access. Actors, like service providers, could provide toll-free call or SMS options, recognising the diverse levels of tech access.
Equity of recognition	**Cultural relevance and representation**	Ensuring the design of an app - or other digital tool - respects local culture and language, and content acknowledges the diversity in knowledge and experiences across users, is a key issue of equitable recognition. This also includes acknowledging and incorporating farmers' existing agricultural knowledge and respecting their expertise.
		Technology providers, could use a participatory approach or recruit agri-food actors (most likely local farmers and other producers) as paid contributors in the iterative development process. This could be facilitated by NGOs, cooperatives, or unions already operating in the area. There is also a role for local agricultural or commerce ministries, or regulators, in overseeing these processes, depending on the pertinent issues.
	Algorithmic biases	Diverse perspectives and training sets are needed in the development of algorithms to ensure that technologies adequately include and respect all user groups.
		See the "algorithmic biases" issue under equity of procedures for potential actions actors could take.
Equity of procedures	**Design and usability**	Considerations like accessibility and language barriers fall under procedural equity since they relate to ensuring that processes (like app design) accommodate diverse users equitably.
	Data privacy and security	This involves equitable processes to ensure all users understand and consent to data practices (e.g., security, surveillance) and have their privacy respected.
		Actors, such as technology providers, regulators, and unions, could focus on ensuring that users are aware of and can consent to data practices.
	Algorithmic biases	This is closely related to the equitable recognition issue. In this case, it is the design and training of an algorithm itself that bakes in exclusions and misrepresentations.
		Actors, like developers and service providers, could focus on ensuring algorithms used are transparent, tested for biases, and able to include diverse user groups through diverse training sets.
		Actors, such as cooperatives and unions, may wish to closely monitor the implementation of certain technologies to ensure the actors they are representing are themselves deriving value and avoiding harms.
	Inclusive feedback mechanisms	Building processes for farmers to provide feedback on an innovation – perhaps through the used platform or a well-aligned mechanism - could ensure their voices are part of the decision-making and design updates.

Case study 1: An agri-inputs platform in Uganda

In many agricultural settings, smallholders face the twin issues of limited awareness of innovative, higher-quality, and/or safe agricultural inputs, and physical inaccessibility when these are known about.

In Uganda, the digital platform EzyAgric has been pioneered to sell competitively-priced and genuine agricultural inputs via a secure payment method, with a guaranteed money-back scheme if farmers are dissatisfied. The platform then offers timely, affordable, and country-wide delivery of products to farmers, offering reliability and trust to farmers, while removing a layer of risk from farm management.

The platform is paired with in-person agronomic training with a focus on the safe use and handling of agrochemicals. The EzyAgric app also has representatives "in-the-field" through a system of agents embedded in cooperatives. These representatives not only support via digital literacy training but also provide access via community smartphones for those without access.

> **Key facts**
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> **Country focus:** Uganda
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> **Partners:** Akorion Uganda
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> **Sector:** Agriculture (general)
>
> **Domain:** Value chain (increasing equitable outcomes for smallholders)
>
> **Contextual equity issues:** Physical and digital infrastructure provisions

There are a number of elements within the design of the platform that aim at increasing procedural equity. Firstly, the platform increases access to reliable information on agrochemicals in several forms (primarily in-app and via training). The app is then designed to maximise physical access to these inputs via a robust distribution network and maximise the reach of the platform via the network of trusted representatives. These measures accommodate the different conditions Ugandan smallholders find themselves in - from differing literacy levels to more or less-remote physical location, having more or fewer assets.

Ultimately the impacts of the platform are focused on distributing the benefits of agrochemical use and the benefits of increased access to agricultural inputs, while safeguarding against the more harmful aspects, such as chemical misuse. The platform does so by "increasing the size of the pie", rather than pursuing re-distribution.

Additional considerations for innovations with hardware components

The issues in table 2 above are relevant to all digital innovations, however some digital innovations rely on hardware components that go further than the interface (e.g. a computer, tablet, or smartphone). This is the case for the milk-testing example in case study 2, which is meant to make quality differences more visible in the value chain and return value to smallholders. In the case of these kind of "multi-component" digital innovations, the following additional emphasis would need to be placed on who bears the cost of innovations, and how this affects digital access, as innovations that incorporate hardware are often considerably more expensive.

Additional consideration would also need to be placed on who benefits from, and who is harmed by the environmental impact of manufacturing and disposing of hardware. The environmental impact of disposal and the associated pollution can be local, and immediate, but they can also harm communities far into the future. On the flip side however, with increased resource scarcity, there is an opportunity to make value chains more circular if innovations are created with the end of life already in mind.

Case study 2: Quality testing equipment for Milk Collection Centres in Uganda

The dairy sector in Uganda grew significantly between 2010-2023. During this period, processing and export activity skyrocketed, driven in part by increases in productivity and quality at the farm level by the use of new breeds of cow. Expectedly, farmers have begun to seek rewards for this increase in yield and quality, but there has been little change in price due to a lack of visibility on quality at the processing stage.

Using milk collection centres (MCCs) as the focal point for change, a Rethinking Food Market Initiative's pilot has implemented milk analysers to allow testing of all incoming milk. This is supported by a tracking app for farmers and MCC staff, and a data visualisation portal targeting enabling decision-makers such as regulators.

The pilot has uncovered two main issues with the introduction of this pilot: 1) the cost of maintenance; 2) the acquisition of replacement parts.

Sourcing replacement parts remains a more complex, contextual issue as it involves international markets and import/export regimes. This is a prime example of where national ministries must collaborate in order to support such innovations.

A note on relational considerations and domain

These case studies focus primarily on the value chain level, with some explicit consideration given to gender issues. However, they all require sensitive consideration of dynamics at the individual level: men and women; old and young actors; asset-rich and asset-poor. Further, they all have an element of intergenerational considerations because of their expressed aim of ensuring the long-term sustainability of the value chain. The purpose of the domain is to help focus thought and provide clarity on where the immediate impact is sought, and does not immediately undermine these more complex relational realities of supply chains, and societies at large.

Key facts

Country focus: Uganda

Partners: Symatech Labs; Ministry of Agriculture Animal Industry and Fisheries (MAAIF); Aviva Equipment Pvt ltd.

Sector: Dairy

Domain: Value chain (increasing equitable outcomes for smallholders)

Contextual equity issues: Limited access to spare parts and maintenance in-country

References

Abate, G.T., Abay, K.A., Chamberlin, J., Kassim, Y., Spielman, D.J., Paul Jr Tabe-Ojong, M., 2023. Digital tools and agricultural market transformation in Africa: Why are they not at scale yet, and what will it take to get there? Food Policy 116, 102439. https://doi.org/10.1016/j.foodpol.2023.102439

Bennett, N.J., 2022. Mainstreaming Equity and Justice in the Ocean. Front. Mar. Sci. 9. https://doi.org/10.3389/fmars.2022.873572

Berdegué, J., Trivelli, C., Corvalán, C., 2023. Creating more and better employment in agrifood systems. CGIAR.

Franks, P., Adrian, M., 2016. From livelihoods to equity for better protected area conservation.

GIZ, 2021. Employment Promotion in the Agri-Food Sector. Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH.

McDermott, M., Mahanty, S., Schreckenberg, K., 2013. Examining equity: A multidimensional framework for assessing equity in payments for ecosystem services. Environmental Science & Policy 33, 416–427. https://doi.org/10.1016/j.envsci.2012.10.006

Schreckenberg, K., Franks, P., Martin, A., Lang, B., 2016. Unpacking equity for protected area conservation. PARKS 22, 11–26. https://doi.org/10.2305/IUCN.CH.2016.PARKS-22-2KS.en

Schroeder, K., Lampietti, J., Elabed, G., 2021. What's Cooking: Digital Transformation of the Agrifood System. World Bank.

Smith, D., Dyer, R., Wandschneider, T., 2020. Making value chains work better for the poor: A toolbook for practitioners of value chain analysis - 4th edition, 4th ed. Australian Centre for International Agricultural Research (ACIAR).

World Bank Group, 2023. Working with smallholders: A handbook for firms building sustainable supply chains - Third Edition.

For questions or feedback, please write to Naomi Black at naomib@isealalliance.org

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