



Connecting the Concepts of Frugality and Inclusion to Appraise Business Practices in Systems of Food Provisioning: A Kenyan Case Study

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Abstract

Small and medium size business enterprises (SMEs) are the linchpin in systems of food provisioning in sub-Saharan Africa. These businesses occupy the middle of the agri-food chain and face a food security conundrum: they must ensure that small-holder producers of limited means can operate under fair terms while low-income consumers are supplied with affordable and nutritious food. This task becomes even more challenging when resources are scarce. This paper explores how resource-constrained SMEs arrange the terms on which both farmers and consumers are included in agri-food chains. To this end, it combines the concept of inclusion with that of frugality. We use the case of a Kenyan SME to demonstrate how a focus on frugality can advance our understanding of how business practices create thriving business relationships with smallholders while simultaneously ensuring access to affordable food for consumers. We additionally identify what conditions for inclusion emerge from this type of dynamic business practices. Our perspective departs from assessing induced organisational interventions, such as contract farming or cooperatives, which deliberately shorten the agri-food chain, thereby overlooking the skilful practices being employed by business actors in the middle of the chain.

Keywords Food and nutrition security · Value chains · Inclusive development · Food systems

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Introduction

Food insecurity and the related problems of hunger and malnourishment remain a major problem on the international agenda. Realising food and nutrition security is contingent on two sides of inclusion (Schouten & Vellema, 2019). On the one hand, farmers producing food under specific agro-ecological and socioeconomic conditions are integrated into markets and agribusiness (Ros-Tonen et al., 2019). On the other hand, consumers, with varying sources and levels of income, must be able to access food in local markets (Thorpe & Reed, 2016; Wertheim-Heck et al., 2015, 2019). How business make this connection between food production and consumption affects the conditions for realising food and nutrition security under conditions of scarcity. In systems of food provisioning, a key challenge is what Giller (2020) coined the food security conundrum of sub-Saharan Africa: how to provide affordable and nutritious food to growing urban and rural populations while ensuring that smallholder farmers have a remunerative and just relationship with food markets and agribusiness?

Our premise is that in many agri-food chains, a network of small and medium size business enterprises (SMEs) assembles the inherent link between food production and consumption. SMEs have a private owner, a limited number of employees (<250), and manage relatively small volumes of produce and cash. We focus on agri-food chains characterised by a largely self-regulated and coordinated network of SMEs creating access to affordable food for low-income consumers. In the middle of the agri-food chain, SMEs handle the entangled practices of sourcing, transporting, processing, packaging and distributing food, whether in a rural or urban context (Demmler, 2020). Moreover, they interact with both producers and consumers of food scattered over large and diverse production areas. Processes of intermediation and orchestration in the middle segment of agri-food chains play a fundamental role in fulfilling the basic human need to consume food by ensuring consistent product flows in precarious food markets. Moreover, resource-constrained SMEs in the middle of the agri-food chains connect to suppliers of food: we have a specific interest in smallholder food producers who till small pieces of land to secure a livelihood while navigating the conditions for market entry.

Food and nutrition security outcomes depend in part on the capacity of SMEs in the middle of agri-food chains to navigate both uncertain market conditions and unpredictable natural environments. Scarcity is omnipresent within agri-food chains: farmers produce food with minimal production means, while growing numbers of low-income consumers have limited resources to purchase food. SMEs operating in the middle of agri-food chains are the prime actors coping with scarcity on both the production and consumption side. Therefore, this paper investigates the business practices of resource-constrained SMEs placed in the middle of agri-food chains connecting both sides of food provisioning: the consumption and production of food. We aim to investigate how, under conditions of scarcity, these practices create both the terms of inclusion for smallholder food producers and the terms of access to food for low-income consumers.

Studies of food systems and agri-food chains have become cognisant of business practices in the middle of agri-food chains connecting production and consumption (Liverpool-Tasie et al., 2020; Nordhagen et al., 2021; Reardon, 2015; Schoonhoven-Speijer & Vellema, 2020; Veldhuizen et al., 2020). It is increasingly recognised that SMEs play an essential role in ensuring access to healthy, nutritious, and affordable food, also in the context of crises or shocks (Reardon & Swinnen, 2020; Wegerif, 2020). Moreover, the central position of practices in the middle of food provisioning implies looking at entangled processes across the entire value chain (Tiwari & de Waal, 2019; Veldhuizen et al., 2020). A strategic and operational challenge for SMEs is how to make a robust connection between the collection of raw materials and the distribution of food in markets frequented by low-income consumers or located in remote areas. We take the business practices of SMEs as entry point for unravelling how producers upstream of the agri-food chain and consumers downstream are included and connected in food provisioning.

To qualify how resource-constrained SMEs in the middle of food provisioning do business, we build on the recently renewed interest in frugality. In settings of scarcity, frugality exposes the interconnection between human needs and natural environments, and guides searches for simple and effective technologies accessible to large groups of users (Roiland, 2016). We consider frugality as a specific reality of evolving business practices, which configure human capacities with the use of tools and techniques under specific agro-ecological conditions (Hossain, 2018; Leliveld et al., 2022; Martignon & Hoffrage, 2002). This perspective takes resource constraints as a pre-condition in business practices in emerging markets and contexts of poverty (Muradian, 2019). We use frugality for exploring search and decision-making processes contributing to inclusive development pathways (Lehtokunnas et al., 2020; Vincentnathan, 2012). Our study traces evolving and sequential decision-making processes, with a focus on actual performance and the practicability of problem-solving actions (Vellema, 2016). Therefore, we examine daily and incremental practices of problem-solving and experimentation by SMEs, which shape inclusion of both food producers and consumers.

To appraise business practices in system of food provisioning, we present a case study of a Kenyan SME making the connection between small sorghum producers and different market channels. The SME operated as a sorghum aggregator sourcing from farmers in rural communities in drier areas of Meru County, Kenya. The SME also became involved in marketing dry farm produce, such as processed and milled flour or whole grains and cereals. We document how this SME dealt with scarcity and show how the resulting business practices affect the terms of inclusion and terms of access on both sides of the agri-food chain. We investigate how inclusion materialises in the frugal practices of SMEs connecting both food producers and consumers under harsh and uncertain agro-ecological conditions.

The outline of the paper is as follows. First, we introduce and explain the concept of frugality and motivate the methodological choice to focus on frugal business practices, as sites where inclusion is configured. Next, we introduce the methods grounded in action research embedded in a business-oriented development program. After presenting the case study in the results section, we discuss conditions under which agribusinesses are most likely to successfully safeguard livelihoods for

smallholder farmers of limited means in combination with secure access to affordable and nutritious food for low-income consumers.

Analysing Inclusion with a Frugality Lens

Our analytical approach incorporates frugality thinking into discourses on inclusive development. The combination of frugality and inclusion has value for research in contexts in which scarcity importantly determines what choices are available in organising food provisioning. We consider this of special relevance in contexts where frugality is not a matter of choice but a reality for both smallholder producers and low-income consumers facing resource constraints. Frugality, as a concept, offers space to unravel how SMEs handle the paradox of attempting to adequately remunerate food producers while providing consumers with access to affordable food. SMEs are essential providers of products, services and solutions tailored to customers in resource-constrained settings in poor countries (Kaplinsky, 2011). Therefore, analysing the role of frugality in business practices of SMEs can contribute to our understanding of the conditions for meeting the basic human needs of earning a decent income and having access to enough nutritious food. Below, we first introduce the concept of frugality and then make the connection to how we investigate inclusion.

Conceptualising Frugality

The more recent literature on frugality reveals a strong interest in frugal innovations: products that are affordable and reengineered to situations of scarcity. Studies in the food domain relate to the question how food industries decrease their resource use (Bocken et al., 2020) or avoid food waste (Kor, Prabhu, & Esposito, 2017), which links frugal innovation to environmental sustainability of the supply chain (Shibin et al., 2018) and doing more with less (Soni & Krishnan, 2014). Other studies concentrate on multinational companies making goods accessible for consumers with lower disposable incomes, for example by selling these goods in smaller quantities and/or by incorporating micro-entrepreneurs in their distribution networks (van Beers, Knorrinda, & Leliveld, 2020). This research on frugal innovation invokes a definitional debate on the characteristics of frugal innovations (Hossain, 2018; Weyrauch & Herstatt, 2017). Studies on frugal innovation related to agricultural production focus strongly on low-cost equipment and machinery provided to smallholder farmers (Ramirez et al., 2018). The bias towards product innovations reinforces an exclusive focus on companies that create and distribute products affordable for actors with limited resources, be they consumers or smallholder farmers. However, this angle runs the risk of losing sight of the relational nature of food provisioning, which is central to our interest in business practices in the middle of agri-food chains mediating inclusion.

For our research, we return to the original idea of frugality that has been explored in a variety of disciplines like philosophy, religion, psychology, and economics

(Lastovicka et al., 1999). In this literature, frugality refers to a restraint and virtue, or to virtuous ways to accumulate capital through saving and avoiding wastefulness (Burrige, 2012). Such a frugality lens emphasises prudent use of scarce resources to achieve practical ends, selecting low-cost and good-enough solutions to overcome local constraints, making best bets when information is scarce, transmitting repair and improvisational skills to prolong the use of resources, and avoiding waste or the use of nonessential items (Devi and Kumar, 2018). This aligns with the perspective of Bhaduri et al. (2018) on food security, which employs scholarship on decision theory (Gigerenzer, 2007). They analyse frugality as an intrinsic element of search and decision-making processes under conditions of resource constraints.

The concept of frugality (Jain & Bhaduri, 2021) underscores the cumulative effect of implementing experimental and improvisational practices in an effort to realise good enough solutions. A frugality lens can reveal how contextualised skills and intuitions function even under constraint and emphasises flexible learning heuristics (Busch & Barkema, 2021). It highlights practices where actors seek opportunities in adversity and aim to 'do better with less'. Our research focuses on bottom-up attempts to navigate contextual challenges that generate scarcity in raw materials (Bhaduri, Corradi, Kumar, & Sheikh, 2022). Accordingly, we start from frugal practices in the middle of food provisioning and document the role of resource constraints in unfolding search processes (Schonberger, 1987; Srinivas & Sutz, 2008). This offers space to analyse food provisioning as a frugal way of decision-making, in which actors usually make decisions based on experiential knowledge and selective improvisation (Bhaduri et al., 2018). A focus on frugal practices entails learning from 'what actually works' in constraining environments and subsequently investigating how these practices configure inclusion.

Connecting Frugality and Inclusion

Our approach to analysing inclusion fits an emerging literature in development studies making contextualised assessments of the precise terms on which an ensemble of actors is included in business practices (Chamberlain & Anseeuw, 2019; Schouten & Vellema, 2019; German et al., 2020; Schoneveld, 2022; Untari & Vellema, 2022). We investigate inclusion not as a predefined outcome, but rather an evolving and dynamic practice shaping the terms on which people are included (Hospes & Clancy, 2012). The focus on navigation and decision-making, which is central to the frugality lens, implies tracing evolving processes of organising food provisioning that configure both the upstream terms of inclusion and the downstream terms of access to food. Frugality recognises that the resulting inclusion of marginalised groups is intricately connected to resource constraints which they, and the businesses or markets they interact with, are facing.

Onsongo and Knorrninga (2020) observe that development and innovation literatures often equate frugality with inclusion, but this neglects the distinct processes and outcomes underlying these concepts. Frugality accentuates the practice of doing more with less, including experimentation and improvisation. Inclusion refers to participation or integration of marginalised social groups. Frugal practices

or innovation may even have outcomes contrasting with inclusion. Meagher (2018), for example, observes selective and disempowering effects of frugal innovation on smallholder producers and low-income consumers. Hence, frugality and inclusion do not necessarily unite. This makes it important to assess how inclusion is configured in a group of resource-constrained business practices mediating the interactions with either suppliers or consumers of food. These intermediary and often distributed practices in food provisioning are of particular relevance in situations where large numbers of smallholder farmers produce food, commonly under conditions of scarcity and in volatile markets. This food is continuously accessed by large numbers of low-income consumers with financial constraints.

By coupling frugality and inclusion, we integrate material constraints and conditions of scarcity to analyse how the *modus operandi* of SMEs in the middle of agri-food chains affects inclusion (Hoffecker, 2021). Organising food provisioning originates in everyday practices related to bringing and assembling food, such as sourcing, transporting, warehousing, retailing, and trading (Legun & Bell, 2016). It also entails SMEs navigating tensions emerging from differences in power and resources between SMEs and lead firms who operate in the same sub-sector and are often competing for similar raw materials (Akinyoade et al., 2016). How SMEs navigate scarcity becomes manifest when focussing on the temporal dimensions of food provisioning, e.g., seasonality and perishability, as well as the spatial dimensions, e.g., aggregate agricultural produce from various, often remote locations (Mangnus & Vellema, 2019). Projecting subsequent moments of decision-making reveals capacities to handle scarcity, anticipate seasonality, navigate large geographical spaces, mobilise working capital, and foster problem-solving by doing more with less or innovating with constrained resources.

By using a frugality lens to analyse how intermediary sites in agri-food chains configure inclusion, we centre our research on (Fig. 1):

1. Resource-constrained business practices navigating conditions of scarcity on the supply side;
2. The orchestration of financial, logistical, and technical competencies distributed across the agri-food chain;
3. Flexible learning heuristics that draw on comprehensive knowledge of local institutions that is acquired through practical experience.

Methodology and Methods

Unit of Analysis: Practices in the Middle of Agri-Food Chains

We present a case study tracing how the SME connected to a variety of other business actors, including a leading beer brewery looking for a consistent flow of raw materials and a diverse network of aggregators and distributors embedded in rural communities. We start from the socio-material practices of this SME operating in the middle of agri-food chains (Vellema et al., 2022a, 2022b). We build on the methodological guidance offered by Nicolini (2009) and zoom in on practices of handling

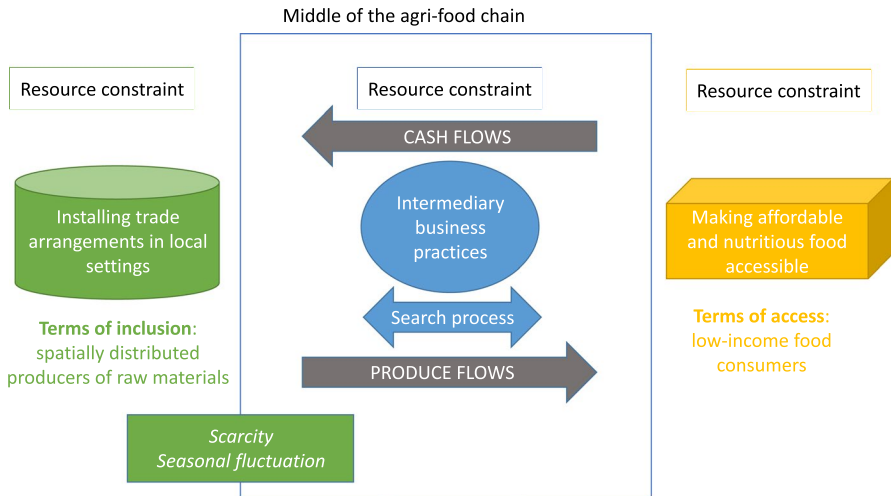


Fig. 1 Business practices coupling frugality and inclusion in the middle of agri-food chains (source: authors)

cash and product flows (Schoonhoven-Speijer & Vellema, 2020; Schoonhoven-Speijer et al., 2017). By distinguishing separate phases in the search process of the SME, we identify subsequent configurations shaping inclusion. We map how the business practices of the SME evolve, adapt to challenges in both the socioeconomic and bio-physical environments, and connect to other practices. This highlights the material conditions under which business practices handle fluctuating and unreliable produce flows and manage stocks, which reveals the frugality dimension.

Research Area

The case study is situated in Meru County, which lies on the north-east slopes of Mount Kenya. It is an agricultural county with 23 percent of its land coverage under food crop production (Kimathi et al., 2021). The area encompasses a variety of ecological zones ranging from extremely fertile, well-watered agricultural areas to low-lying semi-arid lands. Rising relative food costs over the past decades have led to decreasing levels of food security in Kenya; the most severely affected households are those that rely on informal markets or reside in rural areas (Korir et al., 2020).

Case Selection

Shalem Investments is a family-owned, small-to medium sized Kenyan agri-business (‘the SME’) with eight employees at the time of research. As a buying agent for East African Breweries, the SME sources sorghum from a network of aggregator-producer organisations, which in turn obtain produce from a network of approximately 9,000 smallholder farmers. The SME targets buying 6,000 tons of sorghum

per year. It collaborates and shares staff with a non-government organisation whose mission is to improve the socioeconomic status of marginalised people. It receives support through a partnership with a publicly supported development program: 2SCALE. 2SCALE engages in partnering processes situated in agri-business value chains, targeting domestic markets in sub-Saharan Africa. 2SCALE, which started in June 2012, positions itself as an incubator for inclusive agribusiness and is funded by the Dutch Ministry of Foreign Affairs. 2SCALE aims to build partnerships that connect farmers, buyers, and intermediaries, enabling them to create and grow new businesses and at the same time to supply quality products to end-users, including low-income consumers.

Data Collection and Analysis

The research for this study was embedded in the 2SCALE program and based on multiple sources of data. Firstly, 2SCALE granted the authors full access to the partnership archive, comprising partnership agreements, progress reports, minutes of partnership meetings, contracts, and technical reports. Secondly, the research team conducted field work in Kenya, focussing specifically on the practices and arrangements underlying the sourcing and selling of raw materials. This field research took place in September 2017, was organised in close collaboration with 2SCALE staff, and consisted of 13 interviews with key stakeholders (9 with agents working with Shalem; 1 with an insurance company; 1 with public extension services; 1 with a financial service provider; 1 with 2 interviewees from East African Breweries Limited); 3 focus group discussions with 5–6 employees of both Shalem and 2SCALE; and multiple visits to farms, community-based aggregators and the SME. A first round of coding was performed by the first author along the three dimensions of the frugality lens as presented above. These preliminary results were subsequently discussed with the co-authors to arrive at a more fine-grained analysis of the case. As a next step, the results were presented in a chronological manner to show the evolving process nature of the identified frugal practices.

Case Study: Frugal Business Practices Configuring Inclusion

The SME central to the case study is positioned in the middle of the agri-food chain. Figure 2 presents the produce flows in the emerging actor network. In this section, we identify separate phases in how the SME configured the institutional features of food provisioning. Initially, it concentrated primarily on sourcing agricultural produce for a single buyer, with sorghum as its main commodity. Subsequently, the SME also aggregated other staple crops, such as maize, beans and green grams, started to supply rural food markets and ventured into marketing dry farm produce, such as processed and milled flour or whole grains and cereals. In this chronology of evolving processes, navigating scarcity appears as a driving process, feeding the two dimensions revealed by a frugality lens: orchestrating distributed competencies and accommodating flexible learning heuristics.

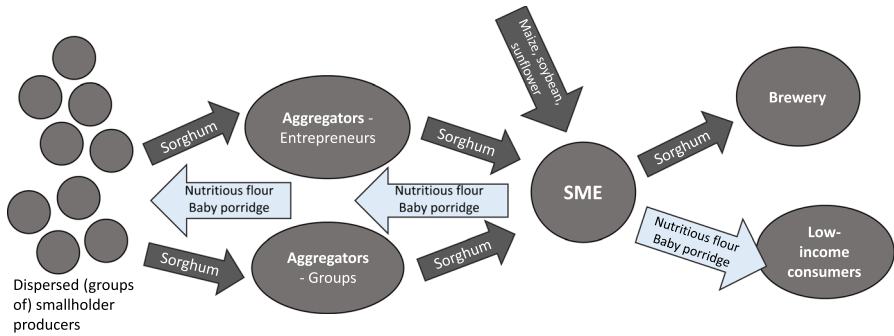


Fig. 2 Produce flows and actor network in the case study (source: authors)

Navigating Scarcity at the Supply Side

Ensuring consistency in sourcing was a major strategic and operational challenge for the SME. An arrangement with a large industrial end-user of raw materials, East African Breweries, majority owned since 2000 by Guinness maker Diageo, formed the starting point for the search process of the SME (Chabari & Idowu, 2019). The SME's core business was to source sorghum as raw material for the beer brewery, as an alternative to barley as raw material. The SME depended heavily on the brewery as a single buyer. The brewery had launched a low-priced sorghum-based beer in 2004, the brand Senator Keg, which has gained a large share in the Kenyan beer market. After rains failed in 2009, the brewery was confronted with its strategic vulnerability in access to sorghum as its main raw material. The brewery recognised the importance of locally produced sorghum, with drought-tolerant traits, and aligned with the SME to safeguard access to this cheap source for raw material.

The operations of the SME, as an aggregator for sorghum produced by smallholder farmers, were vulnerable to political decisions (Orr, 2018). The beer brewery's shift to locally sourced raw materials, such as sorghum, millet, or cassava, was a commercially viable option because of a tax break that made sorghum beer competitive in price with dangerous illegal brews consumed by low-income consumers (Reddy & Perepu, 2014). An excise tax and a levy on sorghum used for beer, introduced in 2013 as a response to state deficits, threatened the local sourcing of raw materials. However, the connection between major beer companies and local farmers was again reinforced by a national bill signed in 2017, which cut excise tax for beers manufactured using at least 75% locally sourced raw materials.

Initially, the SME encountered numerous difficulties in ensuring a consistent flow of sorghum from farmers to buyer. It faced competition from other buyers to whom farmers and village aggregators sold their produce. The strategy of the SME to source from large numbers of small and often vulnerable farmers depended strongly on the relationship with the beer brewery. This relationship featured unpredictable price setting. Concurrently, the connection to the brewery provided a relatively steady bulk market for large volumes sourced from many smallholder farmers. The capacity of the SME to sustain access to a wide network

of farmers has been a key asset for the brewery. However, working capital for the SME to buy produce was limited. This emerging but still fragile relationship between brewery and SME became the starting point for the SME's partnership with the 2SCALE-program.

The SME constantly searched for ways to organise access to raw materials. There were no easy fixes, and the variety of suppliers and contexts encouraged the SME to improvise and explore whatever arrangements could work. In the beginning of their partnership, the SME and 2SCALE focused on agricultural practices and technical problems in post-harvest handling. Gradually, however, the partnership endeavoured to expand the catchment area of the SME and build a network of small-scale aggregators located in rural communities. This group of aggregators became a central pillar to the SME's strategy. Therefore, it searched for ways to engage with local aggregators to secure its supply. One way was to offer premium prices to assure access to steady quantities of quality sorghum (Dijkxhoorn et al., 2017). The expansion of the SME's network entailed a shift from being an agent of the brewery to performing the task of orchestrating and aligning a variety of aggregators.

Weaving the web of aggregators also involved the riskier task of ensuring working capital for resource-constrained aggregators to purchase produce when raw materials were scarce. The SME delegated the task of purchasing sorghum from a wide range of smallholder producers to village-based aggregators. For this purpose, it created a web of spatially distributed practices that shaped the terms of inclusion of smallholder producers. During the time of field work, the SME worked with around 80 aggregators, most of which were self-employed women running resource-constrained micro-enterprises in the village economy (Roy & Wheeler, 2006). One aggregator began as a shop assistant and used seed capital from the SME to start purchasing sorghum, limited to one or two bags at a time. The link to the SME enabled her to expand her micro-enterprise, and she also decided to sell farm inputs and tools. The SME considered this aggregator as a leading example, not least because she stayed connected to the farmers in her vicinity. Her micro-enterprise reflects the skill to make her diversified business commercially viable while achieving a degree of predictability in the transactions with small-scale suppliers of sorghum.

Working with and sustaining a network of diverse village-based aggregators proved to be vital for the SME: it could rely on their capacity to organise sufficient volume of quality produce before sending a truck to collect the material. An important feature of the emerging web of aggregators was the proximity to farmers producing sorghum. Most of the aggregators did not have the means to collect the sorghum from the farm themselves. Hence, they waited at their store and their close connections with farmers gave some assurance of supply. In interviews, aggregators explained that they normally accepted all volumes a farmer delivered, varying from one kilogram to a bag. The proximity of the SME enabled improvisational actions, such as arranging thresher services close to farmers' fields and ensuring proper drying under suddenly changing weather conditions (Chabari & Idowu, 2019). Aggregators mentioned the importance of linking to existing self-help groups involved in table banking, a self-organised way to create access to credit or capital (Gichuki, Mutuku, & Kinuthia, 2015; Lambisia et al., 2016). Supported by the partnership with 2SCALE, the micro-aggregators working with the SME also acted as coaches,

which enabled organising groups or establishing linkages with smaller farmer groups and offering access to insurance schemes.

Orchestrating Distributed Competencies

The SME mobilised and combined financial, logistical, and technical competencies to navigate resource constraints. The SME opted for installing a set of flexible and varied arrangements with an expanding network of aggregators. It developed different modalities of sourcing, tailored to the particular situation of aggregators located in specific rural communities and consequently used a portfolio of sourcing arrangements. In some communities, the SME worked with experienced smaller family-run enterprises, acting as aggregators. In vulnerable communities in drought-affected areas, the SME worked with church-based groups as a basis for aggregation with a storage facility next to the church. The SME also delivered seed to these groups and waited for their call informing them that sorghum was harvested and there was sufficient volume to collect. One aggregator explained that she ran a group store, where farmers received a receipt and had to wait for the actual payment, and a private store, where she paid cash on delivery.

After a process of selecting village aggregators, working with them, and trying to ensure loyalty, the SME succeeded in sustaining a network of local stores as sites for buying and selling: the village aggregators handled most of the money affairs. Keeping this network of aggregators intact involved a joint effort to handle resource constraints, which mainly materialised in the availability of working capital. Mobilising sufficient working capital at the start of the harvesting season was mentioned as a constant major obstacle to engaging in procurement and paying farmers cash on delivery. However, the SME reported instances wherein farmers supplied village aggregators without immediate payment; this was one of the advantages of aggregators deeply rooted in the community or, for example, closely connected to churches. This indicates that the SME and its network of village aggregators navigated resource constraints by fitting business operations into the wider social fabric of the village. Hence, orchestrating its network was supported by contextual knowledge of diverse local institutions, and a flexible approach to arranging transactions.

Accommodating Flexible Learning Heuristics

Learning-by-doing combined with flexible search processes and improvisational actions enabled the SME to diversify and expand its business. The SME wanted to be less dependent on a single buyer and considered itself to be a social enterprise tasked to contribute to food and nutrition security in a drought-prone area. It developed an interest in targeting rural communities as consumers, not only as producers. In the rural villages constituting the original sourcing base of the SME, many farming households were net consumers of food. Although farmers delivered sorghum and other farm products, the farming households still had to buy food. As a first step, the SME began to manufacture nutritious flour based on multiple crops, such as sorghum, maize, soybean, and sunflowers. With support from 2SCALE, it

ventured into piloting nutritional household products, such as fortified sorghum flour for general domestic use and sorghum-based baby porridge. This product portfolio was distributed by its local agents in the rural communities. This entailed learning how to process food ingredients and develop and distribute competitive and low-priced food products in a setting where access to raw materials is limited and uncertain. Incrementally, the SME learned how to use skills, tools, techniques, and know-how to aggregate, sort, grade, clean and transform local raw materials into affordable end-use products.

The SME expanded the manufacturing of food products appropriate for local diets. However, this is not the entire story. Maintaining the network of aggregators seemed to be essential for guaranteeing low-income consumers access to nutritious food products at affordable prices. The logistical infrastructure that originated from the SME's sourcing strategy enabled it to distribute food products at relatively low cost. For arranging distribution of its food products in the rural communities, the aggregators and their stores became pivotal. These aggregators organised a reliable hub, in which they combined the sourcing of raw materials and the distribution of affordable food. The connectivity realised between food production and consumption largely originated in the SME's ability to manage multiple relationships and orchestrate distributed practices, which complemented its initial dependency relationship with a leading brewery. Eventually, the SME aligned a diverse set of frugal practices of resource-constrained village aggregators managing stores as sites which arranged the supply and payment for raw materials and provided access to food to low-income buyers in rural communities. The SME's deep knowledge of local institutions gained through practical experiences enabled it to navigate the diverse conditions of its suppliers. This reflected flexible heuristics on the part of the SME, which did not opt for a uniform model of organising sourcing transactions.

Configuring Inclusion

Table 1 connects the evolving frugal business practices of the SME to emerging conditions under which agribusinesses are most likely to be able to offer advantageous arrangements to smallholder farmers while simultaneously assuring low-income consumers of access to affordable and nutritious food. The capacities of the SME to navigate scarcity were partly co-created and reinforced by its partnership with both the larger beer company and a development program. These capacities radiate towards conditions of inclusion for smallholder farmers supplying raw materials, who were often also recipients of affordable food. The institutional implications of the SME's business practices introduced a degree of predictability for farmers, which also translated into transparent and fair remuneration. Additionally, access to affordable food entailed orchestrating distributed competencies related to the sourcing of raw materials; this brokering capacity made the SME a central player in constructing local food provisioning networks, going beyond a mere extractive strategy exclusively centred on the provision of raw materials. Affordability of food, especially in rural communities, improved, partly due to enhanced and cost-efficient logistics on both the upstream and downstream sides of food provisioning. The

Table 1 The emerging conditions of inclusion in the case study

Actor configurations		Developmental outcome	
		Arrangements favourable to suppliers of raw materials are more likely	Access to nutritious food products for low-income buyers is more likely
Intermediary businesses in the middle of the agri-food chain		When capacities of intermediaries to cope with resource constraints and scarcity conditions are recognised and reinforced by private and public actors	When capacities of intermediaries to integrate financial and logistical competencies reduce costs in sourcing and distribution of food
Interactions with actors upstream the value chain		When business practices reinforce reliability and predictability in the sourcing of raw materials	When business close to the end-use market remunerate actors sourcing raw materials transparently and fairly
Interactions with actors downstream the value chain		When intermediating actors make smart connections between financial, logistical, and technical dimensions of sourcing raw materials and distributing food	When the provision of food becomes an integral part of business practices functional to the sourcing of raw materials

business practice of the Kenyan SME moved from being only an aggregator strongly dependent on a single beer brewery looking for locally sourced raw materials to a skilful orchestrator establishing agreements that reward local aggregators and their supplying farmers. Eventually, the SME made room to channel affordable and nutritious food back into the rural communities. Interestingly, the market arrangement with a single large buyer seemed to have created this space for inventing alternate modalities for both sourcing agricultural produce and marketing food.

Discussion and Conclusion

We used a frugality lens to investigate how the evolving business practices of an SME positioned in the middle of agri-food chains configure inclusion. The case study centred on the behaviour of a resource-constrained SME, and we aimed to detect processes refashioning both the terms of inclusion of economic actors upstream in the agri-food chain (farmers and aggregators), and the terms of access to food of low-income consumers in rural communities. Our research reveals that business practices of actors managing expandable links between downstream and upstream sides of the agri-food chains are strongly influenced by conditions of scarcity. Scarcity of raw materials, due to climatological conditions or shifting priorities of smallholder suppliers, forced the SME to improvise and subsequently skilfully tailor its institutional arrangements to the business practices of resource-constrained aggregators embedded in diverse rural communities. Aggregation takes place at the sites of intermediary trading, which are an important linchpin in food provisioning. This is where aggregators buy and sell food and manage produce and cash flows. These trading sites represent an evolving set of interdependent improvisational practices of aggregating, sorting, grading, cleaning, and distributing food in resource-constrained and often unpredictable conditions. This emerging web of practices is central to addressing the food security conundrum in settings of scarcity.

Our contextualised understanding of the coupling of frugality and inclusion exposes emerging institutional features of food provisioning. The coupling of frugality and inclusion uncovers how inclusion originates in the ways SMEs combine financial, logistical, and technical practices and respond to the unpredictable nature of food provisioning. The business practice of the SME in the case study involved dedicated institutional work to weave together practices that were organisationally distributed across the agri-food chain and spatially distributed over large and diverse production areas. This process reflects flexible heuristics in interweaving the business of the SME with the varied business practices of local aggregators and the livelihood strategies of smallholder farmers. Therefore, a frugality lens detects business practices that form an entry point for innovation and intervention, influencing both the terms on which suppliers of raw material are included in agri-food chains and the terms on which low-income consumers access affordable products.

This perspective on inclusion diverges from studies evaluating the degree of inclusiveness obtained by designed arrangements or organisational fixes, for example contract farming (Ton et al., 2018) or cooperatives (Bijman & Wijers, 2019). The space offered by a frugality lens is that inclusion is analysed as an

emergent outcome of everyday business practices under conditions of scarcity (cf. Jones & Murphy, 2011). We argue that the emerging configuration of inclusion cannot be easily replaced by externally imposed organisational models formalising and consequently shortening agri-food chains (Vernooij et al., 2023). Our perspective contrasts with this type of interventions, which often purposefully shorten the agri-food chain and thereby overlook the skilful practices of actors occupying the middle of the agri-food chain. In contrast to betting on predefined organisational fixes, a frugality lens is supportive of flexible heuristics in installing tailor-made systems and contextualised forms of collaboration.

A risk of using a frugality lens is to naively celebrate bottom-up practices and to presume that business strategies and commercial interests will contribute to a process of inclusive development favourable for both smallholder farmers and low-income consumers. A limitation of our research is to link a contextualised understanding of frugal practices to an in-depth assessment of changes in the terms of inclusion (cf. Untari & Vellema, 2022; Vellema et al., 2022a, 2022b). Future research combining our process perspective with outcome assessments opens space for comparative studies of creating inclusion in different types of *modus operandi* (Hoffecker, 2021). This enables capturing and typifying the transformative potential of SMEs operating in a frugal manner.

We argue that a frugality lens makes it possible to investigate in what ways and under what conditions certain business practices are likely to enhance the terms of inclusion and access in food provisioning. Hence, we do not argue in favour of unconditional support to SMEs per se. A frugality lens guides an inquiry into how to make strategic use of the experiential knowledge of local business actors for propelling context-specific ways to address inclusive development and food security challenges. Our emphasis on continuously evolving and connected business practices creates space to locate leverage points that could plausibly refashion the terms of inclusion and terms of access to basic needs, not only food but also health or water.

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Declarations

Conflict of interest The authors have no conflicts of interest to declare. All co-authors have seen and agreed to the contents of the manuscript, and there is no financial interest to report.

Consent to participate The researchers acquired the consent of the research participants, who were informed about the aim and use of the study.

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References

- Akinyoade, A., Ekumankama, O., & Uche, C. (2016). The use of local raw materials in beer brewing: Heineken in Nigeria. *Journal of the Institute of Brewing*, 122(4), 682–692.
- Anker, R., & Anker, M. (2017). *Living wages around the world: Manual for measurement*. Edward Elgar Publishing.
- Bhaduri, S., Sinha, K. M., & Knorrinda, P. (2018). Frugality and cross-sectoral policymaking for food security. *NJAS-Wageningen Journal of Life Sciences*, 84, 72–79.
- Bhaduri, S., Corradi, A. A., Kumar, H., & Sheikh, F. A. (2022 forthcoming). Frugality in innovation processes: A heuristics-based perspective from the informal economy. In S. Bhaduri, P. Knorrinda, A. Leliveld, & C. v. Beers (Eds.), *Handbook on Frugal innovation*. Cheltenham: Edgar Elgar.
- Bijman, J., & Wijers, G. (2019). Exploring the inclusiveness of producer cooperatives. *Current Opinion in Environmental Sustainability*, 41, 74–79.
- Bocken, N., Morales, L. S., & Lehner, M. (2020). Sufficiency business strategies in the food industry—the case of Oatly. *Sustainability*, 12(3), 824.
- Burridge, J. (2012). Introduction: Frugality and food in contemporary and historical perspective. *Food and Foodways*, 20(1), 1–7. <https://doi.org/10.1080/07409710.2012.652004>
- Busch, C., & Barkema, H. (2021). From necessity to opportunity: Scaling bricolage across resource-constrained environments. *Strategic Management Journal*, 42(4), 741–773.
- Chabari, J., & Idowu, O. S. (2019). Building inclusive agribusiness: going one step down the ladder makes a difference. In 2SCALE (Ed.), *Business as unusual: Insights from the 2SCALE program* (pp. 67–77). Amsterdam: IFDC, BoP, ICRA, KIT.
- Chamberlain, W. O., & Anseeuw, W. (2019). Inclusiveness revisited: Assessing inclusive businesses in South African agriculture. *Development Southern Africa*, 36(5), 600–615.
- Demmler, K. M., (2020). The Role of Small and Medium-sized Enterprises in Nutritious Food Supply Chains in Africa. *GAIN Working Paper Series #2*. Geneva: Global Alliance for Improved Nutrition (GAIN). <https://doi.org/10.36072/wp.2>
- Devi, W. P., & Kumar, H. (2018). Frugal innovations and actor–network theory: A case of bamboo shoots processing in Manipur, India. *The European Journal of Development Research*, 30(1), 66–83.
- Dijkxhoorn, Y., Plaisier, C., Wagenberg, C. v., Verwaart, T., Verstegen, J., Ruben, R., & Oldenhof, R. (2017). *Value chain laboratory: Alternative evaluation method for assessing value chain dynamics*. Retrieved from Wageningen.
- German, L. A., Bonanno, A. M., Foster, L. C., & Cotula, L. (2020). Inclusive business in agriculture: Evidence from the evolution of agricultural value chains. *World Development*, 134, 105018.
- Gichuki, C. N., Mutuku, M. M., & Kinuthia, L. N. (2015). Influence of participation in table banking on the size of women-owned micro and small enterprises in Kenya. *Journal of Enterprising Communities: People and Places in the Global Economy*.
- Gigerenzer, G. (2007). *Gut feelings: The intelligence of the unconscious*. Penguin.
- Giller, K. E. (2020). The food security conundrum of sub-saharan africa global. *Food Security*, 26, 100431. <https://doi.org/10.1016/j.gfs.2020.100431>

- Hoffecker, E. (2021). Understanding inclusive innovation processes in agricultural systems: A middle-range conceptual model. *World Development*, *140*, 105382.
- Hospes, O., & Clancy, J. (2012). Unpacking the discourse on social inclusion in value chains: Otto Hospes and Joy Clancy. In A. H. J. Helmsing & S. Vellema (Eds.), *Value Chains, Social Inclusion and Economic Development* (pp. 39–57). Routledge.
- Hossain, M. (2018). Frugal innovation: A review and research agenda. *Journal of Cleaner Production*, *182*, 926–936.
- Jain, S., & Bhaduri, S. (2021). The many facets of frugality A Quasi-Comprehensive Literature Review. *Journal of Scientometric Research*, *10*(2), 265–278.
- Jones, A., & Murphy, J. T. (2011). Theorizing practice in economic geography: Foundations, challenges, and possibilities. *Progress in Human Geography*, *35*(3), 366–392.
- Kaplinisky, R. (2011). Schumpeter meets Schumpeter: Appropriate technology below the radar. *Research Policy*, *40*(2), 193–203.
- Kimathi, S. M., Ayuya, O. I., & Mutai, B. (2021). Adoption of climate-resilient potato varieties under partial population exposure and its determinants: Case of smallholder farmers in Meru County. *Kenya. Cogent Food & Agriculture*, *7*(1), 1860185. <https://doi.org/10.1080/23311932.2020.1860185>
- Kor, Y. Y., Prabhu, J., & Esposito, M. (2017). How large food retailers can help solve the food waste crisis. *Harvard Business Review*, *19*.
- Korir, L., Rizov, M., & Ruto, E. (2020). Food security in Kenya: Insights from a household food demand model. *Economic Modelling*, *92*, 99–108. <https://doi.org/10.1016/j.econmod.2020.07.015>
- Lambisia, L., Ngahu, S., & Wagoki, J. (2016). Effect of Table Banking on economic empowerment of self-help groups in Rongai sub-county, Kenya. *International Journal of Economics, Commerce and Management*, *4*(3), 95–113.
- Lastovicka, J. L., Bettencourt, L. A., Hughner, R. S., & Kuntze, R. J. (1999). Lifestyle of the tight and frugal: Theory and measurement. *Journal of Consumer Research*, *26*(1), 85–98.
- Legun, K., & Bell, M. M. (2016). The second middle: Consumers and the agrifood economy. *Journal of Rural Studies*, *48*, 104–114.
- Lehtokunnas, T., Mattila, M., Närvänen, E., & Mesiranta, N. (2020). Towards a circular economy in food consumption: Food waste reduction practices as ethical work. *Journal of Consumer Culture*, *22*(1), 227–324.
- Leliveld, A., Bhaduri, S., Knorrinda, P., & van Beers, C. (2022). Capturing Frugal Innovation. In A. Leliveld, S. Bhaduri, P. Knorrinda, & C. van Beers (Eds.), *Handbook on Frugal Innovation*. Cheltenham: Edgar Elgar.
- Liverpool-Tasie, L. S. O., Wineman, A., Young, S., Tambo, J., Vargas, C., Reardon, T., & Bizikova, L. (2020). A scoping review of market links between value chain actors and small-scale producers in developing regions. *Nature Sustainability*, *3*(10), 799–808. <https://doi.org/10.1038/s41893-020-00621-2>
- Mangnus, E., & Vellema, S. (2019). Persistence and practice of trading networks a case study of the cereal trade in Mali. *Journal of Rural Studies*, *69*, 137–144.
- Martignon, L., & Hoffrage, U. (2002). Fast, frugal, and fit: Simple heuristics for paired comparison. *Theory and Decision*, *52*(1), 29–71.
- Meagher, K. (2018). Cannibalizing the informal economy: Frugal innovation and economic inclusion in Africa. *The European Journal of Development Research*, *30*(1), 17–33.
- Muradian, R. (2019). Frugality as a choice vs. frugality as a social condition. Is de-growth doomed to be a Eurocentric project? *Ecological Economics*, *161*, 257–260.
- Nicolini, D. (2009). Zooming in and out: Studying practices by switching theoretical lenses and trailing connections. *Organization Studies*, *30*(12), 1391–1418.
- Nordhagen, S., Igbeka, U., Rowlands, H., Shine, R. S., Heneghan, E., & Tench, J. (2021). COVID-19 and small enterprises in the food supply chain: Early impacts and implications for longer-term food system resilience in low- and middle-income countries. *World Development*, *141*, 105405. <https://doi.org/10.1016/j.worlddev.2021.105405>
- Onsongo, E. K., & Knorrinda, P. (2020). Comparing frugality and inclusion in innovation for development: logic, process and outcome. *Innovation and Development*, 1–21.
- Orr, A. (2018). Killing the goose? The value chain for sorghum beer in Kenya. *Journal of Agribusiness in Developing and Emerging Economies*, *8*(1), 34–53. <https://doi.org/10.1108/JADEE-03-2017-0028>

- Ramirez, M., Bernal, P., Clarke, I., & Hernandez, I. (2018). The role of social networks in the inclusion of small-scale producers in agri-food developing clusters. *Food Policy*, 77, 59–70.
- Reardon, T. (2015). The hidden middle: the quiet revolution in the midstream of agrifood value chains in developing countries. *Oxford Review of Economic Policy*, 31(1), 45–63. <https://doi.org/10.1093/oxrep/grv011>
- Reardon, T., & Swinnen, J. (2020). COVID-19 and resilience innovations in food supply chains. In J. Swinnen & J. McDermott (Eds.), *IFPRI book chapters* (pp. 132–136). International Food Policy Research Institute (IFPRI).
- Reddy, B., & Perepu, I. (2014). *Senator Keg: Diageo's answer to illicit brews in Kenya*. UK / Wellesley, USA: Retrieved from Beds. <https://www.thecasecentre.org/products/view?id=122097>
- Roiland, D. (2016). Frugality, a positive principle to promote sustainable development. *Journal of Agricultural and Environmental Ethics*, 29(4), 571–585.
- Ros-Tonen, M. A. F., Bitzer, V., Laven, A., Ollivier de Leth, D., Van Leynseele, Y., & Vos, A. (2019). Conceptualizing inclusiveness of smallholder value chain integration. *Current Opinion in Environmental Sustainability*, 41, 10–17. <https://doi.org/10.1016/j.cosust.2019.08.006>
- Roy, M.-A., & Wheeler, D. (2006). A survey of micro-enterprise in urban West Africa: Drivers shaping the sector. *Development in Practice*, 16(5), 452–464. <https://doi.org/10.1080/09614520600792432>
- Schonberger, R. J. (1987). Frugal Manufacturing. *Harvard Business Review*, 65(5), 95–100.
- Schoneveld, G. C. (2022). Transforming food systems through inclusive agribusiness. *World Development*, 158, 105970.
- Schoonhoven-Speijer, M., & Vellema, S. (2020). How institutions governing the economic middle in food provisioning are reinforced: The case of an agri-food cluster in northern Uganda. *Journal of Rural Studies*, 80, 34–44.
- Schoonhoven-Speijer, M., Mangnus, E., & Vellema, S. (2017). Knowing how to bring food to the market: Appreciating the contribution of intermediary traders to the future of food availability in Sub-Saharan Africa. In J. Duncan & M. Bailey (Eds.), *Sustainable Food Futures* (pp. 119–132). Routledge.
- Schouten, G., & Vellema, S. (2019). Partnering for inclusive business in food provisioning. *Current Opinion in Environmental Sustainability*, 41, 38–42. <https://doi.org/10.1016/j.cosust.2019.10.004>
- Shibin, K., Dubey, R., Gunasekaran, A., Luo, Z., Papadopoulos, T., & Roubaud, D. (2018). Frugal innovation for supply chain sustainability in SMEs: Multi-method research design. *Production Planning & Control*, 29(11), 908–927.
- Soni, P., & Krishnan, R. T. (2014). Frugal innovation: aligning theory, practice, and public policy. *Journal of Indian Business Research*, 6(1), 29–47.
- Srinivas, S., & Sutz, J. (2008). Developing countries and innovation: Searching for a new analytical approach. *Technology in Society*, 30(2), 129–140.
- Thorpe, J., & Reed, P. (2016). *Addressing market constraints to providing nutrient-rich foods: an exploration of market systems approaches*. Retrieved from Brighton: <https://open docs.ids.ac.uk/open docs/handle/20.500.12413/8977>
- Tiwari, R., & de Waal, G. A. (2019). The role of frugal innovation in ensuring global food security. *Frugal Innovation: A global research companion* (pp. 123–136). Routledge.
- Ton, G., Vellema, W., Desiere, S., Weituschat, S., & D'Haese, M. (2018). Contract farming for improving smallholder incomes: What can we learn from effectiveness studies? *World Development*, 104, 46–64.
- Untari, D. W., & Vellema, S. (2022). Are Collective Trading Organisations Necessarily Inclusive of Smallholder Farmers?: A Comparative Analysis of Farmer-led Auctions in the Javanese Chilli Market. *Journal of Agricultural and Environmental Ethics*, 35(4), 1–21.
- van Beers, C., Knorringa, P., & Leliveld, A. (2020). Can frugal innovations be responsible innovations?. In J. R. Ort, D. v. Putten, L. M. Kamp, & I. v. d. Poel (Eds.), *Responsible Innovation in Large Technological Systems* (80–95). London, Routledge.
- Veldhuizen, L. J., Giller, K. E., Oosterveer, P., Brouwer, I. D., Janssen, S., van Zanten, H. H., & Slingerland, M. (2020). The Missing Middle: Connected action on agriculture and nutrition across global, national and local levels to achieve Sustainable Development Goal 2. *Global Food Security*, 24, 100336. <https://doi.org/10.1016/j.gfs.2019.100336>
- Vellema, S. (2016). Global value chains and inclusive development: Unpacking smallholder producers' agency. In G. Gómez, P. Knorringa, & G. M. Gómez (Eds.), *Local governance, economic development and institutions* (pp. 201–215). Palgrave Macmillan.
- Vellema, S., Obeng-Adomaa, F., & Schoonhoven-Speijer, M. (2022a). Making knowledge work in practice: An integrative methodology for researching performance in global commodity chains and local

- food markets. In D. Ludwig, B. Boogaard, P. Macnaghten, & C. Leeuwis (Eds.), *The Politics of Knowledge in Inclusive Development and Innovation* (pp. 256–268). Routledge.
- Vellema, S., Schouten, G., & Faling, M. (2022b). Capturing systemic change needs boundaries: Theory-informed evaluation of private-sector led transformation in food provisioning. *IDS Bulletin*, 523(1), 103–122.
- Vernooij, V., Vellema, S., & Crane, T. A. (2023). Beyond the formal-informal dichotomy: Towards accommodating diverse milk-collection practices in the economic middle of Kenya's dairy sector. *The Journal of Development Studies*. <https://doi.org/10.1080/00220388.2023.2204178>
- Vincentnathan, L. (2012). Food rights, food frugality, and climate change. *Food and Foodways*, 20(1), 76–92.
- Wegerif, M. C. (2020). “Informal” food traders and food security: Experiences from the Covid-19 response in South Africa. *Food Security*, 12(4), 797–800.
- Wertheim-Heck, S., Vellema, S., & Spaargaren, G. (2015). Food safety and urban food markets in Vietnam: The need for flexible and customized retail modernization policies. *Food Policy*, 54, 95–106. <https://doi.org/10.1016/j.foodpol.2015.05.002>
- Wertheim-Heck, S., Raneri, J. E., & Oosterveer, P. (2019). Food safety and nutrition for low-income urbanites: Exploring a social justice dilemma in consumption policy. *Environment and Urbanization*, 31(2), 397–420. <https://doi.org/10.1177/0956247819858019>
- Weyrauch, T., & Herstatt, C. (2017). What is frugal innovation? three defining criteria. *Journal of Frugal Innovation*, 2(1), 1–17.

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