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Contents

List of abbreviations and acronyms

ASF	Animal source food
BoP	Bottom of the Pyramid
BRIDGE	Building Rural Income through Inclusive Dairy Growth in Ethiopia
EIAR	Ethiopian Institute of Agricultural Research
EPHI	Ethiopian Public Health Institute
FAO	Food and Agriculture Organization
FNP	Food Nutrition Policy
FS	Food systems
GAIN	Global Alliance for Improved Nutrition
ILRI	International Livestock Research Institute
IFPRI	International Food Policy Research Institute
KB-programme	Knowledge base programme
MoA	Ethiopian Ministry of Agriculture
MoH	Ethiopian Ministry of Health
WCDI	Wageningen Centre for Development Innovation, Wageningen University & Research
WUR	Wageningen University & Research

Summary

Transition pathways approaches are increasingly being applied to reflect on sustainable, just and inclusive food system transitions and food and nutrition security (Wigboldus et al., 2021).

Through the 'Food security and valuing water' research theme of the Knowledge Base program - Food and Water Security - of Wageningen Research (WR), stakeholders within the Ethiopian dairy sector have been engaged to explore the potential contribution of Ethiopia's dairy sector towards healthy and nutritious diets through increased consumption of nutritious dairy products.

In the process the "exploring transition pathways" approach and methodology, that was generated in the knowledge base programme, was applied within a specific context with relevant stakeholders. The methodological approach encompassed desk-top research, key informant interviews and interactive multi-stakeholder workshops.

By building on and making use of the extensive network, in depth insights and rich experiences of the BRIDGE project[1], which has been operating within the Ethiopian dairy sector for a good number of years, the process was strongly grounded in the reality of Ethiopia. Thanks to the BRIDGE project the process was able to engage key stakeholders in the interviews and workshops that took place. This report summarizes the learnings from the activities that took place throughout 2021 and 2022.

This report touches on two main elements:
1. Key insights and outcomes of the process.
2. Learnings and applicability of the methodological approach for exploring food system transition pathways.

By applying the approach "exploring transition pathways" to a specific case in Ethiopia, we conclude that the methodological steps in the approach support stakeholders and practitioners to think beyond what is already there and challenge entrenched assumptions regarding development trajectories.

The approach provides guidelines for food system transition exploration processes. A core strength of the approach is its methodological capacity to guide multiple stakeholders and development practitioners in their exploration of transition pathways. This is achieved by diverting the focus from what is currently (im)possible and starting-off by visioning a desired future, without being limited by thoughts about how to realise the envisioned futures.

The experience has shown that the approach can be tailored and be made fit-to-purpose by customizing it to a concrete food system change process. For proper application and continued learning it is valuable to continuously monitor and reflect, together with the project team, about the different experiences that stakeholders have throughout the methodological steps, as well as to reflect on the stakeholder engagement process in itself.

[1] The BRIDGE project (Building Rural Income Through Inclusive Dairy Growth in Ethiopia 2018 – 2023) is managed by a consortium of SNV Ethiopia and WUR and fully funded by the Embassy of Kingdom of the Netherlands in Ethiopia. BRIDGE is implemented in partnership with the respective regional Livestock & Fisheries Resources Development Bureaus, Cooperative Promotion Agencies, and other relevant sector offices. It aims to improve the livelihoods of 120,000 dairy farmers and contribute to transforming the dairy sector in Ethiopia. One of the four components of the project focusses on improved consumption of nutritious dairy products.

1 Introduction

This report summarises the findings and reflections from the application of a methodological approach for exploring transition pathways[2], within the context of the Ethiopian food system. For this particular case, the approach was customized to explore transition pathways that strengthen the contribution of dairy products towards safe and nutritious diets for vulnerable population groups[3] in rural and urban settings.

Transition pathway approaches are increasingly being applied in the context of food systems to reflect about aspired food systems outcomes such as food and nutrition security (Wigboldus et al., 2021).

These type of approaches typically engage stakeholders to think about desired future food system outcomes and subsequently consider the interconnected and bundled actions that are required to make the transition from the current situation towards the desired state feasible.

Transition pathways are an ideal tool to use in initiatives in which stakeholders are looking for a solution to a major structural food system issue that requires a transition. This change cannot be materialised through simple and linear (adaptive) solutions, but requires complex, multi-level transitions that include changes in technical, social, cultural and institutional aspects.

For this scoping study the transition pathways approach has been applied in a concrete practical case to explore transition pathways to enhance the contributions of Ethiopia's dairy sector to healthy and nutritious diets.

This report integrates a description of the steps taken and how they were customized for this particular application. In addition, the report describes the key outcomes, products and reflections that the process generated with researchers, facilitators and key stakeholders. Lastly, the report reflects on the generated insights in relation to the application in Ethiopia and, on the overall methodology.

Special gratitude goes out to the contributions and efforts made by the SNV-WUR BRIDGE project in collaborating with the WUR KB team in this case application.

[2] Exploring Transition Pathways to Support Food System Transitions (wur.nl)

[3] Women of reproductive age, pregnant and lactating women, young children.

2 Methodology

In this study we applied elements of the approach "exploring transition pathway to support food systems transitions" (Dijkshoorn-Dekker et al., 2021) with stakeholders and partner organizations of an ongoing multi-year programme directed at the development of the dairy sector in Ethiopia, called BRIDGE.

The approach consists of a number of steps that ideally are conducted in a deliberative process, involving key stakeholders. Figure 1 depicts the different steps of the approach. Details for each step can be found in the practical guide[4]. Insights into the outcomes of the second, the third and the fourth step, as applied within this particular case-study are provided in this report.

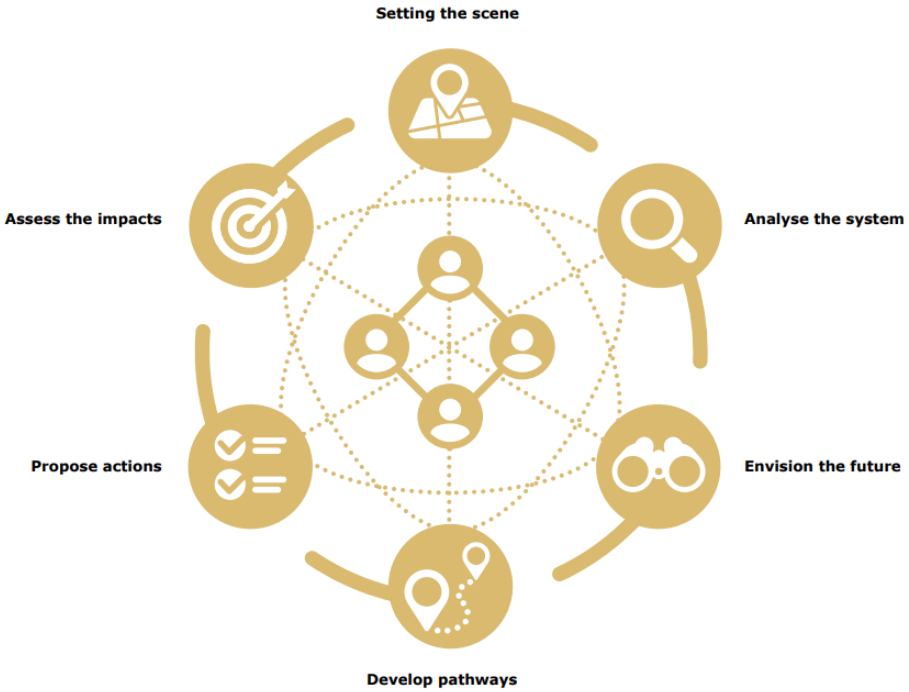

Figure 1 *Steps of the exploring transition pathways to support food system transitions approach.*

What are transition pathways?

"Transition Pathways are written narratives that tell the story of how a future food system may evolve out of a previous system. Transition Pathways make alternative futures imaginable and actionable. The term is always used in the plural: it is not meant as a blueprint, as the future may develop in various ways. However, stakeholders can use a certain pathway as a starting point for action, after exploring one or multiple pathways that lead to the same imagined future. These pathways are therefore always developed with a diverse group of stakeholders who share an interest in the transition, either as active participants or as participants that are potentially impacted by the actions taken.

A Transition Pathway identifies the potential steps to arrive at a shared future vision, and thereby makes that vision more plausible and actionable".

Source: Exploring transition pathways to support food systems transitions https://edepot.wur.nl/583323

[4] https://edepot.wur.nl/583323

The central idea of the transition pathways approach, is to brings together diverse stakeholders to reflect about a desired but radically changed future food system vision, and consider action pathways to take the steps towards these future visions.

In this study, the approach that was applied combined desk-top literature review with key informant interviews (see Appendix 1 for interview guide), and focus group discussions (in workshop settings) involving key stakeholders and dairy experts in Ethiopia.

The approach facilitated interactive reflection in relation to the central research question: **how can the Ethiopian dairy sector strengthen its contribution to healthy and nutritious diets though increased access to and consumption of dairy products for different consumer categories?**

As a result of the collaboration with the BRIDGE project, the research team was able to gain access to valuable experiences, a broad network of key stakeholders and rich insights that the BRIDGE project has accumulated while supporting the development of the Ethiopian dairy sector.

Conceptual definitions as used in the transition pathway approach

Future visions refer to an aspired vision of food systems that attain a wider range of food system goals than the present systems, because they are structurally (and therefore radically) different.

Transition pathways refer to the stepwise process to reach such a future vision over time. By identifying intermediate steps, the pathway provides a roadmap with small actions that contribute towards larger structural transformations.

Source: Exploring transition pathways to support food systems transitions https://edepot.wur.nl/583323

By focusing on how the dairy sector can contribute to healthy and nutritious diets, the approach applied in this particular case purposively deviated from a focus on more conventional key impact indicators that tend to relate to production and productivity. The transition pathway methodology applied in this case started-off by contemplating different future visions in which different vulnerable consumer groups in Ethiopia would have increased their intake and consumption of affordable, accessible and nutritious dairy products.

By initiating the future vision reflection at the food system outcome level, and targeting increased consumption of dairy products, a variety of customized and differentiated future visions for the dairy sector were generated. These future visions were subsequently used to inform the design of transition pathways with detailed descriptions of the means, structural conditions, investments, policies, activities and strategies that were required to transition from the current state towards the desired state.

In the visioning exercise, workshop participants described how they envisioned the Ethiopian dairy sector to look like in 15 years when it would be contributing to safe and nutritious diets for all Ethiopians.

In a follow up workshop, participants designed transition pathways, describing the means, structural conditions, investments, interventions and developments required for the dairy sector to transition from its current state to the desired future vision.

To avoid a short-sighted focus on healthy diets, the final step of this methodological approach engaged stakeholders to look at the potential trade-offs for the future vision scenarios. By taking on a systems perspective, the group of participants looked at the different facets of the food system and reflected on the possible trade-offs between the multiple food system outcomes (for example: improvements in production and productivity with increases in consumption of different dairy products).

The methodological approach that was applied in this specific case was based on the following assumptions:

1. The desired food system outcome: nutrient-dense and healthy diets are a fundamental starting point when considering how the Ethiopian dairy sector can contribute to food system outcomes. This type of food system approach focusses on the consumptive demand (need) for nutritious food and the conditions for contributing to nutrition and health (Dengerink & Brouwer, 2020).
2. The unique nutritional (and cultural) value of livestock and dairy products and their contribution to livelihoods in Ethiopia warrants that dairy will remain a strong pilar of food system dynamics.
3. Future visions of the Ethiopian dairy sector should differentiate how the dairy sector can contribute to healthy and nutritious diets for different consumer categories. Trade-offs between increased production of dairy, increased market access and affordability of dairy products will inevitably result in differentiated place-based effects for different consumer categories. Customized strategies and transition pathways need to be designed for specific consumer categories, paying specific attention that vulnerable consumer categories are not affected negatively (avoiding negative trade-offs that would exclude and reduce access to, and affordability of nutritious dairy products for vulnerable population groups).
4. Transition pathways necessarily integrate multiple food system outcomes (Dengerink & Brouwer, 2020; Wigboldus et al., 2021). The proposed approach and initial exploration of transition pathways takes consumption of dairy products as a starting point. This report fall short on deliberate analysis to explicitly integrate other food system outcome domains including the socio-economic and the environmental outcome domain. Subsequent stages of a transition pathway process would ideally integrate stakeholders' perspective to integrate multiple outcome domains.

As mentioned, two workshops were conducted, using the above methodology and involving key stakeholders in Ethiopia. The agendas of these workshops are included in Appendix 2 and 5 respectively.

2.1 Exploring transition pathways using food systems frameworks

Food systems approaches are increasingy being utilized in research and policy debates. A review of the use of food systems approaches within Wageningen University and Research illustrates that there is diversity in the use of terminology and the application of it in "approaches" (Dengerink & Brouwer, 2020). In a number of cases, the methodologies for food systems analysis are actually extending and building upon supply chain analysis elements. Other cases go beyond the supply chain domain, integrating insights from consumer behaviour and food environment analysis.

In order to inform transformative processes, there is a growing demand for food system analysis to generate practical insights that can be used to spur a action oriented transition pathways.

For the process of this transition pathway exploration, the conceptual food systems framework portrayed in Figure 2 was utilized. The different components that make up the framework have guided the approach and the pathways that were generated.

The specific conceptual food system framework that was utilized is particularly valuable as it depicts how the interplay between food system components and the drivers and the enabling environment generates different food system outcomes. The framework emphasises the importance, integration and relation between food value chains, the food environment, consumer behaviour and dietary outcomes (Fanzo et al., 2021). The framework is proposed as a approach to define and structure monitoring agenda's for food system transformation towards the global sustainable development goals. For the purpose of the transition pathway exploration in Ethiopia, the framework was used in order explicitly reflect on the required interplay between different food system components for transition pathways.

At the centre of the mentioned food system framework, we find food system components structured along three pilars: a) the food supply chain, b) the food environment and c) individual consumer related factors. In the transition pathway approach applied for this case, these food system components were considered in the

design of the transition pathways. These components were taken as building blocks to construct a pathway with a sequence of steps deemed necessary for the aspired transition to take place.

This specific food system framework was used because, instead of the food supply chain being the most central element of the framework, three complementary components of the food system are put in a central position. By drawing attention to elements beyond the food supply chain, within the food environments and within individual factors, the participants had to consider the interaction and complementarity between these three food system components.

The methodological approach applied started-off by taking a specific desired food system outcome (a focus point). For this case that aspired outcome was to enhance the consumption of safe, diversified and nutritious dairy products by different vulnerable consumer categories in Ethiopia. Starting from that specific focal point, the methodology proceeded to assess the structural conditions and food system components that needed to be addressed in order to enhance the access to, affordability of and the actual consumption of nutritious dairy products (Brouwer et al., 2020). Having prioritized specific food system components that require attention, the workshop participants designed detailed pathways, action perspectives and concrete activities that are required to transition from the current situation to the desired situation. The final step in the applied methodological approach was to look at the synergies, trade-offs and feedbacks between food system components and multiple food system outcomes.

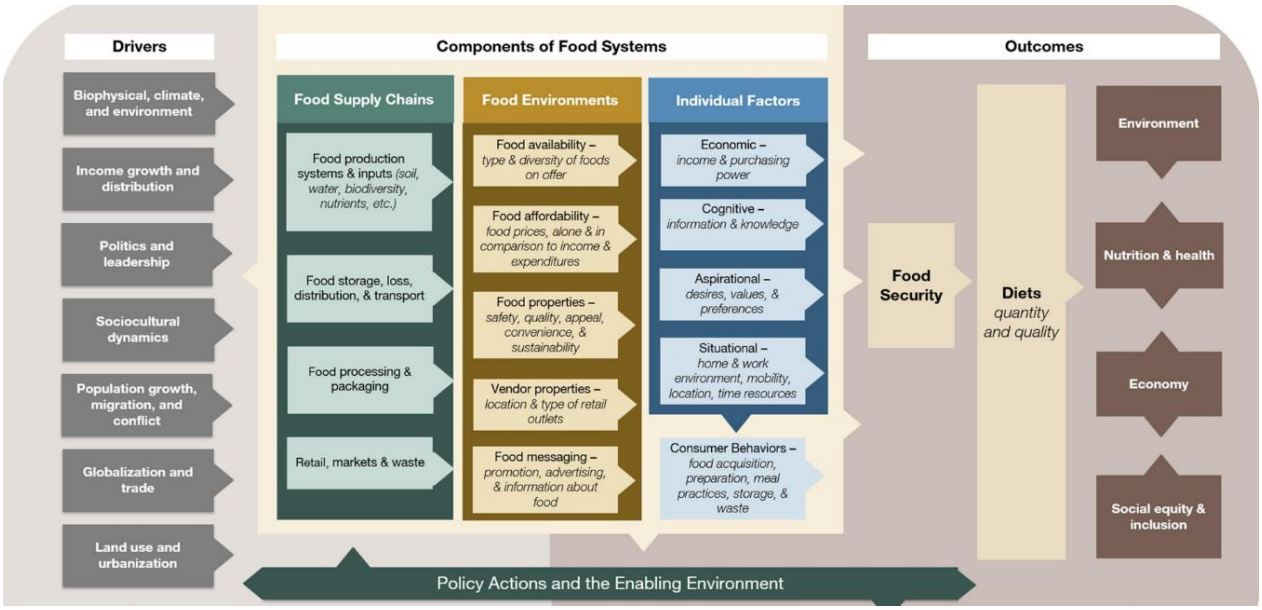

Figure 2 *The Food systems framework developed by Fanzo et al. 2021, utilized in this case.*

3 Context description – system analysis

The second step of the transition pathway approach is a system analysis which integrates a food system analysis, policy analysis and stakeholder analysis. Insights from this process are summarized in this section.

The analysis relied on a review of policy documents, project documents, and research papers, both academic publications and grey literature. In addition, the analysis was informed and guided by a series of key informant interviews.

The system analysis focussed on the following complementary issues:
- Drivers and trends within the food system and the dairy sector in particular;
- Drivers and trends in food and nutrition security and consumption patterns for different population groups in both urban and rural settings;
- Drivers and trends in policy orientation, investments and ambitions;
- Diversity, engagement and dynamics of stakeholders working on dairy sector transformations and food system transformations in general.

3.1 The Ethiopian food system

Ethiopia has witnessed significant economic growth and increases in agricultural productivity over the last 20 years. At a federal level the Government of Ethiopia has formalized and mainstreamed an integrated nutrition agenda geared towards systemic improvements in the consumption of nutritious and healthy diets for the entire population (Baye and Hirvonen, 2020).

In spite of these successes, evidence indicates that one of the key barriers towards improving dietary quality and nutrition in Ethiopia is the unaffordability (and related unavailability) of nutrient-dense foods.

Ethiopia's cereal-dominated, production-focused agricultural policies have considerably increased production and productivity and have contributed to improving the dietary conditions in terms of energy needs and caloric intake. Nevertheless, as Figure 3 illustrates, throughout 2011 till 2015 grains roots and tubers have dominated agricultural production in contrast to very small contributions of agricultural production focussing on nutritious foods such as pulses, legumes, vegetables, animal source-foods and dairy production.

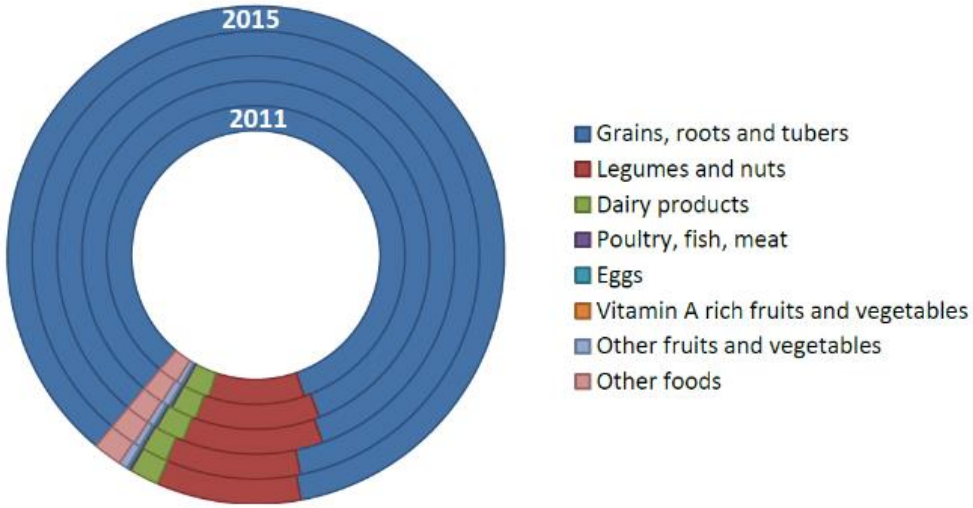

Figure 3 *Agricultural production in Ethiopia, by major food groups, 2011 to 2015.*

The composition and proportional shares of these products in agricultural production practices have hardly changed over this time period similar to the ways that energy and caloric intake have not significantly changed in diets. Focusing on the production of dairy, there have been small fluctuation but no clear trends of changing production patterns (see Figure 3). The current trends in agricultural production are focusing on food security but not geared to address the entire spectrum of dietary needs (IFPRI, 2020; citing Baye, Hirvonen, et al., 2019).

Evidence illustrates that nutrient-dense foods such as animal source foods (ASF) and fresh fruits and vegetables are frequently lacking in Ethiopian diets (IFPRI, 2020). According to a study by IFPRI, three out of four Ethiopians cannot afford the minimum cost of a nutritious diet. The costs of a nutritious diet is more than four times the cost of an energy- only sufficient diet (IFPRI, 2018).

As illustrated in Figure 4, several drivers influence the consumption of nutritious dense foods. These include amongst others: low levels of awareness of nutritional issues; low purchasing power; the high price of nutritious food; and low supply of nutrient dense foods (Teshome and Durr, 2018; IFPRI, 2018).

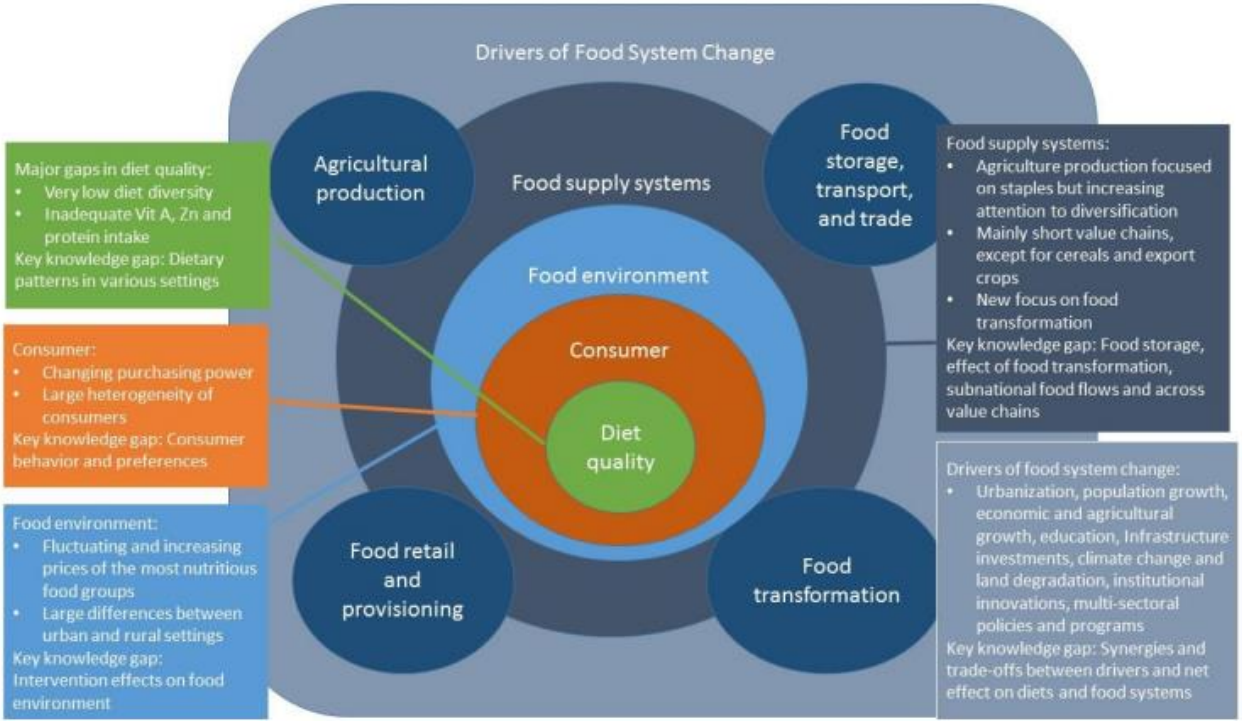

Figure 4 *Drivers and trends in diets quality and related food systems components in Ethiopia. Source: IFPRI, 2018.*

The Ethiopian dairy sector is increasingly considered as a potential contributor to healthy and nutritious diets, local economic development and income generation (Andeweg et al., 2020). The sector is strategically positioned to enhance the availability of, and consumers' access to dairy products, which are important sources of proteins, fats and key micronutrients that are often deficient in Ethiopia's cereal dominated diets (Hasler et al., 2018; Adesogan et al., 2020; Minten et al., 2020).

Consumption of small amounts of nutrient dense dairy products has the potential to address a series of nutritional deficiencies during child growth, adolescence and adulthood. Vulnerable population groups and resource poor individuals have most difficulties in accessing nutrition dense dairy products in rural areas (Hasler et al., 2018; Gatabalew et al., 2019; Minten et al., 2020). The nutritional needs of women and adolescent girls requires particular attention considering the high prevalence of suboptimal maternal nutrition in Ethiopia and its detrimental impact on the health of new-borns and their mothers (IFPRI, 2020; Mekonnen et al., 2020; Bitew et al., 2021; Farrell, 2021).

Ethiopia has experienced substantial agricultural growth since 2000, which can be accredited in part due to a doubling in the use of modern inputs, significant land expansion and increased labour use (Bachewe et al., 2018). At the same time, the economy and the demography of the country, in the past two decades, went through a radical transformative process, with the urban population doubling, and the GDP contribution of non-agricultural output rising from less than half, in 2000, to about two-thirds, today. Moreover, household welfare indicators have drastically improved as rural poverty fell

Ethiopia's dairy sector has witnessed overall increases in production and value over the past 15 years. Nevertheless, national demand for dairy products remains larger than the available supply, resulting in an import of dairy products (Gatabalew et al., 2019; Minten et al., 2020). Although the dairy sector is developing strongly, with clear evidence of increases in dairy production and productivity, not all consumers in Ethiopia are enjoying increases in their consumption of dairy products (Bachewe et al., 2017).

From 45 percent, in 1999–2000, to less than 23 percent, in 2015–2016. Child malnutrition improved significantly, with child stunting prevalence falling from 58 percent to 37 percent, from 2000 to 2019 (see Figure 5).

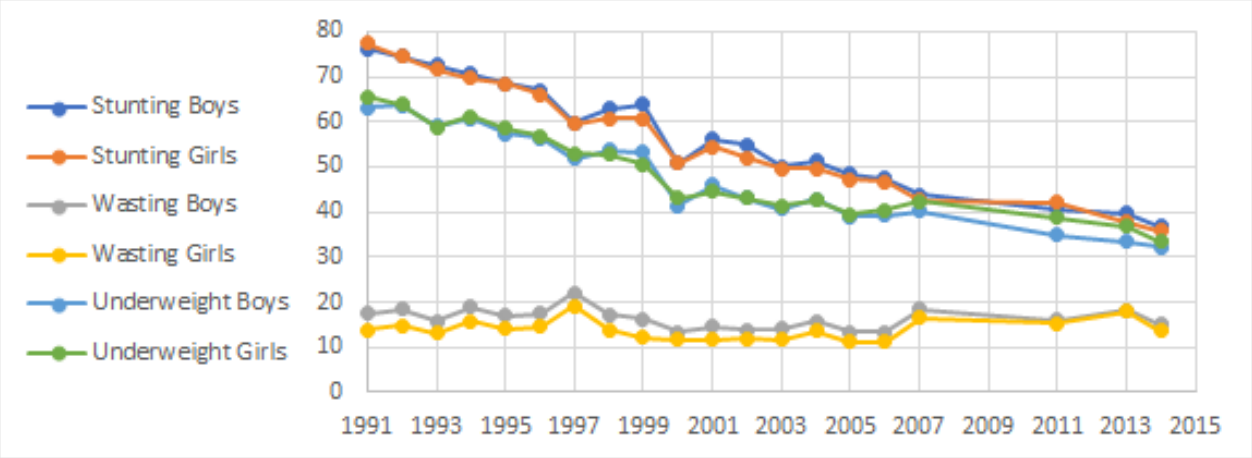

Figure 5 *Child malnutrition in Ethiopia. Y-axis are percentages. Stunting is an expression of height for age, wasting is an expression of weight for height, underweight is an expression of weight for age (all as % of children < 5).*

While almost all Ethiopian households can afford diets that meet their energy needs, for most households the cost of a nutritious diet is unaffordable (Willet et al., 2019), with relatively high price increases of 30% for dairy, eggs and meat in the period between 2007-2016 (Bachewe et al., 2017). Inflation trends troughing 2021 up to 2022 have strongly affected Ethiopian food prices. According to a study by the WFP food inflation in Ethiopia hit 43.9 percent in May 2022[5]. In these critical circumstances households often prioritize foods that can satisfy caloric intake and leave more costly nutrition dense food products out of their diets.

3.1.1 Key Drivers and Trends

A number of studies look at the actual and projected developments of Ethiopia's food systems. A number of key drivers and trends have been extracted from the work of Minten et al., 2018 and the sources cited in their work:

- Ethiopia's food systems are rapidly evolving, being driven by major contextual changes including high population growth, rapid urbanization, infrastructure investments, and income growth. These changes are illustrated by the ongoing dietary, agricultural, and supply chain transformations.
- There is evidence of changing dietary behaviours characterized by higher calorie consumption, a declining share of starchy staples and an increasing share of nutrient dense food products, such as animal-source

[5] Source: https://docs.wfp.org/api/documents/WFP-0000141077/download/

foods and fruits and vegetables. Nonetheless, vulnerable and resource poor households in both rural and urban settings cannot afford to include high quality, nutrition dense foods in their diets.
- In urban settings, there is a growth and emergence of processed convenience foods and greater out-of-home food consumption, although this is out of reach of resource poor consumers.
- Intensification and modernisation of dairy production is mainly taking place at commercial and specializing farms.
- Ethiopia has recently pursued a policy aiming to increase the role of commercial and specializing farms. These have higher yields per unit land, about double the yield of smallholder farmers. They mainly focus on high value markets (both domestic and export).
- Rural households rely considerably on commercial food markets. Two-thirds of the calories consumed by rural households' comes from their own agricultural products, one third of calories consumed are generally purchased. Nutrient dense food products are not frequently produced by rural households. Hence they account for more than two thirds of rural households' total food expenditures.
- Towns and cities are important commercial food markets and food environments for both urban and rural households. Despite the low urbanization share in the total population of Ethiopia, urban markets made up about one-third of the total food market in 2011, highlighting how the urban areas create demand and pull for food products.
- A modern commodity exchange, the Ethiopian Commodity Exchange (ECX), was started in 2008. This serves mainly export crops.
- Mobile phones are now used ubiquitously by agricultural traders, farmers and pastoralists. This has contributed to behavioural changes such as the bypassing of the Addis wholesale markets as the clearing house for agricultural trade and the increasing use of mobile phones by traders to coordinate logistics and trade. However, surprisingly, no major effect of these improvements in communication on prices and trade margins were found.
- Contract farming has been promoted by a number of institutions and firms in recent years. Contract farming might take off in transitional marketing systems to become widespread in modern markets. They have the potential to solve a number of constraints that exist in these markets such as access to improved inputs, credit, extension, and lack of market access. Holtland (2017) reviewed a number of implemented contracting schemes in recent years in Ethiopia. He showed that none of them was long-lived and that the only large-scale contracting scheme with smallholders that existed for a number of years, that with the Heineken brewery, was subsidized by the company. He identified a number of issues with these contract farming schemes, including firms not following up on their promises or farmers failing to deliver because of production problems or side-selling. Such issues have also been found to be major constraints to contract farming in other developing countries (Otsuka et al. 2016).
- Without a doubt there is an exponentially increasing number of stakeholders engaged in formal food markets. Particularly in the dairy sector there is a growing increase of producers and stakeholders in the formal market. Regardless of the trend, the informal market remains strongly present within the agricultural sector and respective subsectors such as the dairy sector.

3.1.2 Perspectives on dairy supply chain systems

With respect to dairy, Minten et al. (2020) analysed urban (Addis Ababa) and rural dairy supply. They conclude that consumption of dairy products is considerably higher in urban areas than in rural areas of Ethiopia.

In terms of production, proximity to the city, farm size (in terms of number of cows per farm) and farmers' level of education are key factors correlated to access to improved dairy inputs and services (like access to artificial insemination, animal health care, adoption of cross-bred cows and use of purchased wheat bran and commercial pre-mixes for feed). It is found that (consequently) also milk yields per cow are strongly correlated with travel costs to the market, size of the farm and farmer's level of education. Minten et al. find that the regions that are well connected to urban centres and cities feature increasing adoption of cross-bred cows and commercial feeds and better access to animal health and dairy-related extension services. This combination of factors contribute to higher milk yields per dairy cow. Simultaneously, a process of upscaling to larger dairy farms is becoming more prevalent, characterized by much higher productivity per cow and per unit of labour. In more remote areas there is evidence of stagnation – or even a decline – in milk yields.

It is concluded that the commercial rural-urban value chain reflects the most important value chain – as a pull factor for more commercially oriented livestock and dairy production. Consequently the dairy sector is considered to be an important high-value growth sector in the process of agricultural and economic transformation that has the potential to provide employment and income generating opportunities.

Key trends that will continue to influence developments in the Ethiopian dairy sector are:

- The amount of traders and traded volumes is strongly increasing. This entails that there is a growing infrastructure and growing investments in different contributing subsectors such as for example: transport, distribution, transformation and processing, and retail.
- The consumption of processed mild and dairy products and, related to that, the number of dairy processing plants is rapidly growing. between 2007 and 2017, the number of dairy processing plants has increased from 8 to 25 (Minten et al., 2020).
- Modern retail and different milk distribution and retail systems are emerging in Ethiopia and neighbouring countries. These innovations are offering affordable and healthy dairy products for resource poor urban consumers (Ayuya et al., 2022).

3.1.3 Perspectives on consumption

This segment of the food systems analysis merges a perspective on the milk environment and individual factors that affect milk consumption.

Although Ethiopia has one of the largest numbers of livestock on the African continent, it has one of the lowest per capita rates of consumption of animal source food in sub-Saharan Africa and in the world (Vision 2030 Ethiopia; Shapiro et al., 2015). It is estimated that dairy consumption in Ethiopia approximates 11% of the recommended daily intake (Farrell, 2021) with yearly averages of 20 – 25 litres of milk per person (CDAIS, 2021).

A multitude of studies have shown how a series of factors influence individual consumers in their habits and practices of consuming dairy and dairy related products. Amongst others, religious, cultural and customary restrictions on diary consumption strongly influence dairy consumption in Ethiopia. In addition consumers in urban areas are often concerned about the safety of dairy products.

Nevertheless, evidence indicates that dairy products are the most important animal source food in Ethiopian diets (Bachewe et al., 2017). A multitude of dairy products are regularly consumed, including milk (from cows, camel, goats, and sheep), powdered milk, yogurt, cottage cheese, buttermilk, and butter. Cow milk and butter are the most important dairy products, representing about half and one-third of total dairy consumption, respectively (Bachewe et al., 2017).

The increasing importance and consumption of milk and dairy products in the diets of Ethiopians – dairy demand is expected to triple between 2011 and 2030 - is affected by multiple factors, amongst others purchasing capacity, geographical location, and religious and cultural practices and innovations in the supply and distribution. The actual consumption of dairy products and underlying factors differ per consumer category. Nutrition-oriented policies should consider multiple approaches, customizing them to address the nutritional needs of different consumer categories (Ten Hoeve et al. 2022).

Highest demand for dairy products is generated in urban areas and larger cities. In rural areas, milk consumption is an indicator of household wealth. Largest demand for dairy products in rural areas is milk with a high percentage of fat, suitable for the production of butter (Brasesco et al., 2019). It is estimated that 40% of the milk produced is converted to butter (Gatabalew et al., 2019).

Thus, although Minten et al. (2018) found that average consumption of animal products is only slightly smaller in rural areas than in urban areas, the fact that urban population consumes more ‘high-density’ products, results in total net dairy consumption in urban areas being significantly higher than in rural areas (Melesse et al., 2009).

A study of the Ethiopian dairy sector conducted by Brasesco et al. (2019) highlights that dairy products are also sold in local markets in rural areas, although Addis Ababa remains one of the main end markets. In Asella town (Arsi zone), cooperative members reported a substantial lack of demand for milk caused by self-production leading to milk availability in almost every household (Brasesco et al., 2019). The same study illustrates that rural dairy producers are both the largest producers and the largest consumers of milk. At livestock farmers' household level, usually the evening milk is retained for home consumption. However, Melesse et al. (2009) also observed that some households had zero consumption. This zero consumption in most cases was related to insufficient household income. A rural consumer study, conducted in 2022, concluded that the dairy cow ownership was the most determinant for dairy consumption in rural areas (Ten Hoeve et al., 2022). A deficient market environment for dairy products in rural areas generates a situation where households who don't own dairy cows struggle to access and purchase dairy products locally.

Urban consumption is constrained by quality and availability, and the principal determinant of consumption level is income (Brasesco et al., 2019). Research findings from Land O'Lakes in 2010 showed that the top 10 percent of earners in Addis Ababa consumed about 38 percent of the milk available in this market. In rural areas, women tend not to consume milk as it is reserved for men, children and sick people.

These disaggregated and detailed insights into consumption of dairy products underscore the importance of designing customised nutrition strategies for different consumer categories and different geographic locations. From a systems perspective, the increases in dairy production and market linkages experienced in urban contexts could be positively influencing consumption of dairy in cities and for consumers with higher purchasing capacity. In contrast, a possible trade-off of this growing urban demand for dairy could be the reduced availability and affordability of dairy products in rural areas. This systemic trade-off might negatively affect nutrition vulnerable population groups and individuals who in turn will increasingly encounter difficulties to access and afford nutrition-dense dairy products in their rural localities (Minten et al., 2020).

Using data from three distinct National Household Surveys, Minten et al.(2020) looked at the changes in consumption of dairy products for different types of consumer categories in Addis Ababa and compare data sets from 2005, 2011 and 2016. They conclude that, although access to dairy in Addis has improved in the last decade, different tendencies and consumption patterns for different types of consumer groups occur, and that there is no direct linear relation between improved access and increased consumption.

The data provided in Table 1 for example highlights that the poorest quintiles are indeed consuming more cow milk and dairy products. Nonetheless, proportionally the increases in consumption are much stronger for the richer quintiles of the population.

Table 1 *Consumption of dairy products in Addis Ababa value of per adult equivalent expenditure comparing data from 2005, 2011 and 2016 per consumer category. Source Minten et al., 2020.*

Year	Heading	Unit	Cow milk	Powdered milk	Yoghurt	Cottage cheese	Butter	Total
2005	Poorest quintile	Birr	0.3	0.0	0.0	0.0	0.2	0.5
	Quintile 2	Birr	1.1	0.0	0.1	0.5	1.2	3.0
	Quintile 3	Birr	2.7	0.1	0.3	0.7	5.1	8.9
	Quintile 4	Birr	3.7	0.5	0.3	1.0	17.3	22.8
	Richest quintile	Birr	28.9	6.2	0.3	0.6	51.6	87.7
	Total	Birr	10.0	1.9	0.3	0.6	20.2	33.0
	Share	%	30.3	5.8	0.8	1.9	61.2	100.0
	Quantities	*kg*	*6.0*	*0.1*	*0.1*	*0.3*	*1.4*	*7.8*
2011	Poorest quintile	Birr	0.0	0.0	-	-	0.2	0.2
	Quintile 2	Birr	0.4	0.1	0.1	0.1	3.0	3.5
	Quintile 3	Birr	2.0	0.3	0.3	0.4	7.4	10.4
	Quintile 4	Birr	12.1	0.8	0.6	1.5	21.9	36.9
	Richest quintile	Birr	69.8	14.6	2.6	8.2	68.6	163.8
	Total	Birr	22.1	4.2	0.9	2.6	25.6	55.4
	Share	%	39.9	7.6	1.7	4.7	46.1	100.0
	Quantities	*kg*	*7.7*	*0.4*	*0.3*	*0.8*	*1.2*	*10.4*
2016	Poorest quintile	Birr	2.5	1.8	0.2	0.4	23.9	28.8
	Quintile 2	Birr	16.5	0.7	1.6	1.1	24.3	44.3
	Quintile 3	Birr	20.7	2.9	1.7	3.1	31.5	59.9
	Quintile 4	Birr	47.1	7.7	0.7	4.4	27.5	87.4
	Richest quintile	Birr	69.5	17.8	3.1	17.9	40.1	148.3
	Total	Birr	37.5	7.6	1.7	6.9	30.8	84.5
	Share	%	44.4	9.9	2.0	8.2	36.5	100.0
	Quantities	*kg*	*8.5*	*0.1*	*0.3*	*0.5*	*0.8*	*10.2*

Birr for the three years are expressed I real 2011 Birr.

Source: Authors' calculations from HCES (2005, 2011, 2016).

According to Minten., et al (2020), the principal drivers and trends that are affecting the dairy sector and the consumption of dairy products are related to the following:

- Strong drivers for increasing productivity in rural areas may come from increased connection to the urban market.
- The least well-off population groups, the poorest quintiles, have not increased consumption of dairy as strongly as the richer quintiles of the urban population.
- Urban consumers and rural consumers are affected differently by the trends and drivers of the dairy sector. The urban pull and the growing demand for dairy will potentially affect availability and affordability of dairy in rural contexts.
- Adding value to raw dairy products through processing has the potential to play an essential role in developing the dairy sector, generating additional sources of employment and income generation.
- Providing (smallholder) farmers in remote areas access to productivity increasing solutions (like artificial insemination and feed concentrates) needs to go hand in hand with sector development strategies, including post-production collection, processing, and value addition.
- Productivity improving solutions such as cross-bred cows can only be afforded by relatively better-off households.

To date, there is a lack of evidence on the precise relation between increased production and productivity and increased consumption of dairy products for all consumer categories. These knowledge gaps do not allow practitioners and policy makers to adequately evaluate and compare the trade-offs between increased production of milk and increased consumption of nutritious and healthy food products.

3.2 Policy analysis

Based on the focus of the transition pathway at hand, a series of policies, strategies and public initiatives were reviewed that had a relation to food system transformation, food and nutrition security, dairy sector development, and agricultural development.

Valuable insights from this exercise are summarised below:

Ethiopia's National livestock master plan (2015-2020) acknowledges the importance of balancing production and consumption of nutrition dense animal food products. Nevertheless, in its vision on the development of the dairy sector, it primarily addresses developments targets that focus on increasing production and productivity (D'Haene et al., 2019).

> "Vision of the National livestock master plan
> By increasing the number and productivity of cattle through improvements in genetics, health and feeding, domestic cow milk production will increase by about 93% by 2020, consumption demand will be satisfied, and export of cow milk and milk products will begin.
>
> Overall target of the national livestock master plan
> Raise total cattle milk production to 7967 million liters by 2020 through genetics, feed and health interventions to improve traditional family cow dairy production and expand and improve specialized dairy production units."
>
> Source: Ethiopia's livestock master plan, 2015

The National livestock master plan contains a detailed dairy development roadmap, describing the vision of transformation of Ethiopia's traditional dairy production towards a market-oriented sector. The manner and extent in which these aspired transformations will impact the access and affordability of nutrition dense dairy products for different consumer categories in Ethiopia is not detailed in the roadmap.

Ethiopia's recently launched 10 year development plan contains a chapter in reference to the envisioned agricultural development strategy for the coming 10 years. Most targets in this strategy are geared towards increases in production and productivity. The causal relation between agricultural production and increased consumption of healthy and nutritious food products is not referred to or clarified.

Although the contribution of Ethiopia's dairy sector to nutritious and healthy diets has progressively received more attention over the years, increased levels of coordination between the dairy sector and nutrition and health sector has the potential to generate multiple benefits.

The majority of the reviewed dairy development policies tend to focus on improving production and productivity. In doing so, they have limited consideration for integrated strategies that consider both the productive elements and the consumer behaviour elements to increase consumption of nutrition dense dairy products within specific consumer groups and vulnerable segments of the population.

Trübswasser's review of Ethiopian policies related to nutrition, describes a rich policy landscape and illustrates that there are a variety of policies and programmatic instruments in place to operationalize Ethiopia's vision of ending stunting by 2030 (Trübswasser, 2020).

Ethiopia has launched various integrated policy efforts which are geared towards productive and behavioural transitions, transitioning away from the current focus on cereal dominated diets towards more diversified diets with increased consumption of nutrition dense foods (Ethiopia Vision 2030). Recognizing that food and nutrition security issues require systemic approaches that rely on interinstitutional coordination, a number of ongoing initiatives are designing mechanisms (strategies and policies) and institutional structures (cross sectoral coordination bodies) that are equipped to address food systems issues (Herens et al., 2021; IFPRI, 2020).

One example of this is the **Seqota declaration**, launched by Ethiopia in 2015. This commitment aims to end undernutrition by 2030 and envisions nutrition-specific, nutrition-sensitive and infrastructure interventions that create positive impact towards national, continental, and global nutrition targets (FDRE, 2016).

Ethiopia's National Nutrition Program (NNP), was extended and updated in 2016 and ran up to 2020. The NNP highlights the multi-sectoral nature of nutrition, and clearly defines the roles and responsibilities of each sector. In contains an accountability matrix with detailed budget overviews for all activities.

A number of specific policies relate to the promotion of good nutritional practices; micronutrient supplementation; nutrition support for people living with HIV/AIDS; and treatment of severe and moderate acute malnutrition. Ethiopia has a Nutrition Development Partner Group (NDPG) which engages UN agencies, donors and civil society. The Department for International Development (DFID) and the UN Children's Fund act as donor conveners and civil society participates in the NDPG and other relevant platforms.

In 2018 the **National Food and Nutrition Policy** was launched. This policy provides a guiding framework for the multi-sectoral and multi-stakeholder approach required to address malnutrition in Ethiopia. It provides a framework for multi-sectoral governance of food and nutrition activities in the country (FNP, 2018). The policy facilitates the creation of The Food and Nutrition Governing Body and an institutional arrangement (structure), that facilitates the alignment, harmonization and coordination of efforts and investments from Federal levels up to Kebele (village) levels. This body is represented by the highest government decision makers at the different levels and is commissioned to govern and coordinate the implementation of the Food and Nutrition Policy.

The National Nutrition Coordination Body (NNCB) is chaired by the Minister of Health and co-chaired by the Ministers of Agriculture and Education. The NNCB convenes nine ministries from relevant sectors and also includes representatives from United Nations (UN) agencies, donors and academia. It also has a supporting National Nutrition Technical Committee (NNTC). The NNCB is planning to expand membership and develop regional coordination platforms.

In February 2019 the Ethiopia Nutrition Leaders Network (ENLN) was launched, which is supposed to give effect to the Food and Nutrition Strategy and Policy (FNP).

The National Food and Nutrition Strategy, currently being finalized, is informed by the 10-year strategic plan outlined in the policy and defines key actions to be undertaken by the different sectors including agriculture. The strategy builds on the National Nutrition Program (NNP II), which was signed by 10 State Ministers of relevant sectors (FDRE, 2016).

Ethiopia has a **Nutrition Sensitive Agriculture Strategy** (FDRE, 2016), **School Health and Nutrition Program**, **School Feeding Program**, **One WASH** and **Productive Safety Net Program**.

In 2022, As a follow up on the study on costs and affordability of nutritious diets in Ethiopia, the Ethiopian Public Health Institute (EPHI) developed a comprehensive set of **food-based dietary guidelines** (EPHI, 2022). These guidelines support, guide and align the implementation activities that come forth from a variety of the aforementioned policies and strategies on food and nutrition security encompassing the agricultural sector and the public health sector. The guidelines provide a clear picture of the different nutritional needs of different consumer categories in Ethiopia. In addition, the guideline provide details regarding the daily required intakes of specific food products and food groups for a variety of different consumer categories. Dairy products are explicitly mentioned in the dietary guidelines as a vitally important animal source food product and an integral part of a healthy and nutritious diets. Nevertheless, they do not receive a great deal of attention with regard to the potential role of dairy products in systematically alleviating malnutrition and nutritional deficiencies of vulnerable population groups.

Both the study on costs and affordability of nutritious diets in Ethiopia and the Food based dietary guidelines highlight that there are clear focus areas in terms vulnerable population groups and consumer categories who are most challenged to consume healthy and nutritious diets. Women of reproductive age (pregnant and lactating women particularly), young infants and children up to 5 years of age and elderly people have the

most difficulty in getting access to, affording and consuming healthy diets. This is both the case in urban setting and in rural settings. There are clear trends of enhanced access and availability of high quality, nutrient dense, animal-source foods, fresh fruits and vegetables in cities and urban areas. Nevertheless, those high quality food products are often not accessible or affordable for resource challenged households.

The recently published **roadmap for Ethiopia's food system transformation, Ethiopia's Vision 2030,** identifies the need to work on more integrated and collaborative approaches towards food and nutrition security. The activities and game changers coined and listed under action track 1 of the food system roadmap are primarily geared towards ensuring the availability and accessibility of nutrient dense foods, enhancing the dietary diversity for nutritionally vulnerable populations, amongst others young children, adolescents and mothers.

The Food system roadmap clearly coins that this will require integrated approaches that go beyond a short sighted focus on production and productivity. As such in includes elements focusing on behavioural change communication, nutrition awareness raising, strengthening of value chains, engraining development of small and medium agro-food processing enterprises.

Although the livestock value chain is explicitly mentioned throughout the food system roadmap document, little mention is made of the dairy sector and the specific role that dairy consumption will play in contribution to safe, nutritious and diversified diets. A clear vision is described on how to increase vegetable and fruit consumption but that detail seems to be lacking for dairy products.

The policy analysis has revealed that there are numerous policy efforts who recognize the need to harmonize and align nutrition related investments and policies with agricultural development and infrastructural development efforts.

Key informant interviews that were approached in the context of this study, acknowledged that this harmonization between sectors and stakeholders is formally in place. Nevertheless, there was a consensus that these young partnerships needed to be explored more in their practical application, involving diverse stakeholders and engaging them in different roles and responsibilities.

In numerous conversations people highlighted that any type of aspired transformation in the dairy sector would greatly benefit from increased stakeholder coordination. In the absence of a dairy coordination platform, an abundant number of initiatives was limited to contribute to structural transformation agenda's.

There is clear evidence of increased political attention on safe, diverse and nutritious diets for all. Recent developments, such as the Ethiopian dietary guidelines, explicitly consider diversified diets but fall short in describing a concrete role for the dairy sector to systematically contribute to nutritious diets. Key informants argued that although the linkages between the health sector and the agricultural sector have consolidated considerably, arable agriculture has enjoyed the majority of attention and public investments. This has left the animal production sector in general, and the dairy sector in particular, in the peripheries of development efforts and nutrition oriented interventions.

3.3 Stakeholder analysis

An analysis of which stakeholders are involved in dairy sector development and support for nutritious and healthy diets in Ethiopia has been conducted using the BRIDGE project as a case of an innovation project. The five documents analysed are the inception report, a baseline study, a gender study, an annual report (2020) and the midterm evaluation report (Nov. 2021). One of the four components of the project focusses on improved consumption of nutritious dairy products. This exercise is meant to identify opportunities for connecting dairy sector development and nutrition ambitions in Ethiopia, not exclusively in the BRIDGE project.

A few observations are made with regards to stakeholders involved in the BRIDGE project in relation to the component about improved consumption of nutritious dairy products, most notably:

1. Opportunities for creating stronger partnerships with nutrition and health experts.
2. Opportunities for considering a greater variety of consumer groups than those consumers that are also dairy producers.
3. Opportunities for partnerships with chain actors

Opportunities for connecting nutrition and health experts

The policy analysis already identified a gap between agriculture and nutrition strategies. This is also reflected in involved partnerships in the BRIDGE project for the implementation in 2020, which was dominated by agricultural and livestock partners, and less by nutrition and health partners.

There is a great opportunity for enhancing collaboration between dairy, nutrition and health stakeholders. This is particularly the case when the core objective of the collaboration is to work on improving diets including consumption of dairy products.

From the reviewed project documents it is clear that livestock experts are well represented, judging from the very clear Theory of Change descriptions for the dairy components. In contrast, considerations for the nutrition component seem to be less detailed. This includes considerations on measuring the impact of the project on dairy consumption. Over the last years, BRIDGE has been engaging with nutrition experts from WUR and has conducted nutrition assessments focusing on rural consumers. The results from these assessments highlight that households in the rural areas who do not own cattle find it challenging to purchase safe and affordable dairy products locally.

Opportunities for considering a greater variety of consumer groups

Further, there seem to be opportunities to take a greater variety of consumer groups into consideration. Currently the main consumers of dairy products considered are households that are targeted under the BRIDGE project for uptake of improved dairy practices and increasing productivity, consumers of probiotic yogurt, and children that are part of the school feeding programs where probiotic yogurt is provided for children.

Research on the question what happens when households upgrade their dairy farming practices in terms of dairy product consumption is however lacking. There is no clarity about how improved dairy production affects household consumption behaviour. Research and knowledge organizations have an important role in this regard.

Opportunities for partnerships with chain actors

In addition to the existing partnerships focussing on production, productivity, feed and fodder and genetic improvement, there are opportunities for increased levels of partnership with diverse chain actors. Partnerships could be strengthened with stakeholders working on elements such as storage, transport, distribution, processing, packaging, retail and marketing.

Additional opportunities for partnerships

Based on insights obtained from the review of documents and key informant interviews, a few other opportunities for partnerships have be identified:

1. Most initiatives in the dairy sector in Ethiopia are donor driven, there is a potential and need for more private driven developments too, for example in the form of public-private-partnerships (PPP).
2. There are disconnects between public nutrition communication and donor driven dairy initiatives that could potentially benefit from each other. From a food systems perspective these are relevant to be strengthened further.
3. There are opportunities for incorporating nutrition ambitions, and an array of nutrition related stakeholders, in ongoing dairy and livestock projects in Ethiopia. This should also focus on expertise regarding consumer behaviour.

The stakeholder analysis has revealed that there are clear ambitions to integrate nutrition in agricultural intensification efforts. Although there are ongoing efforts, there is a potential to increase the collaboration between the various domains and stakeholders. There are opportunities for research partners to study in more detail the connection between dairy development initiatives and nutrition behaviour, not only in urban areas but also in rural areas and among dairy producing households.

There is a demand for institutional leadership and governance structures to guide future transformations of the dairy sector. This need for collaboration structures would be beneficial as long as it would involve nutrition and health related experts and stakeholders working on consumer behaviour. Increased public attention towards quality assurance and food safety considerations in the dairy sector are creating a demand to establish stronger partnerships with public and private sector stakeholders.

4 Exploring transition pathways

The third step of the methodological approach to explore transition pathways for Ethiopia's dairy sector included two multi-stakeholder workshops in which the following distinct steps were taken (see Appendix 2 and 5 for workshop programmes)

In the first workshop, stakeholders generated future visions in which the dairy sector strengthens its contributions towards healthy and nutritious diets in Ethiopia. This is elaborated in section 4.1.

In the second workshop, stakeholders generated transition pathways, and proposed strategies and activities to purposively transition from the current situation towards the mentioned future visions. This is elaborated in section 4.2.

Both workshops were organized physically in Addis Ababa. They were facilitated by BRIDGE team members and an external facilitator on location. Additional participants from the Netherlands and Ethiopia were able to join the workshop through an online connection. The authors of this report participated in the workshops and played an active role in the design and facilitation of the workshops.

4.1 Envisioning the future

Objectives
This visioning stage of the transition pathway process was conducted in a multi-stakeholder workshop on 24 April 2022.

The key objectives of this workshop were to:
- Share details on the transition pathways approach and the way it will be applied, to explore transition pathways that strengthen the contribution of the dairy sector towards healthy and nutritious diets for vulnerable population groups.
- Share key insights from the desk-top food systems analysis and its relation to Ethiopia's "Vision 2030 roadmap" for transforming food systems.
- Engage a diverse group of stakeholders from the dairy sector in a 'storyline' exercise (see Appendix 3 for template) to identify vulnerable consumer categories, geographic focus and specific dairy products to be taken into consideration for the generation of future visions.
- Develop and design future visions.

Stakeholder engagement
The following stakeholders actively took part in the workshop:
- 11 staff members of BRIDGE
- 2 representatives of Ethiopian agricultural research institutes
- 1 representative of the Ethiopian Society of Animal Production
- 1 representative of an NGO and development partner for dairy sector development
- 4 WUR researchers
- 1 independent external facilitator with experience and knowledge of the Ethiopian dairy sector.

This composition of stakeholder clearly highlights that the future visions that were generating in this workshop were designed by dairy professionals without directly engaging producers or consumers.

Methodology
After having introduced the transition pathway approach and the agenda for the workshop, four work groups were set up. Each group worked on designing their own specific future vision for the Ethiopian dairy sector. The future visions were based on reflections about the challenges and opportunities that the sector

encountered and what would be required to strengthen the contribution that the dairy sector could have to consumption of nutritious diets.

To better grasp the assignment of envisioning desired (dairy) futures and to reduce the complexity of the great variety of practices and dairy products that are accommodated in Ethiopia's dairy sector, a type of 'storyline' set-up was used (Appendix 3) that guided the four working groups to focus their future visions around clearly defined consumer groups and dairy products. The groups were asked to engage in dialogue based on a series of guiding questions in order to define, amongst others, which type of consumer group the future vision had in mind (e.g. elderly, children, etc.), their geographical location (urban, rural) and the type of dairy products the future vision contemplated (e.g. raw milk, processed dairy product, etc.).

Outcomes

Four future visions were generated during the workshop, each with a narrative text and an accompanying visual illustration (see Appendix 4)

1. Pasteurized milk for low income consumers in urban areas, distributed and dispensed through ATMs.
2. Raw locally boiled and powered milk for pregnant and lactating women and children (1-7 years) in rural areas- distributed through consumer cooperatives and community dairy farms.
3. Pasteurized packaged milk for urban children - distributed through local shops and markets.
4. Processed dairy (pasteurized milk, yogurt, cheese) for institutional markets – for example school, hospitals, industries, higher learning organizations and other public institutions).

A central reflection from the first workshop was that we should aim for a more diverse group of stakeholders. The main aim of this was that food system transformations are complex and require a wide array of stakeholders.

An illustrator who accompanied the workshop processes, created two illustrations that characterize and portray the overall conversations and dialogues from the workshop. One illustration refers to the current situation of the dairy sector and the second one depicts the combined four future visions for Ethiopia's dairy sector in 15 years (Figures 6 and 7).

The illustration of the current situation portrays a situation where there are limited connections between the rural production areas and the urban consumer areas. In addition the illustration refers to key challenges related to milk quality concerns and lack of or high costs of feed and fodder.

The illustration of the future visions, visually portrays the four abovementioned future visions and in addition also highlights the fundamental need for the establishment of a dairy sector coordination platform to enhance stakeholder coordination, concerted policy efforts and roll out strategies and investments to spur the transition of the dairy sector.

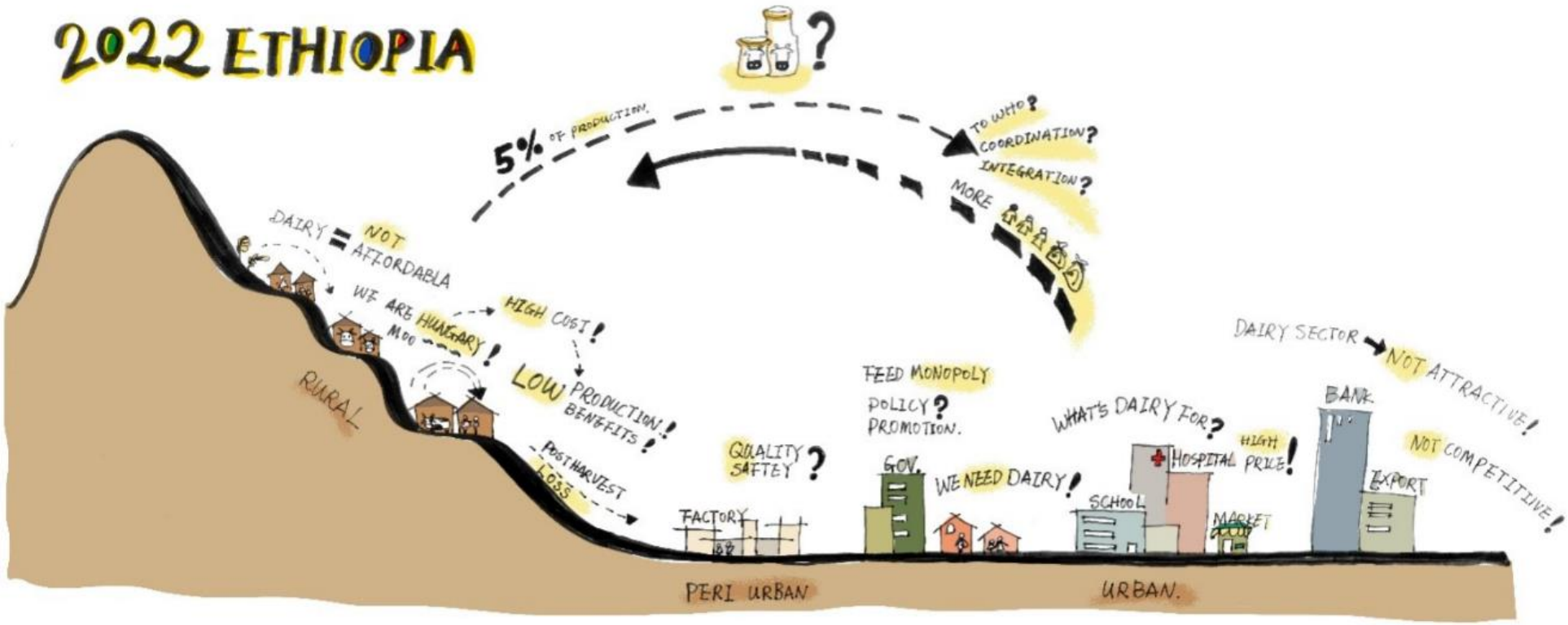

Figure 6 *Dairy in Ethiopia in the current situation - illustration based on workshop discussions.*

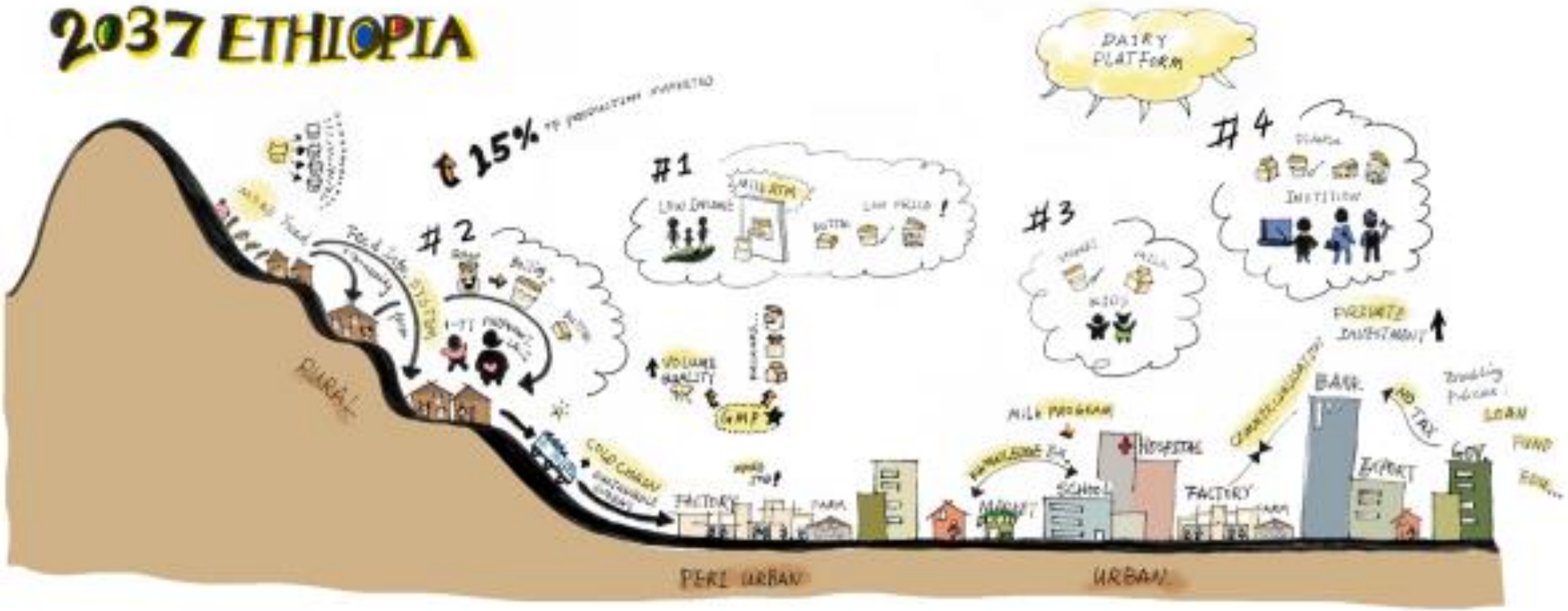

Figure 7 *Dairy in Ethiopia in the visioned future situation (2037) - illustration based on workshop discussions.*

4.2 Developing transition pathways

Objectives and activities

Making use of the future visions that were generated during the first workshop, the second workshop conducted on Thursday the 29th of September 2022, set out to explore and develop transition pathways for these future visions.

The specific objective of the second multi-stakeholder workshop was to engage workshop participants to use the future visions to reflect about food system transition pathways. This was done by looking at the interplay between different food system components and defining a pathway of actions to consolidate the contributions of the dairy sector to healthy and nutritious diets.

A key note speaker opened the second workshop by highlighting how the topics being addressed in this transition pathway exploration process aligned very nicely with the recent multi-stakeholder process whereby a vision for the transformation of Ethiopia's Food Systems was formulated. His overview on how this vision had a specific orientation towards safe and nutritious foods for all motivated the participants to take a next step in exploring these transition pathways.

After this introduction the workshop followed a series of steps:

1. After a recap of the first workshop, three of the four developed cases were pitched by the case owners (workshop participants from the first workshop)[6]. The participants of the workshop could then select the case that appealed most to them, as the case to work on in the in small groups.
2. Each group familiarized itself with their case by reviewing the work done in the previous workshop, based on the information prepared by the case owners in a template.
   The group was asked to identify the key structural elements of the food system that needed to be addressed in order to realize the future visions; key structural elements were selected out of the three columns of food system components from the food system framework (Figure 8). Workshop participants were asked to initiate their reflection about transition pathways, by considering food system components that looked beyond the supply chain and beyond production and productivity.
3. These key structural elements were placed on a timeline, using the back casting technique. The visioning was already done during the first workshop, so during this part of the second workshop participants started from this future vision and then ordered the structural food system components in the pathway and in the order that they saw fit to get to the future vision.
4. Having placed each food system component on the timeline (from the future back to the current situation), each component was considered in detail, reflecting on the challenges and opportunities, potential trade-offs, and partnerships required to address the issue at hand.
5. After completing the pathways for the three future visions, the pathways were shared in a plenary session and followed by final group reflections with regards to challenges, trade-offs and stakeholder partnership required to work on specific issues.

Stakeholder engagement

Present during the workshop were:

- 5 staff members of BRIDGE
- 1 representative of EFDA, the Ethiopian Food and Drug Authority
- 1 representative of the Ministry of Agriculture
- 2 representatives of Ethiopian research institutes
- 1 representative of a dairy cooperative and farmers organization
- 1 representative of an NGO and development partner
- 1 representative of the Ethiopian Food System Roadmap
- 2 WUR experts.

[6] One case – Pasteurized milk for institutional markets - was dropped as there was no case description and introductory presentation available due to the absence of a case owner.

No participants with a nutritional background were present. Nevertheless, the composition of participants was more diverse than during the first workshop and this was experienced as a positive factor by both the participants and the organizers during the workshop evaluation.

Food systems framework

For step 3, the food systems framework was used and each group had to select at least eight structural elements from this framework that they thought were most important to address in order to realize their future vision. The framework in Figure 8 was used, whereby participants were asked to specifically focus on the three columns in the middle (components of the food systems). At least two elements from each respective column (food supply chains, food environments, individual factors) had to be selected.

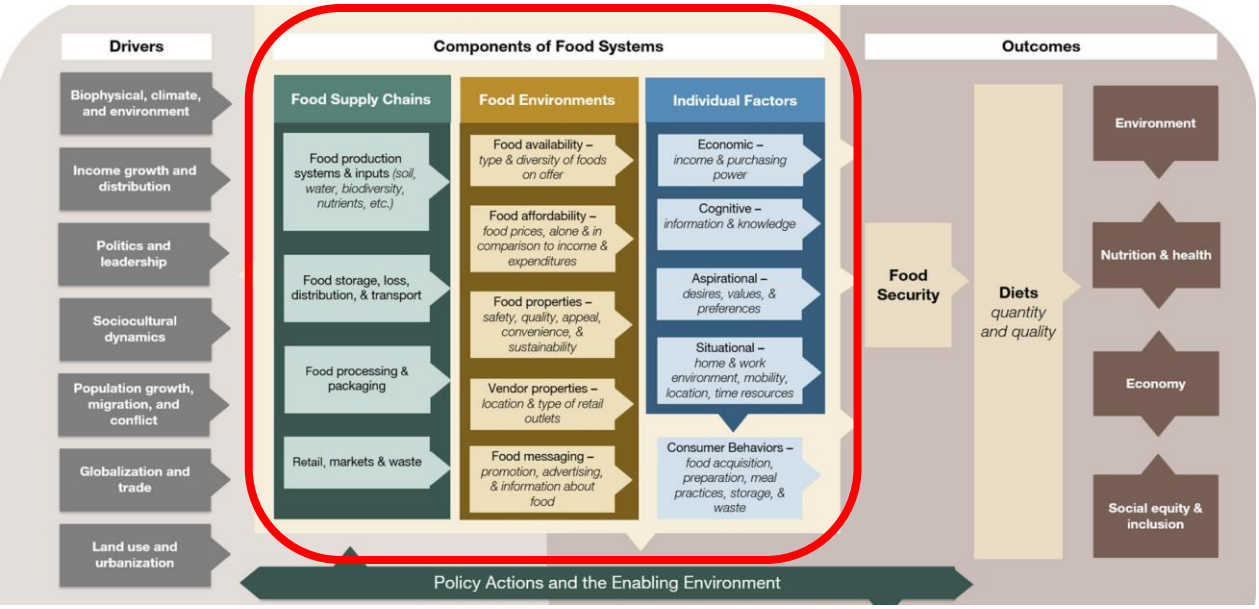

Figure 8 *Food Systems framework (Fanzo et al. 2021[7]).*

Outcomes

Detailed descriptions of the three cases that were discussed were finalized by the case owners after the workshop, utilizing inputs generated during the workshop. The full case descriptions can be found in Appendix 6. Short descriptions of the cases are provided below.

Case 1:

The first case revolves around a socio-technological innovation, that is taking off in Kenya[8], namely milk dispensing machines for retailing pasteurised milk and yoghurt in urban and peri-urban settings.

This case uses insights into purchase behaviour of urban consumers by introducing an innovation that addresses concerns regarding the safety, convenience and affordability of dairy products. In addition the case highlights the value of employment generation through increased jobs for SME's in sourcing, processing, transport, retail and others.

The case describes benefits of using ATM type dispensers where consumers purchase desired amounts of dairy and re-use their own packaging materials.

In the description explicit mention is made of the infrastructural requirements in terms of electricity network and tap water supply that this innovation requires. Mention is made of a series of favourable policies including tax exemption policies and regulations on food stands for sale of dairy products in ATM's.

See source: https://doi.org/10.1016/j.foodpol.2021.102163

[8] See: Ayuya et al., 2022 (Full article: Emergence of Milk Dispensing Machines as a Retail Innovation in Kenya: Trends and Consumer Patterns (tandfonline.com))

Lastly, the case description touches on some of the potential trade-off's such as the food – feed competition in peri urban areas.

In the pathway that was developed for this case, one of the first steps focusses on consumer behaviour and considerations regarding the retail market through ATM dispensers. Subsequent steps look into vendor properties, processing, food safety and information sharing. Considerations regarding production and productivity do not have a prominent place within the transition pathway. According to the group the current levels of production were considered as a limiting factor for this pathway. The detailed transition pathway designed by this group is portrayed in Figure 9.

Case 2:
The second case focusses on locally processed dairy products for children and women. The case look at powdered milk for urban settings and locally boiled milk for rural contexts.

Explicit mention is made about the potential contribution that this transition would have on reducing the losses in fresh milk. The key idea behind the case is to create a permanent market for fresh milk that would be processed in manner that would extend the shelf life of the product while safeguarding it's safety.

The transformation considered in this case emphasises that the use of village level solar powered milk collection systems together with small scale processing would potentially reduce losses, reduce energy requirements for storage and reduce technological requirements for dairy cold chains.

Due to its village level focus the transformation pathway requires a smallholder focussed extension system that supports local organization and local level production, aggregation and processing of milk into shelf staple dairy products.

The transition pathway of this case, looks a lot like a value chain structure in the sense that it starts of with production, moves to processing and packaging towards distribution and transport. At the final stage of the pathway food messaging is brought in as an action item.

Case 3:
The third case revolves around pasteurised and packaged dairy products designed for children and young consumers of middle and upper economic sectors in urban contexts.

This case focusses on making dairy products that are attractive both in terms of their costs and because of their taste. The case targets consumption habits by developing very attractive dairy products for youth that integrate design, packaging and appearance with a smart marketing campaign.

This case mentions the possibility of diverse dairy products including amongst others, milk shakes, flavoured milk, yoghurt, ice cream and cheeses.

The case description explicitly mentions the structural requirements that this would contemplate in terms of cooling, collection systems, storage, transport etc. In addition it also mentioned the need to apply a cooperative model.

The transition pathway has structure that is similar to a supply chain. In the beginning it focusses strongly of production and productivity improvements and then on value chain transformations including storage and processing elements. The case description similarly touches on consumer awareness and messaging campaigns. These elements start to play a role in the latter stages of the transition pathway.

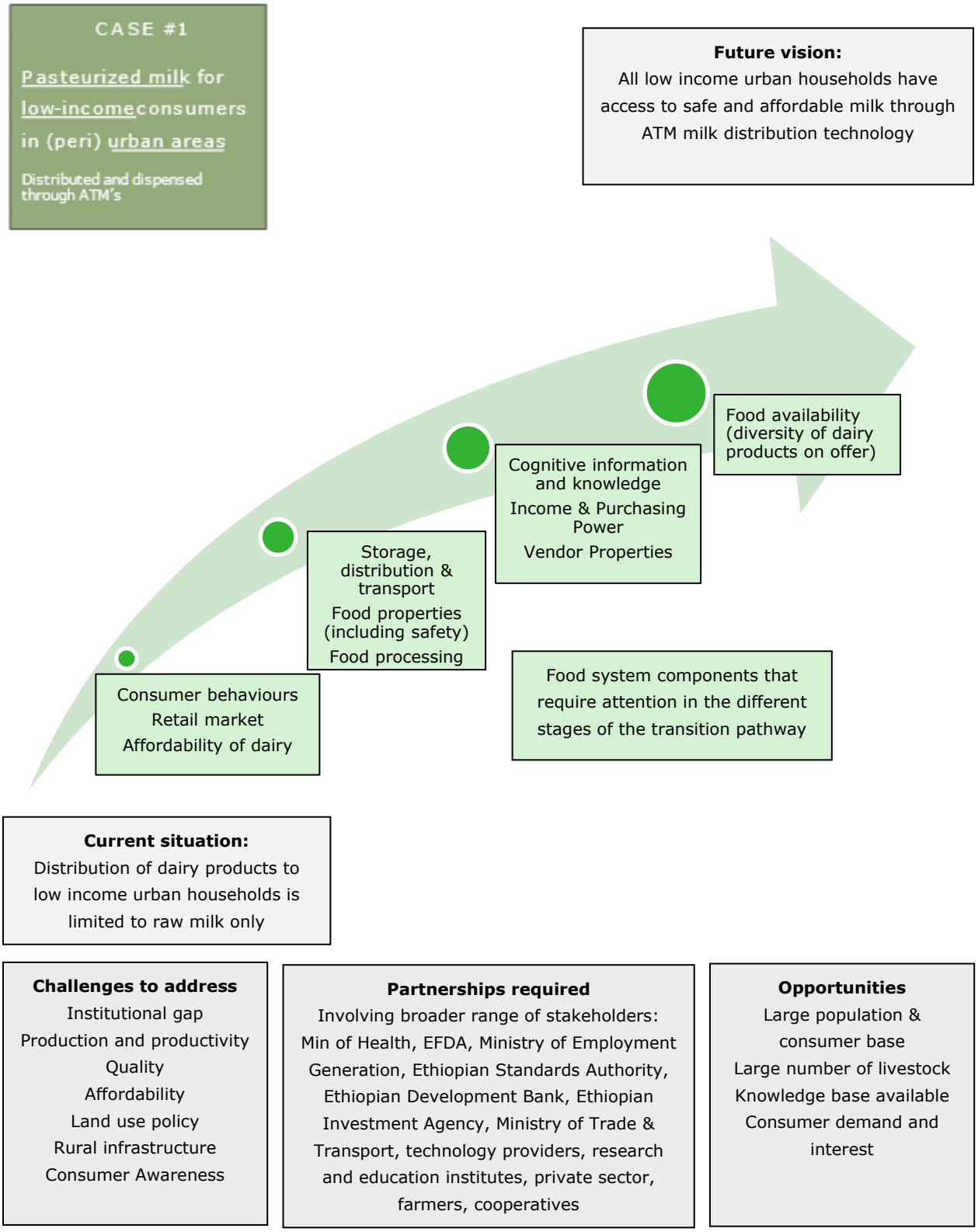

Figure 9 *illustration of one of the developed transition pathways.*

5 Reflections

This section compiles reflections that have emerged from the process of applying the "exploring transition pathways approach" in the context of Ethiopia's dairy sector.

The reflections and recommendations that have a relevance for dairy sector transition pathways in Ethiopia and those that have relevance for the application of the exploring transition pathway approach are described separately.

Reflections for the case of dairy sector transformation in Ethiopia
Many of the stakeholders that were engaged in the process experienced the approach as innovative and that it inspired them to look at the dairy sector transformation from a different perspective. The majority of workshop participants were relatively new to food system transition pathways approaches.

The methodology assisted in generating reflections and considerations that moved beyond the conventional key impact indicators related to production and productivity. This was accomplished by designing transition pathways that contributed to increased consumption of dairy products, focussing particularly on vulnerable consumer categories.

At first, this initial starting point caused some hesitation amongst stakeholders. The novel perspective – of looking at the contribution of the dairy sector to the nutritional needs and demands of vulnerable population groups – challenged the established way of thinking. In retrospect, participants acknowledged that this shift in focus had pushed them out of their comfort zone, but in doing so had generated valuable reflections.

Through the process of designing transition pathways, certain future visions that were initially considered out of contexts and unattainable started to be seen as more realistically attainable.

During the workshops, a number of participants emphasized the importance that the Ministry of Agriculture, should take dairy sector transformation as an institutional policy priority. In the absence of official institutional "change agents", any type of transformation process is difficult to succeed.

There was a strong plea to combine and coordinate public and private investments and thrive on market driven investments rather than development aid to drive the transformation processes at hand. Workshop participants felt that these transformation processes could be supported and catalysed by private sector stakeholders, once they had the autonomy and build their trustworthiness with regards to the sector and public policy for private sector development in dairy.

The observed lack of coordination in the dairy sector, together with the absence of a dairy development platform, was coined as a key inhibiting factor for dairy sector development. Nonetheless, participants agreed that this dairy sector platform must not be a top-down, donor-driven initiative but must be an Ethiopia-driven initiative. All participants agreed on that fact that the transformation that is envisioned cannot be handled singlehandedly by an external project initiative, or by a single stakeholder in splendid isolation.

By anchoring the process at hand in ongoing public policy efforts and by underscoring how the focus on safe and healthy diets for Ethiopia relates to the first action track of the Ethiopian Food System Transformation roadmap, an increased relevance and awareness was created among workshop participants with regard to the proposed activities. By showcasing evidence from nutrition-related research in Ethiopia and by bringing in a key note speaker to talk about Ethiopia's vision 2030 for food systems transformation workshop, participants were motivated to actively engage in the proposed approach.

Brainstorming with diverse stakeholders about food system transformation proved to be a valuable environment for sincere exchange and deliberation that provided insights that can be used in follow up stages to fine tune action perspectives and collaboration in the transition pathway. Involving a diversity of stakeholders from different knowledge domains and sub-sectors provided the opportunity to integrate and articulate different points of view into the transition pathway design.

Reflections and recommendations regarding the methodological approach for exploring transition pathways

The initial stages of system analysis – the food system analysis, policy analysis and stakeholder analysis – proved to be instrumental to map out current and historic trends and drivers for dairy sector development in Ethiopia. In addition, the analysis helped assess and uncover how policies, investments and efforts to develop the dairy sector were geared towards different food system outcomes. This led to the consideration that the transition pathway trajectories should reflect on how to strengthen the contribution of the dairy sector towards healthy and nutritious diets for all.

Key informant interview were instrumental in guiding further in-depth research, validating assumptions and insights and providing detailed insights into specific responses of stakeholders in the workshops. This aided in making sense and in contextualizing the responses and reactions that were obtained in workshop sessions and interviews.

Focusing, in the exploration process, on a specific food system outcome and a specific sector of the food system was helpful in providing clear boundaries for reflection, specific objectives to work towards, and a functional group of stakeholders to engage and work with. By setting these boundaries, the process benefited from a sharper focus. At the same time, this detailed level of focus creates a risk in terms of deliberatively narrowing down the scope of reflection and being prescriptive in making assumptions about the role and value of dairy for food and nutrition security and sustainability concerns.

Boundary setting should be a conscious step in combining food system approaches with the transition pathway approach, as it has a valuable influence on the focus of the visioning and pathway exercises and on the precise identification of stakeholders to engage. In subsequent steps of transition pathway approaches, the identified boundaries can be re-calibrated and adjusted. These adjustments will directly lead to consideration of new stakeholders to engage in the dialogues and deliberations.

Using a food systems framework proved to be helpful in providing a guiding structure for workshop participants. The framework guided their reflection regarding specific components that need to be taken into consideration in the transition pathway. In addition, the framework pushed participants to consider components in the food supply chain, food environment and individual factors.

Developing four distinct future visions was helpful in guiding participants to step away from ‘one-size-fits-all’ discussions. The four future visions were each quite different in terms of focus consumer group, area and type of dairy product that they contemplated.

There is a need to clarify and illustrate what type of diversity of stakeholders should be engaged in these types of processes and how to identify them. Conventionally, multi stakeholder approaches consider public sector stakeholders, private sector stakeholders, civil society and knowledge institutes as the four key typologies of stakeholders to involve in multi stakeholder partnership processes.

This case experience has shown that food system transformation trajectories require a specific understanding of the different and diverse types of knowledge, expertise, skills and attitudes that are required from stakeholders in order to constructively and effectively reflect about the transition pathways.

Each individual stakeholder actively contributed form their experience and expertise area. The specific focus of the transition pathway at hand warrants the need to identify detailed profiles of stakeholders to engage. A transition pathway exploration focusing on safe and nutritious diets for instance, will require more involvement of specialists with a nutritional and behavioural change background and will require value chain developers that consider product development, marketing and distribution. Consideration of food quality and

safety standards will require other specific expertise and articulation between different stages or nodes of the value chain and different levels of government administration. The experience described in this report involved public stakeholders, development partners, research partners, implementation partners, representatives of farmer organizations etc.

After each cycle of activities in the transition pathway exploration process, the representation of stakeholders was evaluated. This led to the identification of relevant stakeholders that were missing in the considerations and reflections who had to be invited for the follow up workshops. This iterative process of evaluating stakeholder representation considered involving stakeholders with relevant knowledge to contribute to a specific topic or area of interest.

The applied utilization of a food systems framework helped workshop participants to visualise the complexity of the food systems while at the same time making the complexity more digestible by structuring and delineating a variety of components that a food system consists of. Its use therefore helped to identify important components and features of the food system that needed to be addressed for the aspired transformation process to consolidate. This guided workshop participants to take a wholistic approach and prevented simplistic business-as-usual perspectives that might lock-in to the traditionally desired outcomes focus on production and productivity. This approach helped workshop participants to shift their focus to the agreed-on food system outcome, i.e. the contribution of the dairy sector towards healthy and nutritious diets for vulnerable population groups.

In order to further answer the question how the dairy sector can contribute to this outcome, and again in line with the sense of urgency, the team suggested to focus on specific consumer groups that are considered vulnerable, e.g. pregnant and lactating women, children, and elderly. Additionally, their location was specified (rural-urban) as was the type of dairy product they consume. This initial boundary setting, contributed to more focused discussions, future vision development, and pathway development. Rather than focusing on the entire food system, a decision was made to focus on a specific subsystem, namely the dairy sector and within this specific markets. From the outcomes obtained through the workshops a clear necessity arises to continue deepening the reflection on how to work on the food environment and individual consumer choices in order to improve consumption of dairy products.

This deliberate boundary setting and framing of the case study reduced the actual complexity, and determined as well the stakeholders engaged in the workshops. Evidently, alternative future visions and pathways to attain the desired food system outcome (healthy and nutritious diets) without the direct contribution of the dairy sector were not reflected on as a result.

Lessons that we draw from this are:

- Boundary setting should be a conscious step in combining food system approaches with the transition pathway approach, as boundaries influence the focus of the visioning and pathway exercises and the (type of) stakeholders that are engaged;
- Boundaries can be extended in subsequent steps, repeating the exercises with a focus on either different boundaries or different outcomes;
- The setting of boundaries can also reduce scope of the food system transformation pathways; in this case, by focussing on the contribution of the dairy sector to healthy and nutritious diets alternatives food products to attain the desired outcome of healthy and nutritious diets were not considered.

There is a strong need to work on commitment for future visions in the first workshop. These visions need to be evaluated, assessed and scrutinized by stakeholders in order to get participants approval and buy-in. This commitment and approval will enhance the follow up work when transition pathways are developed. Without this buy-in there is a risk that the two processes become disconnected and that there is a need to evaluate and assess previous steps before moving towards next steps.

The process has allowed a diverse group of stakeholders to reflect and consider how a food systems framework helps design pathways towards future visions. These reflections contribute to a more systemic understanding on how to integrate different food system component in transition pathways. The workshop facilitated critical reflection whereby stakeholders challenged each other but was not able to fully deliver on clear action perspectives. This is understandable considering the fact that this was an explorative exercise.

6 Conclusions

The methodological approach and practical guide that has been developed in the knowledge base program have been applied and validated in an Ethiopian case study. This case has provided valuable insights on the value and insights that these type of multi stakeholder process can bring in the initial exploration stages of transition pathways for food systems transformation.

By applying the 'exploring transition pathways approach' to a concrete case in Ethiopia, we conclude that the approach has great value in guiding stakeholders and practitioners in a participatory and reflexive process. By applying the methodological steps, stakeholders are challenged to explore beyond established business-as-usual approaches. Implemented in an iterative and reflexive manner, these methodological steps provide valuable guidance to explore transition pathways and co-design integrated food system transition pathways.

One key feature of the approach is its ability to help stakeholders and practitioners to depart from focusing on what is currently (im)possible by starting off with visioning a desired future first, before being limited by thoughts about how to realise the envisioned futures. Doing this in a way that enhances stakeholder's ownership of the issues and challenges they experience, and that engages them in the actual transformation process, helps identify areas and topics that need to be addressed in detail in subsequent stages or steps.

Tailoring and customizing this approach to an ongoing and concrete change-process or to a specific food system objective has the enormous advantage in that it provides context, so that the content of each step of the approach can be customized to the specific case. By making sure that this tailoring and boundary setting takes place in the initial stages of the process, the overall transition pathway exploration process is enriched. It is therefore valuable to provide details and clarity regarding the objective, the urgency, and the scope for the transition pathway process at hand.

The diversity of possible application areas for this particular transition pathway methodology is tremendous. For proper application and continued learning it will be important to be able to monitor and reflect on the project team experiences throughout all steps and for each specific case they work on. These active assessments will help to improve the guidance for practitioners who are interested to use and apply the methodology in any given context.

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Appendix 1 Interview guide for key informant interviews

1. Introduction and framing
    - Introduction
    - Overview and reason behind interview

Developing practical approaches to integrate food systems analysis with transition pathways approaches thinking about SDG challenges in the context of specific cases in LMIC. We apply this as a case study looking at the contributions of the Ethiopian dairy sector to healthy diets for all. Specific choice to look at outcome level: how can the ETH dairy sector contribute to need and demand of ETH consumers. We did desk top review looking into 5 areas – (following conceptual framework for food systems for diets and nutrition 2021:

I) Link between production and consumption
II) Enabling policy environment
III) Food Environment
IV) Consumer behaviour
V) Stakeholder partnerships

With these interviews we aim to validate and triangulate the desktop study findings.

2. Questions

    Topic: Link between production and consumption

Backdrop:
Importance of ASF in diets as source of nutrition dense food for cereal dominated diets.

Nutrition dense foods are expensive and not affordable for everyone. Acknowledging advances in dairy sector over the last 15 years policies, strategies, production, productivity, input, feed and fodder, animal health, food security, market linkage, added value, handling etc. Studies indicate price of animal source foods is increasing which affects availability, access and affordability for many.

Q1: How does increased demand and consumption of dairy in cities and urban centres affect availability and affordability of dairy in rural areas?
Q2: Which consumer groups are consuming more dairy products and how does it affect their diets?
Q3: Experiences, studies, reflections on how to increase consumption of milk for vulnerable population groups?

Topic: Enabling Policy Environment

Backdrop:
Policies and Strategies tend to focus on production, productivity, food safety.

Q4: Existing policies in ETH linking production of dairy to healthy diets and nutrition?
Q5: Ongoing efforts to develop policies and strategies linking the dairy sector to healthy diets?

Topic: Food Environment

Q6: How do elements of food environment currently influence consumption and nutrition of dairy products for different consumer categories?
Q7: Ongoing efforts in this area.
Suggestions ideas?

Topic: Consumer behaviour

Q8: How do elements of food environment currently influence consumption and nutrition of dairy products for different consumer categories?
Q9: Ongoing efforts in this area.
Suggestions ideas?

Topic: Stakeholder Partnerships

Q10: How do elements of food environment currently influence consumption and nutrition of dairy products for different consumer categories?
Q11: Ongoing efforts in this area.

Thank the participant.

[end of interview guide]

Appendix 2 Agenda workshop 1 – 24 April 2022

Objectives the workshop:

- Reflect on how the Ethiopian dairy sector can increase its contribution towards healthy diets through consumption of dairy products.
- Articulate different modalities through which the dairy sector could contribute increased consumption of dairy products by different consumer groups.

Time	Duration	Activity	Detailed process
9:00	5 mins	Welcome	The Ethiopian BRIDGE leadership will give a welcome address and officially open the workshop.
9.05	10 mins	Introduction to the workshop objectives and goal	The workshop objectives, processes and goals will be presented. Overview of workshop.
9.15	10 mins	Get to know each other	Participants will be asked to introduce their name, organization and expectations from the workshop.
9.25	15 mins	Presentation on the Transition pathway approach and FSA	The short presentation will introduce the Transition pathway approach Including a short introduction on the Food Systems Approach (FSA).
9.40	25 mins	Setting scene and Questions and answers	Workshop participants will be given an opportunity to: • ask for clarification; • will also be asked on their experience about the Transition pathway and FSA approach; • They will be given a 5 minute individual reflection and asked to share their thoughts, experiences, opinions etc.
10.05	40 mins	Current contribution of dairy sector to FNS outcomes and Potential / aspired future contribution	Participants will sit in trios (group of three) and discuss on the following: CURRENT SITUATION: How is the Ethiopian dairy sector currently contributing to increased consumption of (nutritious and healthy) dairy products. In trios two rounds. • Key contributions • Key challenges POTENTIAL FUTURE SITUATION: Reflection: How can the Ethiopian dairy sector contribute to long term outcomes related to nutritious and healthy diets, eradicating malnutrition, eradicating stunting in children? The trios will briefly share the result of their discussion.
10.45	15 mins		
11.00	15 mins	Description of the context-2 Multiple approaches for dairy sector to contribute to FS outcomes	Short presentation on description of context which builds on the previous discussion. Dairy sector can contribute to multiple action tracks and food system outcomes. Many roads lead to Rome, there are also many forms and modalities in which the dairy sector can contribute to desired food system outcomes, each has its pro's and cons.
11.15	15 mins	Questions and answer	Participants will be asked to add, ask for clarifications etc.

Time	Duration	Activity	Detailed process
11.30	30mins	Brainstorming on different modalities in which the dairy sector can contribute to aspired FS outcomes	**ASPIRED FS OUTCOMES** Quick brainstorm to identify different future visions in which the dairy sector can contribute towards improved food and nutrition security for specific consumer groups. We will engage in group work. Each group will start of identifying how specific consumer groups can increase their consumption of healthy and nutritious dairy products using the storyline template. Out of the array of ideas 3 promising future visions are selected for the next step.
12:00	50mins		Based on that initial reflection, the proceeding step will be to reflect on what is needed for the dairy sector to tailor specific approaches addressing the consumption needs of the different consumer categories and attain the desired outcomes. Small groups are formed and assigned one of the promising future visions (selected in previous step). Each group will explore ideas on how that future vision contributes to aspired FS outcomes and what is required to attain aspired food system outcomes. WORK FROM OUTCOME BACK to reflect on all the structural elements that need to be address to attain the desired outcome. Participants are asked to prepare a brief role play to share and present their ideas in plenary after the lunch.
13.00	1:30 hr	Lunch break	
14.30	1:30 hrs	Presenting the different reflections regarding future visions in which the dairy sector can contribute to the aspired FS outcomes and evaluating their key strengths and weaknesses	Participants will be asked to present their role play in which they highlight the future vision for increased consumption of nutritious and healthy dairy products and the specific structural elements that need to be address to attain the aspired food system outcomes. After each presentation a group of judges asked questions and reflects on what has been presented. Assessing strength key challenges and how the presented ideas address the aspired FS outcomes.
16.00	15 mins	Health break	
16.15	15 mins	Workshop evaluation and closing	Participants will be asked to reflect on the day and share positive and negative points. Participants will suggest issues to be added for the second workshop.
16:30		Closure	

Ask each group to discuss/fill two or three storylines that they think are important in how the dairy sector could contribute to increased consumption of nutrient-dense dairy products by different consumer groups.

Appendix 3 Storyline template workshop 1

Storyline template

Narrative details of the storyline
Who? What target group?
What type of dairy product?
Where is this product purchased?
What is the frequency that the product consumed ?
Exceptions?

Suggestions of consumer groups:
- Children
- Teenagers
- Adults
- Older people
- Young women
- Pregnant and Lactating Women

Suggestions for what type of dairy product:
- Raw milk (incl. locally boiled and pasteurised milk), typically not packaged
- Processed packaged milk
- Yogurt
- Butter
- Other namely: …

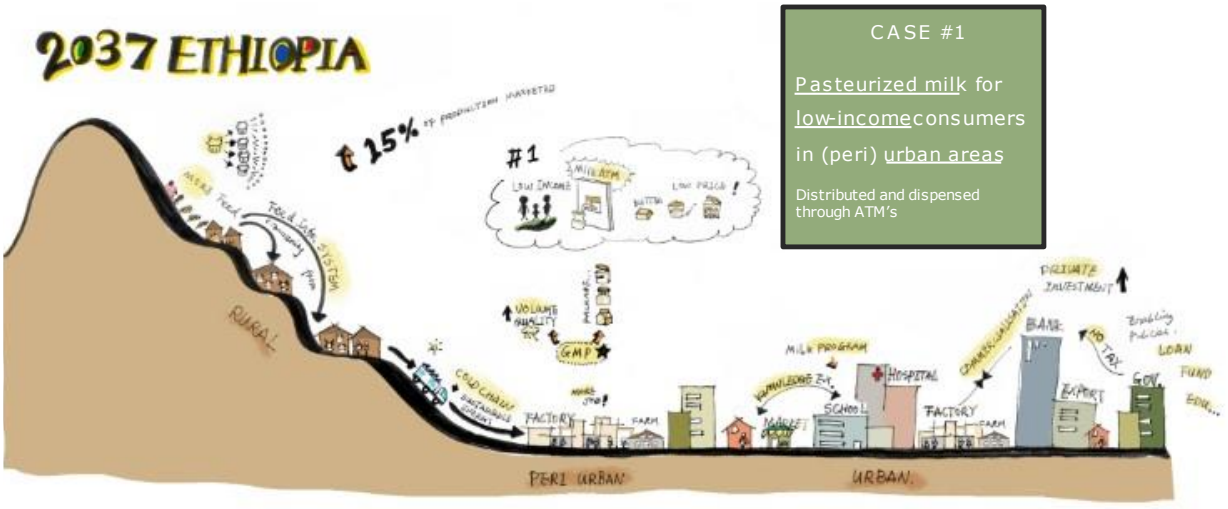
Suggestions for where is this product purchased:
- Urban areas
- Rural areas, specify where if applicable

Suggestions for frequency:
- Daily
- Couple of times a week
- Weekly
- Bi-weekly (every 2 weeks)
- Monthly
- Less than monthly

Suggestions for exceptions:
- Except during festive seasons
- Except during dry season

[end of storyline template]

Appendix 4 Four future vision illustrations workshop 1



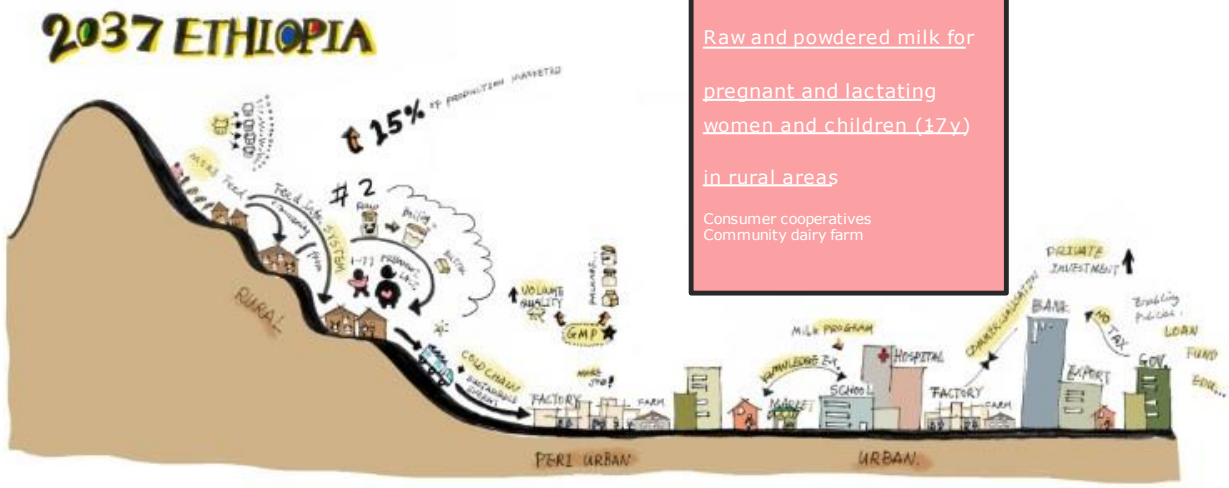
CASE #1

Pasteurized milk for low-income consumers in (peri) urban areas

Distributed and dispensed through ATM's

WAGENINGEN UNIVERSITY & RESEARCH

3



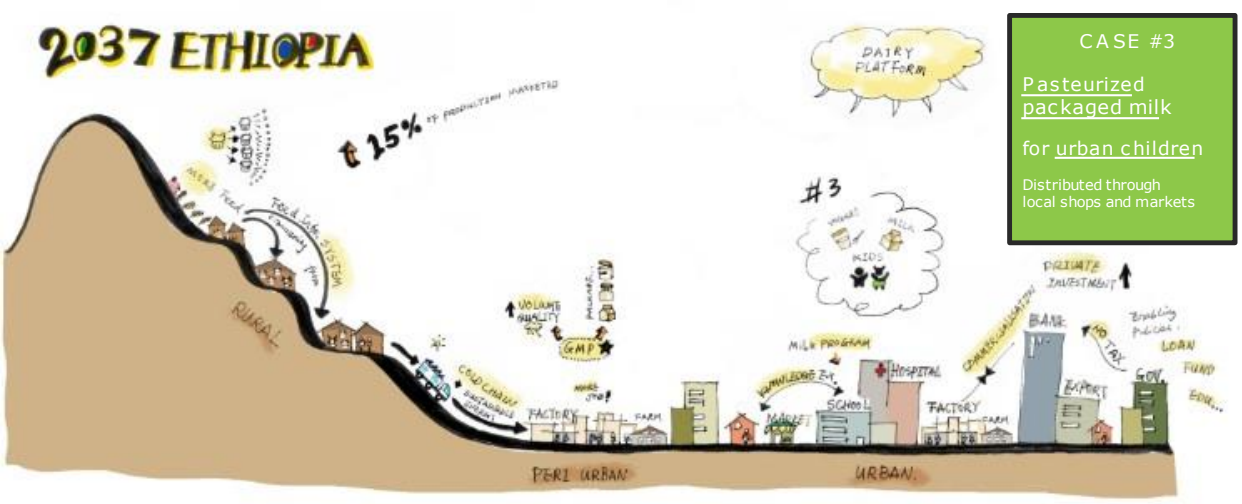
CASE #2

Raw and powdered milk for pregnant and lactating women and children (1-7y) in rural areas

Consumer cooperatives
Community dairy farm

WAGENINGEN UNIVERSITY & RESEARCH

4



CASE #3

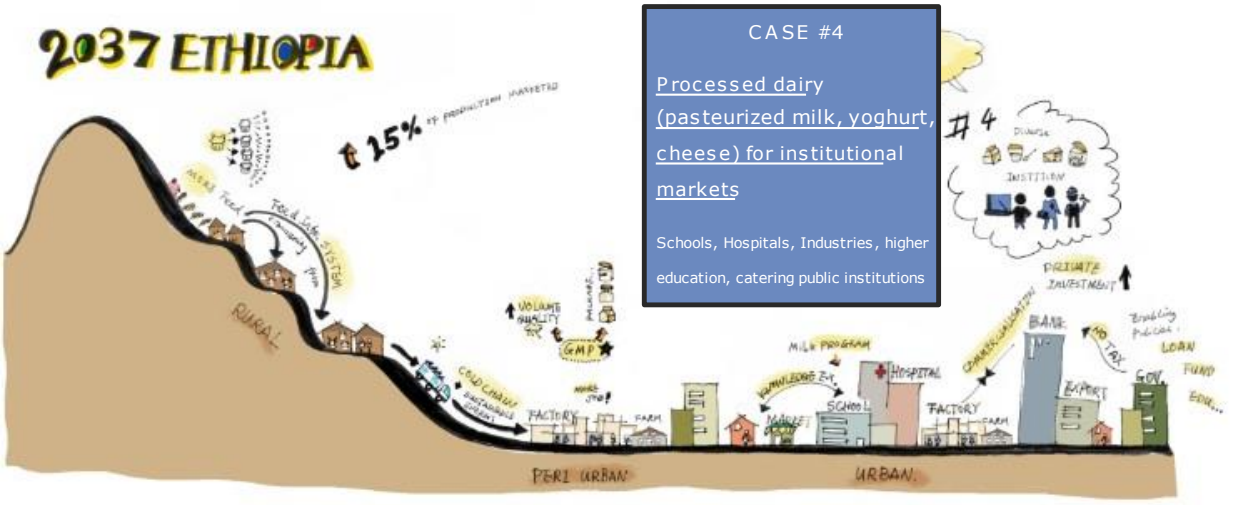
Pasteurized packaged milk

for urban children

Distributed through local shops and markets

WAGENINGEN UNIVERSITY & RESEARCH

5



CASE #4

Processed dairy (pasteurized milk, yoghurt, cheese) for institutional markets

Schools, Hospitals, Industries, higher education, catering public institutions

WAGENINGEN UNIVERSITY & RESEARCH

6

Appendix 5 Agenda workshop 2 – 29 September 2022

Time	Duration	Activity	Detailed process
9:00	**starting time**		
	5 mins	Welcome	The Ethiopian BRIDGE leadership will give a welcome address and officially open the workshop.
9.05	10 mins	Introduction to the workshop objectives and goal	Presentation of workshop objectives, processes and goals – Overview of workshop agenda.
9.15	10 mins	Get to know each other	Introduction round.
	10 min	Recap of workshop #1	Brief synthesis of activities, outcomes of workshop #1. Some participants did not take part in that first workshop. Idea is to bring them up to speed with 4 developed cases and key idea of TRANS PATH workshop methodology. Short intro, no details for now. Summary based on methodology and illustrations from WP #1.
9.35	30 mins Key-note 15 min Q&A 15 min	Key-note Presentation on the FSA And ETH Food system roadmap	Presentation Food Systems roadmap Ethiopia. One or two key-note speakers from MoA / MoH will be providing an intro from the perspective of the ETH food system roadmap, with a specific focus on how ETH dairy sector can strengthen its contributing to healthy diets.
10.05	50 mins (40 min case) 10 min group formation	Presentation of future visions and next steps group work	Four case owners present a summary of their cases, following the case template and the questions coined – quick elevator pitch. Q&A Workshop participants will be given an opportunity to: • Ask for clarification. • Share experiences and examples. Case owners have marketplace type event – each pitch in one corner. Carrousel – gallery walk in which they get to present their 4-minute pitches to a small group of workshop participants. Groups move around hearing all four pitches. After hearing all four pitches of the future visions, participants score each pitch based on predefined table of variables. The two pitches with the highest points get selected for the remaining group work. Creating three working groups (for each case) for next steps. In each working group make sure that aside from the case owner you have one rapporteur that writes up the discussion using the google template case description.
10.55	15 min	Health break	
11.10	50mins	**Group work step #1** Current contribution of dairy sector to FNS outcomes	Group becomes more familiar with their case. Review work and thinking done by case owner (based on template). Reflect on the structural food system elements that need to be addressed to achieve future vision (start by looking at the structural food system elements that have been coined by case owner – in the template add additional input from group. Finalize step 1 by listing all the key structural elements that must be transformed for the future vision – NB the group work starts off reflecting on the basis of the FS framework in the template provided. The central three columns of the FS framework refer to the structural elements.

Time	Duration	Activity	Detailed process
12:00	10min	Description and explanation of the next step	Step 2 of the group work will be explained (prioritization of key structural elements to address in transition pathway timeline). Questions and answer: Participants reflect and ask questions for clarification.
12:10	30m	**Group work step #2**	Start setting up the timeline.
12.40	1h15min	**Lunch**	
13.55	30mins	**Group work step # 3** Structuring and ordering components within a transition pathway	Set up a timeline starting with aspired future vision and ending with the current situation that has been defined. Order the different building blocks (structural elements) that have been coined in in a way that you have a logical, consecutive flow of steps in order of significance, relevance, importance.
14:25	10 min	Description and explanation of next step	Step three of the group work is explained, questions are asked. Finalizing template as provided.
14:35	45 mins	**Group work step # 4**	Based on the timeline that has been set up. Reflect and identify FS drivers and trends that can potentially restrict (challenges) and or accelerate (opportunities) the transformation of these identified structural components? Add a description of these drivers and trends to the timeline for the respective areas & components. Identify policy challenges. Identify implementation challenges. Identify potential trade-offs. Identify key stakeholders to work with for each component. Group prepares presentation.
15.20	15m	Health break	
15:35	60m	Merging 2 groups (20min) Presenting the transition pathways that have been designed by the two groups. 10 min presentation per group 5 min reflection 30 min	From the four groups merge into 2 – 1 group for each case. Participants will be asked to present their reflections in which they highlight the future vision for increased consumption of nutritious and healthy dairy products and the specific structural elements that need to be addressed to attain the aspired food system outcomes (PPT, role play). Merge input from 2 groups - . The merged group prepares one presentation for their case (20min). Timeline. key challenges. Stakeholders to engage. After each presentation, facilitator opens floor for questions and reflections. Facilitator gives opportunity to assigned to group that had been assigned to give feedback to share their reflections. Facilitator asks observers to assess the strength key challenges and how the presented ideas address the aspired FS outcomes. Strengths and challenges for future vision are documented.
16.35	10 mins	Workshop evaluation and closing	Participants will be asked to reflect on the day and share positive and negative points.
16:45		Closure	

Appendix 6 Final case descriptions

Final case 1

Summarized overview - future vision
Name future vision case
ATMs for safe and affordable milk and yogurt for urban consumers
Consumer categories and their preference targeted in this future vision
Low and lower middle-income urban consumers who want to purchase safe and affordable milk and yogurt in their neighbourhood
Geographical scope of this future vision (rural / urban)
Cities and towns across Ethiopia, especially neighbourhood shops in lower and lower middle-income parts, with dependable supply of water for cleaning and electricity for chilling.
Dairy product and services considered in this future vision
Fluid dairy products that can be dispensed into consumer-owned containers, eliminating the need for expensive packaging, such as: 1. Yogurt, modern or traditional (ergo). 2. Pasteurized milk, low, medium and/or full-fat.
Detailed description future vision Describe the future vision in detail providing insights in the modalities in which the future vision aims to contribute to healthy diets by providing dairy related products to consumers in Ethiopia. Provide details on why this business case /future vision is important, how respective dairy products are made available, how significant /the percentage of respective consumer from total population, how this respective consumers access, purchase and consume the dairy products. In addition describe how this future vision aims to contribute to different food system outcomes (healthy diets, income and employment opportunities, sustainable environment).
Dairy products offer essential contributions to healthy diets for children, school children and students, and for pregnant and lactating mothers, among others. Purchase behaviour of dairy consumers depends on price, trust regarding food safety, and convenience. ATMs in the neighbourhood bring quality products at a more affordable price to low and lower middle-income consumers and offer an appealing alternative to packaged products in more upmarket retail outlets. Product is purchased from ATM with cash or mobile money, in own container, at any desired volume. A dense ATM network in low and medium income parts of cities and towns will give an estimated 3 million households / 15 million consumers access to affordable dairy products and move them from hazardous informal supply chains to formal supply chains, with opportunities to control food product safety. Medium and larger scale processors also can adopt ATMs as retail channel. ATM supply of traditional or modern yogurt and of pasteurized milk offers income opportunities to numerous micro and small enterprises in sourcing, processing, transporting, and retailing milk and dairy products. Use of consumers' own containers will significantly reduce plastic and compound packaging waste in urban areas, next to reducing costs.
Considerations for designing a transition pathway towards the aspired future vision During the workshop, participants will design transition pathways towards the aspired future vision. Kindly provide some additional considerations that the group can reflect on during the design of the transition pathways by answering the following questions. Please refer and make use to the food system framework found at the bottom of this document as you answer the guiding questions.
When comparing to the current situation, which structural food system components will be different / transformed in the future vision? Provide a detailed description of the changes required within the identified food system components in reference to the future vision. Describe each food system component that is transformed one by one, providing details on what is transformed and how the components operates in the future vision. (NB: use food system framework found at the bottom of this document to identify the specific food system components that are transformed in the future vision).
Improvements and novel technologies will be implemented in **Food supply chains** • Better storage through chilling, less losses, distribution improves from raw to processed products, and less transport through shorter chains. • Opportunities for SME in processing and packaging. • Reduced packaging needs saves costs and results in less waste. • New and improved retail in low & lower middle-income markets.

Food environments

- Availability of larger range of quality milk and dairy products available to low & lower middle-income consumers.
- Products more affordable.
- Products more safe through processing and chilling.
- More convenience through corner-shop retail channels and/or upgrading of milk kiosks.
- Proven models in many countries (e.g. India and Kenya).
- Retail outlets can be used to promote credible food safety and healthy diet information.

Individual factors

- ATMs offer access to safe dairy products to large group of consumers who could not afford processed products or have limited access to current retail channels.

Which opportunities, drivers and trends will influence the future vision

- Ethiopia's climate, large livestock base, and tradition of dairy consumption are conducive for dairy production.
- ATMs make use of ongoing electrification and tap water networks in Ethiopian towns and cities (GERD).
- Dairy products are essential, but also relatively costly. Despite willingness to pay for dairy products, growth in market volume will depend on actual income developments in low & lower middle-income groups and on dairy price developments.
- High rates of urbanization and population growth and rising middle class with purchasing power make the market grow with 5-10% per year.

Which challenges, drivers and trends might influence the future vision

- ATM channels offers less margin to dairy processors; they may perceive ATM dairy products and SMEs as competitors, rather than as opportunity to draw new consumer groups into the formal market.
- Low milk yields and high product prices in Ethiopia due to productivity related challenges (including input supply, access to land and finance), in particular for the dominant smallholder production system.
- Poor rural infrastructure (particularly milk collection infrastructure) and regulatory environment regrading dairy production and marketing.
- While ATM milk did not prove to be of lower quality than packaged milk in Kenya, the image of ATMs and ATM retail outlets is subject to less trust in terms of safety aspects.
- Consumer awareness about new dairy products and retail channels takes time to grow.

Which stakeholders should be engaged (what actions per stakeholder and who should initiate/coordinate the process) when working towards the future vision

- MSMEs, processors, farmers, cooperatives.
- Providers of technology.
- Insurance companies.
- Relevant ministries, including Ministries of Agriculture, Health, Employment, Road transport.
- Eth Food & Drug Authority, Eth Standard Authority, Ethiopian Development Bank, Eth Investment Agency.
- Research organizations.

What type of policy challenges need to be considered?

- GMP standards for milk & dairy product sales through ATM.
- Tax exemption for dairy value chain to reduce price of dairy products.

What type of implementation challenges might be faced?

- Willingness of milk retailers to change from raw to processed milk.
- Importing or local production of ATM machines, adaptation to Ethiopian money and payment systems.
- Identifying retail locations with good supply of electricity and water to ensure cold chain and proper cleaning.
- Small-scale processing capacity for milk to dairy products.
- Sourcing of milk from what farming system? Distance vs quality vs price.

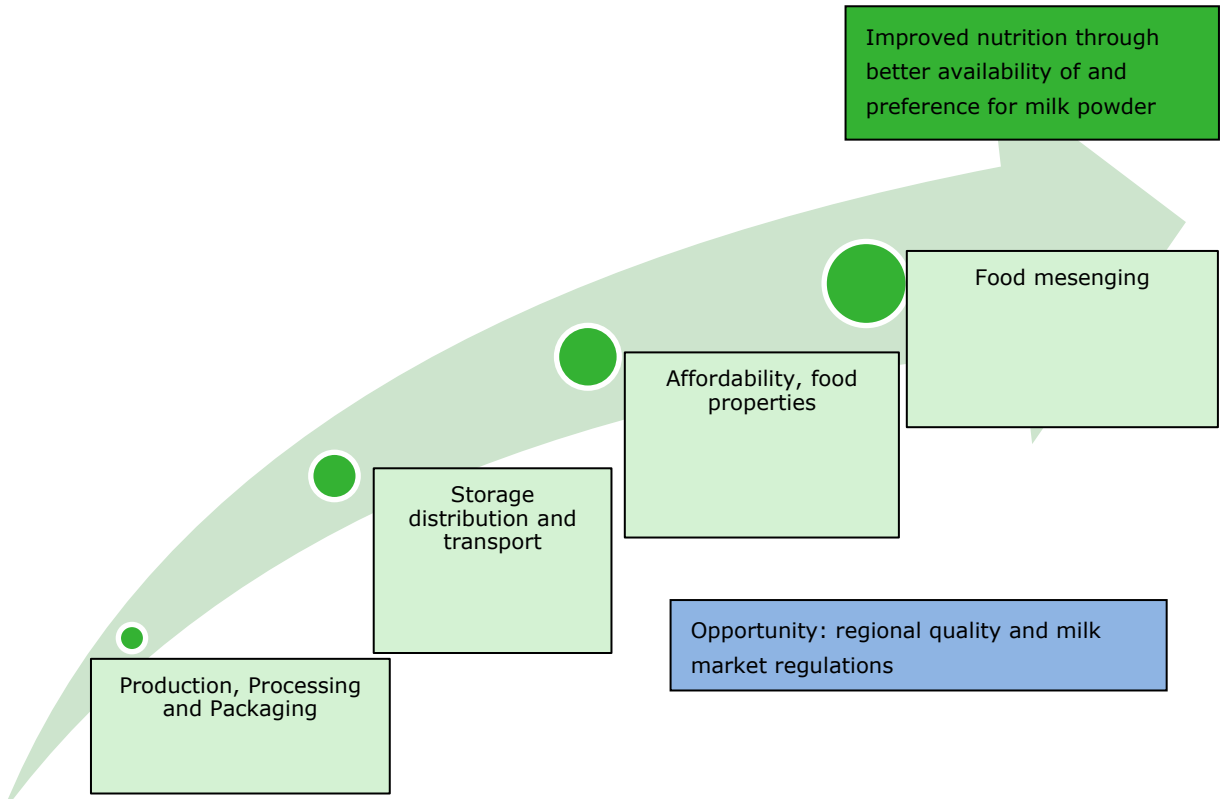
What type of trade-offs need to be contemplated?

- Forgone higher margins for packaged dairy products, in order to increase consumption by new consumer classes; needs to be compensated by high volumes from new markets.
- Feed-food competition, especially showing in land allocation for fodder in peri-urban areas.
- Commercialization may lead to loss of livelihood by smallholder farmers and to reduction in dairy consumption in dairy producing households.

Final case 2

Summarized overview - future vision
Name future vision case
Locally pasteurized milk and powdered milk
Consumer categories and their preference targeted in this future vision
Pregnant and lactating women and children in particular
Geographical scope of this future vision (rural / urban)
both rural and urban
Dairy product and services considered in this future vision
powdered milk (urban), locally boiled milk (rural)
Detailed description future vision Describe the future vision in detail providing insights in the modalities in which the future vision aims to contribute to healthy diets by providing dairy related products to consumers in Ethiopia. Provide details on why this business case /future vision is important, how respective dairy products are made available, how significant /the percentage of respective consumer from total population, how this respective consumers access, purchase and consume the dairy products. In addition describe how this future vision aims to contribute to different food system outcomes (healthy diets, income and employment opportunities, sustainable environment).
• Demand and supply gap in milk value chain affects the nutritional security of consumers especially children and lactating or pregnant women in both urban and rural areas. • This gap varies with the spatial, temporal and social situation of the target group. • Rural women and children from households that do not rear cattle, goats or camel are deprived of dairy products supply. • Urban women and children, who are geographically far from dairy production areas have limited access to fresh dairy products considering the perishable nature of milk. When coupled with low income status, pregnant and lactating women and their children are deficient in animal source foods and thus unable to attain food and nutritional security. • Locally processed (pasteurized milk) ensures safety and availability in terms of longer shelf life than raw milk is proposed here as transition pathway for rural areas whereas locally produced powdered milk as means of bridging the temporal and spatial gap between demand and supply of milk. • Powdering milk ensures year round market for dairy farmers that are currently affected by inconsistent off-takers that blame the fasting season demand drop. While this is an opportunity for the processors! • A year round market for milk has trickling down effect to the dairy farming input supply including fodder and feed production making the sector a dynamic one in the food system.
Considerations for designing a transition pathway towards the aspired future vision During the workshop, participants will design transition pathways towards the aspired future vision. Kindly provide some additional considerations that the group can reflect on during the design of the transition pathways by answering the following questions. Please refer and make use to the food system framework found at the bottom of this document as you answer the guiding questions.
When comparing to the current situation, which structural food system components will be different / transformed in the future vision? Provide a detailed description of the changes required within the identified food system components in reference to the future vision. Describe each food system component that is transformed one by one, providing details on what is transformed and how the components operates in the future vision. **(NB: use food system framework found at the bottom of this document to identify the specific food system components that are transformed in the future vision).**
Food processing will be transformed into an energy efficient milk drying focussed process that reduces postharvest losses. Currently there is a reported 30-40% postharvest loss in East African Dairy due to missing infrastructure for keeping the cold chain between production and consumption. Powdered milk requires no cold chain! Coupled with village level solar powered milk collection systems, milk drying is the solution to bridge the gap in demand supply of milk nutrients by enabling safe transportation from production areas to consumption areas as well as from production times to consumption times. Therefore, food environments component of the food system, especially dairy food availability and safety will be ensured.
Which opportunities, drivers and trends will influence the future vision
Growing population and urbanization drives this transformation to powdered milk focussed consumption as it is demands convenience of dairy products.
Which challenges, drivers and trends might influence the future vision
Policy challenges that continues public investments towards smallholder focused extension system.
Which stakeholders should be engaged (what actions per stakeholder and who should initiate/coordinate the process) when working towards the future vision
Public partners such as investment promotion, technology generation (university and food research), trade ministry.

What type of policy challenges need to be considered?
Lease financing and other financial products need to be introduced to attract more milk drying businesses.
What type of implementation challenges might be faced?
Limitation of forex allocation for the importation of drying technology and availing electric power for milk drying.
What type of trade-offs need to be contemplated?
Public expenditure towards availing electric power for milk powder plants, can be a trade-off for large importation of powdered milk.



Challenges to address

Low productivity, conventional farming system. Not well structured input- and output markets.

poor infrastructure, limited cold chain and milk equipment to reduce postharvest loss, lack of cooled transportation. Opportunity: some coops have commissioned refrigerated trucks and chillers

Poor technology and infrastructure, low quality milk, Technology and infrastructure, absence of milk quality and marketing regulations

Final case 3

Summarized overview - future vision
Name future vision case
Ensure access to safe and quality nutritious dairy product to children and youth
Consumer categories and their preference targeted in this future vision
Children and adolescent who belongs to middle and above economic class, pasteurized and packed dairy products
Geographical scope of this future vision (rural / urban)
Covering the major towns and cities
Dairy product and services considered in this future vision
Diversified processed dairy products
Detailed description future vision Describe the future vision in detail providing insights in the modalities in which the future vision aims to contribute to healthy diets by providing dairy related products to consumers in Ethiopia. Provide details on why this business case /future vision is important, how respective dairy products are made available, how significant /the percentage of respective consumer from total population, how this respective consumers access, purchase and consume the dairy products. In addition describe how this future vision aims to contribute to different food system outcomes (healthy diets, income and employment opportunities, sustainable environment).
Why we target children and youth in urban areas: The percentage of children and youth in urban areas consists more than 60% and the growth rate is very fast in proportionate to population live in urban areas • The children and youth group in urban area consume more dense foods and less nutritional important foods such as milk and milk products. • Absence of nutritious and safe foods increases the incidence of obesity and NCDs among youth populations. • Cognitive capacity and improve school performance. • Demand potential for consumption. • It is the future generation. **What the future vision contributes:** This future vision aims to contribute to on healthy diets the food system outcomes through changing the diet from dense food to affordable nutritive food and it also create an opportunity to flourish small business and create employment specially on retail market. The demand and consumption of milk among children and youth in urban areas is low because of supply, low consumption habit, existing product nature is not appealing for youths and soar price of dairy products. The new vision will work to change the situation and make dairy products is one of the loved products by children and youth. Enable the dairy sector to produce diversified products that serve the targeted market segment with new types of nutritious, safe and diversified dairy products such as flavoured milk, milk shake, yogurts, ice cream, milk, cheese. Develop sound market strategy to reach the critical mass of target market segment since it is the current market as well as future and Having good packaging and appearance, making the product affordable and quality.
Considerations for designing a transition pathway towards the aspired future vision During the workshop, participants will design transition pathways towards the aspired future vision. Kindly provide some additional considerations that the group can reflect on during the design of the transition pathways by answering the following questions. Please refer and make use to the food system framework found at the bottom of this document as you answer the guiding questions.
When comparing to the current situation, which structural food system components will be different / transformed in the future vision? Provide a detailed description of the changes required within the identified food system components in reference to the future vision. Describe each food system component that is transformed one by one, providing details on what is transformed and how the components operates in the future vision. **(NB: use food system framework found at the bottom of this document to identify the specific food system components that are transformed in the future vision).**

Food supply chain

Production system and Inputs

Production system

Change subsistence to market orientation.
Business mind set of farmers should change to take dairy as a business not as a side business.
Transition should take place to commercialization, there is a need to have more specialized and commercial setup.
Is there willingness to be part of dairy business as professionals (policy reform give opportunity).

Inputs

Land:
Land use changing and losing pasture land looking options how to make farming.
Breed improvement.
Inputs quality and quantity, infrastructure, skilled labour, logistic).
Public to private sector, enable farmers to make serving by own).
Feed system.
Quality of feed: Crop residue and industrial by products based to natural razing and cultivated forage (perineurial).
Health.
Accessible to services in terms quality and need to transform public to private.
Availability and affordability of drugs.
Milking and milk handling (hygienic milk production).

Storage loss, distribution, and transport

Collection system (bulking, traceability, cooling system, milk quality testing).
Cooperative model should be strengthened special reference to dairy.

Processing and Packaging

Market system and regulation to keep safety and quality of products.
Volume of product and product diversification tailored to market segment.
Processors should improve capability to respond on demands and priority of end consumers.
Processors have got policy support to address the youth and children (in terms of subsidy).

Retails market and waste

Hygiene and safety.
Infrastructure.
Marketing system is not structured to reach the ned consumer.

Food environment/dairy

Affordability

High Production cost in production, collection and bulking (0.04-2.17 birr /litre), Processing inefficiency and not functional/ well developed retail market.

Quality, Safety, appeal, convenience and sustainability

Individual factors

Economic

To realize the objectives of future vision, the following changes required in the structure of the food system component:

a. affordable, safe and nutritious diets;
b. gainful employment, improved livelihoods, profitable, attractive for investment;
c. efficient use natural resources/ keeping or sustaining the agroecological base environmental issues.

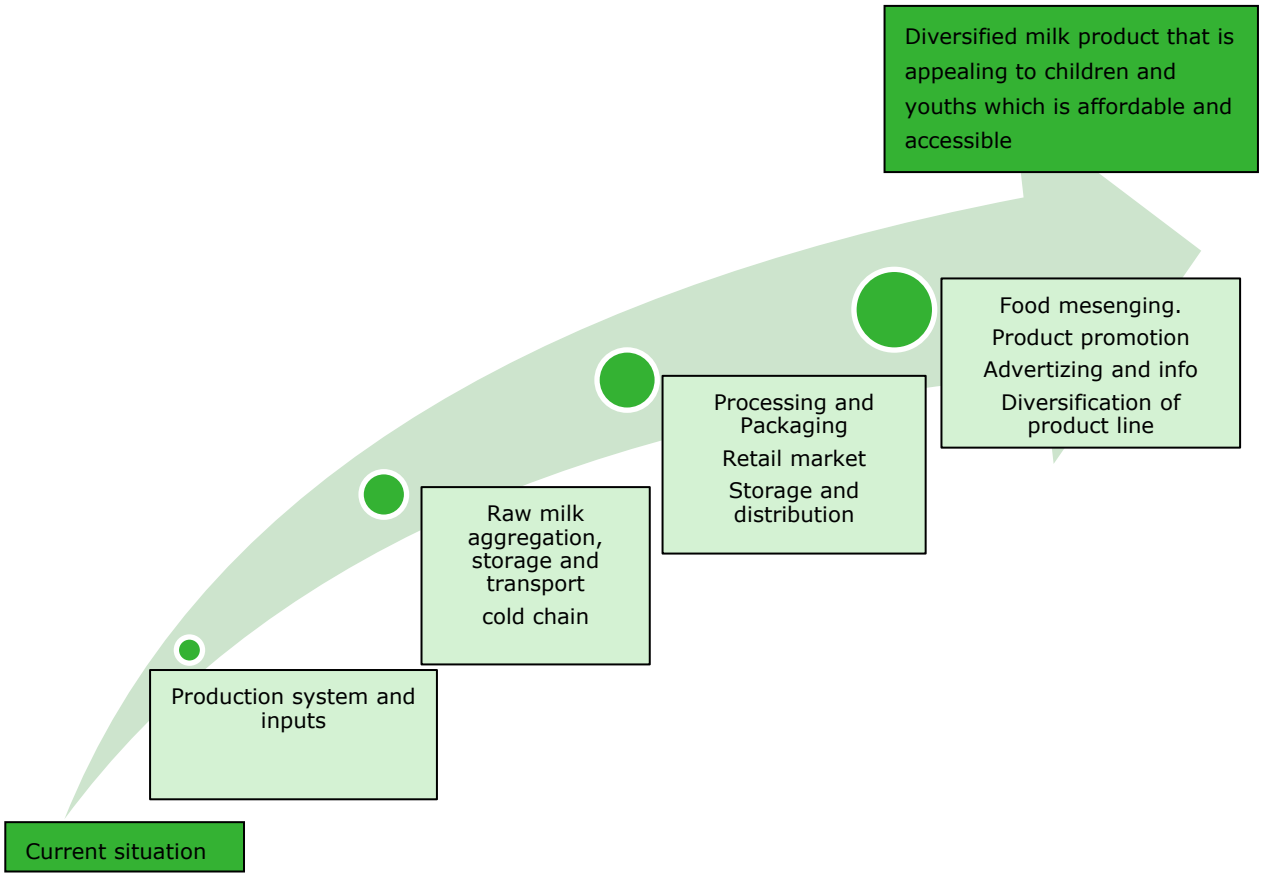
Which opportunities, drivers and trends will influence the future vision

Increasing awareness of food safety among the public.

Supply Vs demand to ASF specially for dairy is huge:

Increasing urban population and youth population in proportionate that may attract new investment.
Feed the growing sect of urban population becomes challenging that trigger to see new policies, implementation approaches and business thinking.
Global initiatives including SDGs.
National nutrition sensitive agriculture strategy.

Which challenges, drivers and trends might influence the future vision:
• High cost of production/ unit of dairy products along each production function of dairy value chain. • Limited access to finance for investment capital and expansion. • Low access to land. • Limited capacity of knowledge institutes to produce skilled labour/experts in quality and quantity. • Low innovation and business cases that improve the efficiency of dairy value chain. • Absence of market framework and low incentive to promote safe and nutritional diets for the public. • Low availability /supply of inputs and services on each node of the dairy value chain to produce and supply safe and quality products to end consumers.
Which stakeholders should be engaged (what actions per stakeholder and who should initiate/coordinate the process) when working towards the future vision
• MoA and regional livestock bureaus/offices. • MoE, MoH. • EFDA. • Dairy industry association (Dairy Board). • Development Partners. • Professional associations (ESAP, EEA, EVA). • Knowledge institutes (Research and university). • Consumer groups or associations. • Schools.
What type of policy challenges need to be considered?
Safety standards and enforcement capacity: The role of industries actors on safety and quality should be more on self-regulated and take the lead. Infrastructures: cooling facility along the value chain, electricity
What type of implementation challenges might be faced?
Setting common goal, coordination, and integration. Adaptive management: reviewing current developments and make adjustment with situation. Foreign currency.
What type of trade-offs need to be contemplated?
Dense foods vs nutritious food. Safety vs shelf life /conserving method.



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Report WCDI-22-235

Wageningen Centre for Development Innovation supports value creation by strengthening capacities for sustainable development. As the international expertise and capacity building institute of Wageningen University & Research we bring knowledge into action, with the aim to explore the potential of nature to improve the quality of life. With approximately 30 locations, 7,200 members (6,400 fte) of staff and 13,200 students, Wageningen University & Research is a world leader in its domain. An integral way of working, and cooperation between the exact sciences and the technological and social disciplines are key to its approach.

To explore the potential of nature to improve the quality of life

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Report WCDI-22-235

The mission of Wageningen University & Research is "To explore the potential of nature to improve the quality of life". Under the banner Wageningen University & Research, Wageningen University and the specialised research institutes of the Wageningen Research Foundation have joined forces in contributing to finding solutions to important questions in the domain of healthy food and living environment. With its roughly 30 branches, 7,200 employees (6,400 fte) and 13,200 students and over 150,000 participants to WUR's Life Long Learning, Wageningen University & Research is one of the leading organisations in its domain. The unique Wageningen approach lies in its integrated approach to issues and the collaboration between different disciplines.