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Synopsis: Implications of increased urbanization and consumer awareness on future food supplies in Tanzania

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This research quantifies how demographic change, urbanization, and healthy diet requirements will reshape Tanzania's food supply. Using contextualized healthy diet benchmarks, it identifies the scale, composition, and policy implications of food system transformation needed to ensure healthy diets in Tanzania by 2050.

- Tanzania's population is projected to more than double by 2050, with rapid urbanization increasing the share of urban residents from one-third to more than half and intensifying pressure on food supply systems and rural–urban linkages.
- To align with this growth, annual food supplies also need to increase by more than double—from about 24 million tons in 2020/21 to 52–62 million tons by 2050—but must do so with fewer food producers.
- Current diets are dominated by cereals and sugar, while fruits, vegetables, dairy, eggs, and animal-source foods are substantially under-consumed across all four geographic population strata.
- Future food system transformation should primarily focus on increasing supplies of dairy, eggs, fruits, and vegetables, and, for diets focused on micronutrients, meat and fish.
- For most priority foods, required productivity gains fall within current global technological frontiers, but environmental constraints—particularly for livestock—necessitate climate-smart intensification and protein source substitution.
- High postharvest losses, misalignment between nutrition priorities and agricultural policy—specifically Tanzania's Agriculture Master Plan—and weak rural–urban food system integration are critical bottlenecks and policy entry points for achieving healthy diets sustainably.

Introduction

There is broad consensus that current food systems (FS) are failing us, and, while views differ on the exact nature of this failure, studies indicate that without major changes, these systems cannot equitably feed future populations with healthy and sustainably produced food (Béné et al. 2019a; von Braun et al. 2021). Traditional FS were largely local and staple-based, used little value addition, and were characterized by short supply chains. In contrast, modern FS have given rise to increasingly complex and globalized systems involving longer value chains that connect industrial food producers, processors, and retailers, and a wide variety of unprocessed and processed foods (Ericksen 2008). These transitions are unfolding alongside increasingly powerful drivers—rising incomes, urbanization, and agricultural intensification—which not only expand food availability but also carry significant environmental, nutritional, and social risks (Béné et al. 2019b).

These challenges have catalyzed a broad coalition of stakeholders to embark on global efforts aimed at rethinking FS frameworks, most visibly through the United Nations Food Systems Summit and associated calls for paradigm shifts toward more holistic and integrated approaches to FS analysis and policy design (Clapp et al. 2022). Many of these same tensions are exemplified in Tanzania: despite the importance of agriculture to the economy, recent indicators reveal widespread inability to afford healthy diets, persistent undernourishment, and substantial food losses, all of which contribute to the growing burden of malnutrition in all its forms, as well as to increased spatial disparity, especially between urban and rural areas (Fanzo et al. 2020).

This study examines the implications of evolving food demand for Tanzania's future food supply. Using representative household food consumption surveys and the last two population census datasets, it projects food supply requirements consistent with healthy diets in the year 2050 and identifies key challenges, trade-offs, and entry points for a more efficient, nutritious, sustainable, and inclusive FS transformation, with particular attention to smallholder farmers and agrifood entrepreneurs.

Data

This study uses population census and household food consumption data to characterize current and future food demand in Tanzania. Population dynamics are drawn from the Fifth and Sixth Population and Housing Censuses, conducted in 2012 and 2022, respectively, which documented rapid population growth in Tanzania—from 44.9 million people in 2012 to 61.7 million in 2022—and accelerating urbanization, alongside marked regional heterogeneity in these growth rates. Youth constitute a substantial share of the population, with about one-third between 15 and 35 years of age. Household-level food consumption data are sourced from the fifth round of Tanzania's National Panel Survey (NPS5, 2020/21), implemented under the Living Standards Measurement Survey–Integrated Surveys on Agriculture framework and covering 4,709 households across four representative strata: Dar es Salaam, other urban areas (mainland), rural areas (mainland), and Zanzibar. To address data limitations, food quantities were derived using food outlays combined with standardized local prices, while food quantities obtained from own production or received as in-kind gifts were obtained by using local metric conversion factors. The consumption of food away from home was also incorporated through expenditure-based adjustments. Sampling weights were recalculated following outlier removal to preserve national representativeness. After this data validation process, the analysis finally relied on detailed consumption records for 65 food items, expressed in metric quantities per adult male equivalent, for a total of 3,945 households.

Methodology

To estimate the food supply requirements of a larger population consuming a healthy diet, this study relies on two important assumptions. The first pertains to the expected demographic growth, and the second concerns specifying and adapting international healthy reference diets to the Tanzanian context.

Population dynamics between 2020/21 and 2050 are projected using region- and area-specific demographic trends. Growth rates are derived from Tanzania's 2012 and 2022 Population and Housing Censuses; these were applied to interpolate population figures for 2020/21 and extrapolate them to 2050 at the regional and urban–rural levels. To ensure consistency with longer-term demographic trajectories in fertility, mortality, and migration, these projections are calibrated to national urban and rural population estimates from the United Nations. The resulting population distributions are then used to adjust survey sampling weights for the baseline period and to project them forward to 2050, allowing household-level consumption data to be scaled consistently with expected demographic changes while preserving geographic heterogeneity.[1] [2]

Healthy diet benchmarks are contextualized by adapting two international reference diets—the EAT-*Lancet* Reference Diet (ELRD) and the Hypothetical Micronutrient Adequate Diet (HMAD)—to Tanzanian consumption patterns. Both diets specify target intake quantities across food groups but differ in emphasis, with the ELRD prioritizing healthy and environmentally sustainable diets and the HMAD focusing on micronutrient adequacy, particularly for nutrients that are globally scarce. To operationalize these benchmarks in the Tanzanian context, the following steps are applied:

- First, target intake quantities from each reference diet are aggregated into 11 broad food groups consistent with household consumption data, ensuring sufficient observations and relevance to food culture and availability.
- Second, for each food group and analytical stratum, households whose observed consumption levels fall close to the reference targets are identified to capture typical within-group food item compositions.
- Third, observed shares of individual food items within each food group are scaled to match reference intake quantities, yielding contextualized daily intake profiles that reflect locally consumed foods.
- Finally, these intake profiles are annualized and combined with projected population weights to estimate national food supply requirements for 2050.[3]

These estimates are then compared with current consumption to identify gaps, trade-offs, and transformation entry points, with special attention to biophysical-, environmental-, perishability-, and processing-level differences.

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[1] The data and methodology used, and other details of this research, are available in Marivoet, W. and Alphonce, R. 2025. *Implications of increased urbanization and consumer awareness on future food supplies in Tanzania.* SFS4YOUTH Working Paper #9. Washington, DC: International Food Policy Research Institute. https://hdl.handle.net/10568/178094

[2] While this methodology captures most expected demographic changes, it may not capture unanticipated changes occurring between or after census rounds, such as variation in fertility, mortality, and migration, nor inter-displacement, urban reclassification, or boundary revisions.

[3] However, this approach has several caveats: (1) it relies on aggregated food groups that mask the finer granularity of the international reference diets, (2) it derives group-specific patterns independently by food group and does not account for complementarities across groups, (3) it does not ensure full energy or nutritional adequacy or cost efficiency, and (4) it estimates only minimum supply needs without accounting for excess demand. A detailed assessment of these limitations is beyond the scope of the study.

Simulation results

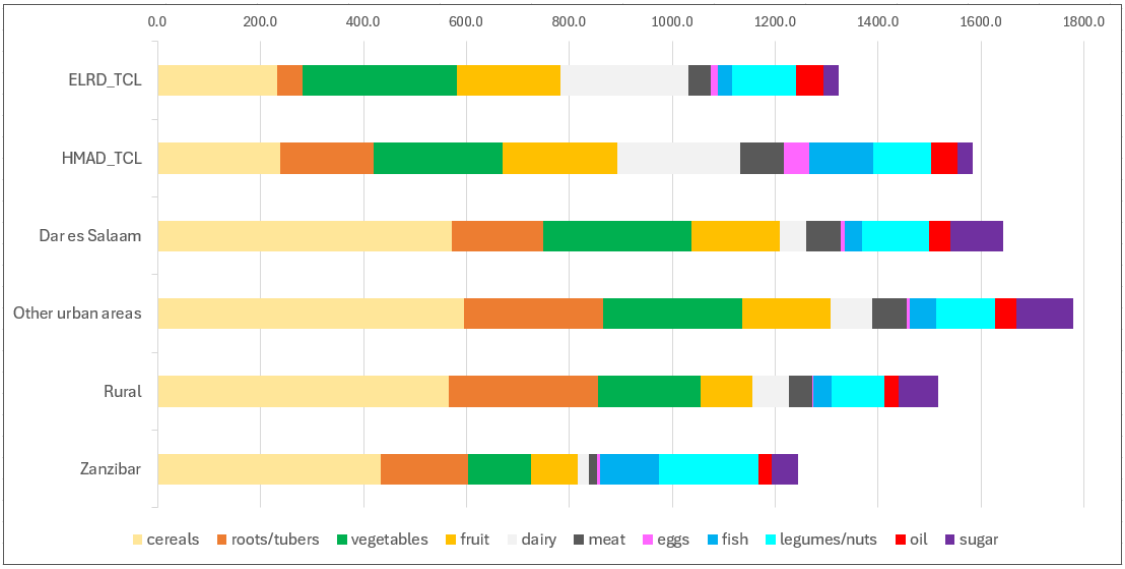
Expected demographic trends between 2020/21 and 2050

Between 2020/21 and 2050, the population of Tanzania is expected to more than double from 59.8 million to 138.1 million people (a factor of 2.3). This is mostly driven by rapid urbanization. While the rural population will grow by 1.6, the urban population will nearly quadruple, raising the urbanization rate from 34.5 percent to 55.4 percent.

Comparison of current and healthy diets

Daily food intake in Tanzania, excluding Zanzibar, is generally close to or in excess of the portion sizes required by international healthy reference diets. However, diet composition diverges markedly from healthy benchmarks across the four population strata (Figure 1). Diets are dominated by cereals and sugary products, while key nutrient-dense foods are systematically under-consumed.

Figure 1: Required and current intakes by food group, healthy reference diet, and population strata, Tanzania (2020/21)

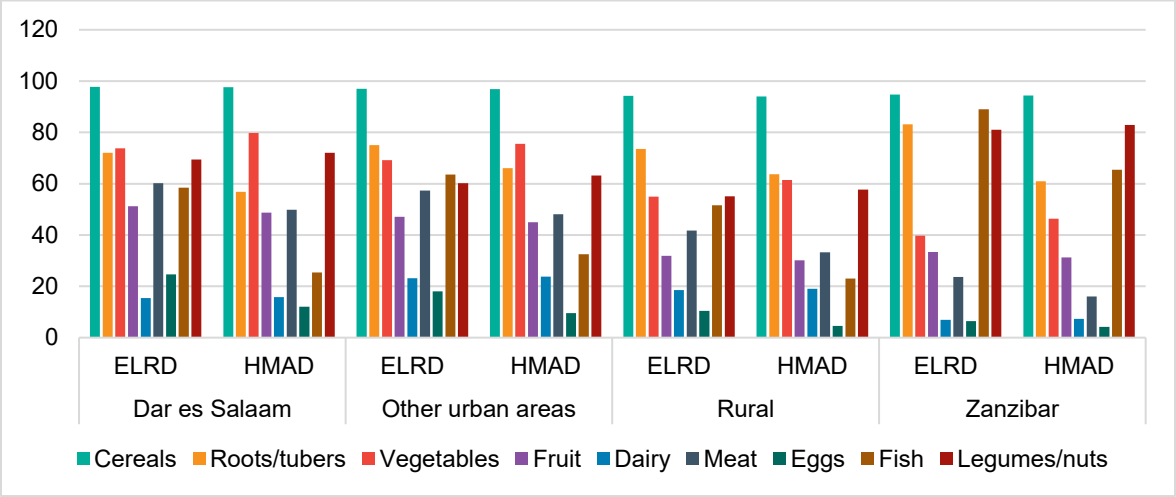


Source: Authors, based on NPS (2020/21), Willett et al. (2019) and Beal, Ortenzi, and Fanzo (2023).

Note: ELRD_TCL and HMAD_TCL refer to the target consumption levels defined by the EAT-*Lancet* Reference Diet (ELRD) and Hypothetical Micronutrient Adequate Diet (HMAD), respectively. These data represent intake levels required by the two healthy reference diets, while data for the four population strata represent current intakes. Intakes are provided in grams/adult male equivalent.

Across all strata, fruit, dairy products, and eggs exhibit the largest intake gaps relative to both reference diets, with particularly severe shortfalls in rural areas and Zanzibar. Vegetable consumption is also insufficient under the ELRD, while meat and fish intake falls well below requirements under the HMAD. Dairy and eggs are the most inadequately consumed food groups, with adequacy rates generally below 25 percent. Food group adequacy rates further reveal strong inequality in diet quality (Figure 2). Fruits, meat, and fish are largely treated as luxury foods and consumed disproportionately by households with higher overall intake levels, whereas vegetable and legume consumption is more evenly distributed across the population. Zanzibar displays a distinct dietary profile characterized by higher fish and legume consumption but very low intake of dairy, eggs, and vegetables.

Figure 2: Food group adequacy rates (%), Tanzania (2020/21)



Source: Authors, based on NPS (2020/21), Willett et al. (2019) and Beal, Ortenzi, and Fanzo (2023).

Note: ELRD = EAT-*Lancet* Reference Diet; HMAD = Hypothetical Micronutrient Adequate Diet.

Required changes in total annual food supplies

The analysis indicates that meeting healthy diet requirements, which is strongly influenced by demographic pressure and rapid urbanization, will require total food supplies to more than double, from about 24 million tons in 2020/21 to 52–62 million tons in 2050, depending on the reference diet (Table 1).

Table 1: Current and required annual supplies by food group, Tanzania (2020/21 and 2050)

Food group	Type	Current annual supplies (in 000 MT, 2020/21)	ELRD		HMAD	
			Annual supplies (in 000 MT, 2050)	Growth factor	Annual supplies (in 000 MT, 2050)	Growth factor
Roots/tubers	Unprocessed	3,839	1,677	0.4	6,497	1.7
	Processed	499	277	0.6	578	1.2
Sugar	Sugar	1,265	1,212	1.0	1,173	0.9
Cereals	Unprocessed	618	422	0.7	346	0.6
	Processed	8,464	8,635	1.0	8,986	1.1
Fish	Unprocessed	395	575	1.5	3,338	8.5
	Processed	181	519	2.9	1,508	8.3
Meat	Small ruminants/pork	195	227	1.2	411	2.1
	Poultry	211	338	1.6	628	3.0
	Large ruminants	366	1,116	3.0	2,245	6.1
Legumes/nuts	Processed	214	554	2.6	578	2.7
	Unprocessed	1,463	4,332	3.0	3,839	2.6
Vegetables	Processed	69	212	3.1	219	3.2
	Unprocessed	3,026	11,513	3.8	9,591	3.2
Oil	Oil	468	2,025	4.3	1,993	4.3
Fruit	Unprocessed	1,705	7,817	4.6	8,677	5.1
Dairy	Processed	360	1,615	4.5	1,824	5.1
	Unprocessed	773	8,156	10.5	7,517	9.7
Eggs	Eggs	54	508	9.5	1,954	36.5
Total		**24,193**	**51,740**	**2.1**	**61,910**	**2.6**

Source: Authors, based on NPS (2020/21), Willett et al. (2019) and Beal, Ortenzi, and Fanzo (2023).

Note: ELRD = EAT-*Lancet* Reference Diet; HMAD = Hypothetical Micronutrient Adequate Diet. The food groups in this table are ranked by the ELRD growth factor.

The required shift in food supply composition is more striking than the required aggregate growth. Supplies of fruits, vegetables, edible oils, dairy, and eggs must increase several-fold, with dairy supplies rising by more than 8 times and egg supplies by nearly 10 times under ELRD and more than 30 times under HMAD. Meat and fish supplies must also expand sharply under the micronutrient-focused diet.

In contrast, current supplies of cereals and sugar are broadly sufficient to meet future healthy diet requirements, while supplies of roots and tubers could even decline under ELRD. These results imply that future FS transformation hinges primarily on diversification rather than staple expansion.

Food supply implications and possible entry points

Tanzania faces key policy challenges to transform the scale and composition of its FS to supply healthy diets by 2050. This study identifies 10 nutritionally critical food items—eggs, fresh milk, bananas, mangoes, avocados, oranges, cooking oil, tomatoes, onions, and beans—as the primary drivers of future transformation. Meeting projected demand for these foods cannot be achieved through incremental adjustments but instead will require targeted interventions across production, value chains, and consumption.

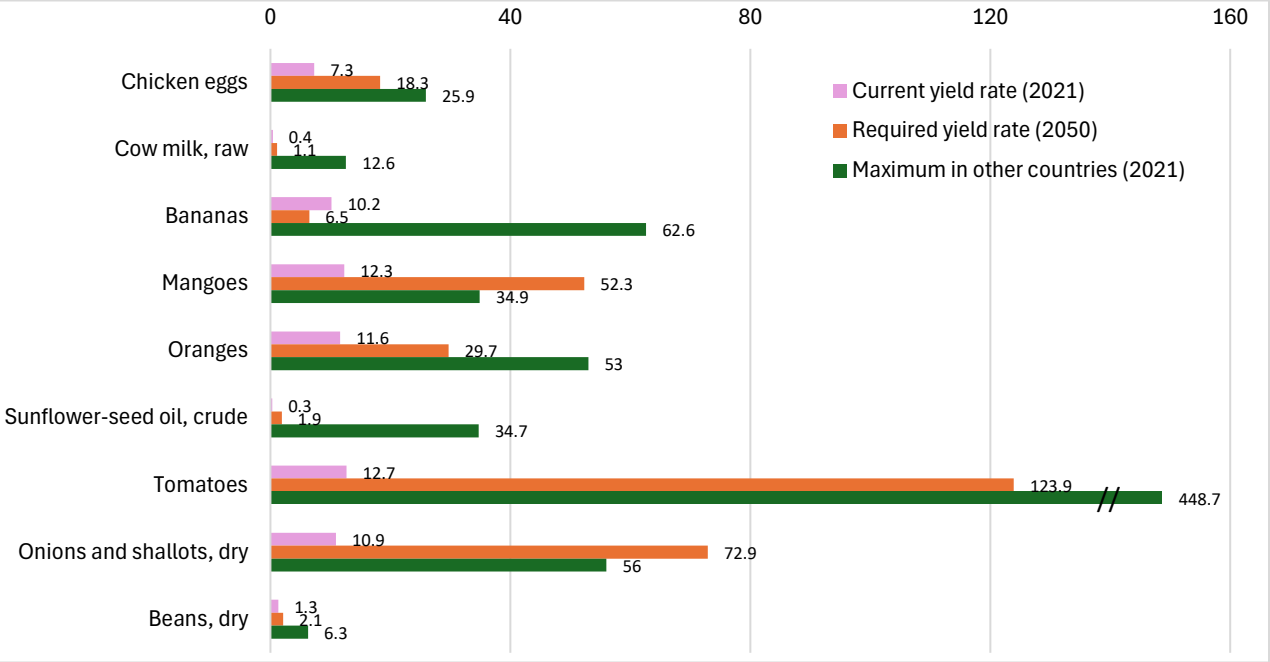
Simulated yield requirements suggest that, for many food items, the necessary productivity gains fall within current global technological frontiers proxied by countries with the highest two yield rates. This is the case for milk, oranges, sunflower oil, tomatoes, and beans, where required yields remain below internationally observed rates (Figure 3).[4] For instance, milk yields in Tanzania should almost triple from 0.4 to 1.1 tons per cow—similar to yields in Libya and Mozambique, but still 10 times below the levels in Israel and Saudi Arabia. For eggs, yields need to increase from 7.3 tons to 18.3 tons per 1,000 hens. These findings indicate that intensification—if supported by appropriate investments in inputs, animal health, genetics, extension services, and infrastructure—could substantially contribute to meeting future demand. However, for certain fruits and vegetables, such as mangoes and onions, the yield increases required under a strategy focused on intensification approach or exceed current international benchmarks, implying that complementary strategies, including imports and land reallocation, may be necessary.

Postharvest losses are also a critical constraint and an important entry point for policy action. For bananas, current yields already exceed those required in 2050, pointing to substantial losses along the value chain rather than production shortfalls. Addressing high postharvest losses—estimated between 20 and 80 percent for bananas—is a clear strategy to reduce resource wastage and increase food security. Similarly, required increases in agricultural productivity could be attenuated if complemented with increased imports, particularly of commodities such as cooking oil.

Alignment between national policy priorities and nutritional needs is another key challenge. Tanzania's Agriculture Master Plan prioritizes 20 commodities, of which 12 are also critical to meet healthy diet requirements, with different items important across ELRD or HMAD. These include fruits, vegetables, legumes, dairy, poultry, and aquaculture. However, important gaps remain. Nutritionally critical foods such as eggs, certain fruits, onions, and leafy vegetables receive limited attention despite their large projected supply gaps, while other items prioritized by the Master Plan affect nutritious diets only indirectly, through increases in people's income. In contrast, several energy-dense staples and cash crops prioritized by the Plan are already sufficiently consumed from a nutritional perspective, suggesting scope for rebalancing priorities without undermining income-generation objectives.

[4] Estimated required yield rates are based on an intensification strategy that assumes constant current harvested areas (or number of animals) while assuming no changes in soil health, climate, and other biophysical conditions.

Figure 3: Current and required yield rates for selected food items



Source: Authors, based on FAOSTAT, NPS (2020/21), and Willett et al. (2019).

Note: All yields are annual, in tons per hectare (crops), tons per animal (milk), and tons per 1,000 animals (eggs). Yield rates were also derived based on current harvested areas (or number of animals) for each food item and required supplies in 2050 under EAT-*Lancet* Reference Diet requirements.

Environmental sustainability also constrains feasible transformation pathways. Efforts to expand animal-source foods must consider reducing emission intensity, particularly for cattle, which are major greenhouse gas emitters. Climate-smart livestock interventions—improved feed quality, animal health, and genetics—are therefore essential. Policies should also be inclusive of pastoralist livelihoods. Substitutions among protein sources to favor plant-based proteins, eggs, dairy, poultry, and low-impact aquaculture over red meat offer additional opportunities to reconcile nutritional and environmental goals.

Beyond production and value chains, urbanization creates both challenges and opportunities. Investments in commercialization, cold chains, and food logistics are essential to strengthen rural–urban linkages, while urban agriculture may also help supply perishable, nutrient-rich foods closer to consumption centers. Although not a panacea, urban and peri-urban production can contribute to affordability, resilience, and circular resource use if supported by context-specific, pro-poor policies. Together, these entry points highlight that achieving healthy diets by 2050 will require a coordinated, multidimensional FS transformation rather than isolated sectoral interventions.

Conclusions

This study quantifies the scale and nature of FS transformation required to secure healthy diets for Tanzania's population by 2050. The analysis provides several insights: first, total annual food supplies must more than double—from about 24 million tons in 2020/21 to 52 million tons under ELRD and 62 million tons under HMAD. While this growth broadly mirrors population growth, rapid urbanization will mean that fewer rural producers need to supply substantially more food, heightening the importance of efficiency throughout the FS. Second, the composition of food must shift markedly toward vegetables, fruits, dairy, and eggs under both reference diets, and toward higher meat and fish supplies under HMAD, while the

future supply of cereals and sugary products could remain below population growth. Third, although required production shifts appear technically feasible for most food items given current global yield frontiers, environmental constraints, particularly for animal-source foods, pose serious challenges, implying the need to prioritize productivity gains that reduce environmental footprints and explore alternative, environmentally efficient protein sources. Fourth, substantial postharvest losses, especially in fruit and vegetable value chains, significantly undermine food security and resource efficiency. Reducing these losses and strengthening rural–urban supply linkages could alleviate pressure on production while improving access to nutritious foods, particularly in rapidly growing cities. Finally, the results suggest important policy implications for aligning FS transformation strategies with nutritional goals. Tanzania's Agriculture Master Plan provides a strong institutional basis by prioritizing several commodities that are central to future healthy diets. However, notable gaps remain, particularly for eggs, mangoes, oranges, onions, and leafy vegetables, given the large projected shortfalls under the Master Plan as well as their nutritional relevance. Although postharvest losses are formally recognized as a critical challenge, their mitigation remains insufficiently integrated into the broader agricultural policy framework, calling for emphasis on appropriate postharvest handling, storage, processing, and cold chains. Urban agriculture emerges as a complementary strategy to improve the availability and affordability of perishable, nutrient-dense foods, though its potential depends on city-specific constraints related to land access, water availability, infrastructure, and private sector development. Overall, achieving healthy diets by 2050 will require a coordinated policy approach that simultaneously addresses production, value chains, environmental sustainability, and spatial differences in FS development.

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