

UKUDLA: Data-driven innovation for sustainable and resilient food systems in Africa

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Why a framework, and what UKUDLA adds

- ❖ Data-driven technologies can improve food security and agricultural sustainability.
- ❖ However, it remains unclear where data science is used across food systems and what information is available.
- ❖ UKUDLA connects food systems research with data-driven methods to generate actionable evidence, inform policy, and support equitable, context-sensitive system improvement.

UKUDLA - African German Centre for Sustainable and Resilient Food Systems and Applied Agricultural and Food Data Science



Conclusion and outlook

The conceptual framework aims to

- ❖ Link food-system research questions with suitable data science methods.
- ❖ Identify where these methods can improve food security and agricultural sustainability.
- ❖ Transfer findings to stakeholders and inform capacity building.
- ❖ Conduct research, knowledge transfer, and capacity building collaboratively with African partners.

A conceptual framework for data science in Southern African food systems

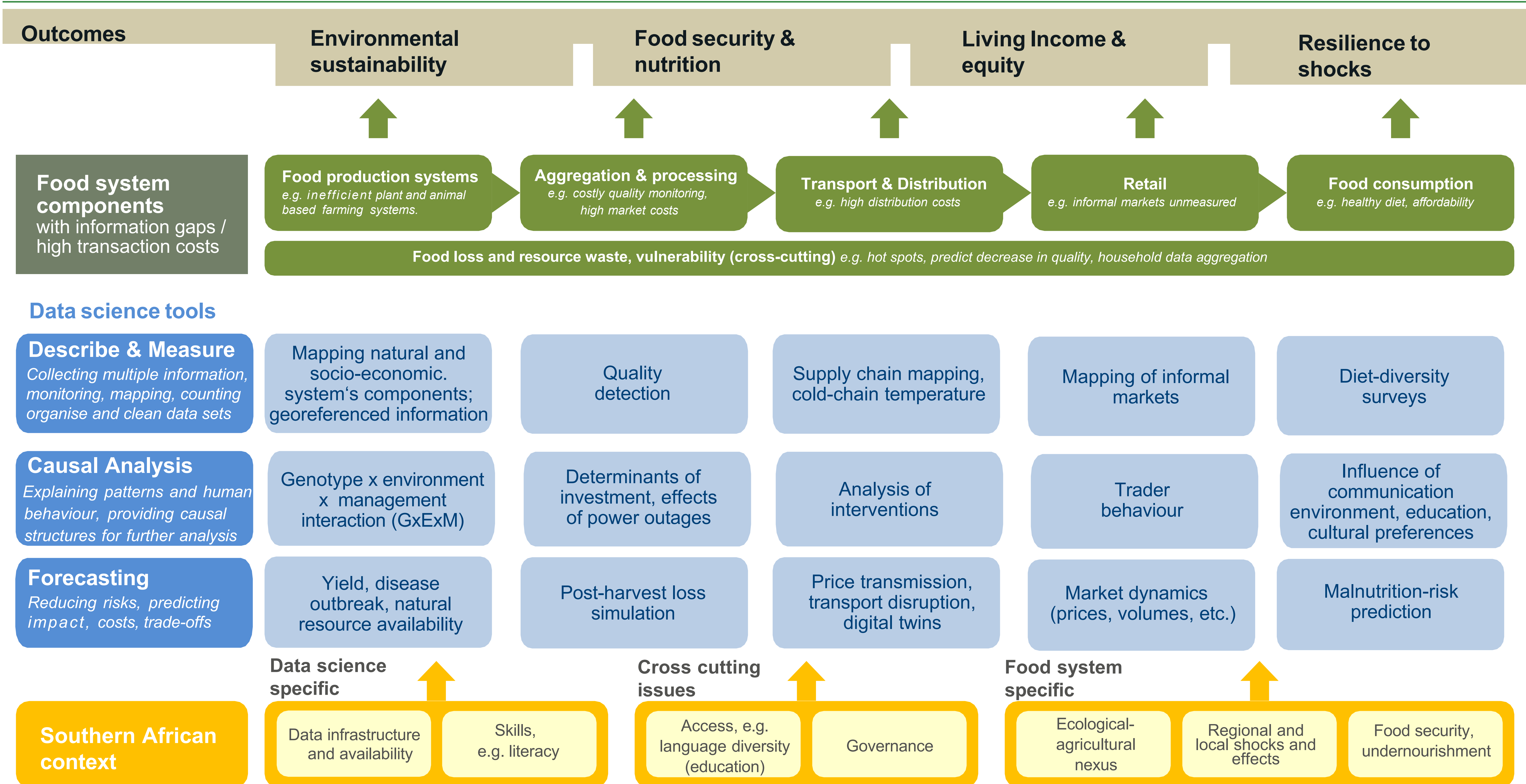


Figure 1. Columns follow the food system from production to consumption, rows are the three data-science layers, and each cell names the question data science can answer at that point. Yellow arrows carry the Southern African context upward into every cell; the banner on top holds the outcomes the system is judged against.

The framework in use: three applications, three kinds of evidence

Food production	Description & measurement	Aggregation & processing	Causal analysis	Food consumption	Forecasting
Production systems under change ❖ Application mapping climate and other ecosystem parameters / resources on geo-referenced farm land. ❖ Evidence resource-use efficiency and crop or animal health under variable environments and management. ❖ Feeds into monitoring, extension services and drought-risk assessment, improved water-, animal- and crop-management, etc...		Policy and governance ❖ Application determinants of investment; effects on value-chain actors. ❖ Evidence what holds back investment along the value chain, and what policy trade-offs cost. ❖ Feeds into policy analysis and coordination across actors and sectors.		Post-harvest, food quality and nutrition ❖ Application malnutrition-risk prediction from diet, price and food-quality data. ❖ Evidence where and when nutritional outcomes are likely to deteriorate. ❖ Feeds into monitoring of food losses, quality and nutrition along the value chain.	

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