Sustainability Along the Value Chain:

A View of the Midstream of Tomato and Amaranth Value Chains in Tanzania

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RSM2SNF
Research Supporting African MSMEs To Provide Safe and Nutritious Food

MICHIGAN STATE UNIVERSITY

ASPIRES Tanzania
Agricultural Sector Policy and Institutional Reforms Strengthening

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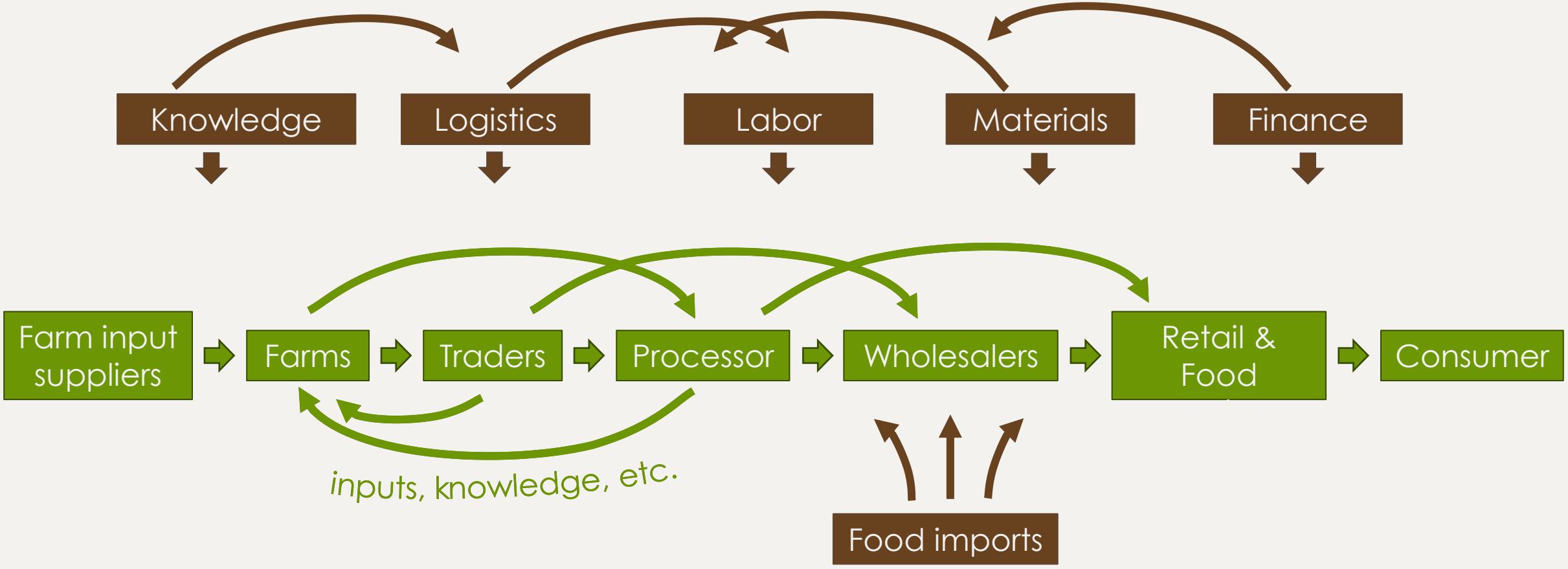
HEKIMA NI UHURU

Agrifood value chains

Farms

Consumer

Agrifood value chains



The “hidden middle”

- Limited attention has been paid, in research and policy, to the midstream of agrifood value chains—processing, storage, wholesaling, and logistics.
- In Asia, the ‘midstream’ accounts for 30–40% of the value added and costs in food value chains (Reardon 2015).
- “The productivity of the midstream is as important as farm yields for food security in poor countries.”
- Growth in agrifood value chains has been propelled by investments made by individual micro, small, and medium-sized enterprises (MSMEs) in the midstream, e.g., truckers, warehouse owners, cold storage operators, processors, wholesale traders, etc.

Growth in the midstream

Country	Urban share of popuation	Urban population: % food value that's purchased	Rural population: % food value that's purchased
Nigeria	51	95	78
Tanzania	32	95	64
Uganda	23	86	54
Ethiopia	20	97	53
Malawi	16	94	76

Source: Liverpool-Tasie et al. 2021

- Proliferation of MSMEs in the midstream (faster than population growth).
- Dynamisn in the midstream (not "missing", not undeveloped).

Sustainability along the value chain

- MSMEs grapple with various issues of **sustainability**.
- They're affected by environmental stress and are also sometimes the cause of environmental distress. And they work creatively to solve their problems and manage their value chains.
  - **Climate shocks:** Livelihoods all along the value chain are affected by climate shocks that drive product availability and prices.
  - **Food loss:** More food loss means more land is needed to produce the same amount of food for consumption.
  - **Water:** Midstream actors need water to maintain food safety & hygiene; processors may need water for food processing.

Sustainability along the value chain

- MSMEs grapple with various issues of **sustainability**.
- They're affected by environmental stress and are also sometimes the cause of environmental distress. And they work creatively to solve their problems and manage their value chains.
  - **Energy (electricity):** Processors need power to do their work. Transporters, warehouse service providers, and retailers may need power for climate control.
  - **Fuel:** Transporters need fuel to move the product over space. Processors make choices about fuels that are either more or less sustainable.
  - **Waste management:** (1) Disposal of unusable product and packaging. (2) Markets need to provide toilet services.

Data

- Survey of tomato wholesalers in 8 cities around Tanzania (2023).
  - 521 wholesalers
- Survey of wholesale markets for tomato and amaranth in the same 8 cities (2024).
  - 45 markets, 90 product-markets

Data

Forthcoming (now in the field):

- "Stacked" survey of value chain actors at various nodes of the value chains of tomato, amaranth, and fish in Morogoro and Mwanza.
    - Input suppliers
    - Producers (farms or fish capture enterprises)
    - Transporters
    - Processors
    - Wholesalers
    - Retailers

Food loss

- In 2022, 13% of all food produced worldwide was lost prior to the retail stage of the food value chain, and another 19% was wasted at the retail, food service, and household levels (UNEP 2024).
- The highest food loss and waste shares are estimated for fruits and vegetables (45%).
- FAO has estimated that 37% of the physical mass of food in Sub-Saharan Africa is lost of wasted (FAO 2011).
- However, these estimates are extremely problematic—coarse, modeled (not measured), etc.

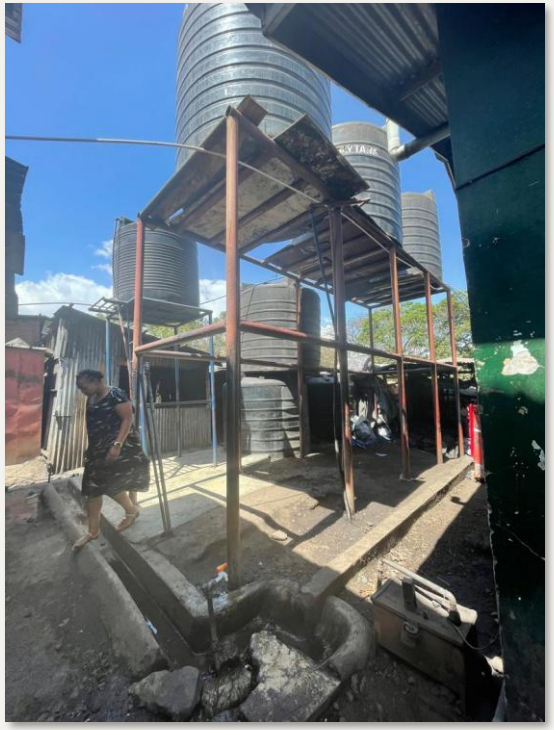
Food loss

Food loss

Food loss

	% (or mean) of tomato wholesalers
In your most recent purchase...	
Did you lose or have to downgrade (reduce the price of) any of the tomatoes you purchased?	17
Quantity lost or downgraded (kg) (mean)	185
% lost or downgraded (mean)	20
Of the tomatoes that were lost/downgraded:	
% completely lost (mean)	12
% downgraded and still sold for human consumption (mean)	62
% downgraded and sold as livestock feed (mean)	25
How did this loss occur? (%)	
Tomatoes were handled well but spent a long time sitting	33
Tomatoes were poorly handled/packed in crates vs. baskets	48
Other	24
What type of damage was done to the tomatoes? (%)	
Crushed	64
Mold	10
Heat damage	29
Insect damage	2
Rodent damage	1
Other	10

Access to water



The importance of water infrastructure in Tanzania's vegetable wholesale markets can't be overstated.

Access to water

	% markets
Main source of water (within top three)	
Pipe-borne water	49
Borehole (pumped)	18
Well (covered)	11
Purchased and delivered by tankers	4
Water in jerricans	22
Surface water	11
Harvested rainfall	2
Private individuals (originally sourced from piped water)	13
No water	2
Traders pay for water (separate from market fees)	
Yes	80

Statistics are the % of markets, unless otherwise indicated

	% markets
Washing vegetables	
Vegetables are ever washed with tap water	5
Market treats any of the water it uses	
Yes	32
Program(s) to help traders access water and sanitation	
From government	16
From NGOs	7
Market has posters promoting...	
Hand-washing and other sanitary practices	27

Access to power (electricity)

	% markets*
Electricity	
Market has access to the grid for electricity	89
Hours per day of electricity (mean)	18
% of stalls with access to electricity from the grid (mean)	71
Only among markets with grid access	
Hours per day of electricity (mean)	20
% of stalls with access to electricity from the grid (mean)	81
Classify electricity as "not at all reliable"	0
Classify electricity as "somewhat reliable"	15
Classify electricity as "very reliable"	85
Main source of power (within top 3)	
Grid	87
Solar systems (personal)	16

Statistics are the % of markets, unless otherwise indicated

- A large majority of markets have access to the grid.
- Access is lower in small markets.

Waste management (1)

	% markets*
How is waste handled in this market?	
It is removed from the market periodically (brought elsewhere)	75
It is burnt at or near the market—Open burning	18
It is burnt at or near the market—Burnt in a protected pit	2
Other	5
How often is the waste removed from the market or burnt?	
Daily	45
Several times per week	5
Twice per week	10
Weekly	13
Twice per month	8
Monthly	8
When needed	13
Plastics	
% plastics in waste (mean)	10
% of plastics that get recycled (mean)	24

Statistics are the % of markets, unless otherwise indicated

Waste management (2)

Access to clean and affordable toilets is an important aspect of the work environment for market traders.

	% markets*
Toilets	
Market has any toilets (%)	98
No. functioning toilets (mean)	11
Among markets with toilets:	
No. traders per toilet (mean)	159
% toilets with dustbin with lid (mean)	39
Do the toilets require a fee?	
All are free	12
Some require a fee	2
All require a fee	86
Types of toilets	
Flush/Pour-flush toilet to sewer connection	24
Flush/Pour-flush toilet to tank or pit	76
Who constructed the toilets?	
A private individual/investor	29
An NGO/project	5
Government	64
The market authority	12
Traders	7

Statistics are the % of markets, unless otherwise indicated

Opportunities for greater sustainability

- **Food loss** can be reduced with initiatives to...
  - improve road infrastructure; improve product handling practices all along the value chain; make match-making between exchange partners more efficient.
- **Water access** can be expanded with initiatives to...
  - improve water infrastructure in wholesale and retail markets; maybe subsidize water fees
- **Energy** use can be made more sustainabile with initiatives to...
  - facilitate use of solar energy; promote geographically shorter value chains
- **Waste management** can be improved with initiatives to...
  - discourage open burning of waste; train market leaders in various options

Thank you | Asante | Zikomo | አመሰግናለሁ

- RSM2SNF will hold a few events (virtually or in Tanzania) on our findings. Please be in touch if you'd like to attend or be involved.
- Please reach out with your thoughts, questions, or ideas for collaboration: wineman1@msu.edu.