



INCATA: Linked Farms and Enterprises for Inclusive Agricultural Transformation in Africa and Asia

Progress report: Value Chain studies in Kenya and Odisha, India

December, 2024

- **INCATA's research questions**
- **Odisha, India value chain studies (IFPRI):**
 - **Locations visited and interviews.**
 - **Aquaculture value chain key findings**
 - **Horticulture value chain key findings**
 - **Key decisions taken**
 - **Research questions**
 - **Workplan**
- **Kenya value chain studies (Tegemeo Institute):**
 - **Locations visited and interviews**
 - **Tomato rapid reconnaissance upstream findings**
 - **Tomato rapid reconnaissance midstream findings**
 - **Workplan**

- **INCATA's Objective** is to study the relationship between commercial small-scale producers (cSSPs) and micro, small, and medium enterprises (MSME) in the hidden middle of agrifood value chains to explain how it underpins and contributes to an inclusive agricultural transformation.
- INCATA Project aims to answer:
 - 1) What kickstart the dynamic of commercialization and engagement with MSMEs in the hidden middle?
 - 2) Which, how, and why do some cSSPs and some MSMEs move along in the transformation process while others don't?
 - 3) To what degree does increasing commercialization and development of MSMEs translate into poverty reduction and women's economic empowerment (WEE)?
 - 4) What investments and policies have the potential to accelerate the symbiotic co-development of cSSPs and MSMEs, and what are the inclusion effects of that dynamic?
- Through two workstreams:
 - LSMS-ISA data analyses for six countries
 - Horticulture and Aquaculture value chain analyses in two countries (Kenya and Odisha in India).

This document presents the progress of the horticulture and aquaculture value chain studies in Odisha, India (IFPRI) and Kenya (Tegemeo Institute).



Progress report: IFPRI's INCATA activities in Odisha in 2024

RIMISP-MSU-IFPRI | BMGF PROJECT INV-066950

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Research activities:

- Four rounds of rapid reconnaissance (June, August, October, December) - 219 interviews in 19 districts over 26 days
- Research planning meeting for INCATA team (IFPRI, Tegemeo, MSU, RIMISP) – Bhubaneswar, August
- Collected and analyzed GoO data on vegetable markets and production by district
- IRB application submitted to IFPRI

Stakeholder engagement and outreach:

- Introductory meeting and discussion with Dr. Padhee, Principal Secretary, Department of Agriculture and Farmers Empowerment (August 12)
- Engagement meetings with Government of Odisha (September 30 - October 1)
- Advancing Inclusive Agricultural Transformation in Odisha conference (December 20)

Map of locations visited during rapid reconnaissance

3 large circuits, covering 19 out of 30 districts:

- Coastal plains
- Northern uplands
- Southern uplands

Included:

- Most agroecological zones
- Tribal and non-tribal communities
- More and less economically developed areas

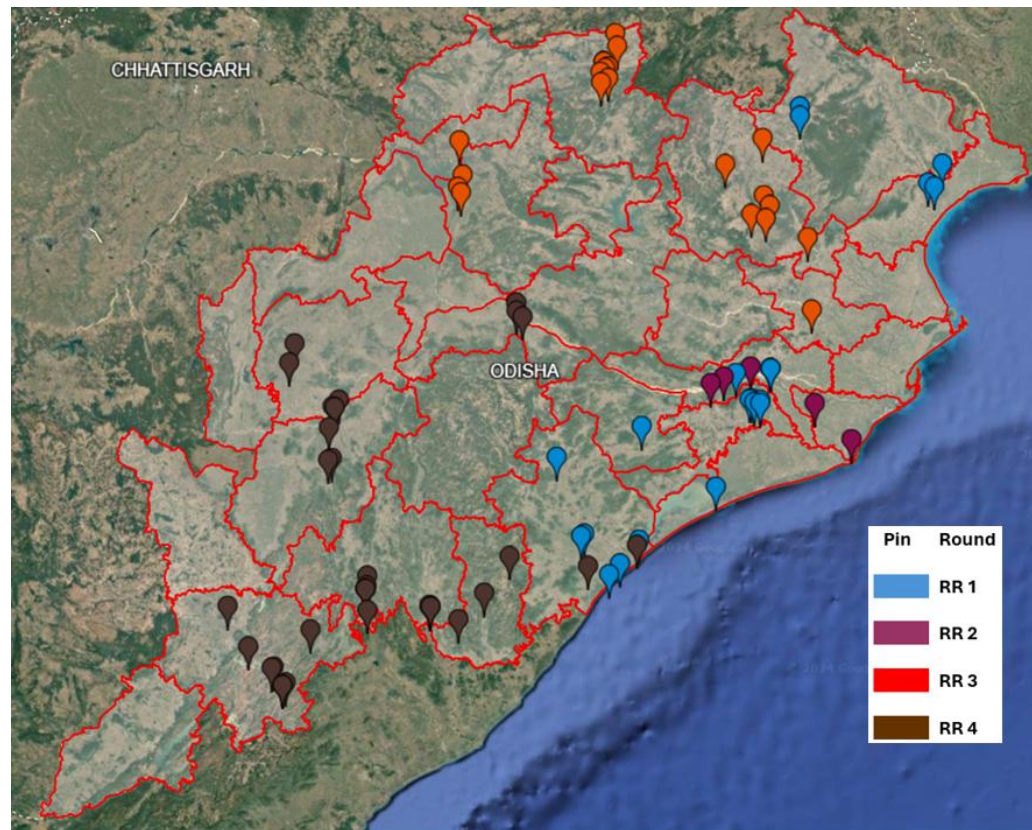


Figure 1: Locations visited during each RR round.

Actor	Vegetables	Aquaculture	Total	%
Input supplier	16	6	23	11
Farmer	42	5	47	21
Wholesaler	25	7	32	15
Retailer	45	13	58	26
Transporter	9	0	9	4
Government	24	5	29	13
NGO	11	2	13	6
Others	5	3	8	4
Total	178	41	219	100
%	81	19	100	-

Table 1: Rapid reconnaissance interviews by value chain and actor type

- Focus on vegetable value chain, as found to be far more prominent than aquaculture
- 35 markets visited

Summary of Rapid Reconnaissance Interviews

Actor	Scale	Vegetables	Aquaculture
Input supplier	Small	5	3
	Large	12	3
Farmer	Small	34	5
	Large	8	0
Wholesaler	Small	5	1
	Large	20	6
Retailer	Small	45	13
	Large	0	0

Table 2: Rapid reconnaissance interviews by, value chain, actor type and scale

Aquaculture Rapid Reconnaissance Key Findings:

- Fish in Odisha is mainly sold & consumed on only 3 days per week due to religious customs, so limited demand/consumption.
- Vast majority of farmed fish in Odisha 'imported' from neighboring Andhra Pradesh. Value chain for fish from AP extremely well developed. Fish from AP cheaper than fish from OD.
- No dense spontaneous clusters of commercial freshwater fish farms and linked SMEs producing for the domestic market exist (unlike in neighboring states of AP and WB)
- Fish aquaculture thinly spread across large numbers of individual ponds, often supported by government promotional efforts (e.g., SHGs, NREGA, PMMSY)
- Locally produced farmed fish from scattered village tanks and backyard aquaculture ponds enter the market in limited quantities: fish farming is primarily a subsistence activity.
- Numerous very large clusters of commercial shrimp ponds throughout the coastal belt.
- Shrimp farmers have high dependency on input suppliers for feed and chemical in-kind credit, and wholesalers for tied output-credit.
- Shrimp is a high value, capital-intensive export crop, so out of scope for INCATA

Horticulture Rapid Reconnaissance Key Findings regarding the upstream sector:

- Commercial vegetable production has been established for 30-40 years in many places, but is expanding wherever there is access to irrigation plus slightly elevated land
- Irrigation is a mix of public (e.g. lift irrigation schemes) and private (e.g., borewells, open in fields wells). Lift irrigation began in 1980s, borewells more recent (1990s and 2000s).
- Irrigation increases the number of seasons in which veg can be cultivated, from 1 to 2 or 3 (in some places, irrigation infrastructure has become defunct and farmers have retreated from veg).
- Expansion of veg area through conversion of fallow land, traditional grains, forest, and non-lowland paddy (plus some lowland paddy in rabi season). Farmers attracted to veg cultivation by high returns relative to paddy.
- Hybrid rice seed means rice more productive than in past, so less rice land needed than before, but nearly all veg farmers also still produce rice.
- Hybrid seed has also increased veg productivity. Introduced around 20 years ago. Now most non-GLV veg is hybrid, with exception of some tribal areas. Hybrid seed adoption often accompanied by increasing use of fertilizer and pesticide.

Horticulture in Odisha, India.



Working with:



- Large-scale government/NGO efforts in past 5 years have promoted the emergence of smaller vegetable farming clusters with support for marketing in historically marginalized areas of the state, crowding in public investments
- Diverse pathways to smallholder commercialization, not always via vegetables – e.g. Cotton, Sugarcane, Maize - where these alternatives exist, veg as pathway might not “activate” – Transformation via non-veg crops brought about by traders and processors persuading farmers to grow commercial crops and sending in extension workers
- Input shops provide a lot of advice to farms (e.g., what seeds to use, which chemicals to treat). Some extension of credit, depending on relationship.
- Some nurseries emerging in Keonjhar, some NGO supported, others not, but few elsewhere. Most farmers still preparing own nurseries.
- In Keonjhar, emerging adoption of package of grafted tomato seedlings (from Chhattisgarh) + drip irrigation + plastic mulch. 3X higher production costs, but 4X higher return. Promoted by large private farmer-traders under quasi-contract farming arrangements.
- Observed lots of elite capture of farmer groups/organization to benefit from subsidies (e.g. GC trader forming farming group with ST members to get subsidized lift irrigation)

Horticulture Rapid Reconnaissance Key Findings regarding the midstream sector:

- Liberal marketing environment since 1984 vegetable denotification has led to private markets outperforming RMCs. Marketing primarily occurs through three channels: direct market sales (small volumes), farmgate collection by local traders (most common), and distant market auctions via hired transport (large volumes). Bulk commodities flow into major urban wholesale markets from across India, while local production focuses on diverse vegetables for rural markets.
- Strong regional variations exist: tribal areas see high women participation in both farming and trading (women sell at market while men tend farms), while coastal regions rely more on farmgate sales to wholesaler collectors. The retail sector shows growing women participation due to low entry barriers, while wholesale remains male-dominated with high capital requirements and institutional barriers. Wholesaler-retailer credit relationships are common.
- Operational characteristics include daily stock clearance priority despite available cold storage facilities, extensive use of shared transportation (small motorized vehicles for local marketing, 3PLS trucks for long distance), and active trading networks. Market institutions are designed to limit wholesale entrants, though retail has grown rapidly with diverse participation. Private markets consistently attract more trade than regulated marketing committees.

Key decisions taken on research approach

- **Vegetables:** full stacked survey + meso; **Aquaculture:** meso study only
- Add **market study** as new research component, drawing on RSM2SNF methodology; **include vegetable and fish markets in market study**
- **Include retailers in stacked survey due to gender/inclusion implications**
- Veg production and supply chains are highly diverse - cannot single out 2 crops:
All perishable/semi-perishable vegetable crops are in scope
- **Sample selection**
 - Calculate cluster coefficients to identify higher density vegetable production zones for inclusion in survey
 - Select sample blocks purposively to ensure spatial representation & include districts from coastal belt, Eastern & Western Ghats, tribal/non-tribal areas
 - Include established vs emerging zones & endogenous vs exogenous clusters & implications for inclusivity
 - Survey all markets in selected production and consumption zones.

Emerging research themes and questions

- Does clustering of vegetable farms and MSMEs lower entry & transaction costs for CSSPs?
- How do spontaneous and intervention-driven vegetable clusters differ in terms of scale of impact and inclusivity?
- How do alternative forms of smallholder commercialization interact, with what effects?
- Does agricultural transformation associate with vegetable value chain development mediate patterns of migration, and vice versa?
- How do gender norms in tribal and non-tribal communities and other social institutions (e.g., caste) shape the structure, conduct, and performance of vegetable value chains?
- Does commercialization of vegetable cultivation reshape gender and caste norms?
- Do vegetable Producer Groups (PGs) or Farmer Producer Organizations (FPOs) experience elite capture, in what forms, and with what implications for IAT?
- Do vegetable PGs/FPOs crowd-in government services/subsidies?
- How does the governance of regulated (RMC) and private vegetable markets differ, and with what implications for market performance?
- What is the extent of loss and waste in Odisha's vegetable value chains, and how effective are measures such as cold storage provision in reducing it?

Workplan (2025)

Jan: Team retreat in India in early Jan to refine research questions & questionnaires; Reardon visit to Odisha late Jan for survey pre-testing; Survey firm recruitment

Feb: Questionnaire pretest (digital); Finalize first stage stratification of sample frame; Further survey pretest (stacked survey instruments)

Mar: Market listing + Listing market actors; Market survey (including meso)

April: Producer/input supplier/off-market trader listing; Sample selection for stacked survey

June/July: Stacked survey + off-market meso; Analysis of market survey

August-December: Market, meso and stacked survey data analysis & writeup; Policy engagement and outreach

EGERTON



UNIVERSITY

**TEGEMEO INSTITUTE OF AGRICULTURAL
POLICY AND DEVELOPMENT**

Rapid Reconnaissance of Tomato Value Chain in Kenya

Tegemeo Institute

December 16, 2024

Horticultural Value Chain Study in Kenya – Main Findings from Rapid Reconnaissance

- The rapid reconnaissance study of the tomato value chain in Kenya was done between September 16th and October 12th.
- The research team conducted 151 interviews across 14 counties with participants from various segments of the tomato value chain: input suppliers, farmers, wholesalers, brokers, transporters, processor, and crate maker/repairer.

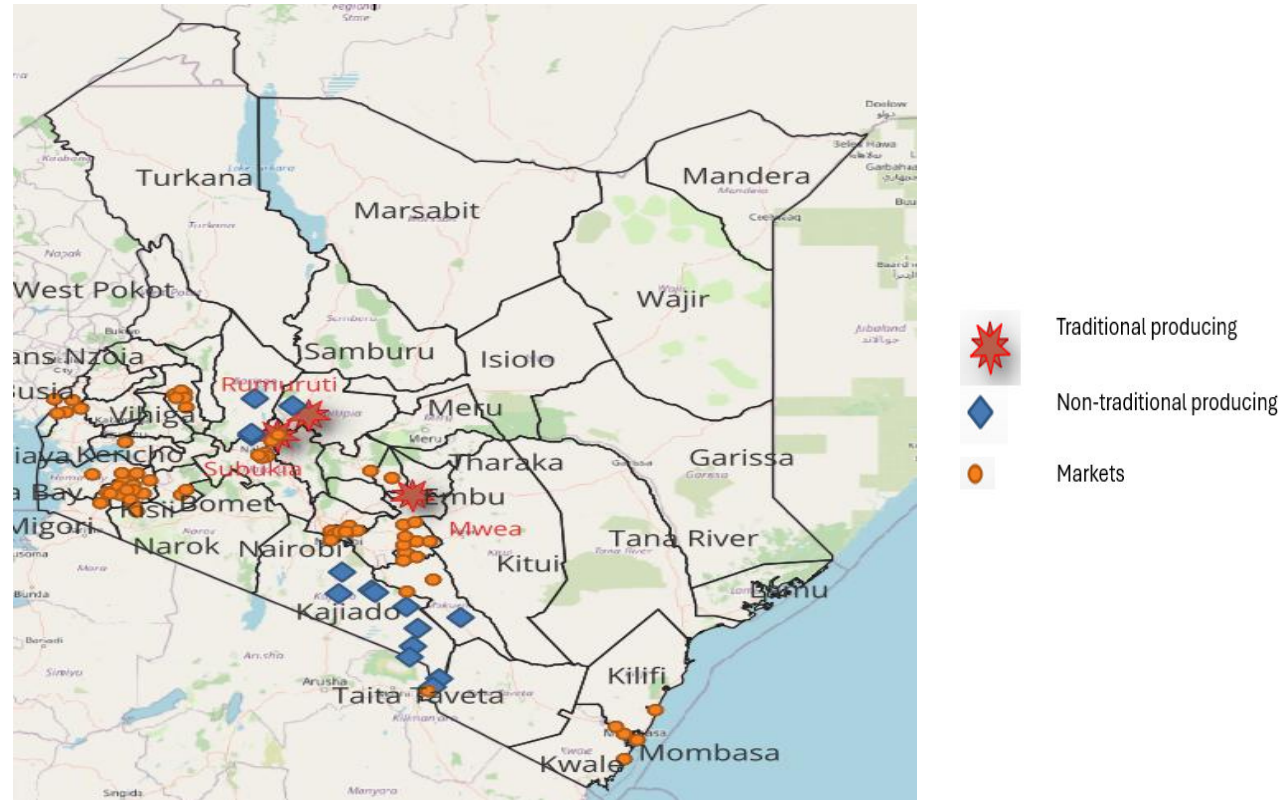


Figure 2: Wholesale markets and production areas for tomato

Wholesale markets for tomato - zoomed

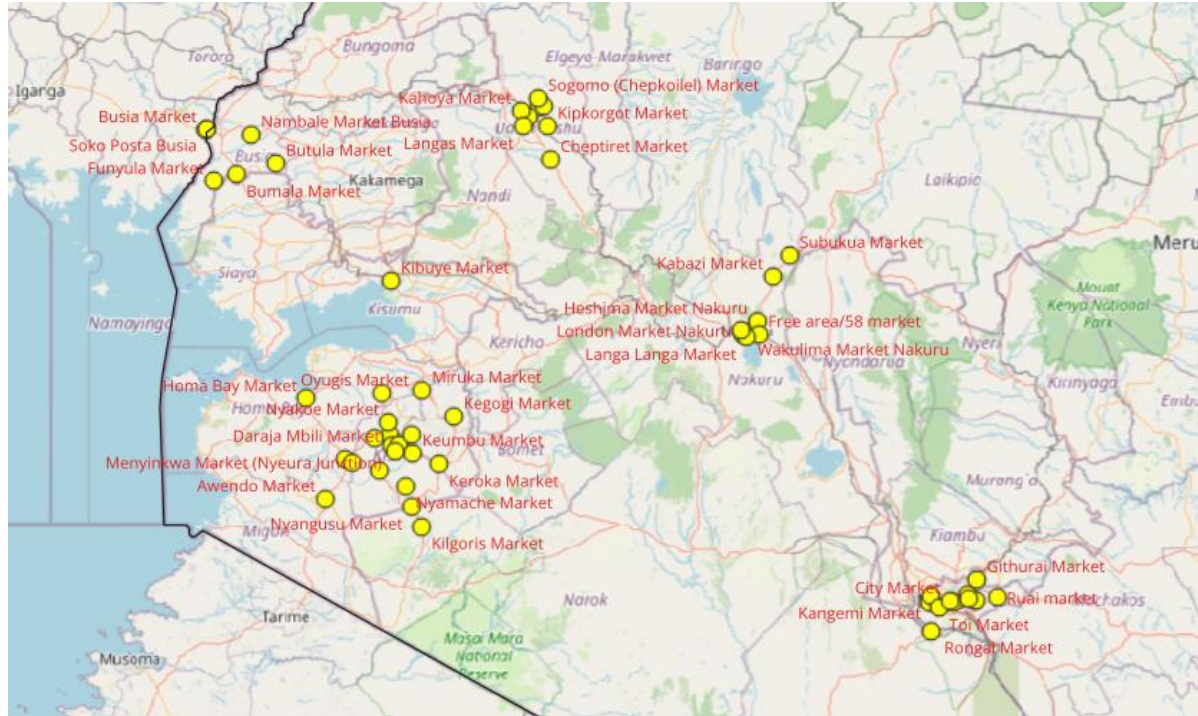


Figure 3: Wholesale markets for tomato, zoomed.

Counties and RR value chain actors visited

	Western region (Nakuru, Baringo, Uasin Gishu, Kisumu, Busia, Kisii counties)			Central region (Kirinyaga, Embu, Nairobi counties)			Southeast region (Machakos, Kajiado, Taita Taveta counties)			Coast region (Mombasa, Kilifi counties)			TOTAL
	Micro	Small	Medium	Micro	Small	Medium	Micro	Small	Medium	Micro	Small	Medium	
Input suppliers		3	2					8	3				16
Farmers		13	2		1	1		7	16				40
Transporters	1		6				1	2	4			1	15
Wholesalers		11	18	2	4	5		17	6		2	3	68
Brokers		7			1	1						1	10
Graders													0
Crate makers/ repairers											1		1
Processor			1										1
TOTAL													151

- Farmers:
 - Small - <5 acres
 - Medium - 5-50 acres
 - Large - >50 acres
- Wholesalers:
 - Small – Probox (small van) or less
 - Medium – Lorry+
- Transporters:
 - Micro – bodaboda
 - Small – Probox /canter
 - Medium - Lorry
- Input suppliers
 - Small - retailing
 - Medium - retailing & wholesaling

Table 3: Counties and value chain actors visited.

Tomato production context and expansion

- Tomato production in Kenya has increased in the past five years, due to more farmers and expansion into non-traditional growing areas. This is attributed to limited off-farm employment opportunities, (especially after Covid-19 pandemic in 2020 when some people lost jobs) and the high returns to tomato farming.
- Production has expanded to semi-arid and warmer areas in Kajiado, Baringo, and Machakos counties, which have larger land sizes and irrigation water sources. These areas have also witnessed improved road access in the past 10 years.
- Tomato production is capital-intensive, costing between KES 250,000 – KES 450,000 (\$1,940 - \$3,500) per acre. This has partly led to **sharecropping arrangements**, especially in non-traditional areas, where investors provide capital and farmers manage day-to-day operations.
- Most tomatoes are grown under irrigation (furrow irrigation, boreholes, hired irrigation pipes). Investors develop water access through simple excavation methods.

Transformation of Kenya's Tomato Sector: Input Supply and Service Specialization

- Farmers prefer using hybrid seeds and purchasing seedlings from specialized nurseries, which have become more prevalent.
- This has led to an interesting market adaptation: the **emergence of specialized seedling propagators**. Traditionally, farmers would buy seeds and manage their own nurseries. However, given the high cost of hybrid seeds, farmers have found it too risky to handle propagation themselves - if something goes wrong, the loss is substantial.
- Most farmers rely on local agro-dealers for inputs. However, some large farmers buy inputs directly from manufacturers. In addition to selling inputs, agro-dealers provide extension advice to farmers mainly on application of agrochemicals and fertilizer.
- **Competition in the input supply sector is increasing**, with manufacturers and distributors supplying directly to some large-scale farmers, posing a challenge to smaller input suppliers. Some input suppliers offer credit to farmers, particularly those with whom they have long-standing relationships.

About Input suppliers (Upstream)

- Sell **diverse range of inputs**:
 - **Seeds**: Both traditional and hybrid tomato
 - **Seedlings**: Preferred by farmers.
 - **Fertilizers**
 - **Pesticides and fungicides**
 - **Other Agrochemicals**, e.g. foliar feeds, bio-stimulants
 - **Equipment** e.g. knapsack sprayers.
 - Also offer farmers **extension advice**:
 - On-farm and in-shop advice on the proper use of agrochemicals
 - Information on pest and disease management strategies
 - Fertilizer application rates and timing
- Major sources **of inputs**:
 - **Naivasha**: Known for seedling propagators and agricultural input distributors
 - **Nakuru**: A major agricultural center with a concentration of input sellers, offering a wide range of products, including fertilizers, pesticides, and equipment.
 - **Thika**: Home to Ona Seedlings, a prominent supplier of tomato seedlings.
 - **Mwea**: Another significant agricultural region with suppliers of tomato seedlings and other inputs.
 - **Kitui, Matuu and Machakos**: Sources of inputs for various agro-dealers in Machakos

About Farmers (Upstream)

- **Farming practices and arrangements**

- **Independent Farming:** Many farmers, especially in Nakuru and Kirinyaga Counties, cultivate tomatoes independently on owned or rented land.
- **Sharecropping:** Sharecropping is a common practice, particularly in Kajiado County, where investors provide capital and resources while “farmers” manage the day-to-day operations.
- **Scale of Production:** The scale of tomato production varies significantly, from small-scale farmers operating on <1 acre to large-scale farmers managing hundreds of acres (e.g. 600acres)

- **Irrigation:**

- Most of the tomatoes are grown under irrigation
- **Furrow Irrigation:** along water bodies like rivers and canals
- **Boreholes:** Some large-scale farmers
- **Hired Irrigation Pipes:** In some areas, farmers hire irrigation pipes to access water.

- **Cost of production:** Varies depending on factors like farm size, inputs, and water access

- Labor is a significant cost

The Role of Brokers, Market Intermediation and Vertical Integration

- Brokers connect farmers with wholesalers who buy tomatoes at the farm gate. These brokers are essential intermediaries with knowledge of local markets, farming seasons, and pricing dynamics.
- The number of tomato traders in wholesale markets has increased due to increasing demand, limited off-farm employment, job losses due to the COVID-19 pandemic, and the perception that tomato wholesaling is a profitable business.
- Many wholesalers enter the market after gaining retail experience or observing successful friends and family members in tomato wholesaling. **Some have become farmer-traders (vertical integration).**
- Tomato sources for wholesalers have shifted over time, influenced by changes in production areas and transportation costs.
- Wholesaling operates on a spot market basis, with prices negotiated on the spot and fluctuating based on supply, demand, and quality.
- Market-based brokers sell tomatoes on behalf of wholesalers to different categories of buyers including retailers, institutions and consumers, earning commissions per crate or vehicle-load sold. They sometimes sell on credit to retailers with whom they have established trust.

About Wholesalers (Midstream)

- **Number of wholesalers has increased overtime** due to
 - The **increasing demand for tomatoes**
 - **Limited off-farm employment opportunities**, leading people to seek alternative income sources
 - **Perception that tomato wholesaling is a profitable** business
 - **The relatively low start-up capital required** compared to other businesses, such as farming

Increase in the number of wholesalers has led to **increased competition in the market**

- **Challenges and Future Prospects:**
 - Wholesalers face numerous challenges, including **market glut, price fluctuations, high transportation costs, competition, and credit defaults**
 - Some express concerns about the increasing number of tomato farmers and the potential for oversupply to further depress prices
 - Despite these challenges, many wholesalers remain optimistic about the future of the trade, citing growing demand and the potential for continued profitability

Transportation and Market Operations in Kenya's Tomato Trade

- Some wholesalers operate in multiple markets, which often have designated market days, leading to the same traders operating across different markets that are in close proximity.
- There is minimal tomato wastage in wholesale markets. Tomatoes with reduced quality due to prolonged storage are sold at lower prices.
- Transportation methods for tomato include lorries, canters, pick-up trucks, small vans (Probox), and motorcycles. The choice depends on quantity, distance, and road conditions.
- An increasing number of wholesalers and large-scale farmers are purchasing their own transport vehicles to use and hire out to fellow traders and farmers. Smaller wholesalers often collectively hire a lorry to transport tomatoes from farms to the market.
- Motorcycle use is rising for local deliveries and cross-border trade, especially in Busia market at the Kenya-Uganda Border.
- Some specialization exists in transport services, with some transporters exclusively doing tomato transportation due to long-term relationships with tomato wholesalers.

Next steps

Meso inventory and Market Studies – January 8 – March 21, 2025

- Meso inventory of wholesale markets (in production & consumption areas)
- Meso inventory of actors in wholesale markets
- Wholesale market studies
- Meso inventory of farmers and input suppliers in production areas
- Meso inventory of processors

Listing of actors and stacked surveys will follow the meso inventory and market studies



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