Promoting Growth of Inclusive Jobs in the Tomatoes Value Chain in Tanzania

The World Bank

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Executive summary

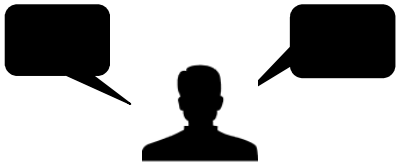
- There are **two major markets for tomatoes**: fresh tomatoes and processed tomato products
  - **Fresh tomatoes:** The market is growing at 15% p.a., but there may be more **latent demand**
  - **Processed tomato products:** The market could grow at 17% p.a. by **displacing imports**
- Fresh tomatoes fetch a higher market price, making it a more attractive market for smallholder farmers; only commercial farmers would find it profitable to sell tomatoes to processors. Given the varying economics, it is **best to think of the two as different markets**
- **Fresh tomatoes:** The market is **constrained by unimodal rainfall**. In peak season, there is an oversupply of tomatoes and farmers have no access to storage facilities or faraway markets, resulting in depressed prices. In off-season, there is an undersupply of tomatoes because of the lack of irrigation, resulting in foregone opportunities to meet the latent demand
  - **Investments in cold storage, long-haul transportation, irrigation and greenhouses would remove these primary bottlenecks in this market**
  - Secondary investments to boost yields and profitability include:
    - Incubate pesticide entrepreneurs to distribute pesticides and improve yield
    - Promote the use of higher yielding seed varieties
    - Introduce innovative financing to reduce reliance on unfavorable informal financing
- **Processed tomato products:** There is underutilized processing capacity because of the **lack of commercial farming** and the **lack of a year-round growing cycle**. Potential interventions include:
  - Promote commercial farms, if there is political appetite
  - Buy small-sized tomatoes from farmers (not sold in the fresh market)
  - Invest in technical skills to reduce downtime in facilities (long term)
- **98% of jobs (n = 34,000) are currently in the production sector.** If the above interventions double the market size, that could result in ~20,000 more jobs in production – many of which could benefit women and youth – and farmer incomes could also rise

Quantitative surveys and qualitative interviews were conducted for the Jobs in Value Chain survey in Iringa and Njombe regions

Objective: The objective of this assignment is to conduct a quantitative and qualitative Jobs in Value Chain Survey in a rigorous manner in Iringa and Njombe regions in Tanzania, in order to extract findings that inform how to improve the competitiveness of local firms and efficiency of the tomato value chain, in a way that stimulates job creation and enhances linkages of smaller firms into the value chain

Quantitative Datasets

- **There were 4 major surveys used to inform deep insights on trends within the tomato value chains:**
  - Agriculture (farm-level)
  - Manufacturing
  - Distributor
  - Input suppliers



Qualitative Interviews

- **Over 20 qualitative interviews were conducted with stakeholders from across the tomato value chain,** including farmer (via focus groups), processors, retailers, traders, associations, etc.

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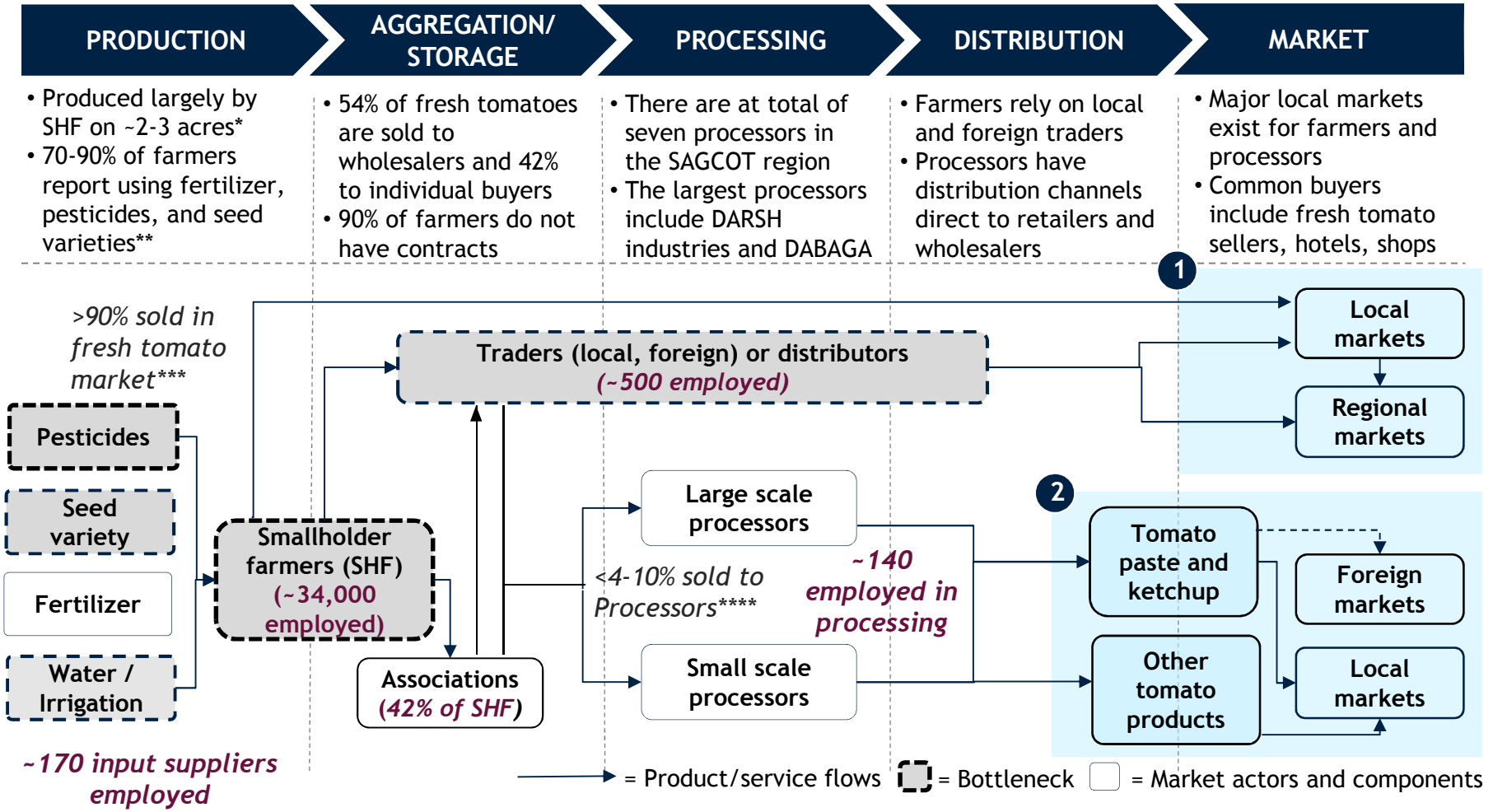
There are two major markets for tomatoes: fresh tomatoes and processed tomato products



*Average acreage owned is 8 acres, of which 4.6 acres is cultivated across all crops **Dalberg Research Agricultural Survey question tz4_10_1 indicates the types of inputs that farmers spent the most money on. This is the closest indicator to their use of these inputs; ***The *Dalberg Research Survey* also showed that 1 farmer out of 202 farmers indicated selling to processors as the single largest client who purchased 20% of farmers' tomatoes. Desk research indicates there are more farmers who sell to processors either via associations or directly after selling to fresh markets during the glut period; ****SAGCOT (2017)

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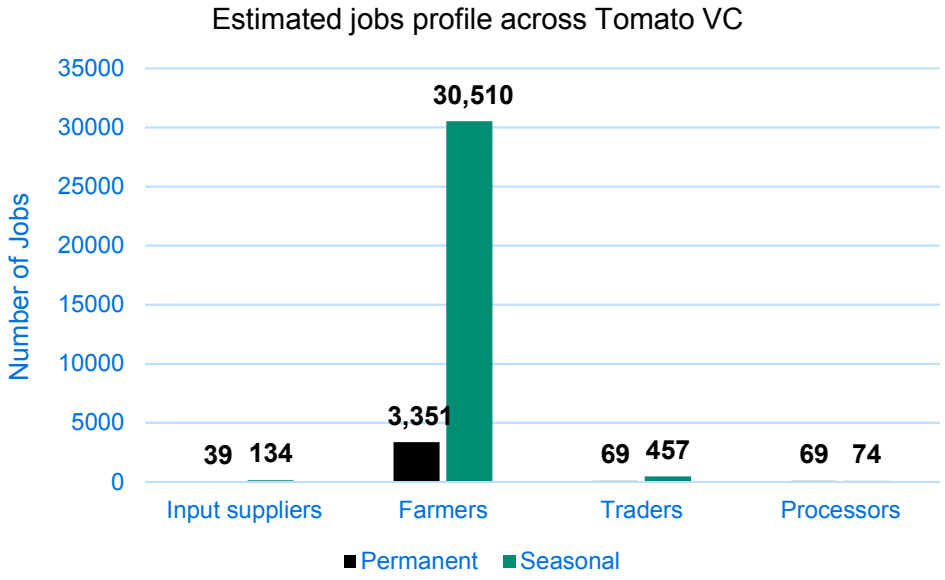
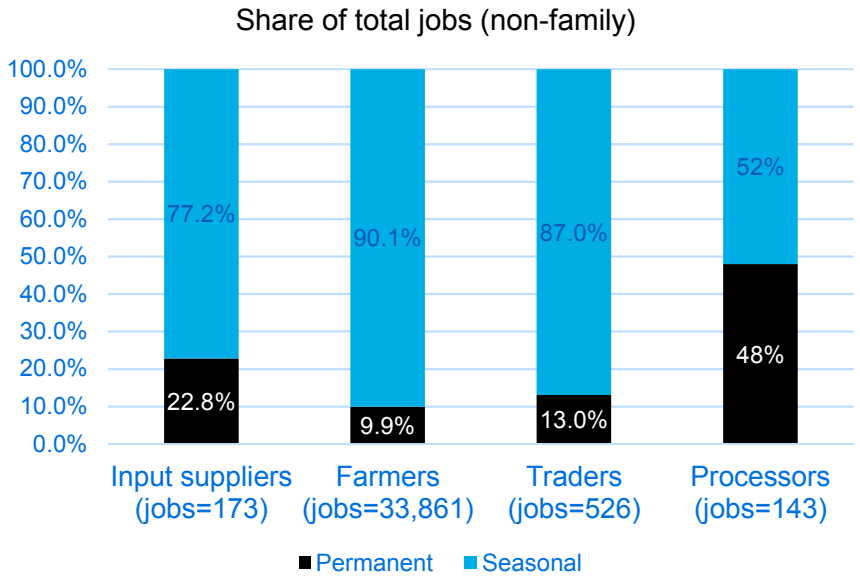
The vast majority of jobs in the value chain are in the production sector, and most jobs are seasonal

1. Most jobs are in Tomato production.



(34,703 jobs across VC, and about 98% are in production).

2. Clear trade-off between percentage of permanent jobs, and number of jobs available by VC node.



Jobs in production, input supply and trading are mostly seasonal, but processing seem to have a higher percentage of permanent employment.

Source: Dalberg Research survey; World Bank analysis

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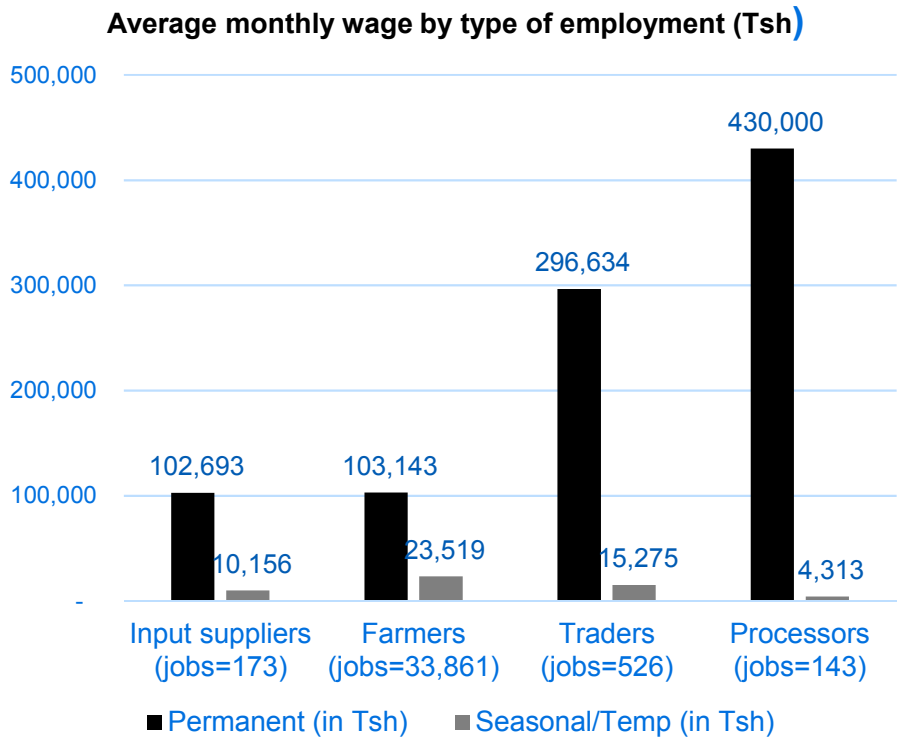
Average wages of seasonal workers are very poor, but female participation in the value chain is higher than expected

3. Trade-off also evident between wages, type of job, and number of jobs available.



4. If tomato VC represents horticulture value chains in general, then female participation more significant in horticulture than is average across agriculture activities.

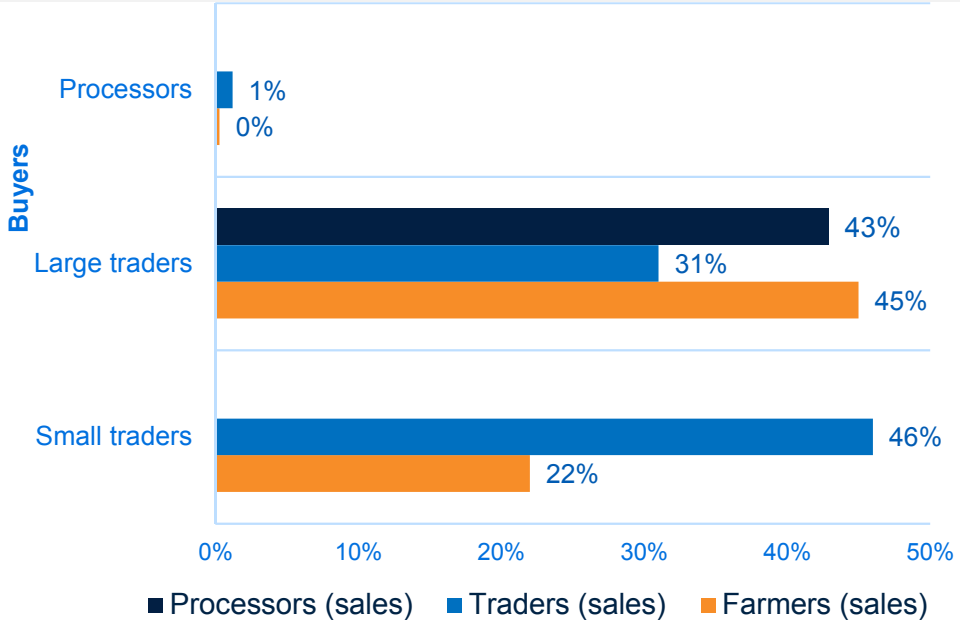
	Input suppliers	Farms	Traders	Processors
Percent of firms/farms with female ownership (>25%)	17%	32.6%	22.8%	57.1%

Female ownership increases with value added activities

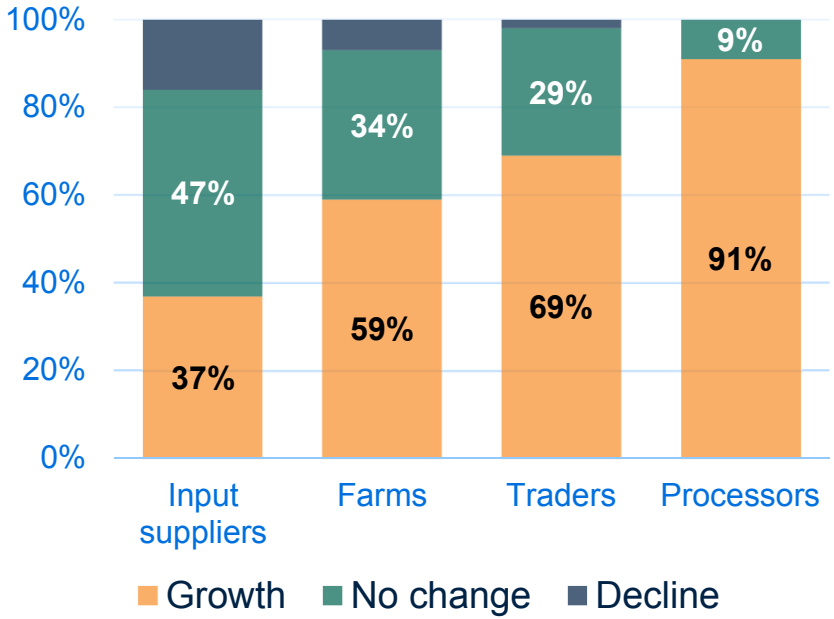
Source: Dalberg Research survey; World Bank analysis

Both large and small traders are the primary buyers in the market; all participants expect the market to continue growing

5. Market system for tomatoes is dominated by traders who own virtually all the post-harvest infrastructure, and maintain the relationships with domestic buyers.



6. Expected performance over the next year is generally positive.



- Rest of output goes to individual buyers (for processors, this means retailers).
- Not only do all farmers sell primarily to traders, but most traders and processors are also selling to other traders.
- Market for farmers is still limited: more than 33% farmers sell directly to individual customers (not traders/processors). Perhaps partly due to access issues.
- About 50% of farms sell all their output to a single trader.

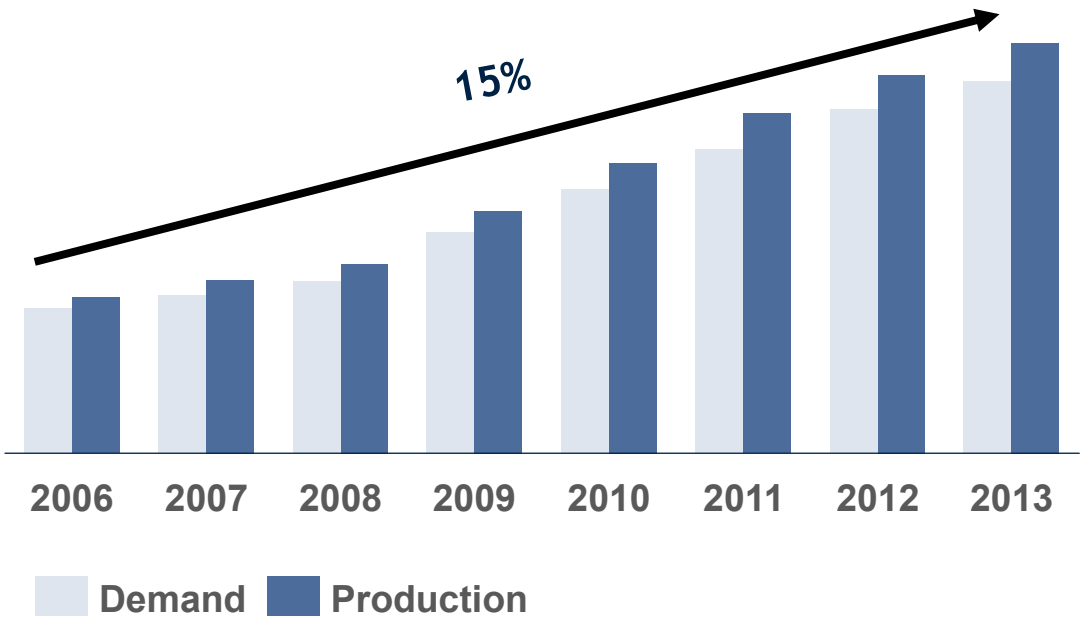
Source: Dalberg Research survey; World Bank analysis

MARKET FOR FRESH TOMATOES

Tanzanians consumed 420,000 tons (T) of fresh tomatoes in 2013 with an annual growth rate of 15% per annum

Comparison of demand vs. local production of fresh tomatoes in Tanzania ('000 T)

Despite the growing local demand for fresh tomatoes, there is an oversupply of tomatoes in Tanzania annually



Production variance by region

Production levels vary by region and by time of the year; creating gluts and shortages of tomatoes

Region	Attributes
Iringa, Mbeya, Njombe	• Unimodal • Glut (Jun-Sept) • Serves Dar es Salaam
Arusha	• Bimodal • Glut (Jan-Feb, June-July) • Primarily serves Northern tourism circuit and Kenya
Dodoma	• Unimodal • Glut (Jun-Sept) • Dry region, buys from Morogoro
Lindi	• Unimodal • Glut (Jun-Sept) • Dry region, buys from SAGCOT region

Source: Dalberg Research surveys and interviews; FAOSTAT; Tanzania Meteorological Agency (2014)

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Almost half of Tanzania's tomatoes are produced in the SAGCOT region with ~42% of SAGCOT farmers in two major associations

Tomato production in the SAGCOT region*

46% Percent of national production from the SAGCOT Region

19k Number of tomato farmers in Iringa and Mbeya region

Farm ownership by gender

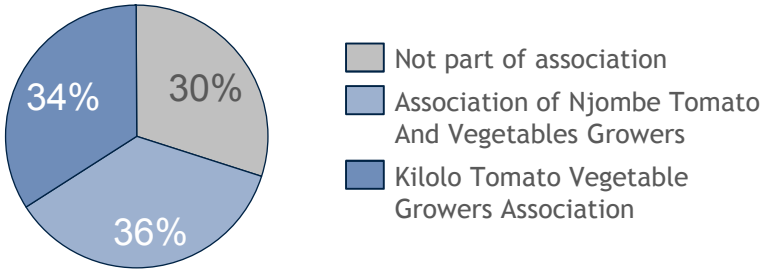
41%
- **41% of farmers reported having women ownership of farms**

56%
- Of the farms with women ownership, on average **56% of farm land was owned by women**

33%
- **33% of farms had more than 25% effective female ownership****
- This number may be higher as majority of women work on these farms

Farmer participation in associations

- **Access to finance, group purchases of inputs, aggregation efforts by processors, and training** are the reasons that farmers stated for joining associations
- **Two thirds of farmers selected for the survey were part of associations and belong to two main associations.** It is estimated that 42% of the farmer population are in associations.**



*We assumed 10T of output per farmer based on *Dalberg Research data* collected in Iringa and Njombe. National *Agriculture Census Data* from 2014 was used to determine the number of farmers in Mbeya and Iringa, totalling 19,000 (SHF census data for Njombe was not available). The total output for tomato production used was 420,000 T based on *FAOSTAT* data on production and demand in Tanzania. The estimated contribution to national tomato production by the SAGCOT region differs from the 72% estimate from a report conducted by SIDO in 2009; Source: Interview with tomato expert at SAGCOT. **Weighted data

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Due to unimodal rainfall in the region, inconsistent supply of tomatoes remains a major challenge for fresh tomato markets

off-season

- **During the offseason, the supply of tomatoes nationally curtails,** constraining the fresh tomatoes market and processors who rely on low prices during glut periods
- **There is evidence of latent demand in the off-season** that is not currently met. For example, a supermarket in Dar reported having limited and inconsistent supply of tomatoes during off-season
- **Potential solutions include:**
  1. Investments in irrigation and greenhouses to create consistent supply
  2. Pesticide entrepreneurs can be incubated to distribute pesticides to improve yield
  3. Use of new variety seeds with higher yield and shorter production cycle
  4. Formal financing can reduce farmers' over-reliance on traders who set lower prices during off-seasons

in-season (glut)

- **There is an oversupply of tomatoes during the glut period** (August and September for SAGCOT region). During this period, average prices of tomatoes also drop to 162 TSH/KG compared to the average of 560 TSH/KG
- **Farmers are unable to find markets to sell their produce. As a result, there is higher post harvest loss** during this period (farmers report up to 40% of their produce is lost post-harvest)
- **Investments in productivity for off-season challenges will result in more glut periods**, facing the same market issues
- **Potential solutions include:**
  5. Access to new markets for fresh tomatoes through cold storage and improved transportation networks

Source: Dalberg Research surveys and Interviews

1 During the off-season, investments in irrigation schemes and/or greenhouses can ensure consistent supply in the market

IRRIGATION

- Irrigation schemes (e.g. drip irrigation) can allow farmers to supply tomatoes during dry seasons/limited rainfall
- This is particularly effective in dry or uni-modal regions
- Processors report only 15% of farmers use drip irrigation
- Requires less use of pesticides

GREEN HOUSES

- Greenhouses (require irrigation schemes) can produce tomatoes during rainy season (when there are shortages of tomatoes)
- SUGECO has 14 greenhouses run by youth entrepreneurs that grow tomatoes, among other vegetables
- Requires even less use of pesticides than open air irrigation schemes

- **A cost-benefit analysis of irrigation schemes and greenhouses will be necessary to assess whether the investment would pay off**
- **There are opportunities to leverage existing partners (such as SUGECO) to demonstrate and implement schemes to improve the supply of tomatoes in the market**

Implication on job growth

- Reduce temporary work and create more permanent farming jobs
- Strengthen existing jobs by increasing economic value for smallholder farmers
- Increased economic value will demonstrate the value of tomatoes production to other farmers
- Improve off-season production which may funnel into processing and create processing jobs

Source: Dalberg Research surveys and interviews

2 Increasing accessibility of and training on the use of pesticides can reduce post-harvest loss and increase supply of tomatoes

Challenges

- **97% of farmers report using pesticides**; however, farmers are unaware of how to most effectively apply it, resulting in losses
- **The cost of pesticides are also high.** Previously, pesticide packaging was too large for farmers, creating wastage. However, donor efforts to reduce the size of packaging for farmers has hiked the prices
- **There are significant environmental damages resulting from tins disposal**

Farmer

"I hadn't use pesticides properly during the season and the quality [of my produce] was compromised"

Potential solutions

- **Incubate pesticide spray entrepreneurs who can buy higher volumes of pesticides and provide pesticides to farmers as a service rather than a product.** This would allow for reduced costs and increase efficiency and effectiveness of pesticide use and reduced environmental damages
- **This will require:**
  - Capital and asset financing for entrepreneurs along with business development support
  - Training on pesticide use to preserve the environment
  - Marketing and training to smallholder farmers
  - Development of efficient distribution models

Processor

("[when prices fall]… the quality [of tomatoes] deteriorates and black spots appear because [farmers] stopped spraying the pesticides and by the fourth week they were completely rotten")

Implication on job growth

- Introduction of new employment and/or entrepreneurial opportunities for youth
- Improved efficiency in the dissemination of pesticides for tomatoes can improve the incomes of smallholder farmers

Source: Dalberg Research surveys and interviews

3 The use of new seed varieties can help improve yields, shorten production cycles and increase job stability for seasonal labor

Challenges

- **Although majority of farmers report using newer seed varieties (e.g. Onex), interviews suggest farmers reuse varieties, reducing yield annually**
- **There are new seed varieties available** that can increase yield and reduce production cycles

Potential solutions

- **Encourage use of more effective tomato seed varieties through demonstrations** for smallholder farmers to plant. Higher yields can allow farmers to produce more during off-seasons
- For example, a seed recently introduced in Kenya called Tomato Premier F1 takes 60 days to mature (compared with 90 on average) and has a shelf life of 15 days (similar to varieties such as Onex)

Current employment trends

- **Farmers hire a median of 2 seasonal workers*** across land preparation, planting, weeding, harvesting, and post harvesting

Type of jobs	Avg. # of Employees*	Avg. # of Days*
Land preparation	1.2	6.1
Planting	3.0	3.0
Weeding	2.2	5.4
Harvesting	3.9	7.9
Post harvesting	0.7	3.0

Implication on job growth

- As a result of multiple production cycles, there will be an increase in the number of days worked by individual temporary workers by 50% (from an avg. of 13 to 19.5 days)
- With an increase in yield, there will be a need to hire more workers per production cycle (for weeding, harvesting, and post-harvesting)

Source: Dalberg Research surveys and interviews; www.hortinews.co.ke
*Weighted data

13

4 Formal financing can reduce farmers' over-reliance on traders who set lower prices during off-seasons when the price is high

Challenges

- **Farmers report having informal relationships with traders (**local and foreign) who provide informal input financing when smallholder farmers need it most, particularly during emergencies
- **This results in an over-reliance on traders** who are then able to demand lower prices for farmers' produce

"If you had cash and a farmer needs fertilizers and he has been trying to borrow some money but in vain, then you could lend him some money, say four hundred thousand"

Trader

Potential solutions

- **Assess whether linking smallholder farmers to financing solutions improve economic outcomes for the farmer** and reduce the over-reliance on traders
- **Develop new tomato-specific financing** that accounts for short harvest seasons, high output during gluts in the rainy season, and low levels of smallholder farmer collateral

"I also have some farmers who I see personally, like I may give them fertilizers and they bring me tomatoes"

Trader

Implication on job growth

- Increased economic value for farmers during and off-season
- Unlock barriers for processing can lead to processing jobs

Source: Dalberg Research surveys and interviews

in-season

5 During the glut period and as the supply of tomatoes increases off-season, assuring access to new markets will be necessary

Challenge

- Beyond local fresh tomato markets, there will be a need to assure markets for fresh tomatoes as the supply of tomatoes increases. There are two key markets to unlock: 1) regional markets 2) market for fresh tomatoes used as inputs for processing

Regional markets

- There are regional markets in Malawi, Mozambique and Zambia that could be explored. Recent bans of fruits and vegetables in Zambia may deter further growth until the ban is lifted
- Kenya and Rwanda are other markets, however, are served by Arusha and Mwanza regions respectively.

Market for fresh tomatoes as inputs for processing

- Increasing the supply of fresh tomatoes during off-seasons will result in more frequent glut periods. This will increase the likelihood of processors to procure more tomatoes consistently throughout the year
- Regardless, there are challenges with the mismatch between market price and the competitive price of tomatoes for processors that can be addressed

Source: FAOSTAT; Dalberg Research surveys and interviews; Dalberg interview with Frederick Kilcher

5 There are opportunities to tap into regional markets for fresh tomatoes: Malawi, Mozambique and potentially Zambia

	Malawi	Mozambique	Zambia
Opportunities	• Tanzania tomato researchers perceive unmet demand in Malawi. Although data suggests no imports, there is evidence of Tanzanian produce in Malawi • Malawi is only 100km away from Mbeya; there is also an opportunity to leverage TAZARA railway	• Demand has grown consistently between 2006 and 2013 at 13% annually • On average 1000 T were imported between 2012 and 2013; although not high, it suggests unmet demand • Close proximity to SAGCOT region	• There is evidence of tomatoes from Tanzania flooding the Zambian market • Traders currently frequent the SAGCOT region from to transport produce to Zambia • Close proximity to SAGCOT region, leveraging TAZARA railway to Zambia
Risks	• Competition from South Africa which currently exports to Malawi; South Africa tends to sell at a much lower price	• Competition from South Africa which currently exports to Mozambique; South Africa tends to sell at a much lower price	• There is currently an import ban of fresh produce, including tomatoes, introduced in early 2017. It is unclear when this ban will be lifted

Kenya and Rwanda are larger trading partners but northern regions such as Mwanza are better placed geographically to serve those markets. Zanzibar relies on Morogoro for tomatoes

Source: Dalberg Research surveys and interviews; FAOSTAT; Dalberg interview with Frederick Kilcher; African Farming 2017; The Times Malawi 2015; Department of Agriculture South Africa 2015

in-season

5 Tapping into regional markets will require investments in better transportation and storage linkages, particularly to Malawi

Challenges

"I lose about 80% because for example like last year[…] I harvested tomatoes but there were no buyers"

Farmer

"He tried to convince me to [export] but I'm not used to that kind of environment so I've never been there. But there are people who export out of the country [in reference to Mombasa]"

Distributer

Potential Solution

- **Tanzania's current tomato trade partners include Kenya (90%) and Rwanda (10%)** with 2013 exports reported at 2,000 T (0.5% of total production). Traders from Kenya, Comoros, and Congo buy from Tanzania when their local production falls
- **There is an opportunity to leverage and strengthen infrastructure networks and the productive capacity of farmers** during glut seasons to export to regional markets
- To tap into this opportunity, there is a need for the following investments:
  - **Decentralized cold storage for export** so that smallholder farmers can store produce
  - **Training for distributors** on tapping into export markets (e.g. quality and storage requirements)
  - **Transport linkages** to high potential markets

Implication on job growth

- Growth in export-oriented jobs that are more resistant to potential national economic downturns
- Increased number of jobs in transportation and storage
- Improved economic value for smallholder farmers by reducing losses for farmers

Source: Dalberg Research surveys and interviews; FAOSTAT

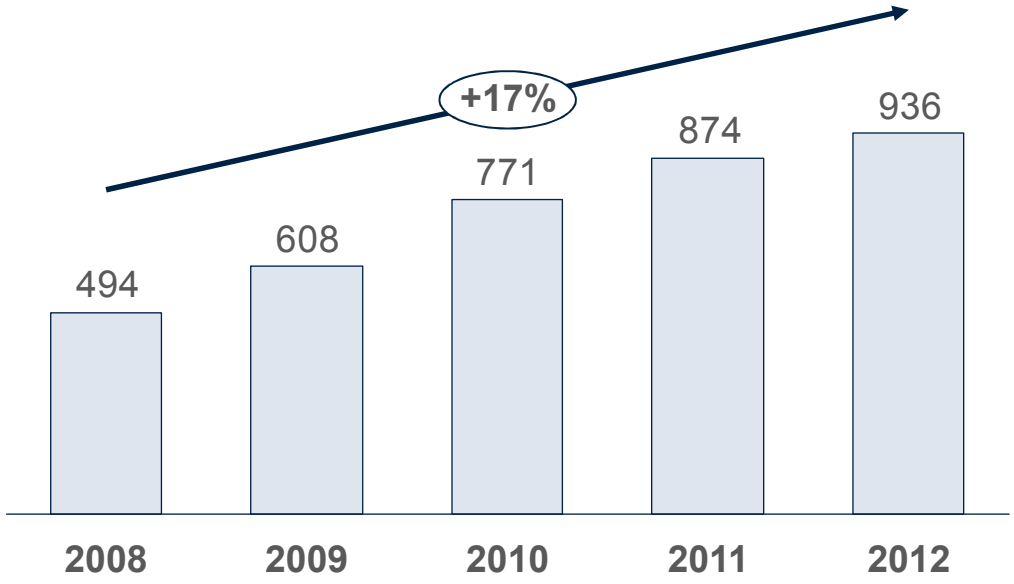
17

MARKET FOR PROCESSED TOMATO PRODUCTS

The domestic market for processed tomato products is expected to grow, given imports of tomato products are growing at 17%

Value of imported tomato products into Tanzania ('000 USD)

Tanzania imports the majority of tomato processed products consumed locally. Most imports are for tomato paste (in 2012 it accounted for 93% of tomato imports). Paste trade partners include Italy and China



Trends in the demand and supply of local processed products

- **Tanzania experiences high rates of import despite there being local processing facilities that can substitute imports.** Large scale processors process tomato sauce, paste, and chili sauce. Small scale processors process tomato sauce, wine, and jam
- **High-end retailers and hotels prefer imported products due to their clientele type** but think that local products have an opportunity to gain market share, particularly through outlets that target local consumers
- **All processors hope to increase** their output between 40% and 100% next year to target local markets and in the future, export markets

Source: Dalberg Research surveys and interviews; FAOSTAT

Local processing of tomato products is constrained by the inadequate supply of tomatoes due to high market prices

- **Processors cannot compete with market prices** and rely on farmers not being able to find a market for their fresh tomatoes during the glut period. **This is possible because processors have lower quality standards (85% of tomatoes meet standards)**
- **As a result, large processors, such as DABAGA and DARSH Industries, are unable to process tomatoes year round.** Small scale processors are often able to acquire the required tomatoes because they only process small volumes
- **Combined processing capacity from DABAGA and DARSH each year could be 80,000+ tonnes.** This would require 8,000 additional tomato farmers producing at current capacity (or increased yields/production from existing farmers)*
- **Processors have attempted to educate farmers about their standards and support aggregation schemes** but have been unsuccessful. Farmers tend to have a poor perception of processors which inhibits processors from procuring tomatoes

"You find that in a period of one year you only do [processing] for one month"

Large-scale Processor

"This is because tomatoes are available in specific seasons and there are times that tomatoes are not produced for a long time

Large-scale Processor

"What [my company] needs is storage facility to buy more during the harvest season and use them even when the harvest is low"

Small-scale Processor

*The average output per farmer is ~10 T per year

Source: Dalberg Research surveys and interviews

There are two main avenues for improving access and reducing the input cost of tomatoes for processors throughout the year

increasing the consistent supply of fresh tomatoes at a competitive price

Potential solution(s)

Production

- **Reduce the cost of tomato production, which will reduce input costs for processors**
  - **Processors** can invest in large scale production of tomatoes or tap into other regions in Tanzania to source tomatoes
  - **Smallholder farmers** can reduce cost of tomato production by reducing input costs or investing in small-scale value addition
  - **Processors can offtake unharvested small tomatoes directly from farmers,** given they are not concerned by sizes of tomatoes

Processing

- **Reduce operational costs by diversifying products.** This will allow processors to increase capacity of factories/machines, spreading costs (e.g. electricity – 33% of total costs) across multiple type of products
- **Reduce production costs (e.g. ketchup and wine) by reducing cost of complementary inputs such as sugar**. There are trade regulations that have increased the cost of sugar

Reducing the production costs of tomatoes (via smallholder farmers or processors) is more feasible and more likely to increase the number of jobs in the value chain

Source: Dalberg Research surveys and interviews

Among various solutions for tomato production, off-taking unharvested small-sized tomatoes is likely to succeed

Processors	• **Processors could invest in large scale production of tomatoes to reduce or control the input costs for processing, however, there are two main challenges that may not make this a viable solution:** (1) the production volumes (and hence the processing volumes) will have to increase significantly to meet the optimal price (100TSH/kg)*; (2) although it does not compete with SHF, it is not politically feasible for donor and gov't money to support a solution that does not impact SHF. **A waterfall analysis can assess how to get yield and costs to a specific number appropriate for production for processing**
	• **Processors could tap into other regions in Tanzania to source fresh tomatoes during off-season, however, those regions already serve nearby markets and would be too costly to transport to processors in SAGCOT region.** Regions such as Arusha and Mwanza have bi-modal rainfalls and have a more consistent supply of tomatoes through the year. This may be challenging due to high transportation costs and the high demand of tomatoes in the Northern tourism circuit and in Kenya
Smallholder farmers	• **Reducing input costs for farmers will decrease the cost of production, however, it is likely not to meet the price needed for processors** and the competition from the fresh tomatoes market will continue to prevail in the market, leaving processors without inputs during off-seasons
	• **Smallholder farmers could add value at the farm gate to convert fresh tomatoes to tomato paste, however, the cost of processing is higher than alternative sources of paste from China**. Processors currently buy tomato paste from China at a very low cost, such that paste by farmers will not be able to compete at that price
SHF & processor contracts	• Many farmers do not harvest small tomatoes to take to the market because the cost of transportation is too high. **Given processors are not concerned by tomato sizes, they can offtake unharvested small tomatoes directly from farmers.** This, however, will require processors to invest in harvesting and transportation services to off-take tomatoes from farmers to reduce farmer losses without requiring investments by farmers

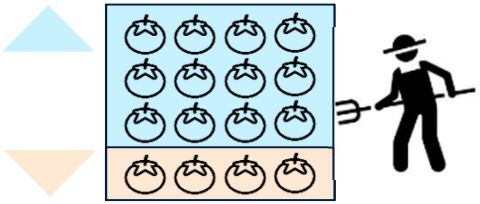
*The current market price for tomatoes range from Tshs 162/kg during glut period and Tshs. 563/kg during off-season

Source: Dalberg Research surveys and interviews; Dalberg interview with Frederick Kilcher

6 Given processors can buy smaller-sized tomatoes, they can offtake unharvested small tomatoes directly from farmers

Challenges

Farmers harvest and transport 75%* of tomatoes (large, unpunctured) for sale into markets. Processors cannot compete with the prices of tomatoes taken to local markets



Roughly ~5%* of tomatoes remain unharvested on farm because they are undesirable, too small for fresh tomato markets. Small-sized tomatoes are acceptable for processors

Previous efforts by processors to set up collecting centers and trucks have been ineffective because the cost of harvesting incurred by farmers was too high

Potential Solution

Processors can buy smaller-sized tomatoes that are unharvested directly from farmers, possibly through a formal or verbal contract on farmer losses

- **Farmers will need to be sensitized on the additional income** that they can make rather than suffer losses if not sold to processors; and change perspective that small tomatoes produce really good paste
- Given farmers are unwilling to put in additional effort to harvest small tomatoes that do not provide significant income, **processors will not be able to off-take small tomatoes unless they invest in harvesting and transporting of tomatoes** back to factories

Implications for jobs

- Increased number of temporary jobs for youth to harvest and transport small tomatoes to processors
- Increased income for smallholder farmers by reducing loss
- Decreased tomato rotting on farms which results into an increase in pesticides in the next production cycle
- Increased number of permanent jobs in processing plants by boosting processing capacity
- Increased number of jobs created in transportation, however, no additional jobs in retail and hospitality

*If post-harvest loss is ~35%, assuming 30% of loss is experienced after harvesting (including rotten tomatoes from lack of market, loss during transportation to local markets and retailers). Another 5-10% of tomatoes may be rotten due to pests

Source: Dalberg Research surveys and interviews; Dalberg interview with Frederick Kilcher

7 As the supply of tomatoes for processing strengthens, investing in training of technical skills will be necessary

Challenges and Opportunities	Potential Solution
• **Around 2 of 10 positions** (e.g. Machine Operator and Processing Manager) **are highly skilled**. Often times these experts are called-in when needed and are not Tanzanian, resulting in additional costs and delays in processing. Other important jobs for processors sit within the quality control department, however, these positions can be filled easily from local universities	• **Invest in on-the-job training for highly-skilled technical experts** via apprenticeships within local processing firms. These resources, particularly ones needed to fix machinery, can be a shared resource
• **Small scale processors report inability to access markets and financial products** to scale their businesses. These processors rely heavily on external grants and funding	• **Incubate small-scale processors (e.g. of wine) to create viable business models** and provide financing facilities for growth, ultimately increasing the number of jobs

"The more capital intensive is the processing manager because he has to check the quality of the tomatoes, he has to check the people who does the sorting among others. The machine operator is also very important."

Large-scale Processor

"It's the machine operator since the machine in ultramodern, it needs a very skilled person for example the other day we started processing then the machine turned off and so we had to call someone from Arusha to come fix the problem because the person who was operating it only knew how to operate but not how to fix it."

Source: Dalberg Research surveys and interviews

SUMMARY OF INVESTMENT OPPORTUNITIES

Summary of investment opportunities to increase quantity and quality of jobs in the tomatoes value chains

	Potential investment opportunities	Number of jobs	Quality and permanence of jobs
	Market for fresh tomatoes		
1	Investments in irrigation and greenhouses to spread out production across the year	Reduce temporary workers, Increase number of permanent farming jobs	More permanent jobs; increase income for SHFs
2	Pesticide entrepreneurs can be incubated to distribute pesticides and improve yield	Increased youth jobs or businesses	Increased income for SHFs
3	Use of new variety seeds with higher yield and shorter production cycle	More workers per production cycle	More permanent jobs; Increase income for SHFs
4	Formal financing can reduce farmers' over-reliance on traders	Few additional jobs	Potential to increase economic outcomes for SHF
5	Access to new markets for fresh tomatoes through cold storage and improved transportation networks	Few additional jobs	Potential to reduce losses for SHFs
	Market for processed tomatoes		
6	Processors can harvest small-sized tomatoes by investing in harvesting and trucking services	Mostly youth in harvesting and transportation jobs; Jobs in processing and transportation	Higher wages and permanence of jobs in processing
7	Once supply of tomatoes is secured, invest in technical skills training	A few additional jobs created if firms hired locally; There may be few transportation jobs	Highest skilled jobs impacted, higher wages

Key: Low impact  High impact

Spreading out production to off-seasons can address growing latent demand for fresh tomatoes locally and regionally

Summary of situation:

- There is growing latent demand for fresh tomatoes during off-seasons in large markets of fresh tomatoes (e.g. Dar es Salaam) as well as regional markets (e.g. Malawi)
- To meet this growing demand, there are two largest barriers that need to be unlocked: 1) farmers have limited access to water throughout the year, and 2) the cost of producing tomatoes is high, particularly driven by the cost and effective use of pesticides

1 IRRIGATION/GREENHOUSES

- Limited access of water throughout the year constraints consistent production of tomatoes during the off-season
- There is a limited use of greenhouses and irrigation schemes to increase access to water. Processors report that only 15% of farmers use greenhouses

Investment opportunity

- Invest in greenhouses and irrigation schemes to provide farmers with access to water to improve the consistency of supply of fresh tomatoes in the market
- There are opportunities to leverage existing partners (such as SUGECO) to demonstrate and implement schemes

2 PESTICIDE DISTRIBUTION

- Farmers use pesticide, however, experts report that pesticides are not used effectively
- Pesticides are also expensive because of efforts to reduce the packaging size

Investment opportunity

- Incubate pesticide spray entrepreneurs who can buy higher volumes of pesticides and provide pesticides to farmers as a service rather than a product
- This would require access to capital financing, business development support and technical training on pesticides
- This would allow for reduced costs for farmers, increased efficiency and effectiveness of pesticide use and reduced environmental damages

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Annex: Recommendations for investments have considered six factors related to job growth within the tomatoes value chain

A. Number of jobs

B. Wage and benefits

C. Permanence of jobs (long term vs. seasonal)

D. Quality of jobs
(high intensive labor, health, security)

E. Mobility of jobs
(including entry points into other jobs)

F. Inclusiveness
(gender, youth, other minority)