Artisanal Processing to Agro-based Industrialization: The Search For Tanzania's Pathway-Lessons from 20 Value Chain Studies from 5 Countries

by Julius Gatune Kariuki

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MAKING INDUSTRIALIZATION WORK FOR SOCIO-ECONOMIC TRANSFORMATION

21st Annual REPOA Research Workshop

From Artisanal Processing to Agro-based Industrialization: The Search For Tanzania's Pathway - Lessons from 20 Value Chain Studies from 5 Countries

Dr Julius Gatune

African Center for Economic Transformation (ACET)

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ACET –BMGF Study:
Promoting Rural Sustainable Development and Transformation in Africa

Objective of Study

The overall objective of the study is to increase smallholder productivity and to improve post-production value (storage, processing, and market access—domestic or foreign) in order to improve the incomes and food security of smallholders, and also to increase agriculture's contribution to an overall economic transformation that reduces poverty in the whole country.

Study Components

i. Study of on-farm productivity, a value-chain analysis to identify value capture opportunities and a simulation exercise on the distribution of benefits to understand the welfare effects
ii. Policy advocacy process to promote adoption of the key recommendations of the country reports in the transformation plans, budgets, and programs of the countries.

Country-Crop Studies

Crop	Kenya	Uganda	Tanzania	Ghana	Burkina Faso
Sorghum	×	×			×
Millet	×	×			
Poultry	×			×	×
Cassava		×	×	×	
Cow	×	×	×		×
Rice			×	×	
Cotton			×		×
Cocoa				×	

Country-Crop Selection Criteria

i. Importance to smallholders
ii. Potential for post-production value improvement.
iii. Other considerations include the market size, imports substitution opportunity, experience with product, agro-ecological conditions, and possibility of developing agro-processing clusters, climate change resilience

Tanzania's agriculture value chains have many challenges

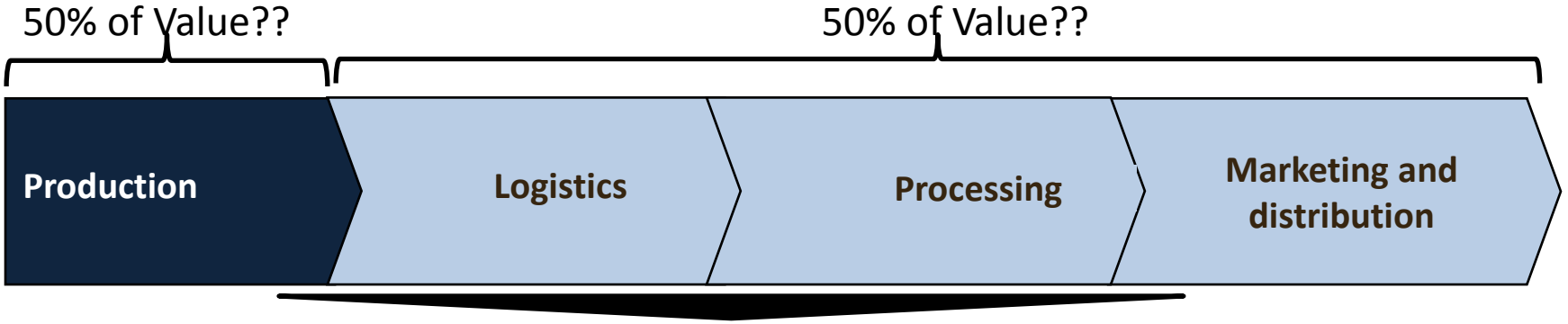
	Production structure	Logistics	Processing	Marketing and distribution
Issues	• Low yields – Saved seeds – Inputs (fake, costly) – Low knowhow • Poor quality – Equipment lack – Cheating – Mixing varieties • Labor challenges • Subsistence orientation	• Post-harvest losses (upto 50% reported) – Storage e.g. evening milk, pests – Transport • Middlemen/women stranglehold (bogeyman?) • Payment on quantity rather than quality	• No Supply guarantee- quantity , quality and price • High costs (energy, packaging) • Access to equipment • Product development	• Informal markets dominance thus low value addition • Low products diversity • Low quality products • Inability to address changing markets – urban poor – Urban rich
Policy questions?	• Who to support (small holder ?) • What to subsidize? (inputs or Info?) • Farmer organization	• Formal vs informal (milk trader question) New market intermediaries (WRS, commodity exchanges	• Artisanal vs formal • Trade policy e.g cassava bread) • Industrial policy- equipment fabrication, vs imports	• Food imports bans vs tariffs? • Mandates vs incentives • Regional standards • Rise of supermarkets

- Solution to many of this challenges lies in innovations across the whole value chain. Technology is important but what is more critical are business model innovations to improve coordination, build trust and unlock synergies

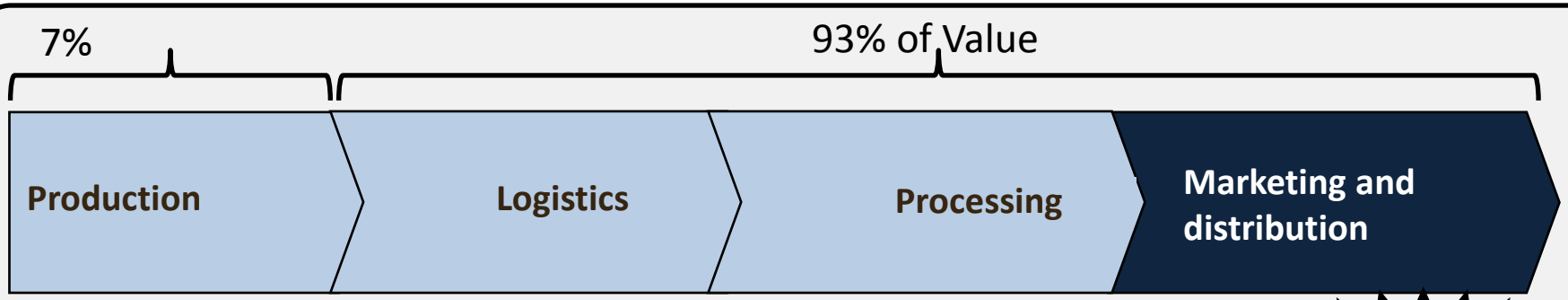
Policy focus should be on catalyzing and scaling innovations along the chain

As a result full potential of agriculture is yet to be tapped

Agriculture generates about 24% of GDP directly and maybe another 20% through manufacturing, services and distribution. We need to move production centric value chain.



..True potential will come from transformed agricultural value chains as case of US agri-food systems demonstrates….



- Tanzania's agricultural growth has not translated to economic transformation as it has not upgraded to address new markets
- Addressing markets requires strong processing sectors supported by strong production and logistics to address market demands

Markets are key to transformation of the agricultural value chains

Markets should drive the agribusiness value chain.

Where is the market?

- Urban markets now dominate 50% of all agricultural products, but how to tap the market?
- Regional integration and the rise of regional supermarkets is new bigger markets
- Poor infrastructure create natural markets.

What does the market want?

- How are diets shaped?
- In the emerging urban markets:
  - The urban poor want convenience and cheap food.
  - The urban middle class want convenience and healthy food

- Image building should be a big part of value chain development. For example experiments in Senegal indicated that innovative labelling of local rice can give it premium of 17% on the market price
- The other side of the coin is R&D. Products must be competitive!

Tanzania dairy processing sector has shrunk 80% over 15 yrs while imports have been growing at 9%. Industry has focused on pasteurized milk while people prefer raw milk! In Kenya Tusky's supermarket is selling raw milk

However meeting the needs of emerging market requires strong agroprocessing sectors and this means 3 pre-requisites

Low prices

- Prices are a function of demand and supply so yields have big bearing on what prices can be supported
- Prices should also be such that farmers get a fair return

Consistent supply

- Once capacity has been installed high utilization is key
- Consistent supply require farmers who can commit and strong logistic providers

Consistent quality

- Processing has very strict standards on quality and very small tolerances
- Quality is also about have consistent varieties

Questions

- What farming model can best support a strong processing sector
- How can we keep prices low as processing sector grows and demand rises
- What business models can we use to address SMEs challenges
- How to harmonize industrial policy and agricultural policy

Capacity utilization of many processor below 50% making agro-processing unattractive to investors

There are many issues to be resolved before supply can support a strong processing sector

Inadequate supply

- Low yields (cotton yields at 541 kg/Ha Vs 1200 -1500 Kg/ha potential)
- Cotton farmers stop picking cotton after first payment
- Side selling by contracted farmers

Uneven supply

- Milk supply can fluctuate by over 50%
- Cotton farmers plant late as they give other crops priority

Low quality

- Manual rice harvesting and threshing introduces many impurities
- Cotton farmers adding sand and water to cheat on weight (Tz cotton on watchlist)
- Farmer mix varieties thus uneven maturity

Wrong varieties

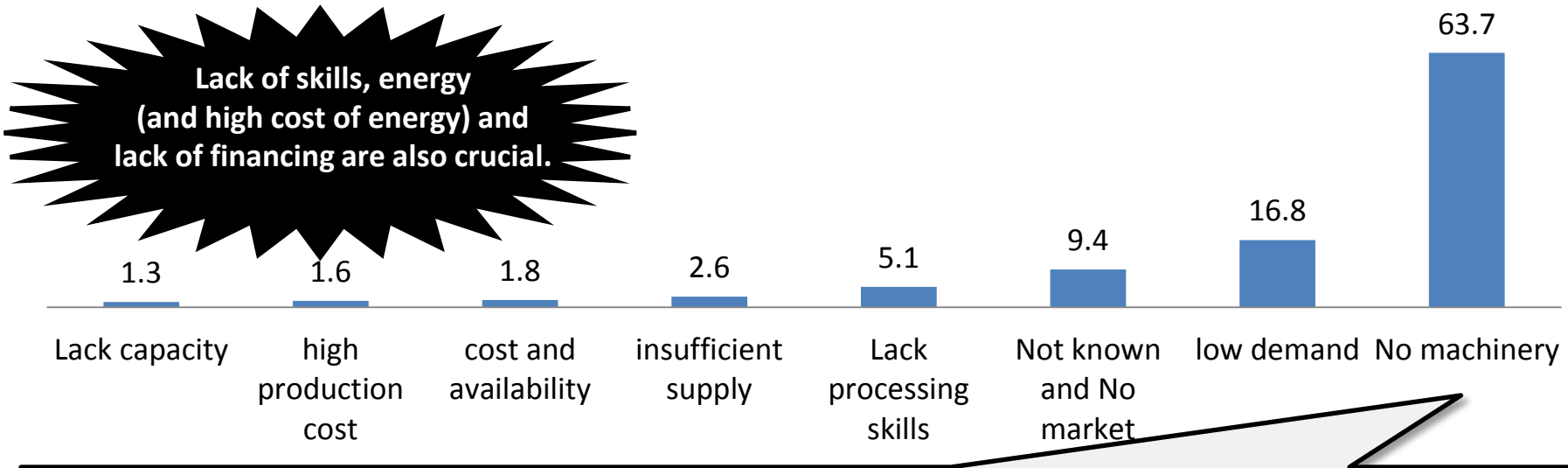
- Cassava farmers want sweet varieties rather than high yielding (which are bitter)
- Risk aversion prevent uptake of new varieties
- Varieties not optimized for existing processing equipment .g. rice

- Artisanal processing and SME processing are likely to be the only areas of dynamism in processing for some time to come.

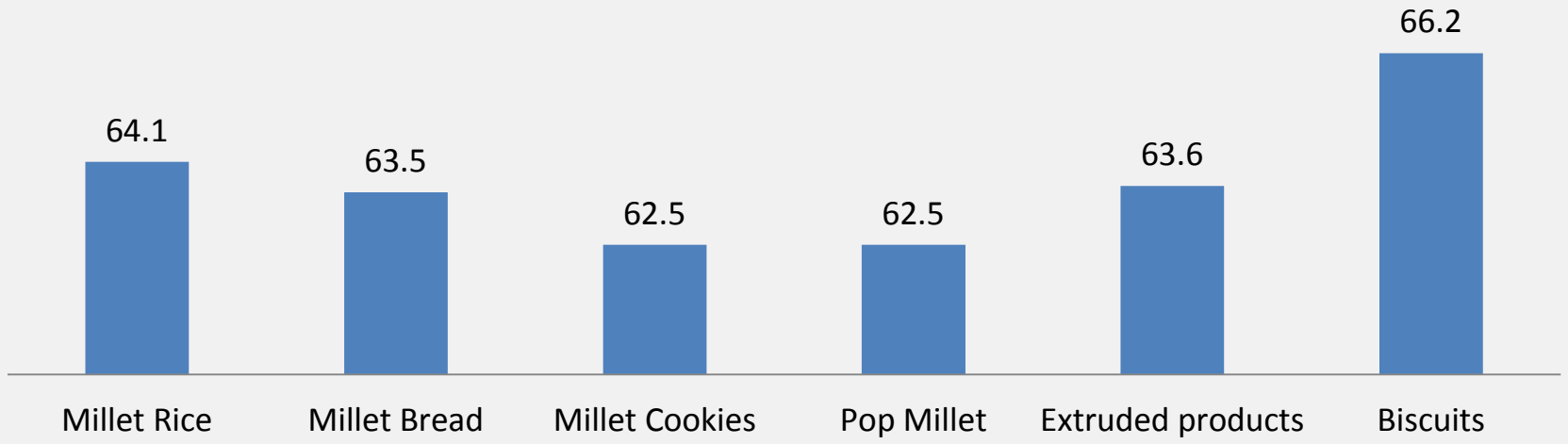
But perhaps trust is the biggest challenge as no one trust the other. Results in poor quality, inability to contract

While lack of machinery means limited products for the emerging urban markets

Constraints to diversifying millet product range (% processors reporting)



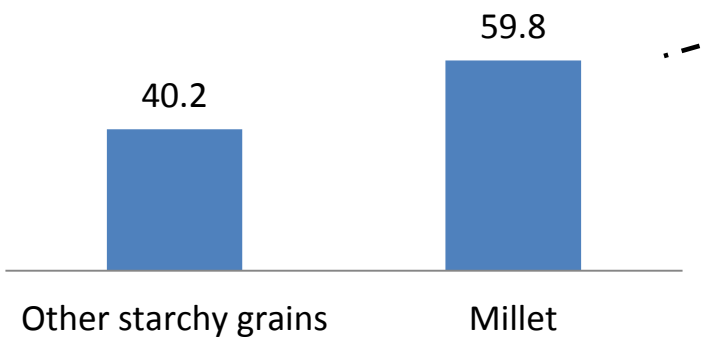
Processors reporting lack of equipment as challenge for various millet products (% reporting)



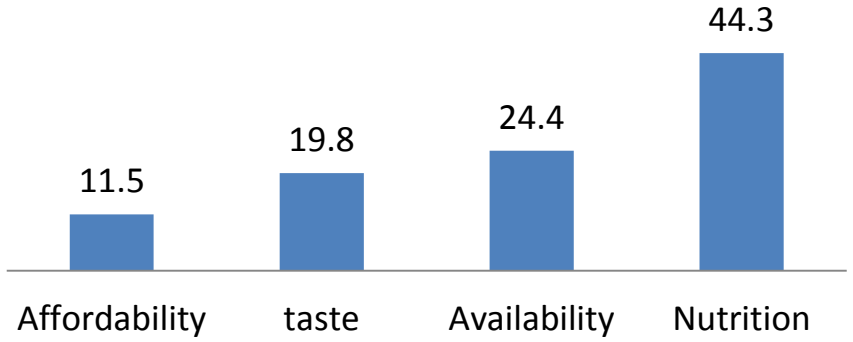
Source: Field survey 2014

Lack of products has seen traditional grains lose market share even when they are preferred to other grains

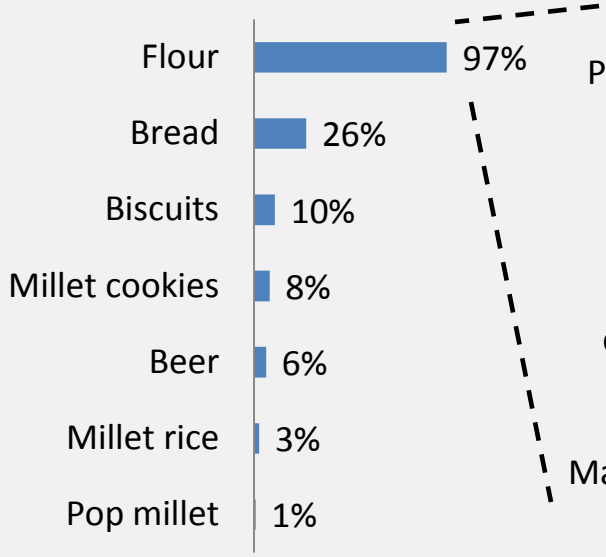
Grain Preference (% Expressing)



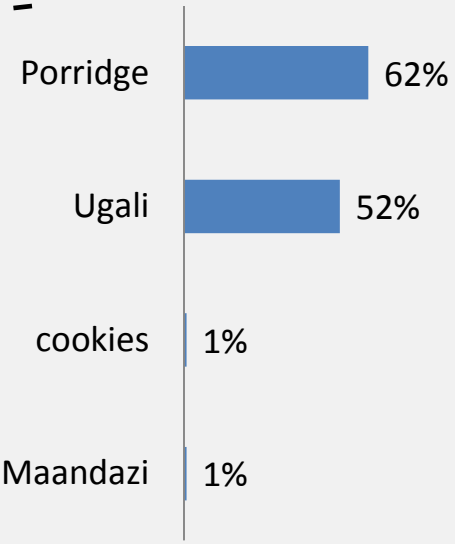
Reason for Millet Preference (% Expressing)



Millet Product Awareness (%)



Millet Foods Eaten (%)



- Flour is the best-known millet product and is mainly used for porridge and *ugali.*
- A narrow product range limits the market for millet.
- Millet is preferred to other grains and, more importantly, is preferred based on its nutritional value, underscoring the potential for development of high-value products.

Agricultural transformation journey is yet to unfold. This will require re-engineering and upgrading the value chain

Industrial agro-processing

SMEs and Cottage industry processing

Artisanal processing

Note TDV 2025 has acknowledge that strengthening Artisanal and SME will be key to achieving the vision

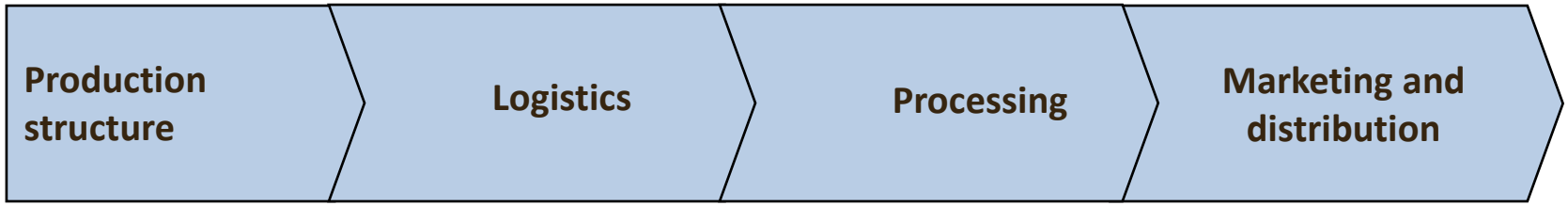
What will it take?

- Framer processing groups
- Strong equipment fabrication sector
- Gender friendly machines
- Business model to support access to technology

- Markets and product development
- Capacity to navigate regulatory framework
- Business support services
- Access to modern food processing equipment

- Strong supply chains that can guarantee sufficient capacity utilization
- Well develop consumer markets e.g. supermarkets
- Supportive industrial policy

Innovations providing many opportunities for upgrading value chains



Innovations/ New models/ Potential opportunities

Production structure	Logistics	Processing	Marketing and distribution
• ICTs e.g. i-Cow • Inputs model – Franchising e.g. Farmshop – Inputs as a service • New FBOs Model (farmers within specialize) • Flexible financing e.g. One Acre Fund, rainfall insurance	• Warehouse receipt system • Commodity exchanges • First mile transport solutions	• Artisanal + SME symbiotic relationship • Dual role processors (buyer of farmers output + selling inputs to farmers creating dense relationships) • Industrial parks, SeZs, EPZs etc	• Branding and differentiation (Mbeya rice) • School milk program (But why not dairy products)

In transformed agricultural sectors, jobs are in upstream activities not production. Policies should reflect this

Farm level production needs to move to towards a more holistic farming eco-systems that support various classes of farmers

Subsistence

- Very poor and faming is focused on food for family. taste rather than yield is key in varieties choice
- Do they need welfare support or agric. Support?

Small Holder Commercial

- Commercial orientation make it easy for them to
  - Enter into contract farming
  - Likely to form strong FBOs that can provide many services and even integrate forward to processing

Medium commercial

- Means and enthusiasm to adapt new technologies
- Easy to diffuse technologies to small holder as distance is not too far from small holder

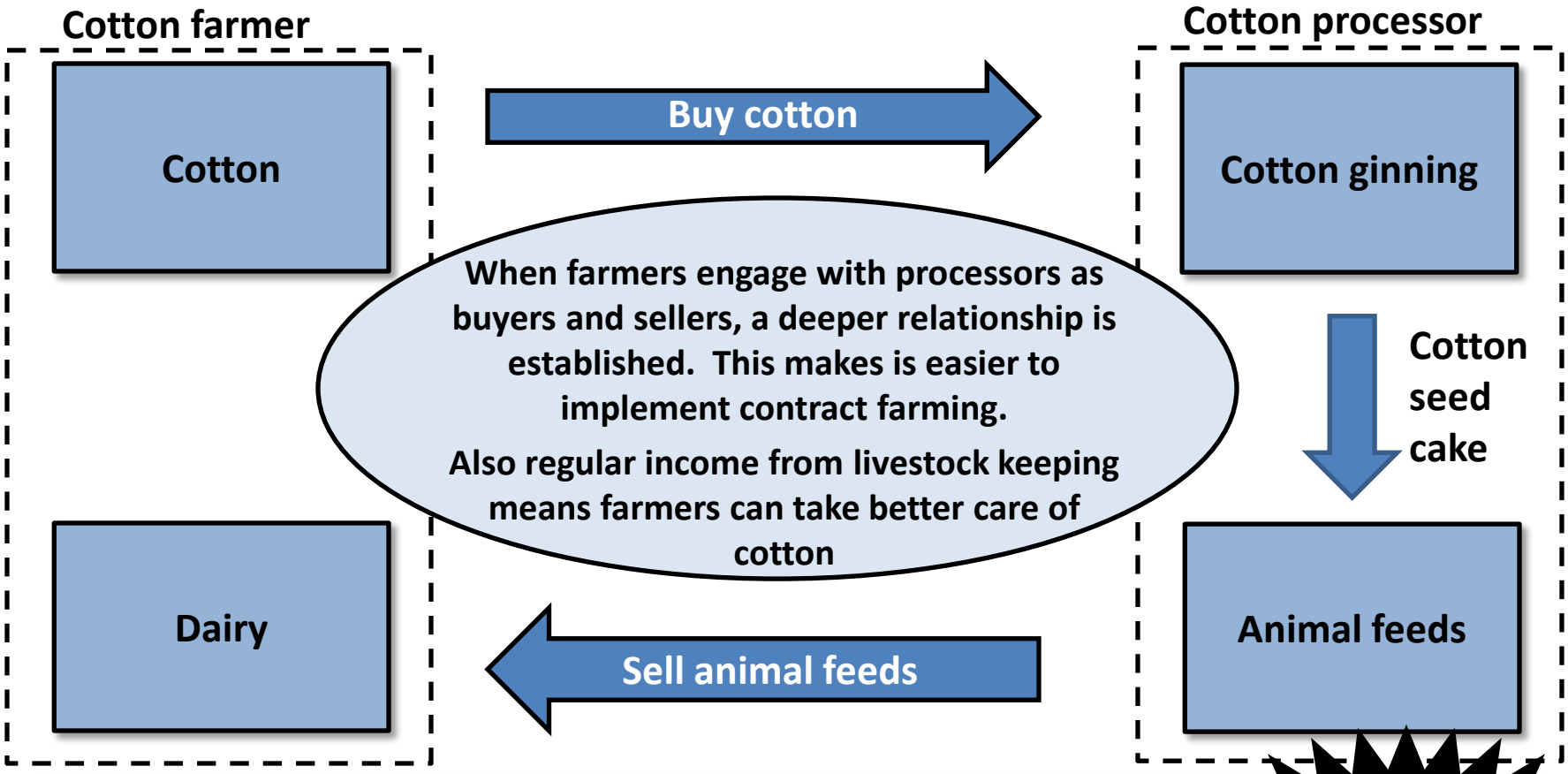
Large Scale commercial

- Able to bring new technologies and developed markets e.g. exports
- Can provide highly specialized capital intensive services e.g. breeding in dairy
- Farming system benefits from infrastructure they provide

Potential for creating a highly symbiotic ecosystems with each farmer specializing e.g. Kenya dairy sector

Unlocking the inherent synergy in ecosystem should be the focus. Where is the low hanging fruit?

Processor can improve supply by developing deeper relationships with farmers, especially in helping them diversifying their livelihoods



- Poor farmers are risk averse and thus not likely to invest in expensive inputs.
- Diversifying incomes is one way of reducing risk. When processors help farmers diversify risk, they increase their supply e.g. Numa feeds with millet farmers in Uganda

In Ghana, Amajaro support its cotton farmers to produce maize thus preventing diversion of fertilizer

Middlemen: From the agriculture bogeymen to value chain upgraders ?

Input Providers

- More likely to e trusted by farmers as perceived to have better knowledge of market. In Benin the success of Nerica was due to efforts of one trader
- Trader can use same infrastructure to buy and supply input

Make contract farming work

- Repeated interaction means deep understanding and insights in what works.
- In Kenya and Uganda breweries are using middlemen (logistic providers to interface and manage contracted farmers

Financing

- Intimate knowledge from repeated interaction mans middlemen have better understanding of credit worthiness of various farmers. In Ghana 70% of rice farmers in the North are financed by middlemen

Quality control

- Have a stake in increasing quality as they are the interface with market
- In Uganda middle men supply tarpaulins to farmers for drying

Big traders can be beneficial to farmers. It is successful traders who eventually become successful processors

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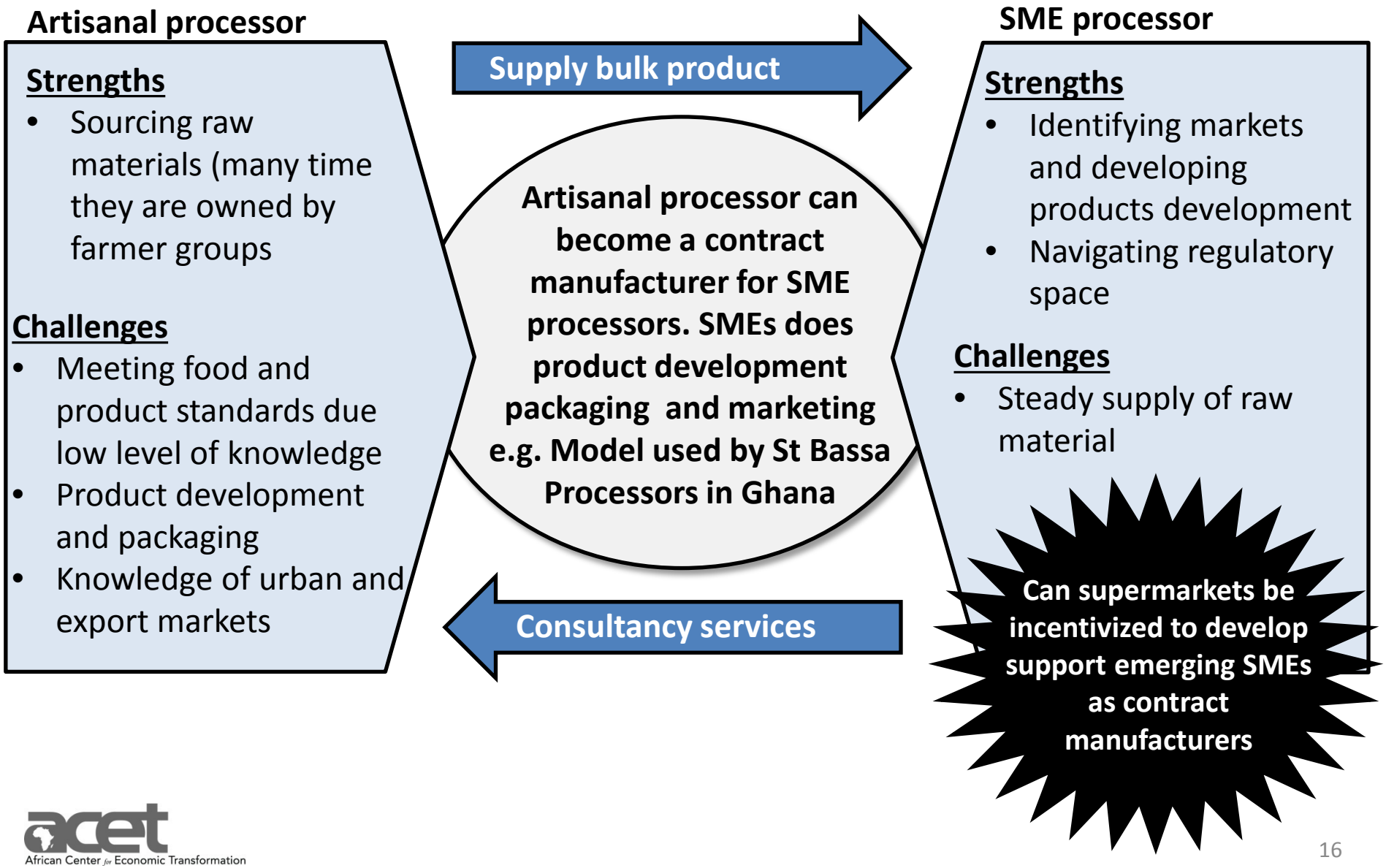
Rural processors and urban based SMEs processors can complement each other through a service model



Three other potential pathways for developing strong SMEs are:

Toll Processing Model

- A high end well equipped processing facility that is shared by a number of SMEs. SME supplies Raw materials and gets a semi-finished or finished product:
  - As SME deals with variable cost of manufacturing resources are freed to do product development and marketing
  - Time to get product to market is significantly reduced
  - Cassava processing centers being pioneered in Tz are an example

Contract Manufacturing model

- Similar to toll processing but the product owner outsources all manufacturing and procuring and gets a branded products.
  - Frees product developer from investing in supply and manufacturing investment. This model is mainly used to develop supermarket branded products
  - Market access is guarantee

This model can be allows a possibility of using a combination of PPP and mandates in developing local industry

Cottage industry

- Medium scale farmers have capacity to do some processing and develop cottage industries. Cottage industry are particularly attractive as they:
  - They grow organically as more successful farmers integrate forward
  - The farmers have the raw material so supply is not a challenge
  - Potential for off-farm rural employment

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Source: Field survey, 2014

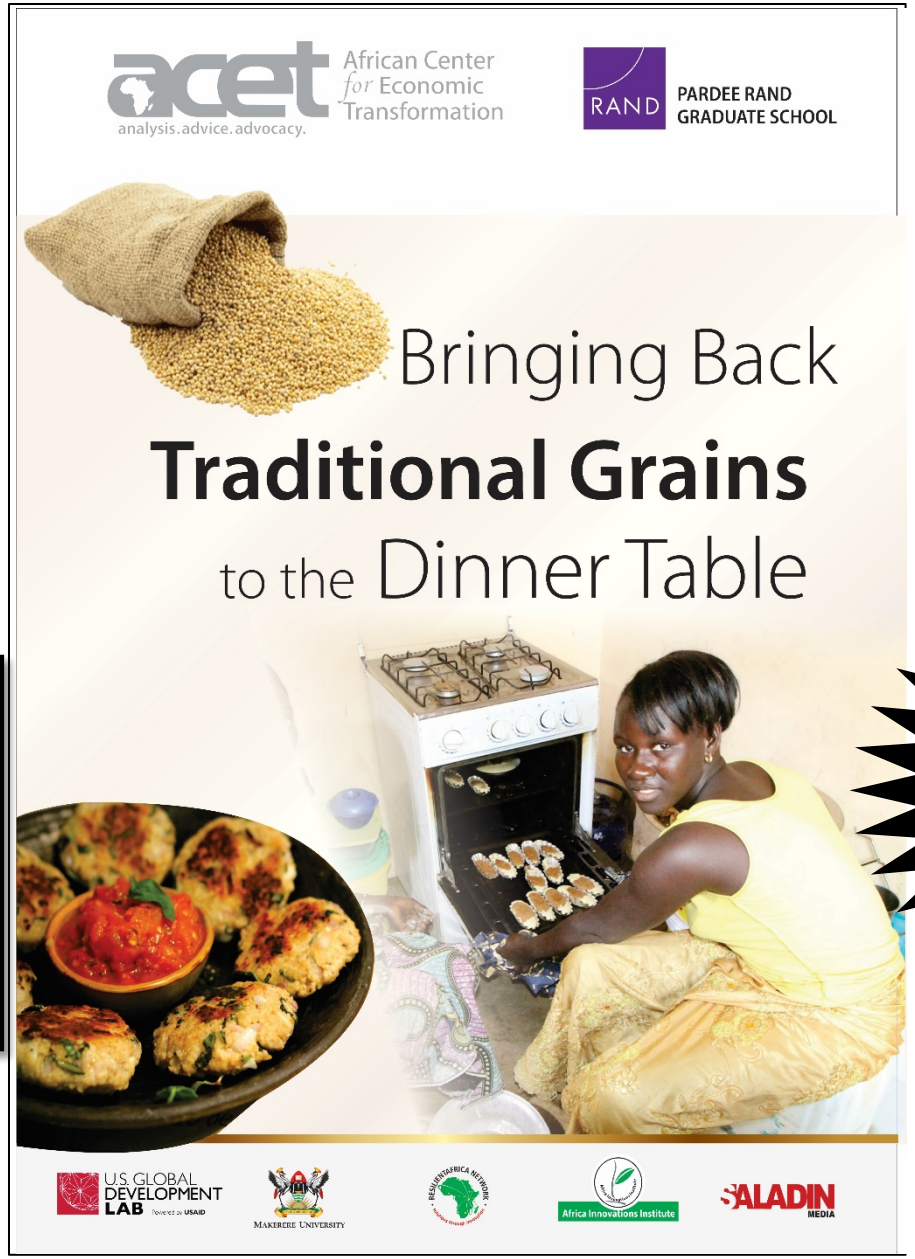
Marketing is part of the package e.g. rebranding millet and sorghum as East African superfoods and showcase them as foods that can meet demands of the modern family

Celebrities are key to shaping diets

When Oprah talked about Quinoa, the price sky-rocked. Kale has also seen demand grow after Actress and Celebrity chef Gwyneth Paltrow endorsed it

Demand for traditional grains likely to go global

Sorghum and millet now being touted as the new global superfoods. Demand for Teff is now making Ethiopia rethink the export of this staple and has limited exports



What middle class consumes sends strong signals to general consumers

A Multi-pronged Approach is needed

Incentives

- Tax breaks to upgrade equipment
- Land for commercial farming
- Subsidies to support symbiotic ecosystem

Mandates

- Local content laws e.g 5% cassava bread
- Need to be sure that undue burden is not put processors)

PPPs

- Where risks are high and capital requirements high government may need to come in e.g. development of toll processing

Questions

- What should be subsidized? production vs processing vs research vs market channels Vs promotion
- What is the role of policy (government)?
  - How should food policy look like?
  - How to harmonize industrial policy and agricultural policy
  - -How to prioritize and sequence

Note Nigeria banned import of barley forcing brewers and food processors to turn to sorghum and develop the supply chains

Industrialization is an ongoing and complex endeavor!

Industries are reflexively constructed by social investments in institutional and organizational forms; the standardization of routines and practices; the forging of linkages between like-minded actors; the fostering of technological capabilities and selection of new technologies; and purposeful policy-choices and elite interests, among others. Thus, industries have to be *made to work*: the institutional and organizational forms that allow learning, cooperating, changing have to be constructed and are reconstructed through everyday routines and practices

Questions

Innovations will be key in boosting farm level production

Knowledge

- ICTs addressing information asymmetry and knowledge gaps; iCow, Esoko, M-Farm
- Successful Farmers as consultants – a new line of business for medium sized farms
- Knowledge platforms e.g. KAAA

Inputs

- Franchising model for inputs supply e.g. farmshop
- Inputs as a service model e.g. weed killers
- Smart card to better target subsidies

Farm mechanization

- Mechanization centers being set-up in Ghana and Kenya under PPPs
- Rural fabricators can sell a service rather than selling equipment (*key to success of Gari enterprises in Nigeria*)

Financing models

- Finance as part of an inputs package e.g. One acre fund
- Identifying key places to offer finance e.g. root capital model
- Insurance -Credit risk e.g. USAID, rainfall insurance

- Service oriented business models can play a key role in improving productivity
  - Poor farmers cannot acquire capital equipment but can pay for a service
  - Good entry point for youth in agriculture as service providers

A strong innovation system that links researchers, policy makers and entrepreneurs is key

Market and trade policy can have important impacts

Partial simulation results (Impact of market structure and trade policy)

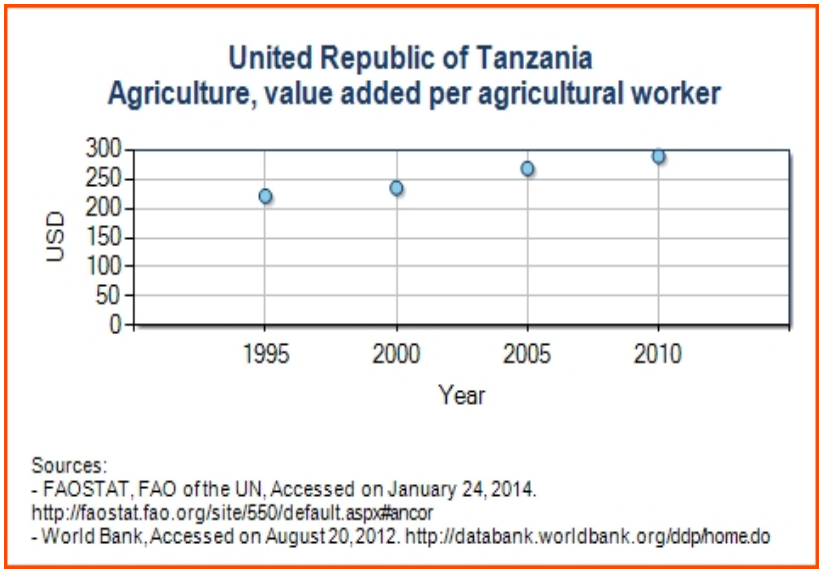
Agricultural product	Impact of market change on farm-gate price (%)			Impact on Incomes	
	Perfect Competition	International Price (10% rise)	Combined (PC+IP)	Poor	Non-Poor
Cotton	18.17	18.62	40.9	0.18	0.65
Rice	-0.85	8.84	8.24	-0.04	-0.13
Cassava	1.28	11.59	13.78	-0.07	-0.22
Dairy	-3.09	7.61	5.24	0	0.01

- Farm gate price increase are fairly modest except for cotton. This is because most markets are local and already highly competitive
- International prices have important impact on farm gate prices implying that trade policy is a potential powerful tool
- Also note that there can be huge complementarities as combined effect tends to be larger than sum of impact
- However the welfare impacts are very small but since they are free(no fiscal expenditure involved) they are still important

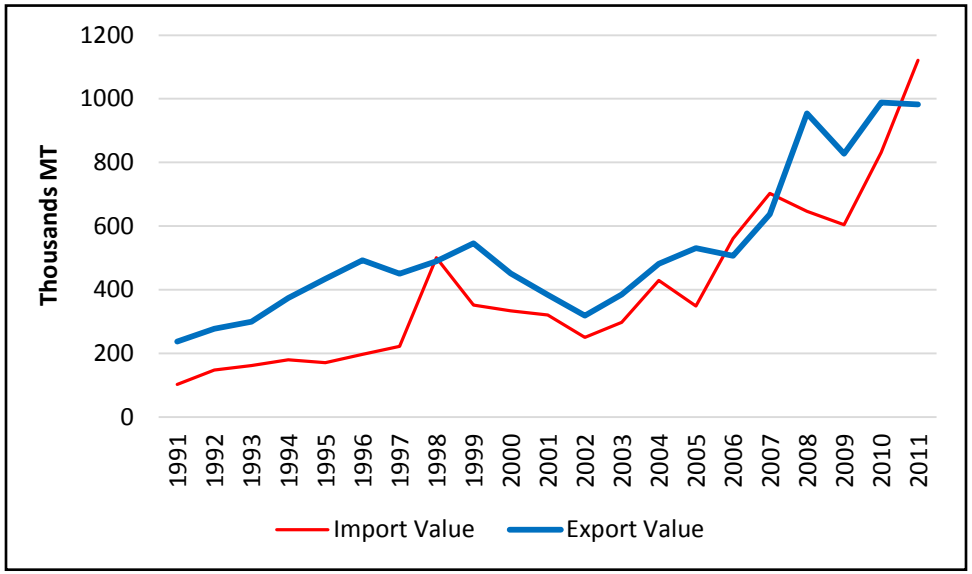
Cotton producer experience a welfare impact of 6.99% implying potential for is in inequality

While agricultural productivity has shown some growth in Tanzania, agriculture remains largely uncompetitive

Agriculture labor productivity has shown growth..



..However imports have been growing faster that exports



- Agricultural growth has not translated to poverty much reduction
- There are still too many people working in low productivity production aspects yet a transformed value means more jobs upstream
- Transformation agriculture can have important implications due to central role agriculture plays in Tanzania economy (24% o GDP, 40% of exports)

Agricultural transformation requires well developed value chains that address market needs

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Questions