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LEVERAGING THE TRIPLE HELIX MODEL OF INNOVATION TO DRIVE LOCAL ECONOMIC DEVELOPMENT:

WHAT CAN TANZANIA LEARN FROM KENYA AND ETHIOPIA?

By

Dr Julius Gatune; Dr. Diederik Deboer and Huub Mudde

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By

Dr Julius Gatune Kariuki

African Centre For Economic Transformation (ACET)

Dr. Diederik Deboer

Huub Mudde

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ABSTRACT

Economic development is the process of increasing supply of goods and services and consumption of these resulting in improved livelihoods. By nature, goods and services are scarce and thus increasing supply requires innovations in technologies to convert natural and knowledge capital to goods and also innovations in business models to make this conversion economical. Thus, economic development is at the core driven by innovations and their commercialization. This requires a Research and Development (R&D) systems to create innovations, a vibrant industry to commercialize innovation and a well-functioning government to facilitate- the so-called Triple Helix Model (THM) approach. The Triple Helix Model affords the potential for tighter collaboration that is key to regular and sustained problem solving needed to build competitive clusters. The power of THM has been recognized is increasingly being leveraged to drive regional renewal as the highly successful cases of Limburg province in the Netherlands and the Ohio valley in the USA attest. Africa context provide a different challenge for THM as the actors may not be ready and also it is not clear whether the THM model my work well for agricultural driven economies. To get a better understanding of the potential of THM model to drive LED in Africa we did two case studies in Kenya and Ethiopia to assess the readiness in Kenya and Ethiopia. The studies indicate that while the building block are there is still some distance to be travelled before Triple Helix Model can take root as model for local economic development. This studies then provide a lessons on how THM can be applied in Africa. This paper will then seek to draws lesson for Tanzania on how THM can be applied to drive Local Economic Development drawing from the case studies and also from successful initiatives globally.

1.0 INTRODUCTION

Economic development is driven by innovations and their commercialization into goods and services. This requires a Research and Development systems to create innovations, a vibrant industry to commercialize innovation and a well-functioning government to facilitate.¹ How these core enablers of innovation work together is crucial in determining the dynamism of any economy and its resilience. The formal recognition of the need for the three actors and potential synergies that can be derived through deliberate and purposeful bringing the three spheres together so that they can act in concert is known as the Triple Helix Model (THM) approach. Central to the THM is the blurring of boundaries between government-industry-research/knowledge institutions with institutions assuming some roles of “the other” In this way the relationships among the institutional spheres of the university, industry and government are continuously reshaped in an endless transition bringing forth new technologies, new firms and new types of relationships in a sustained and systemic effort (Etzkowitz, 2003).

While Africa economies have shown good growth in the last decade this has not translated to economic transformation. Economies remain largely based on agriculture or export of commodities with little value addition. A significant number of people are engaged in low productivity agriculture. As such poverty remains high and job creation potential of the economies is largely untapped. Indeed, the sustained growth has been referred to as jobless growth. For growth to translate to jobs economic transformation is needed (ACET 2014). The underscores the need for greater innovation in the economy to create new enterprises that can build on the comparative advantages of Africa (and even create new advantages). The low hanging fruit is the upgrading of agricultural value chains. Growing populations, urbanization and rising incomes have created dynamic domestic food markets. However, the under-developed value chains have been unable to tap these markets. As a result, food imports are high and rising.

¹ This can include sponsoring research, investments to remove bottlenecks and catalyze innovations, incentives and regulations to attract private investments, provide risk capital if need be etc

Agricultural value chains are plagued with many challenges. There is need increasing yields and quality, increasing the range of food products and building capacity to competitive produce these competitively. These will need innovations across the whole agricultural value chains. Upgrading the value chain will not only unlock these markets but will also provide the building blocks for development of vibrant manufacturing and services clusters that will deliver jobs and rural transformation.

Cluster Development

The Triple helix provides a strong framework for catalyzing and scaling needed innovations and building vibrant clusters. The triple helix model t affords the potential for tighter collaboration that is key to regular and sustained problem solving needed to build competitive clusters. Clusters provide a framework for organizing the implementation of many public policies and public investments. (Porter 2014 cited in De Boer and Langat, 2014). They are powerful tools for driving economic development as they:

- Leverage the power of **spillovers** and **linkages** to drive rapid economic development;
- Are a vehicle for policies and investments that strengthen **multiple related firms/institutions** simultaneously;
- Enhances the efficiency and effectiveness of **traditional economic policy** areas, such as training, R&D, export promotion, FDI attraction, etc.;
- Are forum for **collaboration** between the private sector, trade associations, government, educational, and research institutions –A **mechanism** for **constructive** business-government dialog;
- Brings together **firms of all sizes**, including SME's;
- Are a powerful private/public vehicle to identify and get alignment on **problems** and **action recommendations**;
- Fosters **greater** and **more sophisticated** competition rather than distorting the market;

This policy brief explores the potential for leveraging THM model to drive Local Economic Development drawing from lessons from case studies in Kenya and Ethiopia. Section II discuss what it takes to build a strong THM drawing from global best practices. Section II discuss THM readiness in Kenya and Ethiopia and what it will take to get them ready, Section IV looks at the application of THM to upgrade agricultural value chains, Section V looks and what it will take to implement THM and Section VI concludes.

2.0 APPROACH AND METHODOLOGY

To understand the level of readiness of Kenya and Ethiopia, a combination of document reviews and key informant interviews was employed:

- **Document review:** The document review mainly involved review of key policy documents, published reports and studies and also news items. A review of best practices in implementing THM model was done to identify lessons learned.

The readiness of government for the triple helix model was assessed by looking at the plans and strategies of key government agencies that can potentially play a major role in a THM driven economic development including ministries of education, trade and industry, specialized innovation and transformation agencies, national plans.

- **Qualitative Data Collection:** Based on literature a questionnaire/interview guideline was developed that sought to capture the key aspect of preparedness including; challenges faced in forming sustainable collaborations; perception about the THM actors' readiness in economic development (policy making and implementation, financing, research/knowledge generation, skill development & training, and infrastructure provision); as well as overall perception of Triple Helix Actors regarding readiness in forming partnership (Sharing information, Funding joint research, Coordinating strategy, Pooling resources, e.g., joint investment in a shared facility and Forming a joint & independent company to pursue interests). See appendix II for details of data collection instrument
- **Key Informants:** The main mode of data collection was key informant interviews. The key informants were leaders of various stakeholder organization representing the key actors in the triple helix model namely Government, Industry, research (universities and research institute) and Development Partners (DPs) including NGOs and CSOs. Where key informants could not be met face to face, they were

requested to fill the questionnaire (see Appendix I). The stakeholders interviewed are shown appendix II.

- **Key Informant Interviews:** documents review, and qualitative data collection were supplemented with interviews with key policy makers and leaders in industry, education.

3.0 BUILDING A STRONG TRIPLE HELIX - LESSONS FROM GLOBAL BEST PRACTICES

The close collaboration between government, research and the industry/private sector, has veritable heritage with powerful examples of the ability of this model when well executed can drive economic development². The realization of role of innovation systems has seen government play more pro-active role in driving innovation seen in entrenched in law³. However, building a THM led development strategy is not easy. This will require significant investment in knowledge and capital and strong coordination across the THM actors. The key challenge is overcoming mistrust, managing power asymmetry among partners and having the right leadership that can develop a shared vision that is key to developing a strong partnership. Two case studies provide insights into what it will take to have a strong THM led development strategy.

a) **The Case of Brightlands Chemelot Campus:**

The Brightlands initiative of the Limburg province of the Netherlands is a very ambitious triple helix local economic development strategy. The Initiative was triggered by forces of change that threatened Limburg province economic prospects. The traditional economic base of petrochemical industry was being threatened as competence in knowledge economy became the key competitive advantage. This development had raised serious concerns for the province as it sought to protect employment and also transition to the region to knowledge-based economy. The province leadership saw the answer as adoption of a triple helix model to drive the region to a new development trajectory. It sought to tie the key private sector enterprise, DSM, to the region and also bring on the University of Maastricht (UM) under a new strategy called *Versnellings* agenda

² The US is perhaps the most powerful example of application of the Triple Helix Mode though this is not obvious. Much of the innovations we see today including internet were incubated by the government in Universities and commercialized by private sector though government funding mainly channeled through the military. The land grant university systems can also be loosely categorized as triple helix model with the land grant university being the lead

³ For instance, Brazil's 2004 Innovation Law incentivizes the interaction between firms, public universities and research centres. It provide for allows grants to innovative firms, the set-up of private firms' incubation facilities in public universities and shared use of university infrastructures (Ranga and Etzkowitz 2013)

('Acceleration agenda'). The agenda identified three clusters for development; health, chemical and agro-food.

The Brightlands has since grown to a vibrant innovation ecosystem. The Brightland Chemelot campus has grown to 77 companies, 1,900 employees and 660 students (). Collaborations are the hallmark of Brightlands with more than 300 companies showing serious interest. Some notable collaborations include:

- **Aachen Maastricht Institute for Biobased Materials (AMIBM):** This is a collaboration between Maastricht University, RWTH Aachen and the Fraunhofer institute. AMIBM addresses the question of how plant materials can be used directly from nature as the basis of chemical and applied materials
- **Chemelot InSciTe:** This is a collaboration between Brightlands, Maastricht University and University of Eindhoven. The focus is slowly dissolving materials and implants in the body. Breaking down biowaste into building blocks.
- **TNO:** This is led by Brightlands in collaboration with industrial and academic partners. The focus is on application of advanced polymer materials in the field of Lightweight Automotive materials, 3D printing and Optoelectronic materials.

(See, Joosten 2014, <https://www.brightlands.com/>)

Lessons Learned

The government of Limburg province had to deal with many issues. These include:

- **Persistence of old mindsets:** Key to a successful THM is the blurring of traditional boundaries of the key actors. However, this was a challenge. UM was reluctant to invest in real estate as it saw itself as an educator and researcher.
- **Mistrust:** DSM corporate strategy in the near future was unknown to the province and DSM was not communicative. Further its desire to get rid of its real estate signaled potential of retreat from the region.

- **Power Asymmetry:** DSM kept the door of leaving/divesting from the region open thus used this a leverage to get resources. Indeed, both DSM and UM continued to take advantage of political pressure that the regional government felt to create jobs and cajole the government to make investment it may not have wanted especially providing subsidies. The result is that province had to invest 100% for facilities for Institute for Science and Technology (InSciTe) as opposed to having all parties invest.
- **Governance:** Management of TH system was a challenge as province did not have expertise to run the Triple helix organization created. An outside expert had to be hired.
- **Leadership:** Progress was slowed significantly when leadership at provincial level changed and new leader who was not sold on the agenda and was also suspicious of DSM. UM leadership was slow, I am embracing the idea of blurred boundaries and continued to hold on to the traditional role of university. It was reluctant to invest in real estate (the campus).
- **Political challenges:** Key to getting funding especially from national and European government depended on getting national politicians on board. However national politician want credit and have short time horizons. Therefore, national politician gave half-hearted support for the initiative.

(see also Joosten 2014)

b) The Columbus Partnership: A Case study of a PPP Driven Local Economic Development

The region of Columbus in Mid-Western United States is a good example of a true PPP effort to drive local economic development. Public and private leaders in Columbus region had seen that the region was not keeping pace with the nation in income and employment growth the way it had in the 1980s and 1990s and sought a regeneration strategy. To

drive the vision, a public-private partnership, Columbus 2020 was formed with the objective making the region competitive using a triple helix approach. The strategy has largely achieved the 2020 goals even before the target date. By 2018 the region had created over 160,000 jobs, attracted more than \$8 billion in investments (Wartenberg 2018) and on the way to meet all the targets by 2020⁴. From 2011 to 2013, the Region had an annual average of 22 FDI project announcements, double the 11 announcements per year from 2000 to 2010. The Region's exports of \$11.3 billion in 2013 were up 61 percent from \$7 billion in 2003 (Brookings and JPMorgan, 2018). Much of the success of the Columbus can be attributed to collaborations that have included all configurations of collaboration from industry-industry to industry-university, industry-government and government-university. Some notable ones include:

- Ohio Export Internship Program. This program matches companies looking to export for the first time or to improve their current export initiatives with students who have taken export-focused coursework, while providing a 50 percent reimbursement for intern wages (Brookings and JPMorgan 2018).
- The Columbus State Community College has partnered with Honda of America to develop a talent pipeline of electro-mechanical engineering graduates to address an urgent need. Students pursuing further career development, earn their bachelor's degree in engineering through the Preferred Pathway 2+2 partnership with Miami University, with their tuition paid by Honda (CSCC, 2017).
- Colleges and universities have partnered with the Insurance Industry Resource Council to prepare the industry for the 26,000 jobs that will be open over the next five years. This partnership has resulted in an educational pathway that mirrors the professional career path in the industry, ranging from a claims certificate to a graduate program in insurance (CSCC 2017).
- The City of Columbus partnered with Columbus State Community College to establish a program called FastPath designed to quickly get un- and under-employed adults into the workforce. Programs in construction, healthcare, culinary

⁴ <http://www.columbuspartnership.com/community-impact/economic-development/>

arts, and early childhood education are helping adults in transition enter or re-enter the workforce.

(See also Yost, 2016)

Lessons learned

- **No Silver Bullets:** Economic development is not a single project or activity, but rather a host of initiatives that create a culture of sustainable development over the long-term. We must be deliberate and accountable and think long-term
- **Inclusiveness:** The Columbus partnership includes a diverse spectrum of members – from the largest corporations to the smallest owner-operator business, from The Ohio State University to community colleges, from state government to small community townships and from the city of Columbus to regional communities
- **Deliberate and Purposive:** As a truly community-developed initiative, Columbus2020! takes a collaborative, deliberate and purposeful approach to every step of the process. All stakeholder whether big or small matter and each stakeholder must understand what is at stake, the path forward and the role that he/she plays.
- **Leadership needs to be earned:** Being a good leader requires that you have followers because people trust you. You have to earn that, you can't command it.
- **Humility:** The Partnership is very sensitive to the fact that it's a powerful group, so if it gets misdirected, it could do terrible mischief, unintendedly, Its founder Wexner cautions
- **Curiosity:** Being curious is an ongoing exercise and a fundamental activity that the partnership members practice with vigor. Curiosity expands perspective and ensuring the mission stays relevant as the future unfolds

- **Focus:** Work hard to insure issues are being identified; seek best practices globally; identify partnerships and experts to bring to the table, and tackle the work
- **Collaboration Culture:** This group has cultivated a culture of collaboration between the various constituencies-both public and private-that did not exist in the community”.

4.0 ASSESSING THM READINESS - CASE OF KENYA AND ETHIOPIA

Our assessment of the readiness of Kenya and Ethiopia indicates that collaborations are happening across the triple helix actors. However, collaboration tend to be short-term and opportunistic. The key ingredient of strong triple helix model, trust, shared vision and an institution structure for co-ordination of activities are missing. The level of readiness across the various actors is from moderate to low. A summary of the readiness of the key actors.

a) **Government**

The level of preparedness of governments can assessed as moderate to low. In terms of role of innovation in economy strategy both have elaborated an innovation policy and put in place institutional infrastructures. However, both governments miss the proper role of innovation which is seen as sectoral activity rather than a cross-cutting activity. Funding for research and development is also much lower than mandated by their policies. In Ethiopia the government takes a strong role in leadership and seems to have little room for leadership by other partners.

The role of local government remains limited. In Kenya, this is mainly due to the fact that it is only recently that the local government was devolved, and they are still learning and building capacity to drive development. In Ethiopia central government is still the key driver of development. All the same this is changing. Some county government in Kenya are showing leadership in deploying aspects of THM for example Nyandarua County government is working with Dedan Kimathi University of Technology to develop a cottage leather industry.

b) University

The universities in both countries show a zeal for enterprise but this is driven mostly by desire to close fiscal gaps as the universities are grossly underfunded. This has seen a tremendous rise in number of universities that as seen decline in quality of teaching and research. However there has been many interesting collaborations with universities and with government an indicator that universities are still relevant. However, these tend to be short term consultancies whereas university true calling in research and development which calls for engaging in solving challenges longer time horizons. There is also an emergence of what might be called entrepreneurial university that are seeking to solve local development problems and create opportunities for their students.

c) TVET Systems

In both countries TVETs are seen a key to development and have been rapidly expanded in the past. However, they have challenges. The main challenge of TVETs in Kenya is the significant mismatch between skills produced and skills demanded. There is also huge unevenness in access to equipment. Some TVETs have state of the art equipment they cannot use while other have poor equipment. For Ethiopia TVETs are not able to produce entrepreneurs.

There have also been efforts to upgrade TVETs and make them more relevant through adoption Competence Based Training (CBT). Ethiopia has also put in place a Co-operative model where TVETs students spend 70% of their time in companies. Kenya is also innovating with TVETs by incorporating incubation as part of training to make students ready to build enterprises.

TVETs can be assessed as moderately ready with good potential given the governments focus and interest in developing them.

d) The Industry

The industries are not very competitive and tend to seek local markets rather than international markets and also utilize connections rather than innovate and compete. Industries also mistrust other parties and tend to shy away from collaborations. All the same there are industries working with Universities and increase skills of the employees and also produce more relevant graduates, e.g. Strathmore University and Safaricom in Kenya. SMEs are also starting to use University for R&D e.g. Valsecs Nutritional Foods P.L.C and Addis Ababa University in Ethiopia. Industry are also collaborating with Development Partners (DPs) though this is more driven by the fact that DPs provide funds. All the same this provides opportunities for development of social enterprises.

e) The Development Partners (DPs)

This is a key in building the nascent THM partnerships observed. In Kenya Rockefeller has been instrumental in sponsoring projects that have seen county governments and Universities build fruit processing plants. In Ethiopia and the Sesame Business Network (SBN) which is bringing key sesame stakeholders under one platform is an initiative of the DPs.

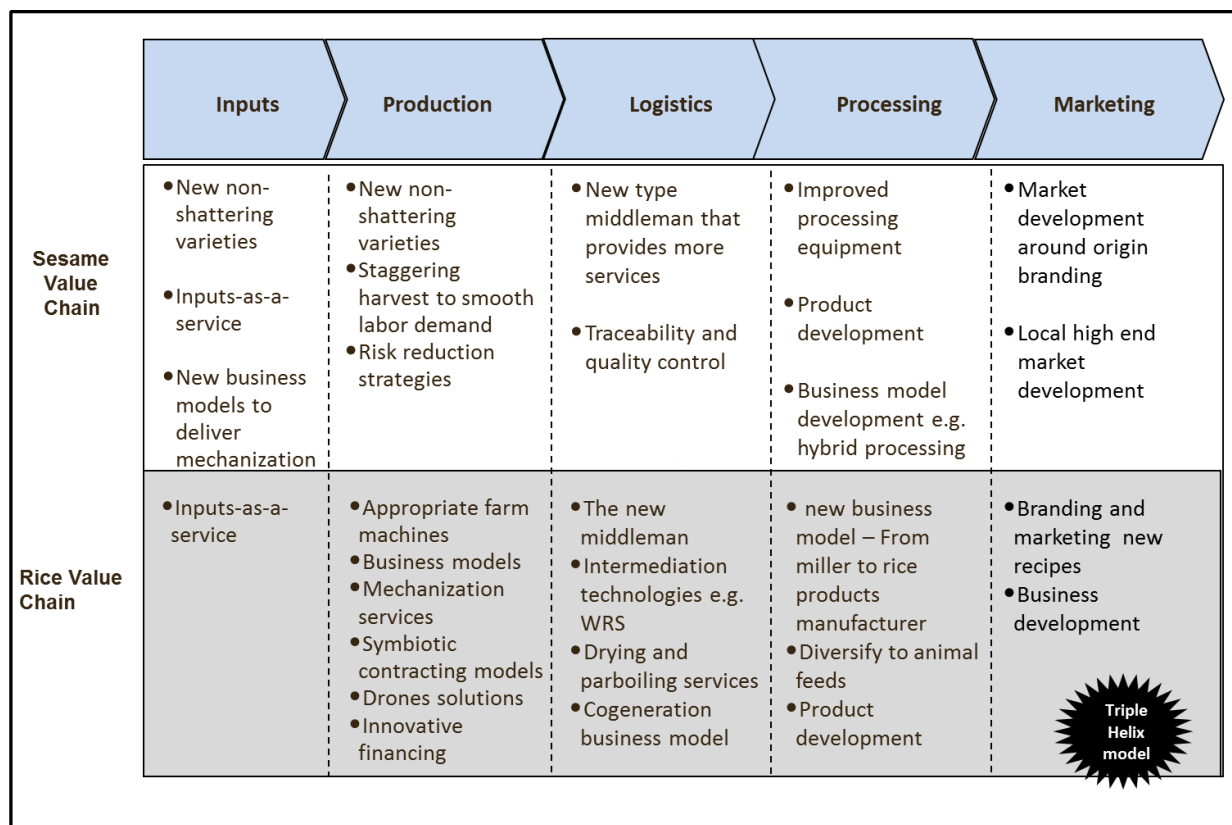
Indeed, the potential for development partners in catalyzing the THM model by sponsoring projects that help develop increased understanding is huge. Further development partners can help establish consensus space like SBN that are key to building trust and a shared vision.

However, it seems that the strong role of DPs has emasculated other partners especially local government who tend to defer to DPs in shaping and also financing the development agenda.

5.0 LEVERAGING TRIPLE HELIX TO UPGRADE AGRICULTURAL VALUE CHAINS

Agriculture is the key economic sector in Kenya and Ethiopia. Upgrading agricultural value chains provides an opportunity for transforming these economies. To understand how the Triple Helix Model can be leveraged we look at the sesame value chain in Ethiopia and rice value chain in Kenya. The two-value chain present interesting contrast as one is export oriented (sesame in Ethiopia) and the other is domestic markets oriented (rice in Kenya). They also provide interesting challenges Ethiopia sesame has good demand, however productivity has been declining and also poor-quality means that they miss out lucrative markets. In Kenya rice faces stiff competition from imports due to high production costs. However, an analysis of the challenges revealed that most of the challenges are common and therefore innovations needed are similar point to potential for learning across countries and value chains and also potential for generic solutions. Figure 1 is a summary of the potential innovations for sesame and rice value chains. The key innovations are technological and business model innovations. The rice value chain needs to be re-organized to allow emergence of stronger players that create the ecosystems needed to drive innovations and also support the formation of a strong rice cluster.

Figure 1: Innovations needed to upgrade sesame and rice value chains



For both value chains innovations needed to re-organize the value chains are discussed below. The potential role of the THM actors is also discussed.

a) Empowering The Farmer -From subsistence to Business Orientation

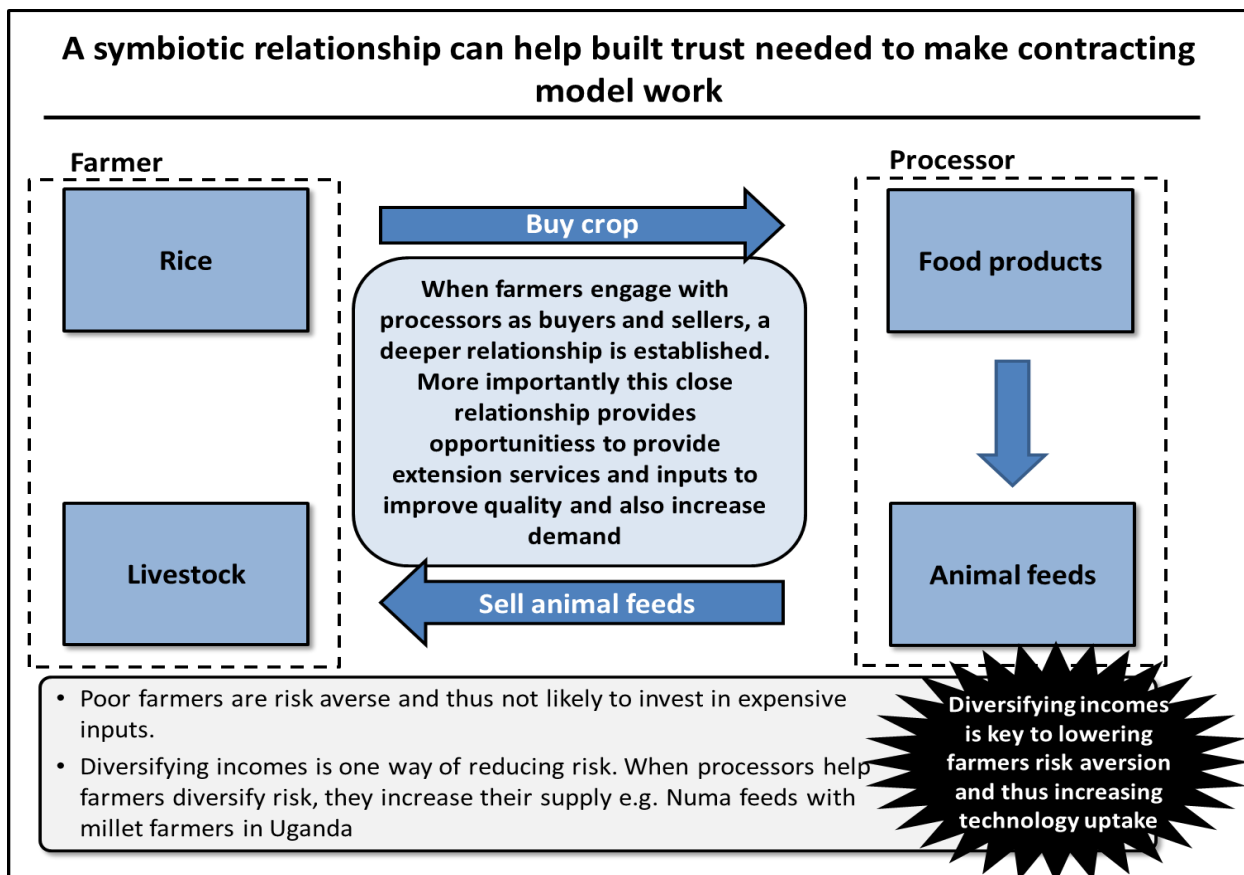
Diversifying farmers income can help farmers change risk perceptions and see them move towards more risk taking and thus to high inputs-high output production regime. For rice and same the low-hanging fruit is to support them diversify to livestock farming. For rice processing produces a bran and broken rice that are sold for animal feeds. Similarly, for sesame, the by-products of processing can make good animal feeds. Therefore, the potential for developing an alternative livelihood exists. Farmers can be supported to establish dairy and poultry ventures. Processors can be incentivized to diversify to high-quality animal feeds that they sell to farmers creating mutual

interdependency. This can be key in creating a trust relationship key for good contract farming arrangement.

The THM model can play a big role in catalyzing this model

- Universities can do research on developing profitable livestock enterprises and R&D on animal feeds
- Government can strengthen this symbiotic model by routing support it provides to farmers through the model and thus strengthen it. This can be a more efficient way of distributing subsidies
- TVETs can develop the needed extension skills

Figure 2: symbiotic contract farming model



b) **Building a better cooperative.**

Cooperatives can play a much larger role than they do, and they can indeed be the key vehicle for upgrading the value chains. However, the cooperative model has been tainted by a history of poor performance and also exploitation of farmers. Part of this challenge stems from the Multi-purpose cooperative that seeks to develop a wide range of services while at the same time lacking the capacity to run a complex business. There is need re-thinking. The business model needs to shift from providing a general array of services to being mostly focused on just one or two aspect and specialize in that. Using this approach, skills and governance system will be easier to build and their limited resources better utilized. The success of cooperative that focus on growing seeds and supply these to farmers is pointer to this new arrangement. The new cooperatives should be focused one of several services including:

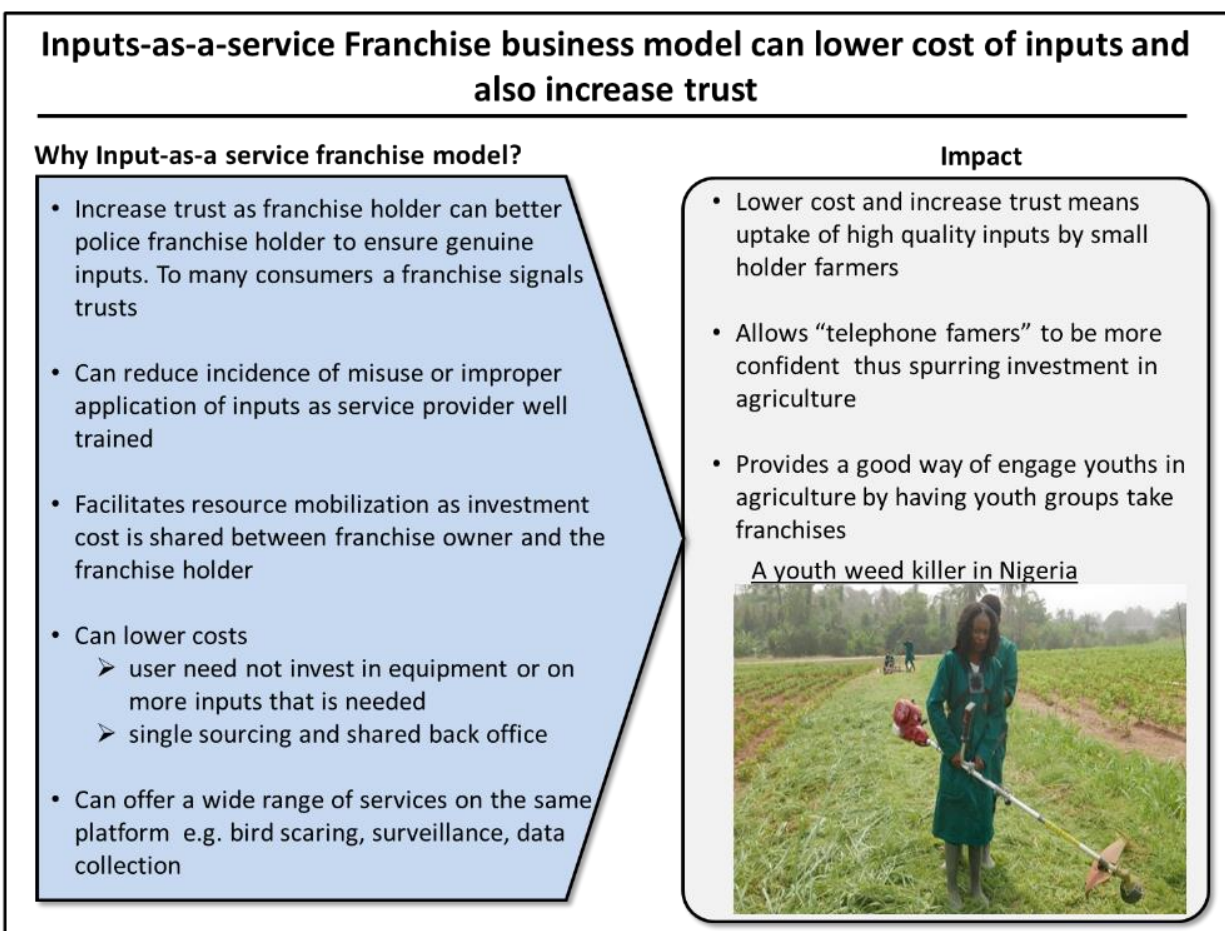
- Inputs supply
- Certified seeds supply
- Mechanization services
- Logistic services (transport, cleaning, grading and storage)

The THM can play a big role in catalyzing this model

- Universities can do capacity building to develop needed skills. Also, Organization development experts can help to-organize and streamline the business model to focus it to services it is best suited to offer
- Government can provide funding to facilitate cooperative re-engineering
- TVETs can develop the needed skills

c) **Improving Farming Systems Efficiency- Inputs-as-a-Service Franchise Business Model:**

Figure 3: Inputs-as-a-service business model



Inputs are costly and people may not apply them properly. Some inputs e.g. herbicides require investments in equipment to apply. Additionally, the presence of fake inputs might deter some from investing in high-quality inputs. A business model that can solve this challenge is for farmers to buy a service rather than input. Thus, if a farmer wants to weed, he can buy a “weed elimination” service. This business model has several advantages especially if the service provider is part of a bigger franchise that the good controls: Farmers need not be experts on the right herbicide, as a service provider has expertise. Indeed, with their expertise, the service provider can also provide extension service; The farmer only buys the amount of herbicide needed; As big service providers, there is an opportunity for providing credit services ultimately, saving farmers the agony of relying on shylocks or predatory traders for financial aid; Quality is a better guarantee as an

established franchise with proper controls is unlikely to have fake products in its systems⁵; Since service providers are highly trained and properly equipped, the model can reduce abuse and improper use of inputs, which in turn, reduces inputs and saves cost for farmers and certainly a better environment.

The THM can catalyse this model through:

- TVET can develop the incubation platform and train young people in needed skills
- Private sectors can develop a franchise model to and put the trained people into franchises
- Government can provide seed funding to help entrepreneurs buy franchises
- Universities can develop innovations to expand the range of services the franchises can provide

d) Upgrading Middlemen to Logistic Service Providers

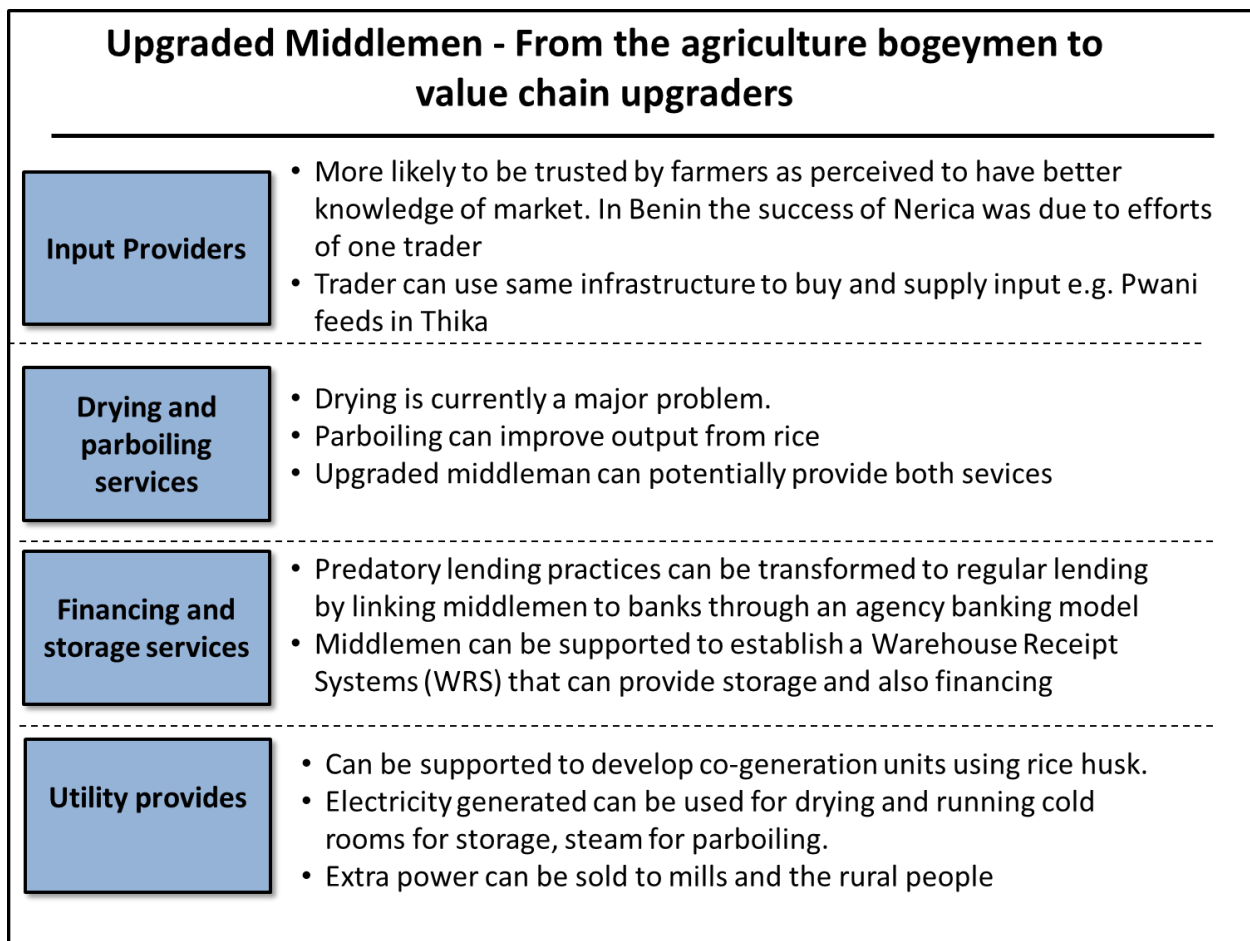
It is clear that middlemen capture a disproportionate share of the value created lending credence to the common refrain that middlemen exploit farmers. The sheer number of middlemen means that though margins are high the absolute value captures is modest. The fact that there are many traders also means that long-running relationships are not built in fact many of the traders could be part-timers coming to the market only during the trading season. What lacks in the value chain is strong traders that can offer many services especially storage and drying services and also credit. These are the kind of traders that can upgrade the value chain. Also given that this is normal businesses with long-run outlook the predatory tendencies are limited and see farmers as partners. Consolidation of the trading sector may thus help in improving the value chain.

⁵ Note that policing of regular agro-vets is left to government agencies that are understaffed and underfunded which explains the preponderance of fake inputs

The THM helix can be leverage here.

- Government can provide incentives (e.g. cheap finance) and mandates (expected services) to help in the consolidation of the sector. Government can also route agricultural support thus expanding range of services.
- Universities can work to build the business skills and also technologies e.g. grading, drying etc.
- TVETs can develop the skills needed

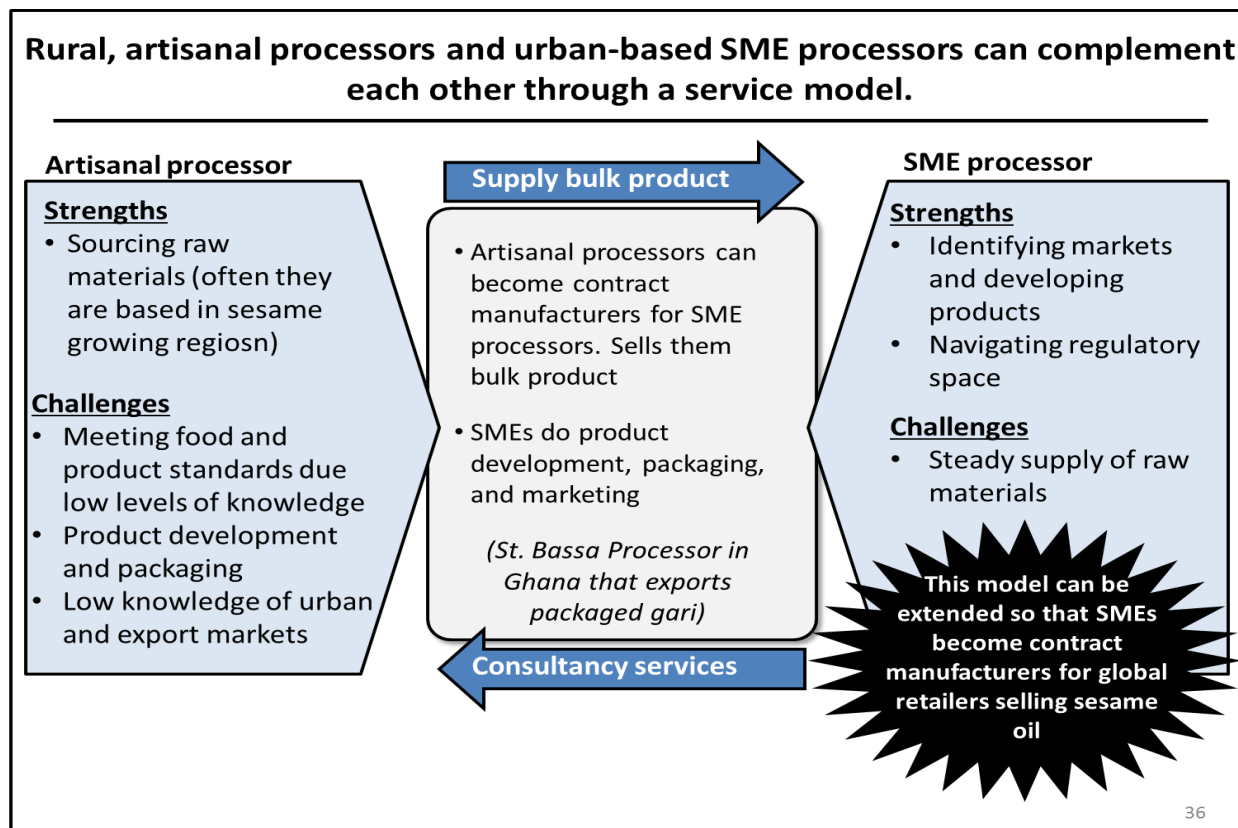
Figure 4: Towards a new middleman



e) Building Hybrid processing models

Processing is probably one of the most heavily challenging parts of the agricultural value chain. The sector suffers from unreliable and low-quality supplies and lacks the resources to develop new products and acquire the needed equipment to bring these products to market. This tends to confine processing largely to artisanal sesame oil processing. One innovation that can address this is linking Artisanal Processors to Urban Based Small and Medium Scale Enterprises (SMEs) that manufacture edible oil. Rural processors have solved the problem of supply (they are based in sesame growing region and are even owned by farmers) but lack skills in product development and navigating food marketing regulations. SME food manufacturers have the skills in market and product development and in managing regulations but have difficulties in sourcing consistent supply. A model where an artisanal processor is able to supply in bulk a product to an SME, which then packages and markets, is mutually beneficial (ACET 2015b).

Figure 5: Hybrid-Processing Model



f) Providing Shared Business Development and Manufacturing Facilities (Cluster Development)

As pointed out there is need for significant product development needed to capture a whole range of products developed from rice. These will require entrepreneur to engage in product development. Given that many will have limited resources and new markets will need to be developed a business model that can help budding entrepreneurs have the breathing space to incubate ideas, develop products and market products is needed. A potential approach is to develop a campus that provides many shared services e.g. testing, manufacturing facilities, space etc. Entrepreneurs pay for services offered as need. This type of facilities can provide incubation, acceleration services for starting entrepreneurs and thus provide business mentorship and capacity development. The role of THM in developing a cluster include:

- University departments of agriculture (breeding and also support in development of animal feeds and support farmers in breeding livestock; Food science/engineering help in product development; Marketing departments to help in “market development for new products.
- The processor can incubate other small firms to make niche food products from processing by-products including food products, animal feeds. The private sector essentially runs a campus of shared facilities. Significant R&D will be needed and part of this maybe farmed to universities.
- The TVET can develop skills and entrepreneurs for the clusters
- The Government can come is an investor in the shared facilities and also as a facilitator. The central government provide research support and seed funding for enterprise development.

6.0 PUTTING THE THM MODEL IN PLACE

a) Sequencing actions

Building the THM model can be jumpstarted by picking on some quick win projects that have little investment overhead and risk for the parties involved. This can then help on building confidence and trust. More and more projects can be undertaken as medium to longer term. The sequencing is as below:

Short Term- Quick Win Projects

Improving quality of the product is the low hanging fruit as interventions needed are simple and pay-off is quite high. The key interventions are drying and also removing dirt and other materials. TVET students incubated to provide these services. Also, efforts to increase awareness and reduce risk aversion and make farmers more business oriented

Medium Term – Re-Engineering The Value Chain

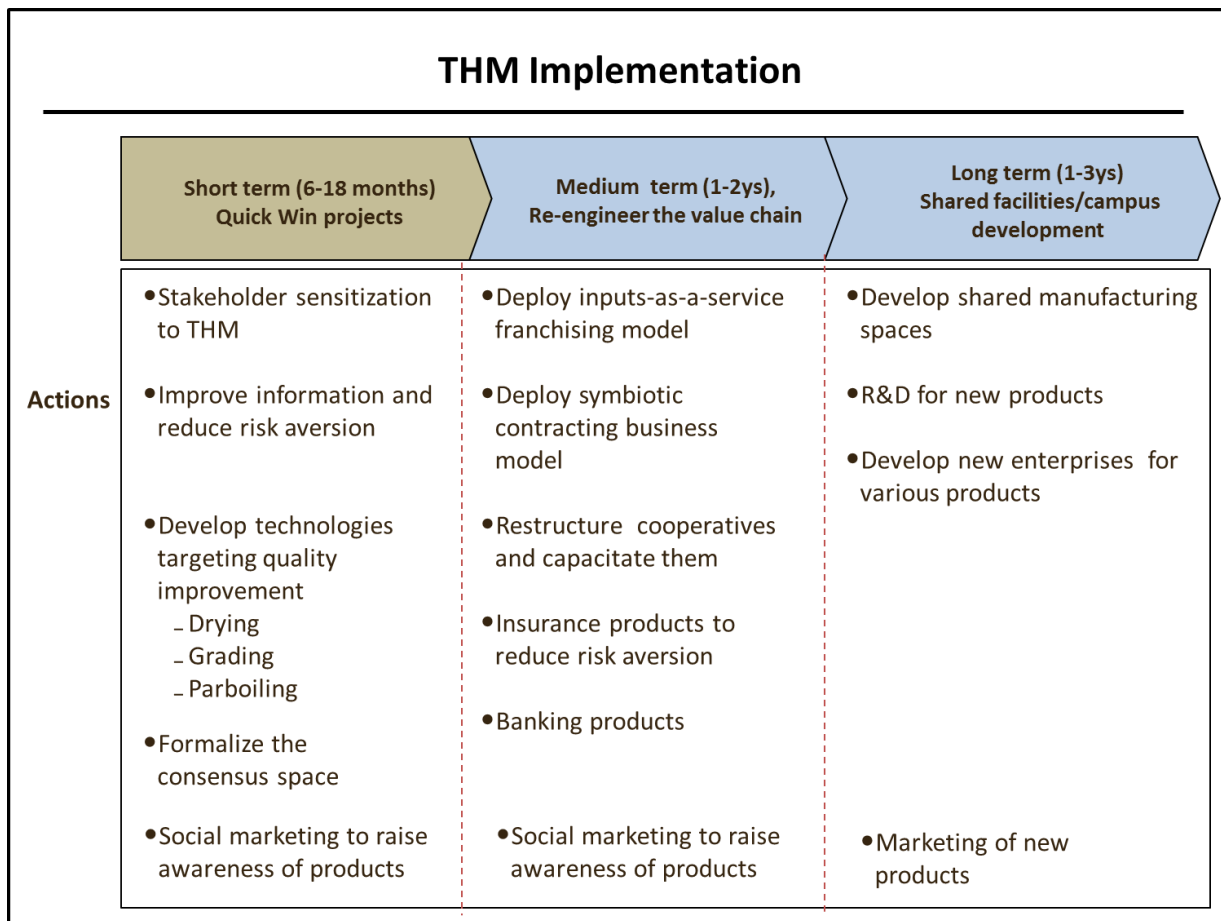
The input-as-a-service franchising business model can be developed building on the drying service. The franchises can expand to providing farm services especially weeding services and slowly expanding to other services including planting, harvesting, monitoring and surveillance and bird scaring. Services will be brought in as technologies are developed and investments to add services secured. The private sector and the county government can set-up a fund to develop the technologies needed. The university can develop these. The TVET can develop the needed skills to equip youth to be franchisees.

The other key re-engineering is the development of a symbiotic contract farming system. The private sector (processor) can take lead and The University and the TVET can support in developing livestock enterprises for the farmers. The processor will need to develop animal feeds as a product line.

Long term: Building A Cluster:

In the longer terms the focus should be on developing shared space for development, incubation and manufacturing various products. The campus should be a joint venture between the regional government, private sector and the university. The private sector should take the lead.

Figure 6: Sequencing THM model Implementation



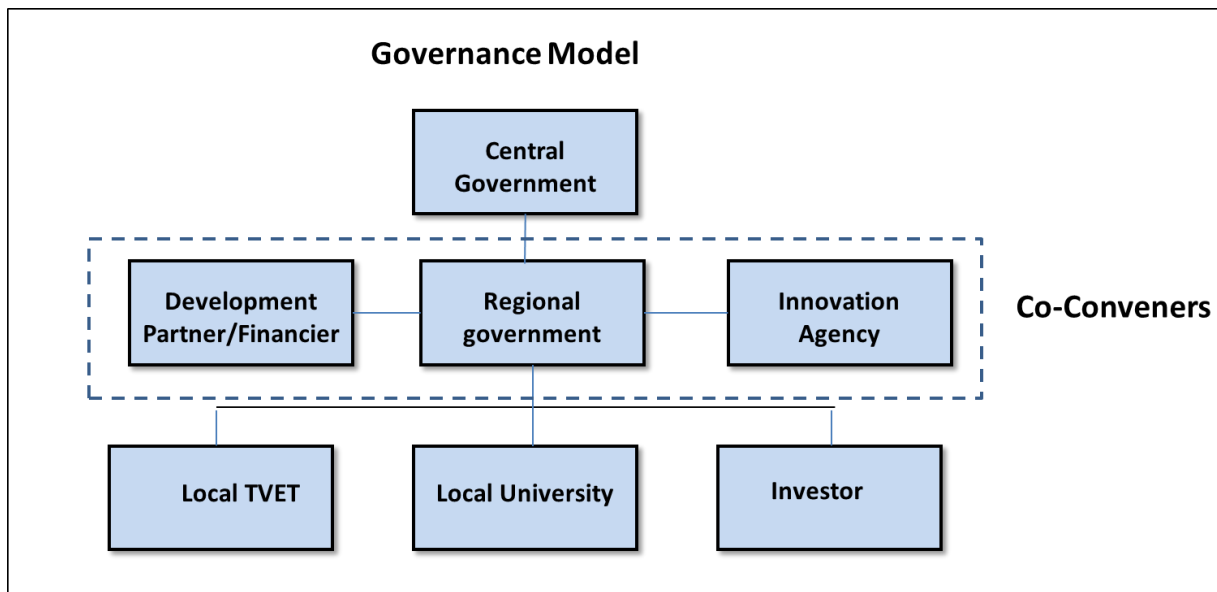
b) Governance Model

The triple helix model is a partnership and as such the ideal model for governance is to have separate organization running the triple helix and have members as part of the board. That way no one partner has undue influence as the lead. This is the model adopted by both Limburg province and Columbus partnership (see Joosten 2014 and Yoost 2016). This model may not be applicable immediately to Africa as level of development is mainly driven by government. The other sectors are too small. The other key driver of development is the development partner (DPs).

So, a good governance should have the two as the key conveners. The government partners are the regional government and the key central government agency that implements the innovation policy.

The local University, TVET and the private sector are then convened through programming of projects

Figure 7: THM Governance



c) **Looking Ahead – Policy Implications**

Making the triple helix work will involve action by all parties, however, policy will be key in driving the process. Policy should thus seek to:

- Understand and strengthen linkages in the triple helix. Policies could include research funds that can be tapped to solve solutions and to facilitate exchange programs to allow staff to move across
- Attract new entrants to the triple helix to develop a critical mass of player R&D and non-R&D actors. Policies here can include improving labour market conditions especially for researchers.
- Develop infrastructure and funding options to attract investors and entrepreneurs. This includes development of incubation facilities, science parks etc. creating seed funds and other venture funds.
- Develop a new institutional structure to coordinate the development of the triple helix that is free from bureaucratic process and conflicts of interest with parent organization when making decisions.
- Develop spaces and platforms to encourage both formal and informal networking as well as increase public participation in decision-making. This could include funds to support innovation fairs, networks, conferences etc.

7.0 CONCLUSION

Innovation is crucial to achieve economic growth that is transformative. This is important for Africa which has so far failed to transform its economies despite good and sustained growth. Innovation can unlock the full potential of economic by creating new industries and jobs. Success will require developing strong ecosystems. One ecosystem that has had good success is the Triple Helix Model which bring the University, the Industry and the Government in joint collaborative effort in catalyzing and commercializing innovations.

The power of this model has been demonstrated in especially in driving local economic development. All the same putting together a Triple Helix Model requires developing trust, shared vision and a coordinating mechanism. Readiness also requires right policies, strong and entrepreneurial universities and TVET system. Beyond these a consensus space where key actors can interact, develop trust and ideas is key underscoring the critical role civil society and development as they are key in catalyzing and funding networks.

Though collaborations among THM partners are happening in Kenya and Ethiopia these tend to be bilateral, short term and opportunistic. There is still much to be done before true THM can be in place. All the same there are good examples of collaborating that can provide the building blocks for building the THM.

Our studies also show that THM can be a powerful way to catalyze innovation needed to upgrade agricultural value chains. This underscores the crucial role THM can play in transforming Africa economies. The value chains also provide a pathway for building this model as they are quick win opportunities that are easy to implement and can have good impact. For example, rice drying, and parboiling technologies can increase rice output significantly and make use of rice husk which has been a menace. The innovation needed to use rice husk as a drying fuel are already being developed by local TVET and with support from University large scale drying technologies can be developed and commercialized. More crucially youth can offer drying services using these technologies

making this an attractive solution to youth unemployment that has been troubling governments.

What is now needed is raise awareness of potential of THM, identify quick-win projects that have good payoff to build the needed proof of concept.

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Appendix 1: Interview Guideline

THM as Model for Economic Development Assessing Readiness for THM in Agricultural Transformation Interview guidelines – High Level Policy Makers

I. Triple Helix Partner

Organization: _____

Type: _____

II. Partnerships

- a) Is the government involved in any collaboration between University government and industry?

If Yes describe the nature of partnerships e.g. Consultancy/research, product development, advocacy/networking platforms, joint ventures etc.

- b) What level of collaborations between the various Actors in the Triple Helix have you observed e.g. Advocacy and information sharing, Research/consultancy, funding activities, product development, joint ventures

- c) What should be the level of collaborations in your opinion?

- d) How do you rate the challenges in forming collaborations across the various partners?

Challenge	Comment
Mindsets that are not receptive to new ideas	
Lack of shared vision	
Mistrust of other parties	
Power asymmetry – one party taking advantage of its power	
Lack of capacity to manage collaborations	

Leadership not attuned to collaborations	
Lack of political skills to tap national resources needed support local development	

*Rating: Very Low, Moderate, High, Very High

Please describe other challenges that you think hinder greater university-industry-government collaboration;

III. Perception of Role Triple Helix Actors Readiness in Economic Development Activities

What is role of the various actors in building the economic foundation

Economic Foundation	Comment
Policy making and implementation	
Financing	
Research/knowledge generation	
Skills Development and Training	
Infrastructure provision	

High, Very High

IV. Overall Perception of Triple Helix Actors Readiness in forming partnerships

a) What is the level of readiness of the key actors?

Actions	Comment
Sharing Information	
Funding joint research	
Coordinating strategy	
Pooling resources, e.g. joint investment in a shared facility	
Forming a joint and independent company to pursue interests	

*Rating: Very Low, Moderate, High, Very High

b) Consensus Space

What platforms e.g. trade forums, development networks etc. that are available for the various actors in triple helix to meet formally and informally to share ideas, brainstorm, develop trust etc.

c) Enabling Conditions

(please rate the enabling conditions for the Triple Helix along the following dimensions)

Enabling conditions	Comment
Consensus on knowledge as key driver of growth	
Market oriented culture	
Intellectual property protection	
Sense of competition and entrepreneurship	
Democracy in decision making	
Vibrant civil society	
Absorptive capacity	
Infrastructure	
Competent Universities	

Appendix II: Stakeholders Interviewed

Table A2.1: Kenya Stakeholders/Key Informants

Stakeholder Class	Stakeholder	Comments
Government	Local Government	Nyandarua, Kirinyaga, Nyeri
	Ministry of Trade and Industrialization	
	Ministry of Agriculture	
	Ministry of Education, Science and Technology	Kenya Innovation Agency (KENIA), TVETA
Research/education Communities	Research Institutes	KARLO
	Think tanks	Tegemeo, KIPPRA
	TVETs	LATIA,
	Universities	UoN, JKUAT, DeKUT, Strathmore
Industry	Industry Body	Kenya Association of Manufacturers (KAM)
	Private firms	Technobyte, Verve-KO, Soko Millers
Development Partners/NGOs/CSO	Rockefeller Foundation	
	ICRISAT	
	IGAD	
	LIWA	

Table A2.2: Ethiopia Stakeholders/Key Informants

No.	Actors	Type
1	Addis Ababa University (AAU)	Education & Research
2	Ethiopian Chamber of Sectoral Association (ECSA)	Civil society
3	Ethiopian Economic Association (EEA)	Civil Society
4	Ministry of Trade (MoT)	Government
5	Ministry of Science and Technology (MoST)	Government
6	National Planning Commission (PC)	Government
7	Netherlands Development Organization (SNV)	Development Partner
8	Ministry of Agriculture and Livestock Resources (MoALR)	Government
9	Ethiopian Institute of Agricultural Research (EIAR)	“
10	Agricultural Transformation Agency (ATA)	“
11	Agricultural Growth Program (AGP)	“
12	Capacity building for Scaling up of evidence-based best practices in Agricultural Production in Ethiopia (CASCAPE)	CSO
13	Jimma University (JU)	Education & Research
14	Dairy cooperative (farmer)	Industry
15	Guts Agro-industry (GAI)	“