
Transformation of African Agrifood Systems in the New Era of Rapid Urbanization and the Emergence of a Middle Class

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1. Introduction

It is common knowledge that rural Africa faces formidable problems such as poverty and malnutrition, inadequate farm yields, low use of fertilizers, certified seed and irrigation, and often poor infrastructure. We acknowledge those problems. But in this paper we present the message that there is also good news for African food systems, in this new era of urbanization and emergence of a middle class, that are emerging and developing firms all along the supply chain: the emergence of a “Quiet Revolution in African food supply chains,” led mainly by African entrepreneurs in tens of thousands of small enterprises, scores, and perhaps soon hundreds, of medium and large-scale firms like Bakhresa grain millers in Tanzania, Shoprite and Uchumi supermarkets chains in South Africa and Kenya, Zartech chicken processors in Nigeria, and so on.

We show in this paper that African food markets have expanded 6-8-fold over the past four decades with most of that growth in the past two decades, and have begun a transformation. Haggblade (2011) presents a projection that the African food market will grow another 6-fold in the next four decades. That means that the African food market will have expanded more than a dozen-fold in a human lifespan, a massive achievement. Africa’s urban areas have grown quickly, and now constitute half or more of overall food consumption. Food consumption itself is changing rapidly, with a shift beyond grains into non-grain foods like dairy, fish, meat, vegetables, fruit, and tubers, and heavily into processed foods. A substantial middle class has emerged, and is an important driver of food system change, but is not the only driver of change, as we also show that the poor’s food consumption patterns have changed deeply.

A central implication of our paper is the need for good public policy and investments to leverage urbanization and diet diversification, to develop food supply chains, to feed millions of people in growing cities millions of rural household food buyers, and to increase incomes of poor rural households who produce food and are employed in food supply chain activities. Rural suppliers need to sell to sources of dynamic, growing demand such as domestic urban

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markets because typically rural purchasing power is too limited to propel a rural area out of poverty if rural suppliers just produce for themselves and their local market alone. However, while export markets are attractive, domestic urban markets are quantitatively far more important and will be increasingly so.

Supply chains are two way super-highways – bringing food and fiber one way, and an avalanche of money back to the producers at every step in the chain – to the farmers, truckers and wholesalers, warehouse and cold store operators, and processors. This avalanche of income fuels – and will fuel far more as time goes on – grass-roots investments (much of it in rural areas or rural towns of small and medium farmers in the midstream and downstream segments of the rural-urban supply chains (such as investments in trucks), in farming (such as investment in pumps), and in the input supply chains. Rural households are also using this income to invest in education, housing, and rural nonfarm enterprises. This investment can lead to rural growth that spreads out in ripples to the poorest of those in the dynamic areas and also over time to the hinterlands. African policymakers have a major new opportunity in leveraging and encouraging this enormous development.

The paper proceeds as follows. We first look “downstream” at two processes – urbanization and diet change – that create the demand “pull” for the changes in the whole food system. We then provide some illustrations of the transformation mainly at the “midstream” post-farmgate segments of the supply chains that are transforming wholesale, processing, and logistics. We conclude with implications.

2. The Rapid Rise and Size Differentiation of the Urban Food Market in Africa

There are four salient points.

First, Africa is urbanizing rapidly. Urbanization in Africa has caught up with the average urban share in population of all developing countries. UN (2011) shows that East Africa’s urban share in 2010 was only 23%, versus 44% in West Africa, and 59% in Southern Africa. Hollinger and Staatz (2015) show that the urban share in West Africa is roughly 50% (up from 33% in 1990).

While all of Africa, with the exception of East Africa, has caught up or passed overall developing country urbanization, even compared with Southeast Asian urbanization, we note that the urbanization rate of Africa is much higher than those of other regions of the world: by 2010, the annualized growth rate of urbanization during 2005-2010 was 4.1% in East Africa, 3.7% in Central Africa, and 3.8% in West Africa with the only subdued pace present in Southern Africa where urbanization is already advanced and only grew by 1.3%. The UN projects this urbanization to continue through 2050, with urban population growth projected to increase by 3.7% per year compared to only 0.5% in rural areas (UNDESA, 2011). Already by 2020, the urbanization level will be 50%, and by 2050, 65% (UNFPA, 2010). For example, Nigeria underscores the rapidity of urbanization, from 35% in 1990 to 71% in 2050 (UNDESA, 2011). (This leap in urban share in a half century is equivalent to what the US did in one century.)

Second, the share of cities in total food consumption and the food (purchased) market of a country are higher than urban population shares per se. This is because urban consumers spend less on food as a percentage of household expenditure compared with the rural population but urban incomes are sufficiently higher that urban per capita food expenditure is higher. The

upshot is that urban food markets – at least as important as rural markets and much more important than export markets in quantitative terms – have become the dominant market for farmers in all these regions.

Specifically, in the least urbanized part of Africa, the developing ESA region, 25% of the ESA population lives in urban areas but 48% of the (purchased) food market is in cities (that is, urban consumers consume 48% of total food produced and sold in the country) (Dolislager et al. 2015). The West African picture is even more striking in this disproportion of the urban share in population versus its share in the total food economy – similar to that of Southeast Asia. Hollinger and Staatz (2015) cite Taondyandé and Yade (2012) budget-consumption studies from 2006-2009 of seven countries (Burkina Faso, Cote d'Ivoire, Ghana, Mali, Niger, Senegal, and Togo); they found that average total expenditures per capita in urban areas were from 78% higher than those in rural areas in Burkina Faso, to 148% higher than those in Mali. A rough extrapolation from these data suggests that in West Africa, the urban population share is half while the urban share of the food economy is at least two-thirds, but more precisely around three-quarters.

Third, while the urbanization debate tends to focus on mega-cities (more than 1 million residents), a large share of the urban population resides in smaller cities (intermediate cities) and towns, so that urbanization is less concentrated than previously believed.

Tschirley et al. (2013) point to two sets of trends that are occurring simultaneously in Africa.

First, large cities are proliferating. The number of cities more than 1,000,000 inhabitants in Africa rose from two in 1950 to 50 in 2010 and is projected to rise to 93 by 2025.

Second, small and middle sized cities are growing faster than large cities. Tschirley et al. (2013) used population data which revealed that the population concentration (Herfindahl) index of African countries as a whole shows a strong negative trend over time. Moreover, the data shows that the indices of concentration show strong convergence over time; the population of countries with the highest indices (i.e., the most centralized urban populations) will decline the most (becoming markedly less centralized in their urban settlement pattern), while those with the lowest starting indices will remain nearly flat.

In West Africa, Hollinger and Staatz (2015) note that 40% of urban population is in national metropolitan areas (the areas of the large cities), which are rapidly growing (primarily in the big coastal cities). The other 60% of urban population is in secondary/tertiary cities, including small towns in rural areas and small and medium cities developing near large cities and along highways.

The rise of small and medium cities is a positive trend for food system development and rural growth from several viewpoints.

On one hand, Christiaensen and Todo (2013) find that countries with a lower level of urban concentration show more inclusive growth patterns and faster poverty reduction than those characterized by the dominance of one or a few very large cities. Interventions in the public market and road infrastructure of small/medium cities offer major opportunities to develop inclusive horticulture supply chains.

On the other hand, small and medium cities establish a far closer relationship with their surrounding rural areas in terms of food provisioning, compared to large cities and metropolitan agglomerations that depend on food coming from all over the country and abroad, and have a lower reliance on their own rural belts (Berdegué and Proctor, 2014). Rural nonfarm employment (often linked to off-farm components of the agrifood supply chain) develops close links to cities in the presence of adequate infrastructure.

Fourth, there has been a steep surge in growth in the African middle class, especially in the 2000s. Ncube et al. (2011) uses a cut-off of 2 USD/day/capita in 2005 PPP (Purchasing Power Parity) for the middle class, with 2-4 USD for the “floating middle class” (near the poverty line, with the chance of slipping below), 4-10 USD as lower middle, and 10-20 USD as upper middle, and above 20 USD as upper income. They find that the share of SSA population in the middle class (2-20 USD) rose from 24% in 1990 to 33% in 2008. As the SSA population was 495m in 1990 and 822m in 2010, this means roughly an expansion of the middle class from 119m to 271m, more than doubling in just two decades.

However, the great majority of the expansion of the middle class was in the floating middle class. Ncube et al. (2011) only show this for Africa as a continent (hence SSA plus Northern Africa) but it is indicative. For Africa overall, the middle class share jumped from 31% in 1990 to 39% in 2010 (thus showing Northern Africa has a higher internal share of middle class), the floating middle class went from 13% in 1990 to 21% in 2010, while the lower middle dropped from 14% to 13%, and the upper middle from 4% to 5%. For example in the West African region, Ncube et al. (2011) shows the overall middle class share to be 24%, of which 58% are in the floating middle class (a bit higher than the all-Africa share).

The rise of the middle class is not confined to the urban areas, but growth is disproportionate (compared with population) in the urban areas. The fact that the middle class is not only concentrated in urban areas is good news for demand growth in food systems. The evidence of this is new and comes so far only from ESA. Tschirley et al. (2013) used the World Bank’s PovcalNet data base for three food staple zones of Eastern and Southern Africa, that capture 81% of the population of developing ESA (excludes South Africa). They found that: (1) the urban population share in this area is 22%; (2) 50% of the urban population is poor (below 2 USD), while 80% of the rural population is poor.

3. The Multi-dimensional Transformation of African Diets

3.1. Diet Transformation

Diets have been changing in a variety of ways. We will start with a brief discussion of the drivers of change and then the changes. The changes have been driven by several factors on the demand and supply sides.

On the demand side, despite the persistence of severe poverty in the region, there has been an average rise of incomes and the emergence of a middle class (as noted above). This has spurred purchase of diverse foods beyond grains, discussed more below, predicted by Bennett’s Law (Bennett 1954). Moreover, urbanization is associated with changes in the employment profile of both women and men. Women are increasingly working outside the home and thus have increasing opportunity costs of time to shop for, process, and prepare food. Men are increasingly working farther from home, across cities. These trends spur the purchase of easy

to process cereals (such as rice and wheat, see Reardon 1993 and Senauer et al. 1986), processed foods and restaurant-prepared foods as discussed in more detail below.

On the supply side, mirroring the demand side, as shown in Table 1 below, there has been a huge increase in the food processing sector in the past several decades and an emergence of restaurant/fast food segment. Also mirroring the demand side, there has been a substantial diversification of agriculture beyond grains and basic food tubers/roots into horticulture, dairy, livestock, fish, and pulses. Finally, the development of rural nonfarm employment and the gradual commercialization of agriculture in certain areas have furnished cash incomes used in part to buy food as noted below.

This has led to a series of changes in food consumption.

First, there has been a partial “diet commercialization” – that is, the diet has gone from (traditionally) mainly home-produced to, at some extent, purchased, even among the rural poor in Africa. The literature notes that there are many net buyers of food in rural areas, not just among the landless, but also among small farmers (see Weber et al. 1988 and Reardon et al. 1988; this point has been made since in waves of the debate in Africa, e.g., Barrett et al. 2008). Recent work by Palacios-Lobos et al. (2015), using LSMS-ISA surveys from five countries, finds that between 56% (Malawi) and 35% (Niger) of all rural households are net food buyers (or between 62% (Malawi) and 34% (Niger) of all households). Adjusting the estimates for the timing of the survey in Malawi and Tanzania – the surveys were conducted throughout the year—raises the estimated share of net food buyers to 83% and 72% respectively.

Table 1: Consumption Patterns Change in Eastern and Southern Africa, all are %'s	
	ESA
1. Share of total food expenditures from purchases for rural households	
a) Overall rural	44
b) Rural poor (up to 2 USD/day per capita)	41
2. Share of total food expenditures in non-grains	
a) For urban households	
b) For rural households	
3. Share of total food expenditures in processed foods	
a) For urban households, overall processed	56
b) Of processed, For urban households, low-processed	58
c) Of processed, For urban household, high-processed	42
d) For rural households, overall processed	29

e) Of processed, For rural households, low processed milled grain	17
f) Of processed, For rural households, low processed non-grain	48
g) Of processed, For rural households, high processed	35
4. Share of non-grain expenditure in total expenditure	
a) Urban households	66
b) Rural households	61
Sources: Dolislager et al. 2015; country coverage and definitions noted in the text	

Recent evidence shows how far the involvement of farm households has gone in terms of reliance on purchases for food consumption. This implies that food value chain transformation and efficiency can be important to the rural poor not just as farmers and labor sellers but as consumers/buyers. Beyond the frequency of net buyers, recent literature also confirms the importance of these purchases to overall food expenditure. Table 1 shows that in the ESA countries, rural households overall as well as the poor in particular spend a substantial share of their total expenditure in purchase. 95% of the rural poor bought at least 5% of their food. In terms of total volume, the food purchased by the rural is actually bigger than the urban one although the share of purchases in urban food is, as expected, higher (Dolislager et al. 2015).²

Second, there has been substantial diet diversification into processed food (both low-processed and high-processed³) with substantial penetration in both urban and in rural Africa. Even the rural poor are buying some processed foods. For example, as shown in Table 1, in the ESA study countries (Dolislager et al. 2015), households in urban areas and rural areas dedicate a substantial share of their total food expenditure to processed foods, both low and high processed categories. The rural poor (which almost represents overall poor because 80% of the rural households are poor) spend 29% of their food expenditure on processed food (17% of processed is in milled grains classified as low-processed items, 48% in non-grain low-processed foods, and 35% in high-processed foods).

Third, there has been a lot of diet diversification beyond grains, with only moderate differences between the urban and rural, and between the rural poor and the rest. The general trend is as one would predict from Bennett's Law, with the disproportionate growth in the food expenditure share of non-staples as incomes grow. Studies show that this diet diversification trend is more advanced in urban areas because of income differences (e.g. in ESA, daily per

² Dolislager et al. 2015 is based on circa 2010 data from Living Standards Measurement Studies (LSMS) survey data in ESA (i.e., Ethiopia, Malawi, Mozambique, Tanzania, and Uganda).

³ Dolislager et al. (2015) defines processed food as any food that undergoes any transformation from its original state beyond removal from the plant and (for non-perishables) drying; the processed food item is defined as low processed if it satisfies fewer than two, and high processed if satisfies two or more of the following conditions: (1) has multiple ingredients (and is automatically high processed if one of ingredients is highly processed); (2) had physical change induced by heating, freezing, extrusion, or chemical processes (i.e., more than simple physical transformation such as cutting, sifting, sorting, removing from pod); (3) packaging more complex than simple paper or plastic.

capita total food plus nonfarm expenditure is \$1.59 for rural and \$3.07 for urban households, Dolislager et al. 2015). In the ESA study countries, the share of non-grains in total food expenditure is substantial (Table 1).

Of course Africa is no newcomer to diet diversification. Maize, cassava, yams, potatoes, bananas, tomatoes, and chilies are all non-African in origin, non-traditional, brought relatively recently to Africa from South America and Asia; only teff, millet, sorghum, watermelons, okra, palm oil are major “originally African” items. But the new wave in the past several decades of diversification is a major thrust beyond grains as incomes grow – into yams and potatoes, into fruits and vegetables, into poultry, beef, mutton, and fish, into dairy and eggs, and into edible oils.

This diet diversification means new and more sources of caloric energy, but also micronutrients. On the supply side, it means major potential income gains for farmers, as producing and selling their meat or dairy or fruit to urban areas results in five to ten times more income for farmers per hectare than grains. This is a major source of income for rural development.

Fourth, while the conventional wisdom says that sharp change in diets happens mainly when families “graduate” to middle class, the data show that much of the diet change occurs within sub-segments of the poor, not mainly between the poor and the non-poor. The diets of the poor are dynamic, as shown in ESA by Dolislager et al. (2015).

3.2. The Imported vs. Domestic Content of the Diet

Despite the changes in diets stated above, diets remain basically local – with only a minor portion imported. While macro data on food imports and production are probably quite sketchy, we can still use what is available to estimate the share of imports in total consumption. In this study, FAOSTAT food balance sheets and COMTRADE for Africa are used to get average figures over 10 years. It is found that 80-90% of urban and rural food consumption has been supplied by domestic supply chains from domestic producers; only 10-20% is imported (although of course that varies by product). Averages around 2010 (2008-12) and 2000 (1998-2002) show for ESA a share of imports in total food consumption grows from 11% in 2000 to 15% in 2010; for West Africa, the change was from 10 to 11% during the same period.

Moreover, Tschirley et al. (2015) show that as incomes rise the import share actually declines as imports are mainly in rice and wheat and the share of these in consumption declines with income and the shares of products with low import shares increase.

Recognizing that the great majority of food comes from domestic supply does not mean we think that competitiveness with imports is not a valid policy issue. Food imports are often an important policy debate especially in Africa, and particularly in West Africa as the concern has grown over time with imports especially of rice (Reardon 1993; Demont 2013). Most of the imported foods (with the exception of wheat) are also grown in the region and imports of those means that there are opportunities for local producers to meet that demand. For example, in West Africa, between 2006-2010, cereals are the leading item in food imports (41%), followed by vegetable oils (13% (up from 4% a decade earlier)), fish (11%), dairy products (9%) and sugar (9%) (Hollinger and Staats 2015).

4. The Emergence of a Quiet Revolution in the Midstream Segments of the Food

Supply Chains in Africa

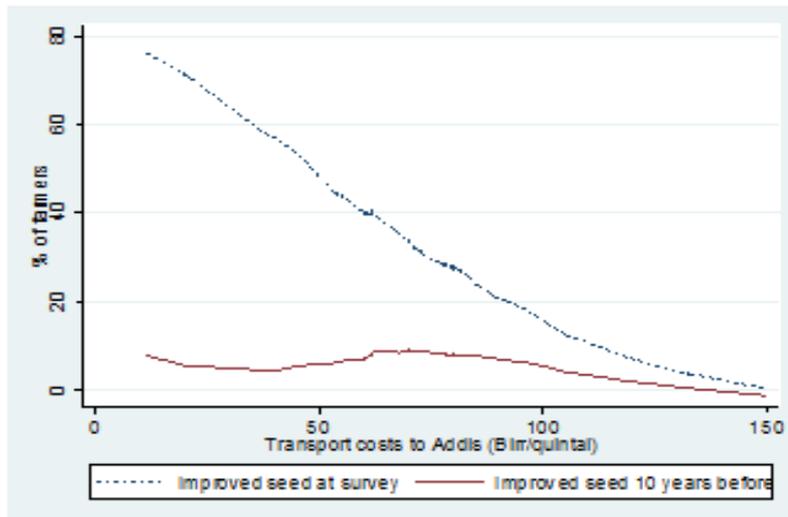
The post farm gate segments of the supply chain – the midstream segment (processing and wholesale/transport) and downstream (retail and food stalls) - account for 40-70% of food costs to urban Africans. (The share varies over products and countries.). That means that these factors are as important as for farmers and for national food security.

A common view of African food markets is that they are largely still only “traditional” and stagnant, suspended in a past when food products moved laboriously to market via fragmented, under-capitalized, un-dynamic market actors. Two observations undermine this view which characterizes African food supply chains as “sleepy” and resisting transformation.

First, African food supply chains have massively increased in volumes over the past 40 years. A rough but indicative estimation (shown in the Annex) shows that: (1) the rural-urban food supply chains in 2010 moved about 5 times more food to cities than in 1970; (2) the rural market volume of purchases of food expanded by a factor of 8 over the period; (3) overall, African marketed food volumes expanded 6 times over 40 years, with much of the crescendo in the 1990s and 2000s. Keep in mind that this estimate is based on developing ESA, the poorest and least urbanized region in Africa. West Africa’s urban growth was 50% more than that of ESA; therefore, the overall food marketed volume expansion in West Africa may have increased eightfold. To achieve a 6-8 fold expansion is not the work of a sleepy or stagnant market system, but rather a dynamic one.

Second, numerous case studies have been found that show – seemingly largely “under the radar” development debates – evidence of the emergence of a “Quiet Revolution” in supply chains, with tens of thousands of small and medium scale enterprises (SMEs) in trucking, wholesale, warehousing, cold storage, first and second stage processing, local fast food, and retail, making major investments in recent years. Similar results, often occurring just in the past decade, have recently been observed in Asia (see Reardon et al. 2012). Asia’s supply chain transformation has been somewhat ahead of that of Africa, but is going in the same direction of grass-roots revolution in supply chains. Below are several examples of this change in Africa; however, this is not meant to be an exhaustive review of evidence and research is in early stages on this phenomenon. The cases are meant to be indicative.

Teff value chain rapid development to Addis Ababa, Ethiopia. Teff is the leading cereal in Ethiopia; the marketed surplus of teff in domestic markets is 464 million dollars, near that of coffee (600 million dollars), a major export. Based on field surveys of farmers, rural and urban wholesalers, truckers midstream, cereal retail shops, mills, and coop retailers downstream, Addis Ababa has experienced an explosion of growth in its value chain in the past decade (Minten et al. 2013). There has been a proliferation of SME mills-cum-retailers in Addis and rapid transformation all along the supply chain. The recent development of the teff value chain was found to be driven overall by: the big growth in Addis and increase in incomes (with a doubling of income and a doubling of teff expenditure in the past 10 years), increased opportunity cost of women’s time (to save time dealing with teff cleaning and milling and enjera making steps), diffusion of cell phones, improvements in roads and reduction of transport costs, and teff government extension.



The development of the teff value chain was in turn correlated with: (a) increasing adoption of modern inputs (chemical fertilizer, improved varieties of seed (see Figure above), and herbicides) by farmers, especially by those living close to urban centers; (b) rising quality demands and important shifts from cheap red varieties to more expensive white eff varieties with concomitant increases in productivity due to the uptake of improved varieties; (c) increasing consumers' willingness-to-pay due to convenience in urban areas with rapid emergence of one-stop retail shops that provide sales, cleaning, milling, and transport services as well as a sizable foodservice industry; (d) declining share of the margins of rural–urban marketing, urban distribution, and milling in final retail prices of teff, indicating improved marketing efficiency over time; e) traditionally in rural areas and small cities and towns outside Addis, consumers buy teff as a grain, clean it at home, and custom mill it and to prepare enjera (teff pancake) at home; practices have changed in Addis over the past decade due to a decline in custom milling, in cleaning grain at home, instead consumers directly buy teff flour or enjera; as a result, a sharp increase (nearly 50%) of teff mills and retail outlets in the neighborhoods has occurred.

Moreover, there has been a sharp increase in wholesale marketing of teff. This segment is seldom studied as attention is usually focused on the farm segment. Recently, cereal wholesale market activity, including teff and other cereals such as maize and sorghum, has been developing quickly (Minten et al. 2014). Level and trends concerning the numbers of traders and brokers in the markets and of cereal trucks arriving in these markets confirm that the marketed surplus of teff has increased rapidly over the last decade. For example, significantly more trade is reported on average in these markets over time. The reported number of trucks increased over the 10 years by almost 70% and by almost 80% in peak and lean periods, respectively. These growth rates are faster than the urban population growth rates in the country, possibly indicating higher consumption levels in the cities over time, more trade between rural areas that may pass through urban wholesale markets, and shifts from other means of transportation to trucks.

Maize Processing, Wholesaling, and Retailing in urban Tanzania. Field surveys present findings for the rapidly expanding and transforming processed maize sector in the capital of Tanzania, Dar es Salaam (Snyder et al. 2015). (1) Initial inventory of processed foods on sale

in shops possessed a great proliferation of processed food types in the shops - 487 different items in the inventoried categories of processed maize and other flours, packaged rice, dairy products (excluding cheeses, butter, and whipped cream), juices, and poultry. A great majority (62%) of these items was from Tanzanian firms; after Tanzania, imports from neighbors in East Africa, Kenya and Uganda, accounted for 10% of the items. South Africa accounted for another 8%. The other 20% of the items were from outside Africa. (2) Branding has expanded dramatically in recent years. In just the initial inventory, over 60 brands of Tanzanian maize meal were found. Branded maize meal now appears to dominate the market in all types of retail outlets from sokos to the now rapidly spreading supermarket chains. (3) There was rapid product differentiation in flours: 50 different blended flour products, all from Tanzania firms, were found. These products contain 2-8 types of milled grain and pulses and occasionally dried ground fish or dried vegetable powder. These are considered “protein-rich nutrition products” targeted for children in the local market. (4) Dar es Salaam has seen a proliferation of types of retail outlets in recent years: three regional or international supermarket chains (Nakumatt and Uchumi chains based in Kenya, and GAME/Massmart (based in South Africa but now owned by Walmart), at least seven local supermarket chains (Imalaseko, TSN, Village, Shoppers, A to Z, Food Lovers, and Shrijee’s), many small-format supermarket independents, and an unknown, but rapidly growing number of “new format retail clusters.” These “clusters” feature parking areas and usually four-five shops that cover the range of food and other needs of most consumers, typically including dukas, sometimes a small-format supermarket, fresh produce shops, and butcheries. All these new outlet types, spreading rapidly, compete with traditional shops (the dukas and sokos) and appear to be taking market share from them.

Chicken-maize nexus in Nigeria: A rapid transformation of the chicken supply chain into urban Nigeria occurred with the rise of companies like Chi Farms, Animal Care, and Zartech which, in turn, link to small producers of chickens, to maize mills, and to maize farmers.

The following information is based on a rapid reconnaissance study by Liverpool-Tasie et al. (2015). Over the past decade, the Nigerian poultry industry has seen rapid growth. Despite the smuggling of frozen chicken into Nigeria and other challenges (high and fluctuating prices of maize and soybean, vet supplies and high energy costs), the Nigerian poultry industry is expected to have a stunning projected 20% annual growth between 2010 and 2020, driven by the growth of the population and of the middle class (Sahel Capital Limited, 2015).

While most poultry production occurs in “backyard production” or on farms with fewer than 1,000 birds, there are a number of large commercial players. The large commercial players (e.g. Zartech Agri Ltd., Ajanla Farms, Obasanjo Farms, Animal care, Amo Byng Nig Ltd.) have expanded significantly over the past 10-15 years. Though initially partially integrated, many large actors have moved towards almost fully-integrated farming operations while many medium scale actors tend to be partially integrated (producing some birds while buying birds from others). Most small and medium scale poultry producers engage in diverse arrangements to secure necessary inputs and to market their products. For large actors, operating an integrated operation often implies the existence of a separate but affiliated sister company that produces the inputs, especially feed. For the small and medium scale poultry producers, there has been a recent and rapid proliferation of feed mills offering a range of services. These services range from selling already milled poultry feed to providing a wide range of feed ingredients, alongside milling services to “custom mill” (upon request), to meet customers’ specific needs.

While most poultry production in Nigeria takes place in southwest Nigeria, most of the maize for poultry feed comes from the North and North Central part of the country. The risky nature of maize access and distribution (due to price fluctuations and activities of Boko Haram), alongside the increased demand for maize products, has given rise to multiple organizational arrangements among maize traders, maize farmers, and feed mills. The traditional approach is to have traders/aggregators purchase maize directly from farmers and farmer groups (at harvest when prices are low), then store in warehouses and sell when prices are higher. However, with the rapid rise of the mill and poultry segments, a multiplicity of arrangements are developing in key maize producing states such as Kaduna, Kano, and Katsina. For example, arrangements are emerging in which aggregators/processors provide farmers and farmer groups with training on best practices (sometimes inputs) in return for an agreed percentage of their harvest or an agreed quantity of maize. Aggregators also are starting to lease farm land from farmers for their own production of maize to supply mills.

Processed/Prepared Millet value chains to Dakar in Senegal. A rapid transformation in the millet supply chain, in particular in the rapid emergence of processed/prepared millet products mainly for the urban market, has occurred in the past five years. As revealed in a rapid reconnaissance study by Badiane (2015), this has featured the development of small women led enterprises of branded packaged millet and millet-cum-dairy products for the Dakar market. These products are traditional millet based meals (such as thiakry) that have been packaged in dry form (cooking-ready) or with milk and sold in a wide range of types of outlets, including convenience stores at gasoline stations, supermarkets, small traditional shops, and traditional markets. They are found dry-packaged on shelves and in cold cases in the stores. Some have even been exported to other countries such as France and US. This emerging sector is providing employment for large numbers of women who are milling the grain in small mills, preparing and packaging and selling the packaged products to wholesalers and retailers.

5. Conclusions and Implications

The food security debate has often been focused in the farm and rural areas. Emerging particularly in the past decade is the new reality that post-farm gate segments of food supply chains and urban markets are becoming as important as the farm segment itself to African food security. Moreover, dynamism of growth and transformation of these supply chains has also emerged, hitherto perceived popularly and traditionally as being stagnant and traditional. With only a half-decade lag, rural-urban supply chains have emerged in Africa similar to the same transformation processes that have emerged in Asia, which can be termed a Quiet Revolution in food supply chains. This has featured investment by the private sector – the small and medium enterprise private sector in particular, although there is also substantial investment by larger African and foreign firms – in retail, wholesale, first and second stage processing, packaging, branding, and logistics.

A lot of these emerging agrifood SMEs appear in the midstream of the value chains – what Reardon (2015) has termed the “hidden middle” because it has been relatively neglected in policy debates. We think these rapidly emerging agrifood SMEs are often neglected (under the radar, lack of awareness of the new phenomenon) in the African food debate. They have long been thought by researchers and policymakers to be a negligible group, too small a force to count; this perception has gone along with laments from governments and donors of the

lack of African grass-roots investments. This widespread view was largely responsible, we think, for turning attention to seeking investment from either parastatals or to multinationals, rather than relying on grass-roots local firms to invest.

But, there is a surge in African grass-roots agribusiness/food industry companies investing in wholesale, trucking, processing, and storage; in the medium-long run it is speculated, these will form the backbone of the Quiet Revolution in food systems in Africa, as did in Asia. A number of the emerging and already established small and medium food firms will also develop into Africa's Lions, large private companies that will be region-wide and eventually important globally, in the global food arena. They will be key to African competitiveness.

However, in the words of Ousmane Badiane, these rapidly emerging supply chain actors are only "flying at 20% of their potential altitude". Urgently, major attention is needed to resolve hard and soft infrastructural bottlenecks such as rural wholesale markets, industrial-strength electricity grids, surfaced roads, and regulation and policy reforms to improve their "business climate."

The doors to the urban markets that these developing supply chains open will be crucial for farmers. Where farmers are linked to growing urban and regional markets (such as teff in Ethiopia, vegetables in Mali and Senegal, potatoes in Rwanda, dairy in Kenya), developing supply chains are making investments in soil conservation, building organic matter in their soils, using productivity enhancing improved seeds, breeds, and fertilizer, and even investing in irrigation and sometimes machines. Farmers growing for subsistence or for just local rural markets often have much less capacity to make these investments (Reardon et al. 1995; Minten et al. 2013).

But the development of food supply chains is important to rural households in another way – the efficiency and development of the food market for food security in which large numbers of rural buyers of food depend on.

Moreover, the rural parts of the developing food supply chains are a backbone of rural nonfarm employment, which contributes some 35-40% of rural household incomes in Africa (Haggblade et al. 2010). In turn, rural nonfarm employment, plus income from marketed crops, is the main source of cash for African farmers to make productivity investments (Davis et al. 2009; Reardon and Mercado-Peters 1993).

Finally, the diversification of urban food markets beyond grains opens up opportunity for farmers to increase incomes. This opportunity requires substantial public (and private) investment in transport, logistics, packaging, storage, cooling, and processing as well as urban wholesale markets, in large cities as well as the burgeoning small and medium cities and towns.

Of course these transformations and developments are very uneven over countries, over zones of dynamic areas near towns and cities versus hinterlands, over asset poor and asset adequate farmers. Differentiated strategies for these different segments is needed for overall inclusive transition to the urbanized African food economy because they will be important in helping a broader set of farmers, including women agricultural entrepreneurs, to access inputs and rural services and extensive information to take advantage of this growing market. At first, this will be an issue of volume and cost, but increasingly over time of quality differentiation and food safety.

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Annex, Calculations of the Expansion of the Rural and Urban Markets over 1970-2010

The (rough, indicative) estimates were calculated as follows.

(1) Urban: UN (2011) indicated 87 million urban residents in 1970, and 414 million in 2011. Let us (very roughly) use the per capita total expenditure of 2010 for the poorest area to have the most conservative estimate, developing Eastern and Southern Africa. The consumption and total expenditure data come from LSMS surveys analyzed in Dolislager et al. 2015. The latter found that urban households have roughly 3 dollars per person per day of total expenditure; the food share of that is 53%, so that is about 1.6 dollars of food. Assuming (roughly) that the share of food was 60% in 1970 (Engel's Law has food's share going up as income goes down), and the total expenditure (as a proxy for income) was $3/1.6$ (as GDP/capita was 1.6 times lower, approximately, in 1970 compared with 2010), the total expenditure per capita was 1.9 dollars in 1970 and food expenditure was thus $0.6 * 1.9$ or 1.4 dollars. So the food volume in dollars moving to urban areas was about $87m * 1.4$ or 120 million dollars in 1970. The urban food volume in 2010 was $414m$ (people) * 1.6 dollars or 662 million dollars. This implies that rural-urban food supply chains in 2010 move about 5.5 times more food to cities than they did in 1970. We deduct 10% of that for imports.

(2) Rural. Recall that about 44% of rural food is purchased in 2010 in developing ESA. Let us roughly assume that only 20% was the purchase share in 1970 (probably a high estimate). Rural households in ESA have total per capita expenditures of 1.5 dollars/day, of which 66% or 1 dollar a day is on food. Let us apply the GDP/capita difference of 1.6 times to that figure, so that in 1970 rural households spent 60 cents a day per capita on food (in 2010 dollars); let us say that 20% of that was purchased, hence 12 cents a day of food was purchased. There were 282m rural persons in 1970, so that was $282m * 0.12$ dollars or 34 million dollars of food marketed in rural areas in 1970. By 2010, there are 632m rural persons, spending in total 1.5 dollars a day each, of which 66% is on food, so 1 dollar a day on food, of which 44 cents was purchased. The total food marketed in rural areas in 2010 was thus approximately $632m * 0.44$ or 278 million dollars. The rural food market volume thus expanded by a factor of 8 over the period.