**The puzzle of lagging Sub-Saharan Africa agriculture: From price distortions, to adoption constraints, and to structural disconnectedness[[1]](#footnote-1)**

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1. **A puzzle: Opportunities and lags in agriculture-based development**

Agriculture can have a major role to play for development in “agriculture-based countries”, countries defined as having a high contribution of agriculture to GDP growth and a high share of their poor in the rural sector (World Bank, 2007). With a few exceptions in Central America and the Caribbean, these countries are mainly low income Sub-Saharan African (SSA) and South Asian countries. An agriculture-based development strategy has been effective for many countries that have now reached middle-income status such as China, Vietnam, Indonesia, Chile, Brazil, Guatemala, and Morocco. In the emerging context of weak labor-intensive industrialization and weak urban-based Structural Transformation (Rodrik, 2016),the current potential role of agriculture for growth in SSA has been confirmed by Page (2018) for the Brookings Foundation and by Stiglitz (2018) for UNU-WIDER. Agriculture has also been highlighted as ahot investmentsector at a world scale due to the combination of population growth, rising incomes, rapid urbanization, changing consumer tastes and diets, and the uncertainties of climate change (NYT,Oct 2019). Success with agriculture-based growth is currently observable in several SSA countries, most notably Ethiopia, Rwanda, and Ghana that provide role models for other countries as to how this can be done. Yet, there is striking under-investment in agriculture in most SSA countries, for example relative to the CAADP standard of 10% of public expenditures on agriculture. In a recent review of public expenditures by SSA countries, Goyal & Nash (2017) show that only three of 25 countries currently meet this target.

Not surprisingly, with low adoption of fertilizers, improved seeds, and high value crops, SSA agriculture increasingly lags behind in land and labor productivity relative to other regions of the world. The consequence is increasing dependency on food imports and declining export market shares at a world scale.

In this paper, we ask the fundamental question as to why this is the case? How can the puzzle of continued under-investment in using SSA agriculture for development be solved? Finding the answer to this question and devising a response strategy could transform the lives and livelihoods of millions of present and future citizens of SSA.

Our thesis is that we need to reverse course in the way we have been thinking about how to make agriculture effective for development in SSA. We will identify three successive phases in how the puzzle has been addressed. The first phase consisted in analyzing surplus extraction from agriculture via the price mechanism. Ample empirical evidence of underpricing at the farm level was provided by classic writers such as Krueger, Schiff, and Valdés (1988), Anderson (2009), Anderson, Rausser, and Swinnen (2013). A political economy rationalization was provided by Bates (2014) who showed that the income effects of distorted markets can be compensated by transfers that are more effective in mobilizing political support than the operation of efficient free markets. While many aspects of price distortions have disappeared, others remain under the form of OECD farm subsidies and import restrictions that have serious negative effects on SSA agriculture.

The second phase consisted in focusing on the barriers to adoption of presumed available technology, basically chemical fertilizers and improved seeds, the ingredients of the Green Revolution. Barriers were found in access to credit, availability of insurance and other risk-reducing mechanisms, lack of information available to farmers about how to use and what to expect from the new technologies, and high transactions costs on markets due to such factors as poor infrastructure and lack of competitiveness. Major institutional innovations were proposed to remove these constraints. However, impact turned out to be modest, with many missing complementary factors limiting adoption of technological innovations and productivity gains in staple crops basically insufficient to take smallholder farmers out of poverty.

The third phase we explore in this paper is based on observing a growing disconnection between what cities consume and what the countryside produces. With this disconnection, cities are increasingly fed by imports of both raw products and processed foods. Quality is a major hurdle for domestic farmers in competing with imports. Reconnecting farmers and domestic consumers would require a major transformation of agriculture, with the construction of demand-driven value chains that meet consumer demand in both quantity and quality, and functionalize domestic producers in servicing domestic consumers. We explore how this has been done and how it would need to be further pursued to effectively induce an agricultural transformation.

1. **A conceptual framework for the puzzle of lagging agriculture**

**Unique structural features of SSA agriculture**

There are good reasons why using agriculture for development in SSA has been a difficult challenge to overcome. Specifically, there are eight unique structural features of SSA agriculture that create hurdles to modernization:

The first is a product of colonial history, whereby property rights over land are notably incomplete for users. Property rights are most often vested with the national state, rarely with the community, and even less frequently with individuals. The result is insecurity of continued access to land that places severe limits to investments that have more than one-crop duration. This can include fertilizers that have residual soil fertility effects beyond one season. It certainly is a major hurdle to irrigation, the big absent in SSA agriculture and a major constraint to intensification of farming systems and extended land calendars. A few countries such as Ethiopia and Sierra Leone have started to emit individual ownership certificates, but they are a minority exception.

The second is also a product of the history of land settlement and demographic pressure. Smallholder farmers and extensive rural poverty are the norm among producers. This makes adoption of technology and achieving economies of scale in production and marketing particularly challenging. It also closely links any agriculture-for-development initiative with the Sustainable Development Goals on poverty and malnutrition. Growth and development are thus inextricably linked to the performance of agriculture.

The third is due to natural conditions and lack of water control. With only 5 to 6% of cultivated land irrigated, most agriculture is under rainfed conditions, with as a consequence strong seasonality in labor calendars and most often only one crop per year. A we will see, prolonged idleness of land and agricultural labor associated with seasonality is a major cause of low annual labor productivity and extensive rural poverty. Extending labor calendars to achieve an agricultural transformation with diversified farming systems does importantly require water control beyond the rainy season.

The fourth is exposure to climate change that destabilizes seasonal rainfall patterns and leads to gradual temperature increase. Both mitigation of climate change through carbon capture by agriculture and adaptation to achieve better resilience of yields and livelihoods to climate shocks are priority issues with rapid climate change that is putting at risk the livelihoods of millions of smallholder farmers and herders.

The fifth is that rainfed farming makes agriculture dependent on local conditions related to climate, soil, and culture, as opposed to a situation where irrigation homogenizes production conditions over vast geographical areas, as it does in Asia. Strong local heterogeneity requires customization of agricultural practices, making it difficult to achieve economies of scale in the development of improved farming systems. The trade-off between precision and cost is a major challenge, with potential solutions through the greater use of IT in diagnosing (sensors) and in recommending (precision farming).

The sixth is the typical dominance of urban elites over the making of agricultural policy, particularly regarding seeking cheap food to lower the nominal cost of urban labor. Urban bias in price formation and in the allocation of public budgets and public goods has been the norm in policy-making (Lipton, 1977; Bates, 2014).

The seventh is that the history of state-market relations has historically been characterized by strong state dominance over market forces. This took the form of parastatals monopolizing markets and setting up prices for the major commodities. Following debt crises in the 1980s and structural adjustment policies in the subsequent period, markets have been extensively liberalized, but transitions remain most often incomplete with extensive presence of rent-seeking policy interventions in markets, such as temporary import bans and subsidies to key inputs such as chemical fertilizers. Erratic and politically motivated market interventions thus remain pervasive, compromising private investment in agriculture, particularly those with a long maturation period.

Finally, and importantly for the interpretative thesis we develop in this paper, there has been a creeping disconnectedness between what domestic agriculture produces and what domestic urban consumers demand, mainly due to lack of quality standards (such as phyto-sanitary) in meeting urban consumer demand, lack of delivery of high value crops, and lack of supply of processed foods by an agro-industry linked to domestic agriculture. The result has been rising food imports for the cities, while domestic agriculture feeds the rural populations (cassava, maize) and delivers eventual booms driven by export demand (coffee, cocoa, cut flowers, tropical fruits, vegetables). As a consequence, agricultural growth does not drive industrialization through cheap labor and forward linkages, and urban income growth does not drive an agricultural response (Jedwab and Vollrath, 2015).

**How to use agriculture for development? A cumulative strategy**

The theory of the role of agriculture in support of industrialization used to be dominated by the idea of surplus extraction from agriculture to the benefit of an urban-based-industry (Mellor, 1995; Basu, 2003). Surplus extraction would take the form of cheap food, labor relocation, financial transfers, and foreign exchange earnings. This perspective has been at the core of the influential dual economy models explaining the generation and transfer of an agricultural surplus to the benefit of industry such as those of Lewis (1954), Jorgenson (1961), and Lele and Mellor (1981). This theory of structural transformation (Timmer, 2012) has been importantly revised in recent years, due to difficulties with both labor-intensive industrialization (Rodrik, 2016) and with labor transfers inducing the growth of urban slums rather than industrial growth (World Bank, 2007). The emerging cumulative strategy replacing the surplus extraction-structural transformation model is as follows (IFAD, 2016):

* **Asset transfers**: Smallholder farming cannot be productive without improved land security (Deininger, 2003), minimum asset endowments (Eswaran and Kotwal, 1986), and eventually comprehensive graduation models for inclusiveness of the ultra-poor (Banerjee et al., 2015)
* **Green Revolution (GR)**: Productivity growth in agriculture starts with yield growth in staple foods based on high-yielding seeds and chemical fertilizer adoption (Sanchez et al., 2009). The Green Revolution is the foundation of national food security for the rural populations as well as for the urban populations for as long as consumption patterns are similar. This Green Revolution is still to reach most rainfed areas of the world, and for that reason most of SSA.
* **Agricultural Transformation (AT)**: This consists in the introduction of diversified farming systems with high value crops, use of the land over more than one season, more complete labor calendars, and value chain development to link high value crops to markets. It is epitomized by success of the household responsibility system in China, as well as switch to high value crops in such places as Morocco (tomatoes), Guatemala (temperate vegetables), and Chile (fruits).
* **Rural Transformation (RT)**: This is riven by employment and incomes in a local Rural Non-Farm Economy pulled by TFP growth in agriculture through forward, backward, and final demand linkages (Adelman (1984)’s Agriculture Demand-Led Industrialization). This calls on territorial development driven by local governance (Schejtman and Berdegué, 2004), the promotion of economic clusters specialized in particular commodities (Porter, 1998), and place-based policies for the development of labor markets and the provision of public goods (Kline and Moretti, 2013).
* **Structural Transformation (ST)**: Ultimately, populations become increasingly urbanized and industry and services located in large urban agglomerations where they benefit from economies of scale. The strategy of successful Assets/GR/AT/RT becomes a novel pathway toward ST that could be particularly effective for SSA where initial conditions for a ST need to be put into place.

Hence, the AT/RT strategy opens new perspectives in using agriculture for development. It goes beyond the traditional Jorgenson/Lele-Mellor TFP growth in agriculture in support of urban-based industrialization and a ST through labor transfers and cheap food for urban workers. It looks at local, place-based development rather than necessary accelerated urbanization. Achieving these transformations would require significantly increasing investment in agriculture, possibly toward the CAADP 10% objective.

**Three interpretations of the under-investment puzzle**

Why has this not been done more extensively in SSA? There have been three successive interpretations of the puzzle of under-investment in SSA agriculture.

The first interpretation was that **predatory taxation** on agriculture, implemented through price distortions and extractive policies such as forced deliveries, reduced the profitability of agriculture and hence the drive to invest (Rausser, 1982 and 1992; Bates, 2014). While taxation of agriculture to benefit industry has worked, as for example in the agricultural revolutions supporting the subsequent industrial revolutions in the “Western Experience” (Bairoch, 1973), it does require prior investment in agricultural productivity growth to generate food, labor, financial, and foreign exchange surpluses that could be taxed without inducing agricultural stagnation. This was the famous “get agriculture moving” principle of Mosher (1965) and the “agricultural treadmill” approach conceptualized by Owen (1966). It underpinned all the dual economy models not based on the presumption of a labor surplus in agriculture (Lewis, 1954) that could be extracted at zero opportunity cost in terms of agricultural output, i.e., all models where productivity growth in agriculture was needed to generate a surplus that could subsequently be extracted for investment in industry.

The second interpretation was that constraints to adoption originating in a variety of market and government failures, as well as in civil society weaknesses, make adoption unprofitable or impossible. Presumption here was that potentially profitable, productivity-enhancing technologies do exist with scientists and agro-dealers, but are not being adopted. Removing constraints to adoption would give a supply-driven approach to getting agriculture moving. It has been pursued under the Gates-DFID-funded ATAI1 project (Jack, 2011) that focused on using experimental approaches to identify and remove constraints to adoption.

The third interpretation is that there exists a growing disconnection between domestic agriculture production and urban consumer demand that prevents SSA urban growth--based on mineral exports, remittances, services, and some industrialization--from serving as a source of dynamics for domestic agriculture (Jedwab and Vollrath, 2015). Re-connecting domestic markets to domestic agriculture would create a demand-driven approach to agriculture modernization (ATAI2, 2019). Establishing the connection would require the construction of inclusive value chains originating in consumer demand that can induce the production of high-quality high-value crops (AT) and the emergence of a rural non-farm economy (RT) that can add value to agriculture and complement rural household incomes as an instrument to escape poverty. Exploring this third interpretation is the main contribution of this paper.

1. **Explanations of lagging investment in SSA agriculture**

**Explanation 1: Price distortions as predatory policies**

The price distortion interpretation of underinvestment in agriculture dominated the policy discourse in the 1960s and 70s, before the mid-1980s emergence of sovereign debt crisis. Rausser (1982) provided an important theoretical framework for this interpretation using in a combined fashion the concepts of PERT (growth-promoting) and PEST (rent-seeking) policies. In industrialized countries, agricultural PEST policies take the form of redistributive protection and subsidies interventions. These policies are compensatory to PERT policies that promote productivity growth in agriculture through research and development. These policies are thus part of apolitical equilibrium with endogenous PEST transfers buying the political feasibility of growth-promoting PERT policies with strong redistributive effects favoring consumers over producers given inelastic demand for food. In developing countries, PEST policies under the form of agricultural taxation via price are used to obtain cheap urban food for urban constituencies, with neglect of investment in agriculture. Extractive policies (PEST) are pursued without PERT legitimation, in support of an agricultural transformation (Rausser and Foster, 1990). Ample empirical evidence in support of this interpretation was made available by Krueger, Schiff, and Valdés (1988), and Anderson (2009). For tradables, both exportables and import-competing, overvalued exchange rates had an important role to play in under-pricing. For non-tradables, consumer subsidies and forced procurement were instruments for low farm prices.

Following extensive policies of trade and market liberalization after the mid-1980s debt crises and comprehensive responses by the Washington Consensus (Williamson, 1993), price distortions on tradables have largely disappeared (Anderson, 2012). Transitions to market economies are however incomplete with continued erratic PEST-type government interventions in markets creating uncertainties about future market conditions (Economist 2019). Urban political elites and urban populist agendas continue to dominate over agri-food policy-making, with low rural political engagement (Beegle and Christiaensen, 2019). And important trade distortions also remain for developing country agriculture under the form of OECD farm subsidies and restrictions to imports of food products. What remains as a consequence is low adoption of technological and institutional innovations resulting in a large TFP growth deficit for SSA (Fuglie et al., 2019).

**Explanation 2. Constraints to adoption: a supply-driven approach**

Adoption of productivity enhancing technologies is constrained by market failures and state deficiencies. Extensive experimental research using randomized controlled trials was directed at identifying the major constraints to adoption and experimenting with ways of overcoming them (Jack, 2011). They addressed principally liquidity constraints, uninsured risks, information deficits, and transaction costs in access to markets (Bridle et al., 2018). This research led to major institutional innovations to overcome each of these constraints.

On the issue of credit, access to liquidity is clearly important to farmers due to seasonality of agricultural production and potential benefits from holding to harvests until market prices peak. Yet, credit services are typically inaccessible to a majority of smallholder farmers, too expensive like through microfinance, too risky to expose collateral to loss, or ill-adapted to farmers’ seasonal liquidity cycles. While much progress has been made in customizing financial services to smallholder farmers liquidity needs, recent experiments have shown that a liquidity constraint is most often not the main reason for under-investment in fertilizers. The main constraint tends to be low profitability in using fertilizers due in particular to lack of complementary inputs to secure high returns and high transaction costs in accessing markets.

Exposure to uninsured risks is another major constraint to technology adoption. It forces farmers to engage in costly shock-coping and risk-management strategies that contribute to the reproduction of low growth and poverty. To respond to this, progress has been made with index-based insurance that could be well adapted to the conditions of smallholder farmers, with payouts triggered by a verifiable local rainfall index or a satellite-based small area yield estimate. Use of index insurance has shown to make a difference on higher risk-higher yield investments in agriculture. Yet adoption rates have been notably low. Initiatives to promote adoption include improved design of the insurance product to reduce basis risk, better data to calculate fair premiums, group insurance such as coffee cooperatives, combining index insurance with other risk-reducing instruments such as resilient technology, and pre-approved emergency loans (Carter et al., 2017).

Information is key to adoption for the farmers to not only know of the existence of a new technology, but also how to use it and adapt it to their own circumstances. Availability of extension agents is notably low and typically of poor quality in SSA. Learning-from-others is made difficult by heterogeneity of circumstances. Important progress has been made in identifying the more effective contact farmers in spreading information in social networks and in motivating these farmers to act as proactive diffusion agents (Beaman et al., 2018). Agro-dealers can also be trained to the new technologies and to diffuse information and provide advice to their clienteles. And extension services can be made more effective through the use of IT services. Finally, the diffusion of information can be reversed from a push approach initiated by well selected and powered contact farmers to a pull approach where community members are induced by signals to seek information from informed individuals in the community (Dar et al., 2019). New approaches are promising, but much experimentation with new designs and new tools is needed, with the potential to make large differences on farmer behavior.

Finally, profitable adoption requires well performing markets, with low transaction costs, competitive traders, and relatively elastic demand to sustain prices with shifting supplies following technology adoption. Important interventions thus include improved infrastructure (Aggarwal et al., 2018) and market facilities, better information on prices (Fafchamps and Minten, 2012), more competitive traders facilitated by entry (Berquist and Dinerstein, 2019), and very importantly improved quality to be competitive with imports and meet urban consumer demand. Lack of quality recognition on markets prevents farmers from responding to incentives to improve quality. Difficulty is with quality recognition high enough in the value chain before produce gets aggregated, and subsequent traceability down eventually long value chains to where quality meets willingness to pay.

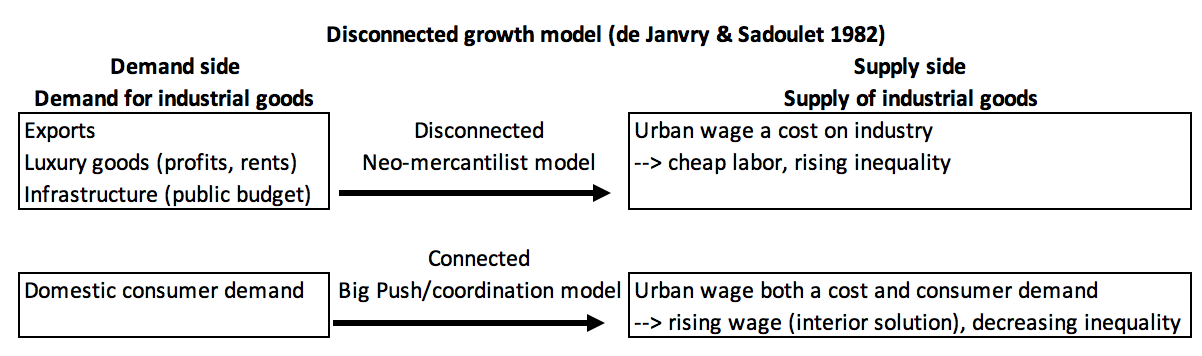
The constraints removal approach has been effective in identifying institutional innovations that can overcome constraints and induce adoption. Yet, adoption has typically ceilinged at some 30% of the farm population. This is due to three factors (Laajaj et al., 2018): (1) heterogeneity of circumstances implies that complementary factors securing profitability are often missing. Examples are soil fertility provided by organic matter (Marenya and Barrett, 2009), and soil acidity requiring complementary inputs (Burke, Jayne, and Black, 2017); (2) farmer objectives are different from breeders, with concerns for utilization of family labor through the year and food security for the household; and (3) farmers capacity to adopt may be limited by the need to acquire new knowledge. Ideal are new technologies that do not require modifications in agronomic practices, such as the flood resistant feature in rice that leaves cultivation methods unaltered. This suggests that another approach is needed to complement a supply-driven, constraints removing approach. This is the development of value chains that originate in the specificity of urban consumer demand.

**Explanation 3. Market disconnections: A demand-driven approach**

A disturbing fact in most of SSA is that food imports are increasing rapidly in response to urbanization, rising incomes, and changing tastes. Because of quality and price issues, domestic production is often not competitive with imports. We studied this with onions in Senegal (Bernard et al, 2017). An increasing share of domestic consumption is imported, and domestic production needs protection under the form of a six-month import ban to be competitive. Domestic production cannot compete with imports without a quality upgrade. We also studied this with wheat in Ethiopia (Abate and Bernard, 2017). Millers prefer imported wheat as it is of higher quality than domestic procurement due to domestic aggregation of smallholder harvests without grading high in the value chain. In these two cases, markets fail to recognize quality, creating a disconnection between domestic production and urban consumption.

How did this happen? With export-driven growth (typically on exports such as cocoa, coffee, and minerals), cities emerge as consumption places rather than industrialization places (Jedwab and Vollrath, 2015). Urban income dynamics creates demand for food imports, not for domestic production (beyond wheat/rice, meat, poultry and fish). As a consequence, productivity growth in agriculture does not cheapen urban wage nor induce an urban-based structural transformation. The dynamics of agriculture is found in the export of cash crops. This suggests using a demand-driven approach through value chain development to re-connect domestic production to domestic markets and induce agricultural and rural transformations.

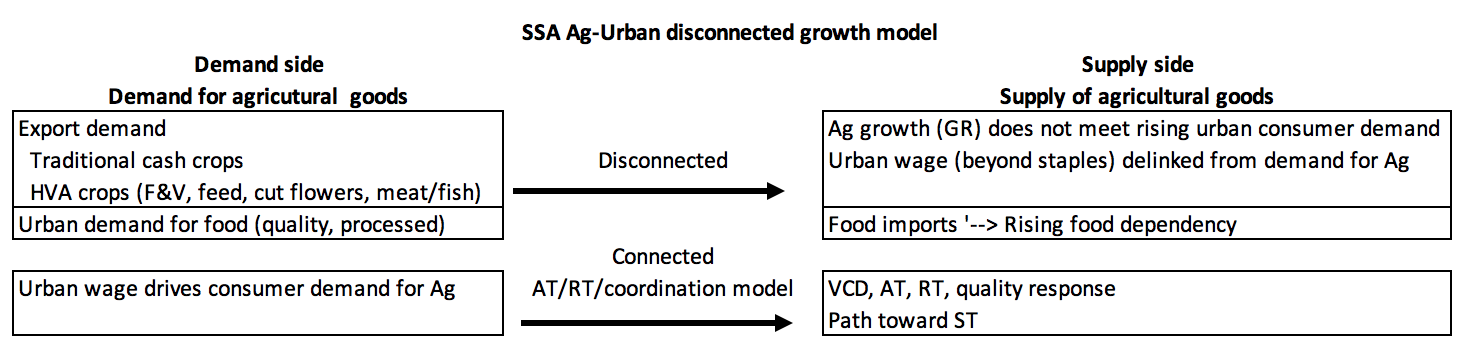
We worked in the past on a model of market disconnectedness and its consequences for growth and the distribution of benefits (de Janvry and Sadoulet, 1983). In this case (Figure 1), the demand for industrial goods originates in exports, in profits and rents (luxury goods), and in public expenditures (infrastructure).

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**Figure 1. Disconnected growth model**

The urban wage is a cost on competitiveness and is disconnected from effective demand creation. In this disconnected neo-mercantilist model, accelerated growth benefits from cheap labor and leads to rising inequality. This model applies well to Chinese export-led growth that sustained accelerated growth for some 25 years, until the financial crisis of 2008 reduced the demand for imports in OECD countries. China briefly sifted to public expenditure-led growth with construction of highways, bullet trains, and housing. The next, and current step, is to place domestic consumer demand at the center of effective demand for industry. This is the Big Push approach of Rosenstein-Rodan (1961) and the coordinated multiple-equilibria investment model of Hirshman (1981) and Sachs and Warner (1999). In this connected model, the urban wage is both a cost and a source of effective demand for industry, implying an interior solution for rising wages and potentially decreasing inequality as workers capture part of the productivity gains in industry. The political economy of the transition from disconnected to connected model is the struggle to relocate market for industry in domestic consumer demand via rising wages. There is a least a logic for wage concession as labor productivity rises.

We can think by analogy of a disconnected growth model for Sub-Saharan Africa where disconnection is not between wage income and effective demand for industry as above, but between domestic agricultural production and urban food consumption (Figure 2).

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**Figure 2. Disconnected transformation model**

In this case, the demand for agricultural goods originates in exports of either traditional cash crops such as cocoa and coffee or high value agricultural crops such as fruits and vegetables, animal feed, cut flowers, and meat and fish. Urban demand for food, driven by changing life styles, the rising opportunity cost of women’s time, limited space for cooking, and rising incomes, is for high quality raw materials and for processed and prepared goods (Gollin, 2019). While rural diets are dominated by maize, cassava, and starchy foods, urban diets are much more diversified and include rice, bread, pasta, poultry, sugar, sweets, pastries, snack foods, beverages, tobacco, and dairy products. This was observed following the change in diets of rural-urban migrants in Tanzania (Cockx, Colen, De Weerdt, 2018). With domestic agriculture currently not supplying these foods and at the desired quality levels, agriculture growth does not meet rising urban consumer demand. An agricultural transformation would be needed for this purpose. Urban consumers also demand processed and prepared foods which are imported as not domestically produced. Domestic availability would require an agricultural transformation. Urban wage growth, beyond some staples such as rice and wheat when they are produced, which is rare in SSA, does not create demand for currently produced agriculture goods. What it creates is demand for food imports and results in rising food dependency.

In the connected version of the model, the urban wage drives consumer demand for agriculture. The supply side of the model consists in value chain development, agricultural transformation, rural transformation, and importantly quality response. The political economy of the transition from disconnected to connected model is the struggle to relocate the market for agriculture in domestic consumer demand driven by rising wage and changing diets. The change is not trivial as an agricultural transformation requires large investments in infrastructure and likely mechanization and land consolidation. A rural transformation requires medium enterprises with wage labor that can deliver processed and prepared foods. Empirical evidence of connectedness is provided by the experiment with quality recognition in the onion market in Senegal and in the wheat market in Ethiopia which both induced production of higher quality import-competing domestic products.

In that sense, the use of agriculture for development has to be quite different in SSA than it was in Asia. In Asia (India, Indonesia), smallholder farmers could produce foods that were the staples of urban diets. The Green Revolution could lower the real price of food and help reduce the nominal urban wage and deliver low cost labor for industrialization. Industry emerged in the urban environment, supporting the theory of the structural transformation as the way of using agriculture for development (Timmer, 2012). Trying to achieve the same outcome through a Green Revolution for SSA is insufficient as the structural context is now markedly different.

In SSA, smallholder farmers need deliver diversified quality foods and raw materials for the current urban consumer diets and for agro-industrial processing. Agroindustry, to be competitive in an open economy context, requires not home-based food processing but a rural non-farm economy with medium-large enterprises and an associated labor force. Agriculture must also focus on the export of cash crops for foreign exchange earnings. The agricultural transformation thus corresponds to farming systems with diversified food crops and cash crops. This is a model of agriculture supporting industrialization and services, but quite different from the one that made the success of Asia. A Green Revolution for Africa is thus necessary, but far from sufficient for an ultimate structural transformation.

1. **Ingredients to value chain development for AT/RT and agriculture-urban connectedness**

The normative program to achieve modernization of SSA agriculture beyond removing constraints on adoption consists in developing value chains to achieve agricultural and rural transformations and to connect agriculture with urban demand. Like in the Chinese shift from disconnected to connected growth, this requires a comprehensive program with roles for the state/governance, the market/private sector, and civil society. Specifically these roles are as follows:

1. **Role of the state**

**Planning connectedness** requires an Agricultural Transformation Agency to inform, propose, and monitor implementation of the necessary investments, responding to the highest levels of political leadership. This was effectively done in Ethiopia, Rwanda, and the State of Orissa in India where we see agriculture moving toward transformation (Boettiger et al., 2017).

**Security of** **property rights** is essential to investment, hence land certification programs must be put into place where rights are assigned to individuals or to communities. Ethiopia and Sierra Leone have introduced certification programs. Security of property rights over land is still lagging in many SSA countries. It is likely to be a major contributor to the low development and poor maintenance of irrigation systems, one of the greatest hurdles to an agricultural transformation.

**Infrastructure** is essential,requiring public investment, particularly in the trilogy of roads, irrigation, and storage. As we have seen, public investment in SSA agriculture has been lagging relative to international norms. The major lending institutions should likely return to prioritize such large investment programs rather than direct engagement in especially transfer programs.

**A pro-active state** is necessary to target nudges onthe winners**,** build onthebestopportunities across regions and enterprises,andcompensate through smart PESTs the losers (regions and individuals) to achieve political feasibility and meet the Sustainable Development Goals. For many donors, this is a major departure from the way they look at the role of agriculture for development. Once success has been secured in the best areas and with the best entrepreneurs, spread of the transformations to less well-endowed regions and entrepreneurs can be actively pursued, including with the necessary smart-PEST subsidies and public assistance.

1. **Role of the market**

**Markets** urgently need to be fixed to achieve **quality** **recognition** and to pass-through to farmers the quality premiums paid by consumers to create incentives to produce higher quality. Quality recognition can be achieve as part of contracts, or through third-party certification. State regulatory interventions are necessary to secure the accuracy, fairness, and sustainability of the quality recognition mechanism.

**Coordination** in value chains is important to achieve shared norms among agents, to guide complementary private investments, and to invest in value chain club goods that will not be delivered, neither publicly nor privately. There are several institutional options for organizing coordination, including a multi-stakeholder platform (Devaux et al., 2016), a lead agent typically with monopoly or oligopoly power--either high in the value chain such as a producer cooperative or low in the value chain such as an agroindustry or a supermarket--, or a state or donor-sponsored institutions at least as a transitory solution (de Janvry, Sadoulet, and Trachtman, 2019).

**Contracting** enables to secure transactions among participating agents and to overcome market failures and government deficiencies. For that second purpose, contracts can be resource-providing (also called interlinked, Bardhan, 1989), giving smallholder farmers access to information, technology, credit, and potentially insurance that would not be available to them through the state or the market.

1. **Role of civil society**

**Producer Organizations** can be effective for contracting with smallholder farmers. World Bank experiments with Productive Alliances have shown that they can build discipline among farmers in avoiding side-selling and oversight over commercial partners in constraining hold-up practices (Horst and del Mar Polo, 2016; Collion, 2018). Yet, sustainability of the approach beyond the donor-supported grant period has been an issue, calling on the role of higher-order organizations such as second-degree cooperatives, or on continued public support typically through social funds.

1. **Conclusion: Toward a political economy of connectedness**

Using agriculture is essential for growth and poverty reduction in agriculture-based countries such as the SSA nations. For these countries, conditions have however changed markedly relative to how agriculture was used for development in the Asian countries. SSA has witnessed an increasing disconnection between what agriculture produces and what urban consumers demand. As a consequence, urban markets are increasingly served by foreign imports of high quality foods, processed foods, and prepared meals. The dynamic sectors of agriculture cater to international cash crops markets, especially tropical commodities and specialty crops. Reconnecting domestic agriculture with its urban markets is an important policy objective to dynamize domestic agriculture and have it serve urban industry and services. This suggests moving beyond aGreen Revolutioninstaple foods as the main policy instrument in using agriculture for development, the way it was effectively pursued in India and Indonesia. Needed instead isanAgriculturalTransformation for meeting urban demand for diversified diets and quality foods, and for more complete rural labor calendars contributing to reduce rural poverty. It also requires aRuralTransformation for the production of processed and prepared foods and for the expansion of rural non-farm sources of income to help take rural households located in rural clusters out of poverty.

The main policy implication is consequently to move beyond a supply-driven technology-adoption model to a demand-driven value-chain development approach. This requires exploring alternative business models to promote entrepreneurship in these value chains and functionalize smallholder production to deliver the supply side of the value chains. Addressing the political feasibility of re-connectedness requires using compensations for losers (smart PESTs) as the strategy initially favors the best locations and entrepreneurs, and striving to achieve the SDGs through complementary policies until the transformations become more inclusive, especially through the labor market. Important for this is to use impact evaluation methodsfor results-based management andto explore alternative designs.

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1. Chapter prepared for Gordon Rausser’s Festschrift Book [↑](#footnote-ref-1)