



The Challenge of Sustainable and Inclusive Rural Transformation: Which Role for RTB Crops?

A Position Paper on Cluster 5.1 Research Activities

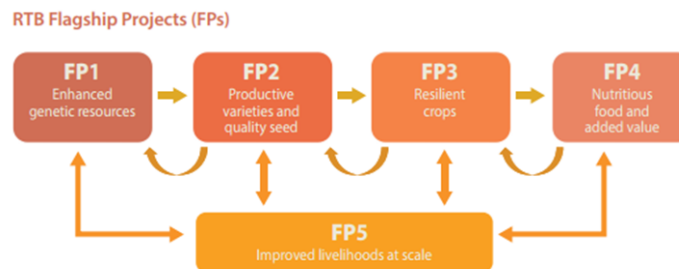


Key Messages

- RTB Priority research countries in Africa and South Asia are experiencing a process of comprehensive societal change, recently defined in the literature as *Rural Transformation*: as food production stabilizes, local economies diversify and their reliance on agriculture reduces, relatively isolated and underdeveloped rural communities modernize, increasing social and physical mobility and blurring the line between rural and urban settings.
- Transformation trajectories are highly context-specific. Pathways are undermined by a number of constraints originating from unsustainable rural livelihood systems and lack of inclusive integration in the broader economic system. Circumstances of people's everyday life increase individuals' vulnerability on the one hand, while reducing their capability to actively play a role in the transformation process on the other. Despite small-holder farmers, three quarters of the poor and hungry people in the world, are those with the highest potential to foster a sustainable and inclusive transformation, their capabilities constraints result in a late and unequal transformation process.
- The international community is calling for the necessary knowledge base to buffer the transformation negative trends and, simultaneously, positively support the development of the rural landscape. Because the prominent role of agricultural development is widely recognized as a tool for sustainable and inclusive transformation pathways, the effects of farm innovation, diversification and best practices adoption need to be carefully investigated better tailor agricultural development intervention.
- Cluster 5.1 wish to enrich the current academic debate through the provision of empirical and multidisciplinary evidence on the rural transformation pathways of selected case studies in South-Asia and Sub Saharan Africa. The synergies and the continuum between RTB Foresight, Ex Ante and Ex Post impact assessment (IA) analytical tools offer a unique opportunity to assess the transformation from different angles, and understand how RTB technologies and know-how can positively enhance the process.
- The findings of direct and indirect development outcomes will provide alternative theories of change (ToC) to guide development intervention and planning, as well as advice policymakers seeking to stimulate rural economic growth and poverty reduction, boosting a transformation of the rural space which is economically viable, socially inclusive and ecologically sustainable.

Who We Are

The CGIAR Research Program on Roots, Tubers and Bananas (RTB) brings together Bioversity International, the International Center for Tropical Agriculture (CIAT), the International Potato Center (CIP), the International Institute of Tropical Agriculture (IITA) and CIRAD with more than 350 partners for research and development on banana, cassava, potato, sweet potato, yam, and minor roots and tubers. RTB organizes research around five linked and interactive flagship projects (FPs):



FP1 and FP2 support gender-responsive breeding pipelines to obtain high-yielding and nutrient-rich varieties in line with consumer demand. FP3 develops an array of products for pest and disease characterization and management and improved agronomic practices for more resilient cropping systems. FP4 promotes collaboration among public and private partners to develop and disseminate improved processing and post-harvest technologies and protocols for RTB-based food products that help to reduce waste and make healthy and nutritious food available. Flagship Project (FP5) “Improving Livelihood at Scale” is greatly emphasized in the RTB Research program for its capacity to assess and scale up the impact of next and end-users technological innovation adoption on farm. Flagship 5 provides a livelihood systems-related guiding framework for all RTB FPs with the aim to steer them toward promising scaling of innovations, opportunities for advancing gender and intergenerational equity and research in areas of greatest expected return (RTB Brief, 2016).

Within this framework, Cluster 5.1 invests in foresight and impact assessment through qualitative participatory and quantitative modelling tools for Foresight, Ex-Post and Ex-Ante analysis, deployed to inform RTB and partners on R4D investment priorities. Improving livelihoods at scale requires understanding of the technical constraints and opportunities that exist in an area as defined by the biophysical (e.g. climate, soils) and socio-economic (e.g. markets) environment in which a farm community operates. (www.rtb.cgiar.org).

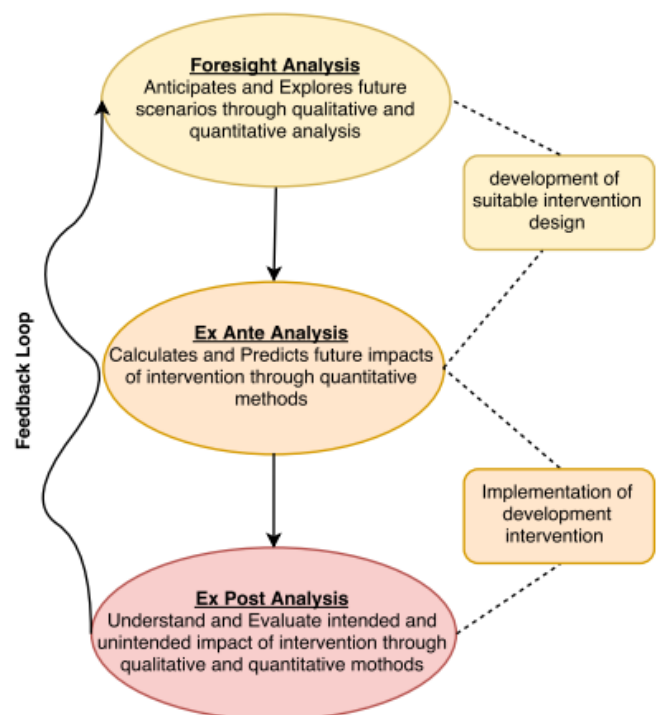


Figure 1 Continuum between Foresight, Ex Ante and Ex Post Analysis for Impact Assessment

The Challenge

The world in which agriculture operates has been changing dramatically over the past two decades: demographic growth, uneven economic development, rapid urbanization, climate change, environmental degradation and shrinking biodiversity are major constraints to the achievement of the Millennium Sustainable Goals (SDGs) Agenda. In the midst of such a broad changing global landscape, key RTB research communities in rural Africa and South Asia are currently undergoing a process of comprehensive societal change, defined as *Rural Transformation*: as local economies diversify and the reliance of agriculture reduces, relatively isolated and underdeveloped rural communities modernize (Berdegue' et al, 2014). The economic, social and cultural features of rural and urban settings gradually blur, and blend into each other, strengthening existing linkages and supporting the emergence of new markets (Tacoli, 2003). Mobility increases as the rural non-farm economy grows, and households' become "stretched" in the sense that members spread into other locations but continue to maintain different degree of ties with their family, manifested through the flow of remittances (Crush, 2012).

Transformation pathways are highly context-specific. Asian countries have successfully increased agricultural production and efficiency through technological change on farm. These recent transformation of rural societies and their economy have coincided with a deep and fast structural transformation at a national level, cutting sharply into rural poverty and malnourishment. Mainly due to rising income and urbanization, food consumption patterns have been changing, leading to a more diversified agricultural production. Nevertheless, inequalities are rising and the pressure on land, natural resources and the environment is growing (IFAD, 2016). On the other hand, Sub Saharan Africa (SSA) countries are experiencing much lower rates of productivity growth and labor movement into higher value services (MacMillan et al, 2014). While agriculture GDP and employment shares has been generally decreasing, the decreasing rate has been relatively small and slow, and agriculture is still the dominant economic sector, resulting in late transformation processes (Ripoll et al, 2017). For SSA, agriculture shows a slow and steady growth in terms of output at a macro level, but the commodity mix remains limited and not diversified (IFAD, 2016).

Despite small-holder farmers, three quarters of the poor and hungry people in the world, are those with the highest potential to foster a sustainable and inclusive transformation, they face several constraints undermining their agency capacity. The absolute number of people living in the rural areas will remain very high for the coming decades: by 2050, about 2.8 billion people are expected to be living in rural areas, with South Asia and SSA accounting for two-thirds of them (Losch et al, 2012). The current thinking is that millions of people in the developing world will face increasing hardships in finding viable employment opportunities, either on or off farm, given the annual volume of new market entrants along with the limited absorption capacity of local economies. Because of the continued "youth bulge" in the labor force across the global, inclusive transformation must also account for the younger portion of the population. In their way into adulthood, their desire to establish a family and livelihood will be predominantly rural for the coming decades. The limited economic and employment opportunities available, combined with fears about future food and nutrition security, access to land and natural resources degradation, as well as increasing risky mobility patterns, underpins the interest of policy makers to identify viable pathways for a sustained, stable and inclusive rural transformation process. Several scholars call for more comprehensive and multidisciplinary studies on the subject (World Bank, 2017), adopting systemic approaches to the assessment of rural development impact (Douthwaite and Hoffecker, 2017) and specifically on how agricultural research affect broader societal change (Schut et al, 2014; Gaunand et al, 2015).

Theoretical Background

Rural transformation is defined as a process of comprehensive societal change and reorganization. In this process societies diversify their economies, reduce their reliance on agriculture and become dependent on distant places to trade and acquire goods, services and ideas (Berdegue' et al, 2014). Global forces and broader national structural changes drive the transformation: rural economies diversify their activities away from agriculture, agri-food system progressively globalize and affect the conditions under which producers, community and firms engage in agricultural productivity, the urbanization of rural regions reduces and, eventually, eliminate the relative isolation of rural communities (Berdegue' et al, 2014). The macro context can be defined as the “backdrop against which all else plays out” (Ripoll et al, 2017).

Locally, the rural transformation dynamics are influenced by the quality and availability of natural resources, changing climatic conditions and their manifestations, and the existence and accessibility of markets. The local context also include the impacts of new agricultural technologies, services and infrastructures (Ripoll et al, 2017). The transformation process is mediated by social structures, cultural dynamics and institutional frameworks: local societies have thus different potentials to do and see things – in other words, different level of human agency (Berdegue' et al, 2014, Sen, 1999) depending on their cultural laws, traditions, expectations values and norms (both formal and informal) that might constrains or enable people's actions.

Individual behavioral choices evolve and diversify within the new context and possibility at the households' disposal. Their motivations, decisions and actions change depending on their freedom constrains in the exercise of capabilities and on the material, cognitive and informational deprivations which shape and “bound” individuals' rationality (Simon, 1972, Haushofer & Fehr, 2014; Datta & Mullainathan, 2014).

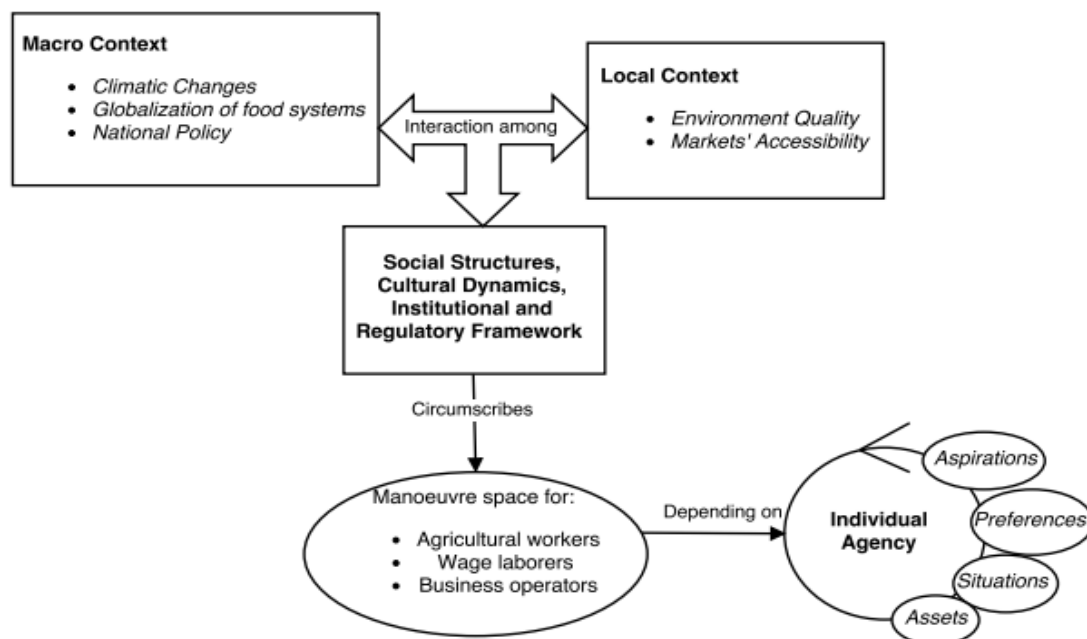


Figure 2 Analytical framework of the interactions among different levels of analysis, adapted from Ripoll et al (2017).

The macro dynamics of rural transformation have received extensive attention mainly in early economic studies on the broader structural transformation process, as societal transformations in which society or a complex subsystem structurally changes in a continuous, gradual way can in fact be defined as structural transformation (Johnston and Mellor, 1961; Mellor, 1976, Timmer, 1988). More recent research has confirmed the patterned regularities previously detected (Timmer & Akkus, 2008; FAO, 2008; Tacoli, 2003). In this sense, rural transformation appears to be an integral and essential part of the broader process of structural transformation. While the former refers to the transformation of rural landscapes, based on the development of the agricultural sector in the first place (i.e. the improvement of the quality of life and economic well-being of farmers), the latter involves the society, its institutional structure and economic system, as a whole.

Similarities and intersection with other transformation theories are found in socio-demographic and innovation studies. The process entails, in fact, long term changes in the population structure referred to as demographic transition (Galor & Weil, 2000). The theory describes the transition from high birth and death rates to lower birth and death rates as a country or region develops from a pre-industrial to an industrialized economic system. Similarly, for a structural transformation to take place, major technological changes in the way societal functions are also involved. The literature identifies this process as technological transition, and considers societal changes ranging from user practices, regulation, industrial networks (supply, production, distribution), infrastructure, and symbolic meaning or culture as an additional integral part of the transformation process (Geels, 2002).

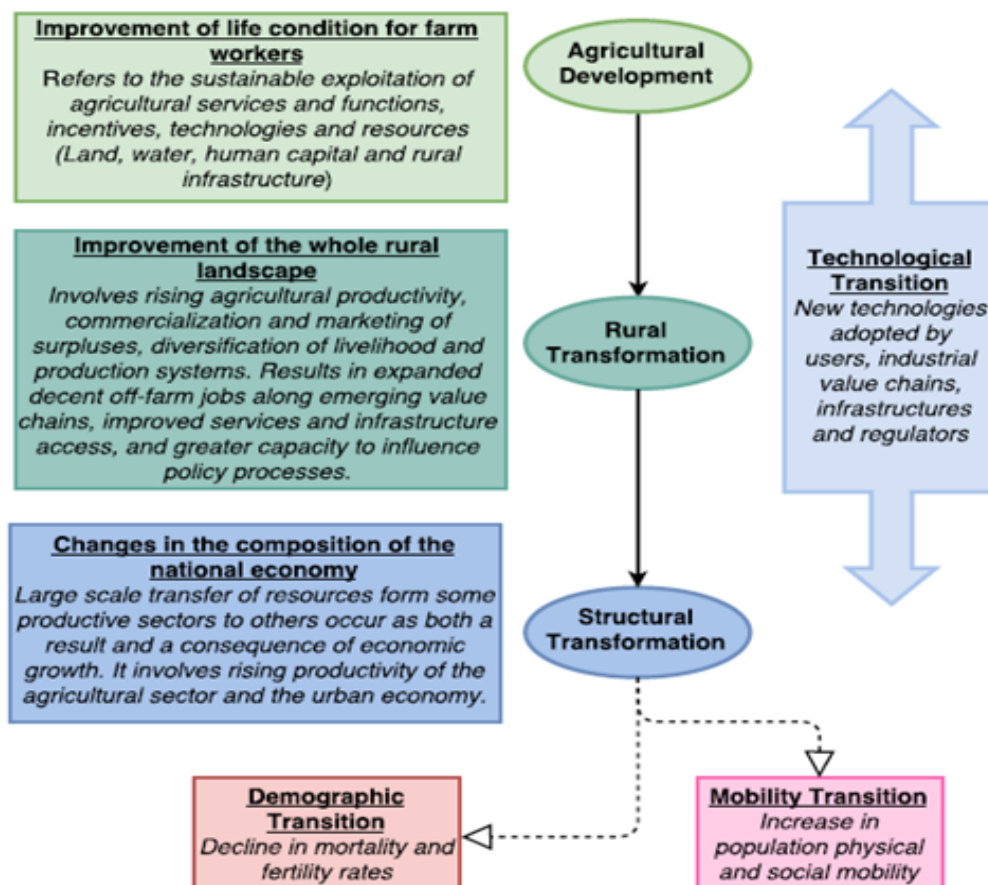
In general, the process leads to a decline in the relative importance of agriculture to the overall economy, as the industrial and service sectors grow even more rapidly, partly through stimulus from a modernizing agriculture and migration of farm workers to services, manufactory and other non-farm jobs. The transformation process is conceptualized as originating from agricultural modernization and consequent productivity growth, accompanied with improved market infrastructure and supporting services (Timmer, 1988; Johnston & Mellor, 1961). In particular, emphasis is put on the mobility-enabling role of these changes, as they allow for an increased physical and social mobility of individuals. This pattern is also found in early studies on mobility transition (Zelinsky, 1971), confirmed by recent literature (De Haas, 2010). The theory asserts that starting from a relatively sessile condition of severely limited physical and social mobility, before the onset of the urbanization, societies move toward a much higher rates of such movement that always occurs as a community experiences the process of modernization.

In this context, Increased market access is expected to foster labor movement to more productive sectors as well as support the emergence of a non-farm economy. Productive farmers with enough land are able to generate surpluses and income gains, stimulating the demand for goods and services from the non-farm economy. At the same time, less efficient farmers would move to other off-farm sector, driving net efficiency gains. Functionally, in fact, the rural nonfarm economy (RNFE) plays a pivotal role in the process of transformation (Hazel et al, 2007; Thirtle, Lin & Piesse, 2003).

Rural non-farm activities are highly diverse, as they span forestry, natural resources extraction, food and non-food manufacturing, tourism and services. In particular, both small-scale households and modern factories using mechanical power rely on local raw materials to generate products of differing degree of quality for rural and urban consumers (Ranis and Stewart, 1999; Lanjouw and Lanjouw, 2001). This gradual de-agrarianization of rural areas is also conceptualized, in contrast to the dominant discourse on urbanization, as ruralization: “the changing lifestyle towards functional rurality; and effective and efficient rural conditions (physical, social, economic and environmental) resulting from human socio-spatial behaviors, migration and population dynamics” (Chigbu, 2015).

Rural and structural transformation might differ in the speed and path they take, with strong implication for labor movement and employment creation: if off-farm and urban jobs do not grow fast enough to absorb the growing labor force displaced, workers end up unemployed or underemployed. This highly adverse outcome is the result of the differing speed at which the two types of transformation occur (Timmer, 2014).

Figure 3 Dynamic interplay among the economic and social theories affecting the rural transformation process



Emerging Issues

The forces underpinning the transformation of rural areas might create the conditions for many favourable societal impact—by creating increased opportunities for rural people to exert their agency, escape poverty and, at the same time, protect the environment. However, several social, political, economic inequities might arise as well, combined with increase degradation of the environment, and the prospect for inclusion can be negatively affected. Empirical evidence shows that inclusive transformation is far from spontaneous and rural poverty can remain in spite of a transforming economy: necessary policies must be in place to “make it happen” (IFAD, 2016) and supporting changes at different levels: agricultural modernization, value chains creation, active institutional involvement (Figure 4).

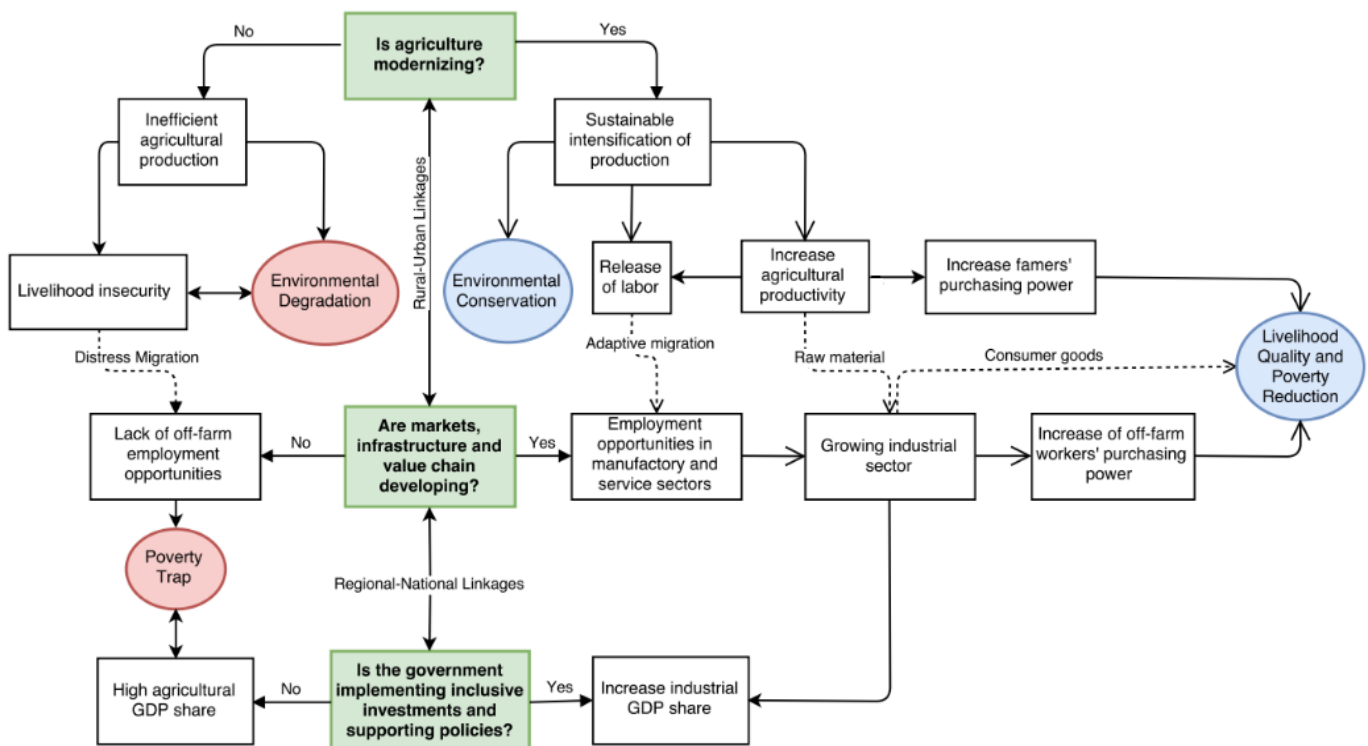


Figure 4 Theoretical Framework highlighting the possible directions of the transformation process

Transformation is then defined a mixed-blessing: while in some cases evidence of transformation, particularly market emergence and integration, greatly improve the income level as well as the food and nutrition security of the poorest groups of the population (Verkaart et al, 2016; Negash & Swinnen, 2013; Dries & Swinnen, 2010) in other cases it might benefit the already better off (Haggblade et al, 2007). Having low level of education and owning little or no land at all, marginalized household are likely to engage in agricultural wage work, unskilled non-farm employment, or detrimental and distress migration to crowded urban areas: productivity and returns are low, increasing instability and weakening local growth capacity. Rural development, together with the growth of the rural non-farm economy, is thus a potential source for both inclusion and exclusion (Nagler and Naude, 2014).

Agriculture as an Opportunity

The long-run answer to the challenges and inequalities induced by structural and rural transformation entails higher return of on-farm employment together with a faster integration of farm labour in the non-farm economy. In the short term, development policies must include marginalized groups in the mainstreamed rural development interventions, while “maintaining momentum for transformation” (Timmer, 2014). Improving access of rural people to markets, finance systems, technology and information is essential for achieving more diversified and resilient rural economies (IFAD, 2015). The necessary ground to support individuals overcome their livelihood constraints and, consequently, foster inclusive transformation pathways, requires the exploitation of all the functions agriculture can play. Going beyond food production per se, agriculture can contribute to several other functions in the community livelihood system: natural resources management, biodiversity conservation, and the socio-economic viability of rural areas (Renting et al, 2009). The exploitation of its multifunctional role appears extremely important to ensure a sustainable transformation (Westley et al, 2011; Horlings and Marsden, 2011).

Agriculture, rural areas and the broader agri-food system always matters: not only for their directly contribute to food and nutrition security, livelihood and environmental conservation, but they also shape the path of the transformation (Timmer, 2014). If the momentum for inclusive transformation is to be sustained, rural areas must experience the spread and depth of agricultural modernization, and an increased number of farmers should be supported to make the transition to greater specialization and diversification of products and trade (IFAD, 2016; FAO, 2016). The development of agrifood value chains has supported many countries to shape the necessary link between the agriculture and manufacturing sectors. This, in turn, has catalysed the development of broader manufacturing industries by providing raw material inputs (Wilkinson et al, 2009). Figure 5 disentangles the main dynamics of the process.

The agrifood sector is also often the main source of off-farm employment in rural areas of poor countries (ILO, 2015). Growth in the demand for agrifood products is forecasted to be driven primarily by developing countries where population growth, increase mobility and higher urbanization are changing consumer diet preferences.

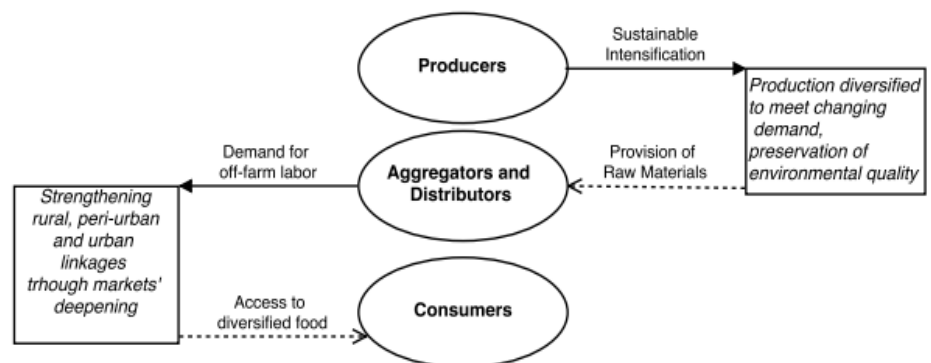


Figure 5 Agricultural surplus as a necessary tool for value chain development

This trend creates strong opportunities for developing countries to respond to emerging domestic and regional demand by pursuing diversification and value addition strategies. These strategies are essential for the development of agrifood industries that will contribute towards broader-based and lower risk economic growth, food security and nutrition, and poverty reduction in rural areas.

What Role for RTB Crops?

The CGIAR Research Program on Roots, Tubers and Bananas (RTB) is working globally to harness the untapped potential of roots, tubers and banana cultivation in order to improve food security, nutrition, income and climate change resilience of smallholders, especially women and youth. Root, tuber and banana crops – cassava, potatoes, sweetpotatoes, yams, bananas, plantains, and tropical and Andean roots and tubers– are some of the most important staple crops in the world’s poorest regions. They provide around 15% or more of the daily per capita calorie intake for the 763 million people living in the least developed countries. Often rich in key nutrients such as provitamin A, RTB crops can significantly improve nutrition and food security. Many RTB crops can be grown with few inputs and often under harsh conditions. Yet they respond very well to intensification and are high yielders in terms of calories produced per hectare. As important cash crops they can help boost family incomes and are frequently grown or marketed by women.

RTB have collected several success stories of how the adoption of RTB crops and practices can contribute to the sustainability of livelihood systems. These cases range from the testing and adoption of improved Yam, Cassava and Potato seed varieties, Banana disease control technologies, soil fertility and erosion control methods (Mignouna et al, 2015; Myric, 2016). The case studies offer a unique opportunity to assess the means, extent, and trajectory of different agricultural innovation contribution to the transformation or rural landscape, allowing for cross-country comparison, and collecting information on different stages of the process.

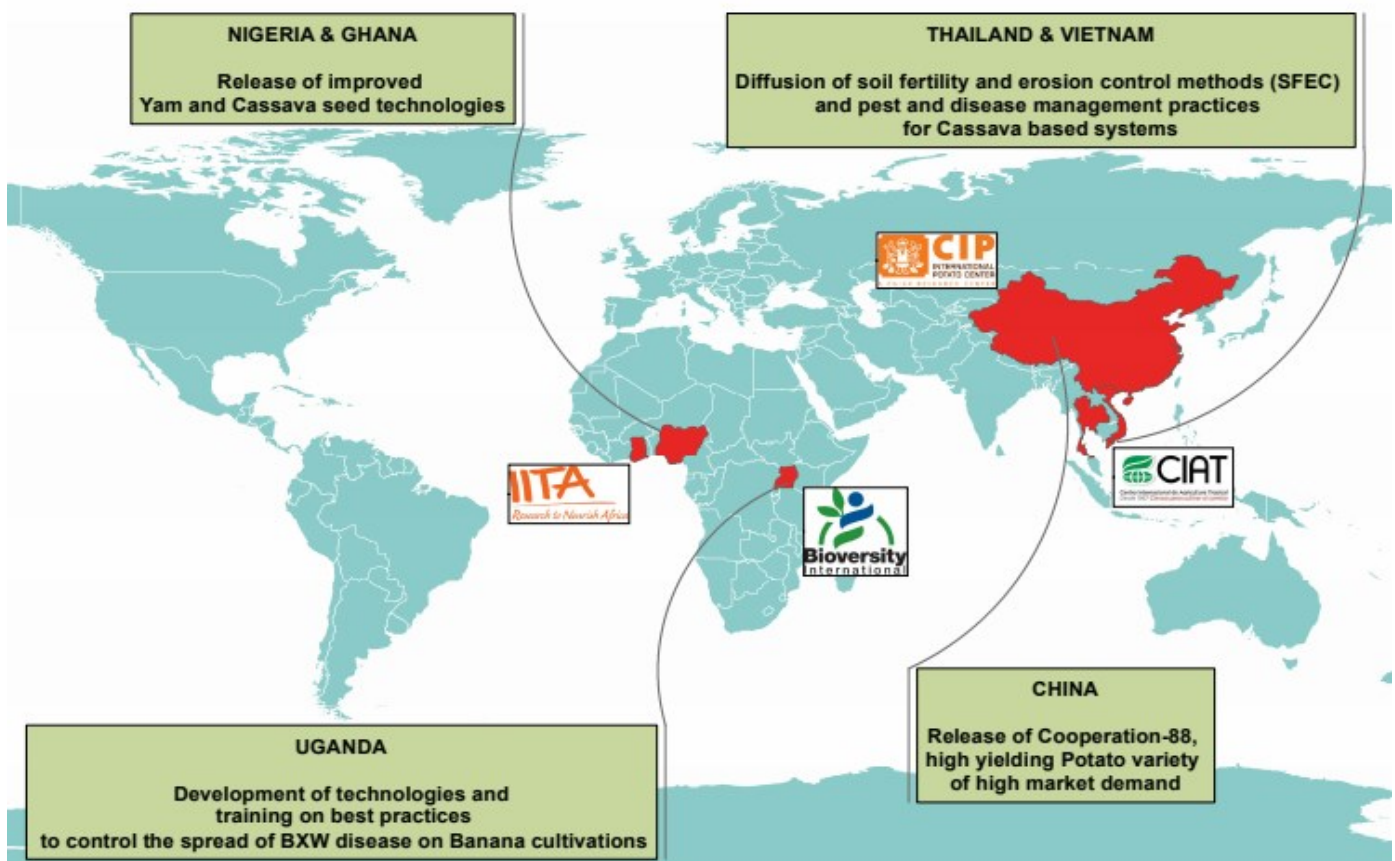


Figure 6 Proposed case studies

Next Steps

Cluster 5.1 is working to provide new insights into 21st century Rural Transformation, and identify how it looks like in the regions where key RTB research is implemented. We acknowledge the necessity to improve researchers and development practitioners understanding of transformation pathways at all levels – ranging from individual behaviour to macro institutional change – in order to better tailor agricultural development intervention. Focusing on each partner proposed case study, the synergies and the continuum between RTB Foresight, Ex Ante and Ex Post impact assessment (IA) analysis offer a unique opportunity to capture, at different stages and different levels, the complexity of the dynamics and pathways driving the rural transformation process. The combinations of these analytical tools, in an aggregate effort of different research institute with complementary expertise, can generate the necessary informational added value to picture different stages of a scaling pathway towards a sustainable and inclusive rural transformation. Emphasis is put on the investigation of causal linkages and multipliers effects, achieved through the adoption of a multidisciplinary approach and the implementation of mixed data collection methods. Ultimately, the capture of intended and unintended development outcomes would serve as base to advice policymakers seeking to stimulate rural economic growth and poverty reduction.

RTB Flagship 5.1 wish to answer the following research question:

- ▷ *What is the role of farming and technological development in the rural transformation process of key RTB producer regions?*
- ▷ *To what extent do RTB crops contribute to foster the process?*
- ▷ *What are the economic, social and environmental cost and benefits?*
- ▷ *Which policy options can be drawn to support farmers' reaching development goals?*

The analysis would focus particularly on the following indicators:

- a. *changes in livelihood diversification strategies (on farm, off farm and migration),*
- b. *agricultural productivity,*
- c. *food and nutrition security,*
- d. *social inclusion (gender and youth),*
- e. *markets emergence and deepening.*

The outcomes of interest relate to the domain of sustainable agricultural development accompanied by off-farm changes and livelihood diversification. The analysis will explore changes in behaviour, capacity, opportunities and motivations of direct and indirect beneficiaries. Practices of different stakeholders and next users will be analysed, with a focus on: regional organizations and platforms (e.g. CORAF, ASARECA, FARA, Learning Alliance for Sustainable and Inclusive Development, CATIE, IICA), Musa regional and international networks, extension services, producers organizations and associations, private enterprises and policy makers. Ultimately, the insights and findings of direct and indirect development outcomes would serve as informational base to provide policymakers, scholars and development practitioners with alternative theories of change (ToC) inserting development intervention and planning into the broader framework on rural landscape evolution.

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