A Planet for Life 2012 focuses on agriculture and its relation to development, food and the environment. At the end of the 2000s, a consensus has emerged and points to the urgent need for massive investment in the agricultural sector, which is (once again) viewed as one of the prime engines for development and food security, as well as for poverty reduction, but what exactly does this consensus cover? While the idea of investing in agriculture is gaining ground and although several countries or regions appear to be offering opportunities for investment in agricultural land, debates are going on as to which agricultural models to choose and how agricultural policies should be implemented.

A Planet for Life called on many highly specialized authors from different countries and perspectives, and invites the reader to discover the sector in all its complexity, upstream and downstream of agricultural production. At the crossroads of the challenges posed by development, food security and the environment, the transformation of the agricultural sector is at the heart of the global stakes of sustainable development. To help steer these changes towards greater sustainability, this book makes us aware of how crucial it is to also change our representations of agriculture, change the visions that guide projects for change and the policies regulating this sector.

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There remains a lively controversy over the role of agriculture in development. There are two opposing viewpoints, agro-optimistic and agro-pessimistic, regarding the potential role of agriculture as an engine of growth and economic transformation, as well as the importance of smallholder farms. This opposition is particularly strong in Africa, a continent that is still largely agricultural.

THE ROLE OF AGRICULTURE IN AFRICAN ECONOMIC DEVELOPMENT: WHAT DO WE DISAGREE ON?

After a hiatus, agriculture is back on the development agenda. While there is consensus on the importance of agriculture in poverty reduction, disagreement still exists on whether agriculture can be an engine for growth and economic transformation and how to develop agriculture most effectively to realize its role in economic development. The main positions on agriculture as an engine of growth can be classified as “agro-optimist” and “agro-pessimist”, while differences in opinion over “how” primarily focus on the role of smallholder agriculture. Optimists emphasize the positive role of agriculture in growth and often simultaneously advocate smallholder agriculture. Whereas agro-pessimists, though not necessarily against the promotion of commercial agriculture, question the relevance of smallholder agriculture and consider domestic agricultural development as unimportant for food security, suggesting that the priority should be the development of industry and import.

This chapter focuses on Sub-Saharan Africa. We first highlight the debates around the role of agriculture, particularly smallholder agriculture, in economic development. We then provide a detailed analysis of Ethiopia and Ghana to further address this important research and policy issue. We conclude with a brief discussion of the key opportunities and challenges for African agricultural transformation.

SMALLHOLDER AGRICULTURE AND ECONOMIC DEVELOPMENT – THE MAIN DISAGREEMENTS
On historical, theoretical and empirical grounds, there is little controversy regarding
the role of agriculture in poverty reduction in Africa. Large-scale poverty reduction is unlikely to occur in the absence of agricultural growth, given that in most African countries more than one-third of the workforce (sometimes up to 50%) is involved in agriculture, along with the importance of the contribution of agricultural output to the consumption baskets of the poor. What remains a challenge however, and perhaps not surprisingly a source of disagreement, is how to transform African agriculture in which smallholders account for most of the farming population. Agricultural transformation requires not only the development of nontraditional (and often export-oriented) agriculture, but also changes to traditional agriculture where farmers have produced the same products for generations. While success stories involving nontraditional and export-oriented agriculture in African countries are becoming increasingly common (for example, Reardon et al., 2009), scaling up and replication to encompass traditional smallholder domestic-oriented agriculture remain a challenge.

The debate centres on the linkages between agricultural development and economic growth. Albert Hirschman introduced the concept of linkages, showing that investments in a few modern industrial sectors could cause whole economies to grow through backward and forward linkages with upstream and downstream industries; such growth is self-reinforcing and enables developing countries to escape the stagnation trap (Hirschman, 1958). At that time it was assumed that the necessary economical drivers must be modern industries, since agriculture was perceived as a traditional sector. Indeed, we would expect subsistence-oriented agriculture to have few linkages with other economic sectors, since it typically uses hardly any modern inputs produced by non-agricultural sectors.

However, Asia’s green revolution in the late 1960s and 1970s swept aside the view of agriculture as a traditional sector with a passive development role. It revealed the possibility of transforming agriculture through science-based technologies adapted to a country’s ecological conditions. The “induced innovation model” espoused by Hayami and Ruttan (1985) emphasized both the importance of technical change for agricultural growth and that technical change is often endogenous to a country’s economic system. As the green revolution and the induced innovation model revealed, growth in agricultural productivity requires support for the linkages between agricultural and non-agricultural sectors. By introducing consumption linkages, Johnston and Mellor (1961) first brought the linkage concept into the broad economy in which agriculture is an important component.

A summary of the key areas of disagreement between agricultural optimists and pessimists, mainly differing on their perspectives concerning the transformation of smallholder agriculture, is provided in Table 1. Barrett et al. (2010) assessed the role of agriculture in development through an analysis of historical literature, concluding that the perspectives of the 1960s remain relevant today. Gollin (2010)
Table 1. Controversy and Debate

<table>
<thead>
<tr>
<th>Topic</th>
<th>Agro-optimist</th>
<th>Agro-pessimist</th>
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<tbody>
<tr>
<td>Role of agriculture in growth</td>
<td>Agriculture-based growth is more effective than other engines of growth for economic development and poverty reduction (Timmer 1988; Gollin et al. 2002; Tiffin and Irz 2006)</td>
<td>Causation might actually reverse and run from economic growth to agricultural growth (Dercon 2009), or non-agricultural growth to improvements in agricultural productivity (Gardner 2000).</td>
</tr>
<tr>
<td>Importance of linkages</td>
<td>Agricultural growth produces stronger forward and backward production and consumption linkages than non-agricultural growth, suggesting agriculture has the highest multiplier effects that can produce broader economic growth during the early stages of industrialization (Johnston and Mellor 1961; Diao et al. 2007).</td>
<td>Evidence for starting growth in smallholder agriculture that is based on “linkages” research is weaker than often suggested, and the methods used cannot establish causality and identify the sources of agricultural growth (Collier and Dercon 2009).</td>
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<tr>
<td>Smallholder farms</td>
<td>Smallholders dominate African farming and more attention should be given to investing in their productivity and profitability (World Bank 2007). Many smallholders are net food buyers, and accelerating their productivity directly contributes to income growth and food security (Byerlee and de Janvry 2009).</td>
<td>Smallholder agriculture is a form of “romantic populism” and incompatible with economic development (Collier 2008). Efforts to support it are inefficient as it represents a backward sector and offers a narrow range of economic activities with little scope for sustaining decent livelihoods and generating growth (Collier 2008).</td>
</tr>
<tr>
<td>Markets and trade</td>
<td>A trade-based food strategy is difficult to implement in Africa with large populations in remote areas whose diets are staple foods that are only lightly traded due to high transportation costs. Smallholder domestic production is essential in the face of global food crises and foreign exchange constraints, and food imports are unlikely to replace domestic production as a viable solution (World Bank 2007). The greatest market potential for most African farmers still lies in domestic and regional markets for food staples where increases in farm incomes will be higher than those offered by niche markets and traditional and nontraditional exports (Diao and Hazell 2004).</td>
<td>The availability of cheap imported food allows African countries to bypass agricultural development and move resources into the manufacturing sector and to exporting cash crops or non-agricultural goods to attain more rapid growth (Dercon 2009). Domestic markets for food staples in Africa are limited and increased production can cause prices to decline to levels that make farming relatively unattractive amongst competing activities (Ellis and Harris 2004; Ellis 2005).</td>
</tr>
<tr>
<td>Rural-urban</td>
<td>The comparative advantage in many African countries’ tradable subsectors will remain in primary activities (agriculture and mining) and agro-processing for many years. Developing manufacturing is more difficult than developing agriculture in such countries (World Bank 2007). In most African countries, the urban economy does not yet generate sufficient jobs for the rural population. Manufacturing has been stagnant (and even shrinking) and has created few jobs. Surplus rural labour has low skill and education levels (Gollin 2010). When migration to urban areas is used as a coping strategy, non-farm jobs are frequently informal, risky and provide low returns (Thirtle et al. 2001). If migration is driven by desperation instead of farm productivity growth, it lowers wage rates, denudes rural areas of innovators (i.e. brain drain) and while it may briefly relieve extreme need, it seldom cuts chronic poverty (Lipton 2005).</td>
<td>Exclusive focus on agricultural development is unwarranted because it is more productive to invest in other sectors: for resource-rich countries, natural extractive resources should be the main economic priority; for coastal and well-located economies, “industrial progress” is most likely the best way to take advantage of trade opportunities (Ndulu et al. 2008). Urban dynamism offers better prospects for stimulating growth by creating employment opportunities in manufacturing and services sectors, enabling people to stop farming, access higher paying jobs and reduce vulnerability to agriculture seasonality and risk (Dercon 2009). The failure to take advantage of the rural-urban transition and policies that “trap people in agriculture” have stalled the development process (Ellis 2005). Public investments in rural areas should be on health and education to ease migrant access to major cities (Dercon 2009; Ellis and Harris 2004). Urban migration provides an opportunity for the benefits of growth to trickle down to rural households where agricultural-based incomes remain stagnant (Ellis and Harris 2004).</td>
</tr>
</tbody>
</table>
showed that agricultural development is essential for economic growth for countries with large interior populations and limited access to international markets, since the importance of agriculture-led growth depends on the feasibility and cost of importing food. Dercon (2009) argued that the role of agriculture in the growth of African economies is crucial in landlocked, resource-poor countries but not for resource-rich, coastal or well-located countries. De Janvry (2010) highlighted the huge costs entailed by developing countries through neglecting agriculture in the 1980s and 1990s, linking the renewed attention on agriculture to recent economic, social and environmental crises. In his view, the role of agriculture for development should be reconceptualized because its functions are now multiple and the contexts for implementation have changed dramatically. While a new paradigm of agriculture for development remains incomplete, the successful implementation of a redesigned agriculture for development is critical and urgent in Africa.

**AGRICULTURAL AND NON-AGRICULTURAL LINKAGES IN ETHIOPIA AND GHANA**

The fact that the role of agriculture in development differs from one country to another is an issue on which consensus is found. Country-level assessments are therefore necessary. Below we present case studies of two very different African
countries, focusing on agricultural and non-agricultural linkages to understand agriculture’s role in development.

Ethiopia and Ghana were chosen to highlight the variation that exists across Africa. Ethiopia is landlocked, poor in natural resources other than agricultural land and in the early stages of economic transformation. Since large-scale, commercial agriculture is scarce, few doubt that smallholders must lead agricultural growth. In contrast, Ghana is a well-situated coastal country that benefits from trade with Europe. Due mainly to recent improvements in infrastructure, it has the potential to develop export-oriented services. Ghana thus fits well with the agro-pessimist’s argument that many African countries should focus on the development of export-oriented industry rather than agriculture.

ETHIOPIA With only 15% of the population living in urban areas, Ethiopia remains one of the least urbanized and most agrarian economies in the world (Figure 1). Besides coffee, sesame seed, animal hides and a few other agricultural primary products, the domestic food economy remains insulated from global markets by high transport and marketing costs. Agriculture is dominated by locally grown non-internationally traded staples such as teff, sorghum and barley. The country has no mineral resources and exported goods and services only account for around 13% of GDP, much lower than most African countries. The main industrial imports are fuel, fertilizer and other chemical products.

Agro-optimists cite the closed nature of Ethiopia’s economy as a basis for strong agricultural linkage effects. As Ethiopia is insulated from global markets and dominated by agriculture and a large rural population, when agricultural growth raises the income of farmers they spend disproportionately on domestically produced non-agricultural goods and services. Thus there are strong consumption linkages between the two sectors. A closed economy also implies that food prices fall with increased agricultural production. Therefore when growth is led by agricultural productivity, farmers who adopt high productivity farming practices benefit from the growth, while rural net buyers and urban households benefit from lower food prices, and so increase their demand for both agricultural and non-agricultural goods. Lower food prices benefit non-agricultural sectors by lowering labour costs. While this classical linkage effect has been weakened in many developing countries due to globalization, it remains dominant in Ethiopia.

Agro-optimists believe that spatial factors in Ethiopia, a large country with diverse agro-ecological conditions, are the other main cause of strong agricultural linkage effects. Domestic trade is active and markets have benefited from recent improvements in road infrastructure and market policies. When increases in local agricultural production are used to meet demand in various locations, opportunities are created for the development of agriculture-related services such as transformation, storage and trade. In this way Ethiopia has experienced rapid growth in its domestic service economy, as occurred in India during its green revolution (Hazell and Haggblade, 1991).
Since Ethiopia is labour abundant, agro-pessimists point to opportunities to develop a labour-intensive and export-oriented manufacturing sector (Ellis and Harris, 2004; Ellis, 2005). However, for a land-locked, large country like Ethiopia, high domestic and international transportation costs significantly discount the low labour cost advantage for such development opportunity. Moreover, low labour cost is only one of the many prerequisites for the development of a manufacturing sector. Agricultural growth would also be necessary to support an increased food demand, since urban populations in small towns consume mainly locally produced agricultural products as they are cheaper than imports. Although Addis Ababa’s urban economy appears able to develop independently of agricultural development, it is already one of Africa’s largest cities and any benefits from manufacturing development will be diminished by the increased costs of living in such a city. Urban costs of living would be further increased if more food is imported, and thus the traditional link between urban wages and agricultural productivity remains (World Bank, 2007).

Agriculture's linkage effects are an important guide for Ethiopia’s Agricultural Development Led Industrialization (ADLI) strategy, which aims “to bring about a structural transformation in the productivity of the peasant agriculture and to streamline and reconstruct the manufacturing sector, so that it makes extensive use of the country’s natural resources and manpower” (GOE, 1993). The strategy has been central to the government’s development programme since 1993, undergoing fine-tuning as understanding has deepened on the role of agriculture in growth, as reflected in Ethiopia’s 2005 Plan for Accelerated and Sustained Development to End Poverty (MoFED, 2005).

Despite the challenges of a large and rapid population growth and limited and deteriorating land resources, recent investments and policy decisions have had a strong impact on agricultural development. Since 2004 Ethiopian agriculture, as well as its whole economy, has witnessed the most rapid and sustained growth in the country’s history, with an average annual growth rate of around 10% from 2005 to 2009.

Agriculture accounts for 40% of Ethiopia’s economy and so its direct contribution to economic growth is large. However, agriculture also indirectly contributes to non-agricultural sectors. This can be demonstrated through the application of the Computable General Equilibrium (CGE) model for Ethiopia (Dorosh and Thurlow, 2010). Our simulation suggested that a slowdown in agricultural growth would negatively affect growth in non-agricultural sectors, 70% of the observed decline in overall growth being directly due to agriculture, while the rest is through agriculture’s linkages that negatively affect other sectors. In contrast, when non-agricultural growth slows, only 20% of the decline in overall growth is due to linkage effects between non-agricultural and agricultural sectors. It therefore seems reasonable to conclude that agricultural growth has directly contributed to Ethiopia’s recent period

GOVERNMENTS OF MANY AFRICAN COUNTRIES ARE DISAGREEING WITH THE AGRO-PESSIMISTS AND ARE PUTTING THE FOCUS BACK ONTO AGRICULTURE FOR DEVELOPMENT.
of strong economic growth, while indirectly stimulating growth in the non-agricultural sector through its linkage effects.

The poverty reduction effect of agricultural growth on the role of agriculture is less controversial. Our CGE analysis suggested that a slowdown in agricultural growth results in a much higher poverty rate than a similar slow down in non-agricultural growth (Figure 2).

**Ghana** Ghana has long been regarded as one of sub-Saharan Africa’s “star performers” (Coulombe and Wodon, 2007). In the past three decades, Ghana has had positive per capita GDP growth every year, a highly unusual phenomenon globally (Breisinger and Diao, 2008). Sustained economic growth has not only raised per capita income to more than US$1,000 in recent years, but also helped the country reduce poverty rates from 51.7% in 1991/92 to 28.5% in 2005/6 (GSS, 2007). Ghana’s growth rate further accelerated after 2006, so expectations are for Ghana to achieve the Millennium Development Goal 1 by halving the 1990s poverty rate before 2015 (Kolavalli et al, 2011).

Sustained growth has been accompanied by rapid urbanization. In 2009, around half of the population lived in urban areas (Figure 3). However, progress in urban industrial development has been slow and government efforts to promote it have largely failed. Following independence, a state-led development strategy created several large industrial enterprises, but few have survived in today’s liberalization and globalization era. Agriculture’s share in the economy has been replaced by informal services, while manufacturing growth has stagnated. Therefore, the key issue for Ghana is not whether it should develop its industrial sector, but that it must determine the role of agriculture in such development. This potential role is examined below through an analysis of agro-processing.

The pink shading represents urban peripheries. Here road conditions are similar to urban areas but population density is lower. The situation is similar for medium size cities and their peripheries, represented by the green colours.

Ghana’s agro-processing industries account for 60% to 70% of its manufacturing, which as a whole accounts for less than 10% of GDP (Breisinger et al., 2009). They are concentrated in basic foods, textiles, furniture and other wood products. In general, the domestic agricultural sector is able to provide the necessary input materials.

While traditional food processing – often small-scale and informal – has long existed in Ghana, the consumption of foods processed by formal manufacturing industries has rapidly increased, spurred by rising incomes, urbanization and concomitant increase in the opportunity cost of women’s time (Reardon, 2009). This increases market opportunities to develop agro-processing to meet local demand without necessitating the level of competitiveness required for export. However, the increased domestic demand for processed foods is often met by imported goods, a consequence in part of trade liberalization and globalization (Robinson and Kolavalli, 2010). This trend has not only challenged the development of Ghana’s
agro-processing industries but also threatens its agricultural sector, which loses out to imported processed substitutes.

Ghana’s agro-processing situation was analysed by Robinson and Kolavalli (2010). They conducted a case study on tomato processing which suggested that production capacity is not a constraint for development. Indeed, Ghana has sufficient tomato processing capacity to meet domestic demand; in fact it is significantly underutilized. However, consumers are substituting imported paste for domestically produced fresh tomato, and smallholder tomato production has stalled. The industry fails because the productivity and quality of fresh tomato is too low to ensure a regular supply of tomatoes at competitive prices. Thus, whether African countries should develop agro-processing as the first step of industrialization or not, actually depends on agricultural productivity.

The tomato example is not unique, with increased demand for processed food, the failure of large-scale food processing is common in Africa. For example, except for cocoa, Ghana has recently become a net agricultural importer of primary foods and agro-processing products. About one-third of foreign exchange earned by exporting cocoa is needed to pay for imported foods and other agricultural products, many of which could be produced locally. Rice and chicken imports have surged after Ghana liberalized its domestic market by lowering its import barriers in the early 1990s; and processed vegetable and oilseed product imports have increased on average by 20% per year in the past decade. Ghana currently imports around 60% to 70% of rice and 80% to 90% of poultry meat consumed domestically. Local producers cannot compete with imports and either reduce production or switch to other products (MoFA, 2009). Considering demand for most imported foods is highly income-elastic, such imports are expected to continue to rise in the absence of competitive domestic production.

This suggests that competitive agriculture can make inroads into manufacturing through food processing to meet domestic demand. However, when agricultural productivity stalls, development of some manufacturing such as agro-processing is constrained because cheaper imported processed foods can substitute primary non-traded agricultural products. Indeed, with globalization, agriculture and manufacturing have become increasingly integrated and interdependent, suggesting that African manufacturing should be a mechanism to transform rather than replace agriculture.

OPPORTUNITIES AND CHALLENGES FOR AFRICAN AGRICULTURAL TRANSFORMATION
Governments of many African countries are disagreeing with the agro-pessimists and are putting the focus back onto agriculture for development. For example, in reply to Collier’s agro-pessimism, an African Minister commented, “This is not the
Africa we live in” (Brooks, 2010). Moreover, more than thirty Sub-Saharan African countries had signed Comprehensive African Agriculture Development Program compacts by 2010 and agreed to increase agricultural public spending to 10% of total government budget. Ten countries have already reached the target. Donors and development partners also believe in the important role of agriculture in Africa for economic growth, food security and poverty reduction, suggesting we seize the moment and make an irreversible commitment to agriculture as a driver of growth (Brooks, 2010).

Encouragingly, Africa’s agricultural performance, aggregate and per capita, has improved recently. But most output growth has come from area expansion, rather than growth in total factor productivity or increased use of modern inputs. So, although growth has recently improved, productivity and international competitiveness lag.

Africa’s challenges are considerable and in some respects unique in world history, with simultaneous economic and demographic transitions occurring in the context of globalization and climate change (Naylor 2011). The most taxing issue is how to develop agriculture and what role governments should take to support private sector-led agricultural transformation. As de Janvry (2010) stated, it is a serious mistake to believe that we know what should be done. While African countries have much to learn from Asia’s example, Africa’s green revolution will be different given the initial conditions and the current global environment.

Agricultural transformation is difficult and there is no magic bullet. Perhaps the most important lesson from Asia’s green revolution is that serious and long-term political commitment is essential. Benefits will only follow if the effort is sufficiently large, concerted and sustained (de Janvry, 2010). Asian experiences emphasize the active and consistent engagement of government in technology adoption and in the transformation process (for example, Asian countries often have a strong and effective public extension system). With the expectation that the private sector will lead African agribusiness development, the way a country’s public sector engages in improving agricultural productivity will be different. What the government should do, how it should do it and the requirements for institutional revolution in smallholder farming, are challenging issues.

There is more than one path to effective transformation. Mistakes are inevitable and lessons must be learned. Success in export-oriented agriculture, private sector-led in particular, has been encouraging. However, it remains to be seen whether the lessons from export agriculture can be transferred to traditional agricultural components that primarily cater to the domestic market. More effort is needed to critically examine experiences at sectoral and country levels and to build appropriate frameworks for analysis. ■


TOWARDS AGRICULTURAL CHANGE?

A Planet for Life 2012 focuses on agriculture and its relation to development, food and the environment. At the end of the 2000s, a consensus has emerged and points to the urgent need for massive investment in the agricultural sector, which is (once again) viewed as one of the prime engines for development and food security, as well as for poverty reduction, but what exactly does this consensus cover? While the idea of investing in agriculture is gaining ground and although several countries or regions appear to be offering opportunities for investment in agricultural land, debates are ongoing as to which agricultural models to choose and how agricultural policies should be implemented.

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