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Comparative Study of Trends in Urbanization and Changes in Farm Size in Africa and Asia: Implications for Agricultural Research

A Foresight Study of the
Independent Science and
Partnership Council

Peter Hazell

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SUMMARY

This paper explores the implications of recent trends in urbanization and farm size for prioritizing future small farm assistance policies in Asia and Africa, including agricultural R&D. It finds that unlike the green revolution era when small farm led development was a simple win-win proposition for growth, food security and poverty alleviation, a new situation has arisen in which policy makers need to differentiate more sharply between the needs of different types of smallholders, and between growth, poverty and food security goals. This paper distinguishes between three types of smallholders: commercially oriented, subsistence oriented, and part time smallholders who are in various stages of transition out of farming. For the CGIAR system, a widening fault line between the food security needs of large numbers of poor, subsistence oriented and transition smallholders verses the food needs of growing urban populations will require twin agendas. One agenda requires that agricultural R&D be integrated with humanitarian and off-farm forms of support for smallholders who are unlikely to become commercially viable as farm businesses. The other agenda requires integrating agricultural R&D with other forms of farm business support for market oriented smallholders who can produce net surpluses for the market. While some types of R&D may benefit both groups, many will need to be more specifically targeted to one type or the other. The business oriented agenda will become increasingly important in countries where rapid urbanization is leading to ever larger shares of the poor becoming divorced from the land.

PATTERNS OF URBANIZATION AND THEIR CONSEQUENCES

In 2011, the urban population is estimated to have reached 40% of the population in Africa and 45% in Asia (Table 1). The UN projects that urbanization will increase faster than total population in both continents and by 2050 the urban population shares are expected to reach 58% in Africa and 64% in Asia. By 2050, three quarters of the world's total urban population will live in Asia and Africa.

Table 1: Trends in rural and urban populations, 1970 to 2050, Africa and Asia

	Population (millions)				Average annual rate of change (%)		
	1970	2011	2030	2050	1970-2011	2011-2030	2030-2050
<i>Total Population</i>							
Africa	368	1,046	1,562	2,192	2.55	2.11	1.69
Asia	2,135	4,207	4,868	5,142	1.65	0.77	0.27
<i>Urban population</i>							
Africa	87	414	744	1,265	3.82	3.09	2.65
Asia	506	1,895	2,703	3,310	3.22	1.87	1.01
<i>Rural population</i>							
Africa	282	632	818	927	1.97	1.35	0.63
Asia	1,629	2,312	2,165	1,833	0.85	-0.35	-0.83

Source: United Nations (2011)

There are good reasons to think that urbanization rates may be over-estimated, as Potts (2012) argues for Africa. Drawing on recent calculations by Africapolis that combine remote sensing data with previously unreleased census data, Potts estimates that Nigeria's urban population is actually only 60% as large as UN estimates. She also argues that population growth rates in most Nigerian cities have been well below the national population growth rate and have slowed in recent years. Important sources of error have arisen from the reclassification of many rural areas as urban based on achieving certain population sizes regardless of occupations, and because of gross errors in the reported census data for many cities. Potts also marshals evidence to show that similar patterns of slowing urbanization are common across Africa. Notwithstanding these potential problems, urbanization seems likely to continue even if starting from a smaller 2011 base than the figures in Table 1 suggest.

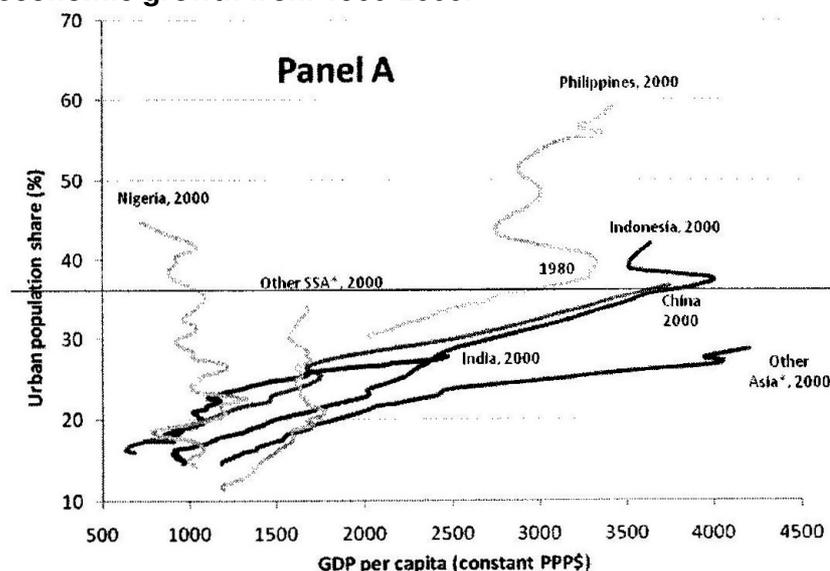
The mirror image of increasing urbanization is falling rural population shares. However, in Africa the total number of rural people is expected to keep increasing, at least until 2050. Asia may already have reached a tipping point and the total number of rural people is expected to decline by 0.35% per year during 2011-2030, and by 0.83% per year during 2030-2050 (Table 1). However, there is considerable variation by country, and a number of Asian countries are still well short of their tipping points (e.g. Pakistan and Afghanistan).

Urbanization (and non-agricultural employment) shares typically increase with national per capita incomes. However, Headey, Bezemer and Hazell (2010) argue that during 1980-2000, urbanization shares in most Asian countries increased at lower than expected rates compared to cross-country norms for comparable levels of income, while in many African countries, urbanisation shares increased rapidly even though per capita incomes declined or stagnated (Figure 1). This too-slow rate of urbanization in Asia can be attributed to the generally good performance of the agricultural sector in creating productive employment, and by rapid growth in the rural nonfarm economy that enabled rural workers to diversify into non-farm sources of income without having to move to urban areas. By contrast, the

too-fast rate of urbanization in Africa has been driven by poor agricultural performance - leading many rural workers to seek alternative livelihoods, and by slow growth in the rural nonfarm economy. In short, migration in Africa is driven more by despair and declining rural incomes. In Asia it is much more of a pull phenomenon associated with rising per capita incomes, but with considerable pull to the rural nonfarm economy and not just to the cities.

If these findings are correct, then it is possible that there will be an unexpected surge or catch up in rural-urban migration in Asia in coming years if agricultural growth rates and employment elasticities continue to decline. Moreover, if Africa were finally to achieve an agricultural revolution this could seriously slow rates of rural-urban migration. But in both cases, much also depends on the rate of growth in urban based manufacturing and services, and the strength of agglomeration economies.

Figure 1. Alternative development paths in Africa and Asia: urbanization and economic growth from 1960-2000.



Source: Headey, Bezemer and Hazell, 2010.

There are a number of implications of increasing urbanization for small farms (SFs):

- Urban people consume significantly more high value foods (e.g. horticultural and livestock products) and less cereals. This creates more market opportunities for high value, labour intensive agriculture in which SFs could excel.
- But urban food markets are increasingly supplied through integrated and consumer driven market chains controlled by corporate agribusiness and supermarkets. How far these entities will be willing to engage with SFs will determine their market prospects. SFs will need to organise to penetrate these markets, and many will be left out. The alternative is for SFs to use local farmers' markets, but that may be difficult for many SFs who are not located near urban centres. Market integration is currently more advanced in Asia than Africa.
- Growth in urban demand for livestock products will also lead to growth in the demand for feed grains. This will put some upward pressure on domestic cereal prices - especially in Asia where livestock systems tend to be more intensive, and improve market opportunities for cereals that SFs can easily grow and market. It will also increase staple food prices which will adversely affect those SFs who are net buyers of food, as well as other poor people.
- Urbanization creates more backward linkages to the rural nonfarm economy, and hence more local opportunities for SFs to diversify out of farming. This will lead to

- more part time farming. These effects are much weaker in Africa than Asia because of the poorer infrastructure and a less well developed manufacturing sector.
- An increasing share of the poor will become located in urban areas, where they will be divorced from the land and any ability to grow food for themselves.
 - Urban agriculture may become more important, particularly as more rural areas with significant agriculture are arbitrarily reclassified as urban when they reach a census threshold.
 - Men dominate exits to urban areas, leading to greater feminization of agriculture.

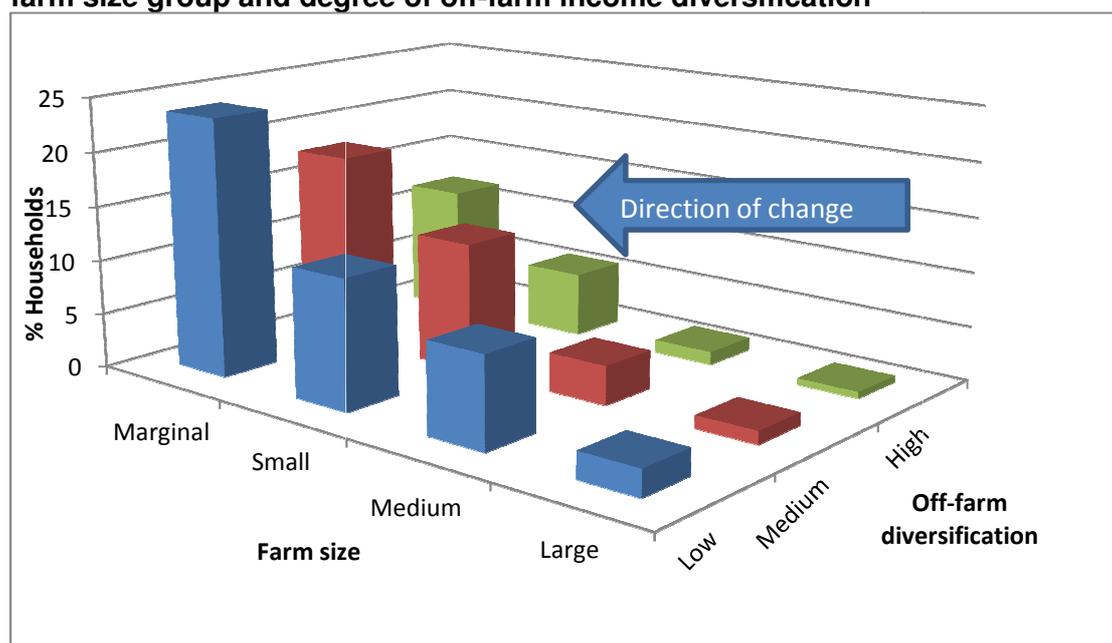
PATTERNS OF FARM SIZE TRANSITION AND THEIR CONSEQUENCES

Despite all the challenges they face, small farms are proving surprisingly resilient. They not only persist but continue to increase in number across much of Asia and Sub-Saharan Africa. The farm size data are much better for Asia than Africa, but as workshop papers by Jayne and Djurfeld and Jirström show, average farm sizes are already falling in many of the more populous countries in Africa, and SFs less than 5 hectares increasingly dominate farm size distributions.

Small farms are also becoming more diversified into off-farm sources of income, often because they are now too small to provide an adequate living from farming. In China, nonfarm income shares for farm households increased from 33.7% in 1985, to 63% in 2000, to 70.9% in 2010 (Huang, Wang and Qiu, 2012). This is a more extreme example, but nonfarm income shares have reached 40% or more in many other Asian and SSA countries, and are often much higher for the smallest farms (Haggblade, Hazell and Reardon, 2007). On average, this diversification is higher across Asia than Africa, but there is considerable variation within each continent.

Although there is a lot of country and regional variation, the overwhelming story is one of more small farms, shrinking farm sizes and increased income diversification. Despite growth, sometimes quite rapid growth, in national per capita incomes, there is little sign yet of a shift to the patterns of farm consolidation that occurred during the economic transformation of most of today's industrialized countries. Rather, relatively few workers are leaving their farms for the cities and instead are diversifying into nonfarm activity from a small farm base. This "reverse" transformation is leading to farm size distributions that look more and more like Figure 2. There is a general drift in the farm size distribution towards the origin on the horizontal axis, while off-farm diversification is leading to a simultaneous movement along the depth axis. Even in land abundant countries where the average farm size is increasing, still many small farms persist in lagging regions. In some countries (e.g. Bangladesh, India and the Philippines), even the total agricultural land area is becoming more concentrated among small farms, and it is the large farms that are being squeezed out.

Figure 2: Stylistic representation of the emerging distribution of farm households by farm size group and degree of off-farm income diversification



There are many factors driving this reverse farm size transition:

- Rapid rural population growth, especially in already populous countries.
- Insufficient growth in urban jobs to enable faster rural-urban migration. Even relatively fast growing countries like India have not generated sufficient growth in nonfarm jobs. Bangladesh and China may be two recent exceptions.
- Other constraints on rural-urban migration, such as language, racial and cultural barriers; legal restrictions on resettlement (e.g. China).
- Inheritance systems that lead to sub-division of farms amongst multiple heirs.
- Dense rural settlement patterns that provide enough income earning opportunities in the local nonfarm economy so that farm based workers do not need to migrate to urban areas.
- Growing high value opportunities in farming that create significant new employment opportunities in agriculture
- Restrictions on land market transactions, such as caps on farm size (India), or indigenous land rights systems that limit opportunities for land consolidation (Africa).
- An aging and immobile population of farmers. Farm exits tend to be an inter-generational phenomena; land is consolidated when farmers retire or die.
- Constraints on women's employment opportunities that keep them on the farm
- Inadequate social security systems so that farms are kept as a retirement hedge
- Subsidies and other agricultural support policies that make small scale farming more attractive than its real economic worth.

Many of these drivers are very powerful and seem unlikely to diminish in the near future. In poor, heavily populated countries experiencing rapid rural population growth (parts of South Asia and much of Africa) the pressure on land seems likely to keep growing. How many small farms will remain trapped in low productivity farming and poverty, and how many will successfully escape poverty by diversifying into high value agriculture or productive nonfarm activities or leaving farming altogether will depend critically on national and regional rates of economic growth and urban-rural linkages. In slow growing countries and in lagging regions more generally, large numbers of small and marginal farmers seem likely to remain trapped in subsistence farming and poverty.

The earlier experiences of Japan, Taiwan and South Korea suggest that the reverse farm size transition could continue until well into middle income status (Otsuka 2012). In Japan, for example, the average farm size only bottomed out around 1960 at 1 ha, and then increased to 1.2 ha in 1980 and 1.8 ha in 2005, while the percentage of farms less than 3 ha in size fell from 97.6% to 90.5% over the same period. China may finally have reached a tipping point in that the average farm size, which had fallen from 0.7 ha in 1985 to 0.55 ha in 2000, increased to 0.6 in 2010 (Huang, Wang and Qiu, 2012). However, it is difficult to obtain data to determine whether the actual number of small farms is now falling in China.

DOES THE REVERSE FARM SIZE TRANSITION MATTER?

From the perspective of economic efficiency or growth it does not really matter that farms are getting smaller unless there are economies of scale in farming. On the production side, the overwhelming evidence still supports an inverse relationship between land productivity and farm size, but small farms are facing growing challenges in accessing modern inputs, credit and high value markets. Large farms seem able to capture economies of scale and scope in linking to value chains, so unless small farms are organized into marketing groups, it is possible that they are becoming less efficient than large farms. If so, then the reverse transition does matter from an efficiency perspective.

Another economic growth concern is that as small farms get smaller, they may not have the kinds of cash income and expenditure patterns that help drive growth in the rural nonfarm economy. During Asia's green revolution, for example, small farms generated significant marketed surpluses and cash incomes, much of which was spent locally on a range of agricultural inputs, consumer goods and services, and investment goods for their farm and household. These expenditure and investment patterns generated significant secondary rounds of employment intensive growth in the rural nonfarm economy – or large growth multipliers (see Haggblade, Hazell and Dorosh (2007) for a review of the literature). Small farms today are less than half the size of the small farms of the green revolution era, and many are subsistence rather than market oriented. Much may depend on how off-farm sources of income are spent, but the possibility arises that it is now the commercially oriented and medium sized farms that are able to generate significant growth multipliers.

From food security perspectives the reverse transition poses a difficult dilemma. Small farms provide for the food security of huge numbers of rural poor. But many small farms are net buyers of food and they generate relatively little of the food required to feed large urban populations. Urban population shares are projected to grow strongly across the developing world (United Nations, 2011), and feeding these populations will require rapid growth in marketed food supplies. For most foods, these supplies will need to come from larger farms and commercially oriented small farms that can generate net surpluses. It follows that a food security agenda needs to walk on two legs. One leg is to provide support to the many smallholders who farm largely to meet their own subsistence needs. The other leg is to invest in large and medium sized farms and commercially oriented smallholdings that can produce marketed surpluses for the cities. Today about half the malnourished people in the developing world live on small farms (IFPRI, 2005), so support for subsistence oriented farms is crucial for meeting the current global food security challenge. But as urbanization proceeds, an increasing share of the poor will become urban based and detached from the land, so support for commercial farms will become increasingly important for meeting the food security needs of the poor.

From poverty and income equality perspectives the reverse transition also poses difficult challenges. Although diversification into nonfarm activities is a useful way of supplementing farm income, it may not be enough to maintain an adequate income, to escape poverty, or prevent widening rural-urban income gaps. Local diversification opportunities into high value

farming and nonfarm activity are higher in fast growing countries, and in dynamic and more densely populated rural areas. Small farms in such areas may be achieving adequate livelihoods despite having little land. Elsewhere, opportunities for diversifying into high value farming or local nonfarm opportunities are more limited, leaving many small farms trapped in subsistence oriented farming and poverty. This is especially common in lagging regions where most of Asia's rural poor now live (Ghani, 2010).

In India and some other Asian countries there seems to have been sufficient growth in remittances and rural nonfarm income in recent years to enable farm households to successfully avoid any widening gap between rural and urban per capita incomes. Rural poverty rates have also declined in tandem with urban poverty rates (Otsuka, 2012; Binswanger-Mkhize, 2012). But this is not true in many slow growing countries, particularly in Africa, where rural-urban income gaps are widening and rural poverty rates remain stubbornly high. The relatively slow growth of the agricultural sector and the generally sparser rural population densities in Africa also constrain growth in rural nonfarm opportunities.

Evidence from Japan, South Korea and Taiwan suggests that income diversification by small farms is not a long term solution to the rural-urban income gap problem. In these countries governments eventually had to introduce income support measures to narrow the income gap, and China and some other Asian countries are now beginning to follow suite (Otsuka, 2012).

From an environmental perspective more small and marginal farms can lead to mixed outcomes. Many small farms retain complex farming systems that are ecologically well balanced and serve to conserve in situ many underutilized and neglected foods and indigenous crop varieties and animal species. On the other hand, many highly intensified small farms are an important source of environmental pollution and zoonotic diseases. Many other small farms struggle to make a basic living, and can become trapped in downward spirals of resource degradation and poverty (Cleaver and Schrieber, 1994). Yet other small farms encroach into forests and are an important cause of deforestation. A larger number of small farms in a landscape also increases the difficulties of introducing knowledge intensive NRM practices, and can make it more difficult to undertake the kinds of collective action needed to sustainably manage and improve watersheds and common properties. On the other hand, it needs to be noted that many large farms also cause significant environmental damage.

In sum, the reverse transition is not a uniformly good thing, and is creating new tensions and potential tradeoffs between important economic, social and environmental goals. During the green revolution era, small farm growth was seen as a winning proposition for growth, poverty alleviation and food security outcomes, and concern focused largely on adverse environmental outcomes. This is now changing and the future outlook is for less complementary outcomes at national scales between growth, poverty alleviation and food security goals, posing more difficult choices for policy makers.

The widening fault line between these goals is most evident in the recent emergence of two very different agricultural agendas. On the one hand, recent increases in world food prices have made agricultural growth an imperative for food security. Since most of the food insecure households live in rural areas and mostly on farms, improving the productivity of subsistence oriented farms has become a high priority. As part of the 2009 G-8 Summit, leaders of 43 countries and multilateral organizations endorsed the L'Aquila commitment to "act with the scale and urgency needed to achieve sustainable global food security," creating the New Alliance for Food Security and Nutrition. On the other hand, higher agricultural and energy prices have turned agricultural growth into a 'business' opportunity for producing food, raw materials and biofuels for world markets, and there has been

significant growth in agricultural investment by sovereign wealth funds and foreign and national corporate sector investors.

Unfortunately these two drivers of change are not necessarily complementary. Many donors and NGOs are pushing for a broad social, environmental and climate change agenda based on subsistence oriented farmers, but with little thought about increasing agricultural growth or urban food supplies (Badiane, 2008). On the other hand, the private sector is pushing a new business agenda, often with an emphasis on large commercial farms, integrated value chains and exports. Many governments seem uncertain which way to go, should it be a 'food security' or a 'business' oriented strategy?

The business oriented strategy does not have to be inconsistent with a pro-poor, food security approach, as long as it engages with large numbers of smallholders who are, or can, become commercially viable. Already, private sector investments along value chains are opening up new market opportunities for some smallholder farms, particularly for high value products. However, it is also becoming apparent that many more smallholders are being left behind. Many smallholders are not only missing out on new high value chains, but in many countries have also lost access to modern inputs, credit and market outlets even for their traditional food staples (Djurfeldt, Aryeetey and Isinika, 2011). There has also been growth in land grabbing and the development of corporate sized farms which threaten to displace smallholders from their land as well as their markets (Deininger and Byerlee, 2010).

If more smallholder farms are to become commercially successful, governments will need to do more to support them by investing in the kinds of R&D and rural infrastructure that small farmers need, helping to organize small farmers for the market, and incentivizing the private sector to link with more small farmers.

What of the smallholders who cannot become commercially viable? Some are successfully diversifying their livelihoods out of farming, but there are many instances where this is not yet possible on the scale required or where the returns to nonfarm activities remain too low for them to escape poverty. Many others are sinking into deeper poverty and subsistence modes of production because of higher food prices and reduced access to land, markets and modern inputs. Yet investing in this type of farming is often little more than a productive safety net approach, particularly in remote and more marginal agricultural regions. It may be more cost effective to invest in improving subsistence farming rather than to spend on income transfer programmes, but that is something that needs to be determined on a case by case basis. There seems to have been very little work comparing the two approaches.

THE CONTEXT FOR ASSISTING SMALL FARMS

Policies towards small farms need to be guided by country economic context and the enormous diversity of small farms in terms of their assets and aspirations.

Country context

Country context matters in determining the kinds of opportunities available to small farms. An important difference arises between countries where agriculture can serve as a major engine of national economic growth verses countries where agriculture is a secondary sector. This difference defines both the types of agricultural sector investments that are worthwhile, as well as the relevant roles that small farms might play.

Table 2 highlights different types of country situations. Historical evidence from around the world shows that agriculture plays its largest role in the early stages of a country's development, and diminishes significantly in relative (though rarely in absolute) importance as economies diversify and workers migrate to the non-agricultural sector. But even in the

early stages of development when its importance is potentially high, agriculture's contributions are affected by a country's resource endowments and its access to international markets. Table 2 captures these characteristics by differentiating between countries at early versus later stages of development, and among the former, between countries that have significant minerals or urban-based manufacturing sectors versus those that must rely more on agriculture as their lead sector.

Two key roles for small farms are identified. One is a growth, or development role. This role arises when agriculture itself has a growth role to play and when commercially oriented small farms are efficient and can compete in the market. This role will be greatest in countries at early stages of development with good agricultural potential and lacking large mineral or urban-based manufacturing alternatives. In these cases, the best opportunities for small farms are likely to be in food staples for the domestic market and high-value production for export. Countries starting with large mineral or urban-based manufacturing sectors will have strong currencies and ready access to low-cost food imports, so their best small-farm growth opportunities are likely to be in high-value production for the domestic markets. An important but challenging growth role for small farms lies in countries with limited agricultural potential and which also lack significant minerals or urban based manufacturing.

Table 2: Priorities for small farms by country economic characteristics

Early stages of development		Later stages of development
Leading sector		
Minerals or urban based manufacturing	Agriculture	All types of countries
Commercial opportunities for small farms to sell high-value products in domestic markets. Social value in retaining small farms as a reserve employer, and to spread mineral wealth and provide subsistence for the rural poor.	Commercial opportunities for small farms in export crops, food staples, and some high-value products for the domestic market.	Remaining small farms gradually squeezed out, and those that survive focus on high-value products and part-time farming. Social value in retaining small farms as a reserve employer until sufficient exit opportunities have been created.

Source: Adapted from Hazell, Poulton, Wiggins and Dorward (2007).

As countries industrialize, small farms typically play a shrinking role in all kinds of countries. Rising real wages within the wider economy tend to drive farm consolidation, and the small farms that survive find niches in high-value markets or become part-time farms.

In Asia, the Green Revolution of the 1960s to 1980s was predominantly led by small farms at a time when agriculture, and cereals in particular, served as a leading growth sector. But now that many Asian countries are successfully industrialising, small farm led agricultural growth based on cereals is becoming less relevant and less able to avoid widening rural-urban income gaps (Otsuka 2012). The reverse transformation that is occurring in Asia is potentially leading to a growing backlog of workers who will eventually need to exit from agriculture (Headey, Hazell and Bezemer, 2010). In this case, policies for small farms need to be designed to help improve the productivity of small farms and help them find high value opportunities, but remain cognizant of the possibility that many of them will need to diversify out of agriculture, or leave farming altogether.

In Africa, by contrast, government and donor neglect of agriculture in recent decades has created a different situation. Except in relatively few countries with large mineral sectors or urban based manufacturing, agriculture needs to become a leading growth sector. By neglecting to invest, a situation has arisen in which too many workers have either left farming for the cities, or diversified out of farming from a small farm base. This has happened in the context of stagnating or even declining per capita incomes, suggesting a premature exit of agricultural workers into low productivity nonfarm jobs (Headey, Hazell and Bezemer, 2010). In this situation there is still a good case for productive investments in agriculture and small farms.

A second role for small farms arises from their potential social contributions. Small farms can provide a way for governments to spread the benefits from a large mineral or urban-based manufacturing sector during the early stages of development when most people are still engaged in agriculture. As economies grow, small farms can also serve as a useful reserve employer until sufficient exit opportunities exist. Finally, small farms may provide a social safety net, or subsistence living, for many of the rural poor, even when they are too small to be commercially viable. These social roles are most important in countries with a poor agricultural productivity potential, or a large mineral or urban-based manufacturing sector. These social roles do not necessarily require that all small farms be commercially viable. There are also important environmental considerations in countries where poverty and environmental degradation is associated with small farms, and these problems may also warrant targeted interventions of their own. But as we shall see, policies and investments to support these kinds of roles may often need to be structured differently than those for commercially oriented small farm growth.

Diversity of small farms

Small farms are a very diverse group, and they face varying prospects that depend on their own assets and aspirations as well as on their country and regional context. Policies and investments to assist small farms need to take this diversity and context into account. A variety of farm typologies have been offered in the literature to help manage this diversity. Vorley (2002) distinguishes between farmers operating in three rural worlds. In rural world 1, commercial farmers are globally competitive, linked to export markets and use modern technologies; in rural world 2, farmers sell primarily in local, regional and national markets and use intermediate technologies; in rural world 3, farmers are subsistence oriented and use traditional technologies. The WDR2008 (World Bank, 2007) identifies five smallholder groups: market oriented, subsistence oriented, off-farm labor oriented, migration oriented and diversified households that combine multiple income sources. Berdegue and Escobar (2002) identify three groups of family farms based on regional context and household assets. The first category are family farms with good assets (land, labor, and/or access to capital) and who are located in places with good agricultural potential and access to markets. These farmers are usually fully integrated in a market economy and make a substantial contribution to the production of food for domestic and international markets. The second category comprises family farms that have reasonable assets and agricultural potential but are constrained by being located in slow moving regional economies with limited market access. The third category comprises resource-poor farmers located in places where conditions are adverse not only for agriculture, but often for nonfarm activities. The majority of smallholders in this group are poor, subsistence oriented and may be diversified into low productivity nonfarm sources of income.

Key elements in these typologies are access to markets, household assets, agricultural potential and off-farm income diversification. Drawing on this work, it is proposed to classify smallholders into three groups for the purposes of targeting small farm assistance:

- Commercial small farmers who are already successfully linked to value chains, or who could link if given a little help. Commercially oriented small farms may be full or part time farmers.
- Small farms in transition who have or will soon have favourable off-farm opportunities and would do better if they were to either exit farming completely or obtain most of their income from off-farm sources. Most transition farmers are likely to leave farming, and it is just a question of when and how. Those that remain will farm part time and may not be very market driven.
- Subsistence oriented small farms are marginalized for a variety of reasons that are hard to change, such as ethnic discrimination, affliction with HIV/AIDS, or being located in remote areas with limited agricultural potential. Many of the same factors also prevent them from becoming transition farmers. Subsistence oriented farms frequently sell small amounts of produce at harvest to obtain cash income, but they are invariably net buyers of food over the entire year.

The relative size of these three groups will vary by country context. With economic growth and urbanization, significant numbers of commercially oriented small farms are likely to prosper through diversification into high value agriculture. The most successful small farmers will tend to be located in areas with good agricultural potential and market access. Over time, some commercially oriented small farmers will become large farms while others will eventually become transition farmers or successfully exit farming to the nonfarm economy. Transition farmers will either have, or will be able to develop, suitable skills and assets for undertaking nonfarm activity, and they are likely to live in well-connected areas with access to off-farm opportunities. Their farming activities are likely to be oriented towards their own consumption rather than the market. Subsistence oriented farmers are more likely to persist in less-favoured and tribal areas and to grow traditional food staples (both crop and livestock) for their own consumption.

Table 3 summarizes the kinds of transitions that are possible for each of the three small farm groups. Over finite periods of time, shown as a move from period t to period t+1 in the table, it is desired that subsistence farms should become transition or commercial farms; that transition farms should successfully move to the nonfarm economy; and that commercial small farms should either prosper as such, transform into larger farms or find successful exit strategies to the nonfarm economy. To be avoided are situations where many small farms revert to or remain trapped in subsistence farming, or where transition farms fail to find successful exits to the nonfarm economy.

Table 3: Transitions from small farm groups

Type small farm		Period t+1				
		<i>Subsistence</i>	<i>Transition</i>	<i>Commercial</i>	<i>Large Farm</i>	<i>Nonfarm</i>
Period t	<i>Subsistence</i>	O	X	X		
	<i>Transition</i>	O	O			X
	<i>Commercial</i>	O	O	X	X	X

Note: X = desired transition; O = undesired transition

APPROACHES TO ASSISTING SMALL FARMS

Some guiding principles

Table 4 highlights the kinds of interventions that may be relevant for each of the three groups of small farms. Commercially oriented small farms need support as farm businesses.

They need access to improved technologies and natural resource management (NRM) practices, modern inputs, financial services, markets, and secure access to land and water. Much of this assistance will need to be geared towards high value production, and provided on a commercial basis. Many smallholders will also require help acquiring the necessary knowledge and skills to become successful business entrepreneurs in today's value chains, especially women and other disempowered groups. Managing market and climate risk is a challenge for many small farms, and in addition to insurance and access to safety nets, they need to develop resilient farming systems.

Transition farmers need help developing appropriate skills and assets to succeed in the nonfarm economy, including in many cases assistance in developing small businesses. This can be especially important for women and other disempowered groups who have little experience working off farm. The transition to the nonfarm economy may also be facilitated by securing land rights and developing efficient land markets so that they can more easily dispose of their farms. Since many transition farmers seem likely to continue to remain as part time farmers, they can also benefit from improved technologies and NRM practices that improve their on-farm productivity.

Subsistence farmers are predominantly poor and will mostly need some form of social protection, often in the form of safety nets, food subsidies, or cash transfers. Interventions that help improve the productivity of their farms (e.g. better technologies and NRM practices) can make important contributions to their own food security and perhaps provide some cash income, and may in many cases prove more cost effective than some forms of social protection. But subsistence farmers have limited ability to pay for modern inputs or credit, so intermediate technologies that require few purchased inputs may be needed, or inputs will need to be heavily subsidized. Subsistence farmers are typically the most exposed and vulnerable to climate risks, and in addition to safety nets, they need help developing resilient farming systems.

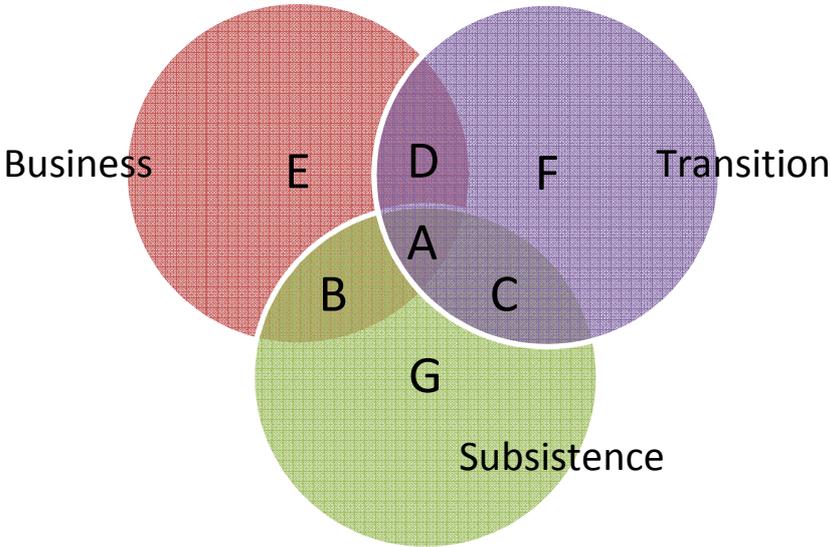
Table 4: Types of assistance relevant for different small farm groups

<i>Type small farm</i>	<i>Types of assistance</i>
Commercial	<p><u>Farming as a business</u> Better technologies and NRM practices Organizing small farmers for marketing purposes Incentivizing large agribusiness to link with small farms Accessing seeds, fertilizer, finance and insurance Securing land rights and development of efficient land markets Encouraging entrepreneurship Empowering women and other vulnerable groups Building resilient farming systems Safety nets</p>
Transition	<p><u>Stepping out of farming</u> Training and support for nonfarm activity, including development of small businesses Encouraging entrepreneurship Empowering women and other vulnerable groups Securing land rights and development of efficient land markets Better technologies and NRM practices Safety nets</p>
Subsistence	<p><u>Social protection</u> Safety nets and transfers Better technologies and NRM practices</p>

	Subsidized inputs for own food crops Securing land rights Building resilient farming systems Empowering women and other vulnerable groups Support for nonfarm diversification
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Although the choice of assistance policies will need to be different for the three groups of small farms, not all interventions need to be as carefully targeted as others. Figure 3 shows how possible interventions to assist small farmers might impact on the three groups of SFs. Some interventions will benefit all three groups, and these are the interventions that fall in area A. Other types of interventions will benefit two groups (areas B, C and D) and others will benefit only one group (areas E, F, and G). Interventions that benefit only one group (areas E, F and G) may be relatively easy to target, but interventions that benefit two or more groups can be more problematic. If an intervention generates ‘non-excludable’ benefits, i.e. other groups can also benefit at little or no additional cost beyond the cost of reaching the primary target group (e.g. some types of agricultural R&D) then the benefits captured by other groups can be viewed favourably as “spillover” benefits and careful targeting would not be required. But if the benefits captured by other groups represent are ‘excludable’ and represent a diversion of benefits from the primary target group, then this must be viewed as a “leakage” that needs to be minimized through careful targeting. Cash transfers, food subsidies and fertilizer vouchers intended for the poor typically fall into this category.

Figure 3 Potential benefits accruing to different types of small farms as a result of assistance interventions, including agricultural research



IMPLICATIONS FOR AGRICULTURAL RESEARCH AND THE CGIAR

As with other interventions designed to assist SFs, agricultural R&D should help to improve welfare within the groups to which it is targeted (Figure 3), and help SFs make desired transitions to other groups (Table 3).

As Table 4 suggests, agricultural R&D needs to be integrated with other types of SF assistance. It also needs to be integrated with the types of agents that provide such assistance. This principle applies generally, but is especially important in three cases in Figure 3:

- Area E is also of interest to private sector, particularly for productivity research, so public R&D (including the CGIAR) needs to find its appropriate niche. This may be to focus on improved NRM and the types of productivity research that are not easily appropriated by the private sector (e.g. improved agronomy, open pollinated crop varieties).
- In area F, alternative interventions by the state and NGOs to assist off-farm diversification, small business development and even exits will be relevant, and increasingly so as countries develop. Public R&D needs to complement these activities and avoid trapping people on farms longer than is socially desirable. Depending on country context, this may require greater focus on research that has short to medium term payoffs rather than long term impacts.
- In area G, public research needs to complement a whole range of social protection activities undertaken by governments and NGOs. Some types of agricultural R&D that improve food security may be very worthwhile, and reduce dependence on social transfers. Yet social protection policies may be the better alternative in many marginalized and insecure/conflict areas, and for some of the poorest of the poor.

Table 4 provides some examples of the types of public R&D that seem most relevant for different target groups in Figure 3.

Table 4: Types of public R&D relevant for each small farm group

<i>Target area in Figure 3</i>	<i>Farm groups that benefit</i>	<i>Examples of types of research</i>	<i>Comments</i>
A	C, T, S	Cereals improvement, particularly upstream science like biotech Farming systems research	
B	C, S	Cereals improvement, particularly upstream science like biotech	
C	T, S	Diet enrichment	
D	C, T	High value crops and livestock	
E	C	High value crops and livestock Precision management of modern inputs Water management Animal health Small scale mechanization	Public R&D needs to complement research undertaken by private sector
F	T	Small scale mechanisation Diet enrichment Food staple crop	Public R&D needs to complement alternative interventions to

		improvement	promote exits
G	S	Food staple crop improvement, including neglected and underutilized species (NUS) Improved low-external input farming (LEI) methods Improved water capture Resilient farming practices in face of weather shocks Diet enrichment	Public R&D needs to complement social protection interventions

Note: C = commercially oriented SFs; T = SFs in transition; S = subsistence oriented SFs.

CONCLUSIONS

The case for smallholder development as one of the main ways to achieve agricultural growth and reduce poverty and food insecurity remains compelling. The use of public funds for this purpose can yield high returns, both in terms of economic growth and poverty alleviation. The best evidence for this comes from Asia (Fan, 2008), but more recent evidence shows that it can also hold in Africa (Mogues and Benin, 2012).

However, the gathering forces of rapid urbanization, a reverse farm size transition towards ever smaller and more diversified farms, and an emerging corporate driven business agenda in response to higher agricultural and energy prices, is creating a situation where policy makers need to differentiate more sharply between the needs of different types of small farms, and between growth, poverty and food security goals.

Many smallholdings today are too small to provide adequate livelihoods, and their farm families have either begun a transition out of farming into the nonfarm economy, or they are trapped in subsistence modes of farming, often in lagging regions. Both kinds of smallholders may need assistance developing new off-farm opportunities, and in overcoming poverty and food insecurity. These smallholders account for large shares of the total rural poor and food insecure people in the developing world, and they are an important target group for international efforts to achieve the MDGs and promote food security (e.g. the New Alliance for Food Security and Nutrition). However, transition and subsistence oriented farms play a relatively minor role in producing marketed surpluses to drive economic growth and feed growing urban populations, and are unlikely to successfully link to modern value chains. Interventions to improve on-farm productivity can be helpful to the food security of both groups, but will need to be complemented by other interventions that more directly alleviate poverty and facilitate off-farm transitions.

In contrast, there are also many small farmers who, because of their resource endowments, good location or sheer entrepreneurial skill, are succeeding as commercial farm businesses, even if only on a part time basis. These kinds of small farms are much more aligned with the new corporate driven business agenda. As with small farms in green revolution days, they can play important roles in driving economic growth and feeding urban populations. The greatest challenge facing these types of smallholders is accessing modern value chains. Private sector investments along value chains are opening up new market opportunities for some smallholder farms, particularly for high value products, but it is also becoming apparent that many more commercially oriented smallholders are being left behind while

larger farms are gaining market shares. In Africa, many smallholders are not only missing out on new high value chains, but have lost access to modern inputs, credit and market outlets even for their traditional food staples (Djurfeldt, Aryeetey and Isinika, 2011).

If more smallholder farms are to become commercially successful, policy makers will need to do more to support them. Key areas for support include improving the workings of markets for outputs, inputs, land and financial services to overcome market failures that discriminate against small farms, investing in the kinds of R&D and rural infrastructure that small farmers need, helping to organize small farmers for the market, and incentivizing the private sector to link with more small farmers. The best way to achieve these is for government to work through private sector and civil society partners, creating an enabling policy and business environment, and scaling up proven successes.

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