

Investing in Poor Farmers Pays

Rethinking how to invest in agriculture

EMBARGOED UNTIL 00.01 HRS GMT TUESDAY 30 JUNE 2009

Decades of faltering public commitment to investing in agriculture has hindered farmers' ability to cope with price volatility, climatic and economic shocks, or to pull themselves out of poverty. Yet donors and governments must see investing in agriculture as part of the long-term solution to the food, financial, and climate crises. Global agricultural growth and rural livelihoods cannot be improved nor poverty reduced without renewed public commitment to invest more, and more wisely in agriculture. Investments must include the forgotten poor people who live in marginalized areas, be context specific, demand-driven, participatory, and promote sustainable rural livelihoods through environmentally sustainable and empowering practices that treat men's and women's needs equitably.

Summary¹

In July 2008, world food prices reached their highest peak since the early 1970s. Food stocked on grocery store shelves was out of reach. Riots ensued. Millions were afflicted. Another 100 million people were pushed into the ranks of the hungry, raising the total to nearly one billion worldwide. And these numbers could climb again as food prices remain high, and continue to rise in many local markets.

Notwithstanding, the 20th century witnessed unprecedented growth in agricultural productivity for one primary reason: strong government commitments to invest in agricultural research and development (R&D) and supporting sectors.² Growth occurred most visibly in the rice and wheat 'Green Revolutions' of Asia during the 1960s and 1970s, where rice yields grew by 32 per cent and wheat by 51 per cent. Without these advances, it is largely recognized that there would be large food deficits in the world today,³ but these gains were not achieved without losses to the environment and human health, increased rural inequality, and insufficient solutions to establishing better policy frameworks for tenure security, labour regulations and enforcements, and women's empowerment.

Ironically, these successes contributed to public complacency about the world food supply, leaving many on the sidelines of prosperity.⁴

Complacency manifested itself in decades of faltering public commitment to investing in agriculture in developing countries. And this complacency has hampered farmers' ability to cope with price volatility, climatic and economic shocks, or to pull themselves out of poverty. Yet rich countries did not neglect their own agricultural sectors. Respectively, the USA and the EU invested annually an average of \$17,765 and \$7,614 per farm from 1986 to 2007, compared with the miniscule \$1.01 (US) and \$2.46 (EU) invested in small farms in poor countries over nearly the same period.⁵ Even though investments did occur, they were insufficient in magnitude, inadequate in scope, and inequitably distributed, and therefore unable to address the needs of many agricultural communities, particularly those of smallholders, women and workers in marginalized areas.

The 2008 *World Development Report* renewed interest in agriculture as the foundation for poverty and hunger reduction. In response, investments from all donors increased nearly 25 per cent from \$3.8 billion in 2006 to \$5 billion in 2007.⁶ The food crisis of 2008 then riveted public attention on the plight of agriculture. Bilateral and multilateral donors came swiftly, although inadequately, to the rescue, only to be shadowed by the impact of and response to the global financial crisis and tailing recession. Failing banks and lenders have already begun to worsen the effects of the food crisis and to steal the spotlight.

With at least \$8.7 trillion injected into the global financial sector since January 2009 to resume trade and credit flows,⁷ the donor community

is drawing on empty pockets as national governments watch their revenues dwindle, potentially reversing any gains made in poverty reduction in recent decades. Under a worst-case scenario, global unemployment could reach 231 million, and another 53 million people could be trapped into poverty living on less than \$2 a day.⁸ Yet donors and governments must see investing in agriculture as part of the long-term solution to the food, financial, and climate crises. In poor countries whose economies depend on agriculture, agricultural growth can reduce poverty through broad-based demand for labour, rural goods and services.

Global agricultural growth and rural livelihoods cannot be improved, nor poverty reduced, without renewed public commitment to invest more, and more wisely, in agricultural research and development, rural development, and supporting sectors: education, infrastructure, health, and the environment. With relatively few opportunities for profitable investments by private sector investors in many of these areas, the public sector and voluntary sector must play stronger roles. When measured against poverty reduction indicators rather than returns on investment, investing in poor people pays.

Major, predictable funding of agricultural development is critical. Agriculture is a diverse and dynamic industry. As conditions vary from place to place, 'one size' will not 'fit all.' Agricultural investments must be tailored to the specific conditions and actors in different locations. Just as there is no one technology that will work everywhere, technology in and of itself is only part of the answer. To address poverty, investments must be made in, in support of, and outside of agriculture.

Investment where and for whom is also significant. Agricultural investments must include those who have been left behind by the productivity gains of the past century – an estimated two-thirds of farmers in low and middle-income countries who live in risk-prone growing environments or in remote areas, or both – and for whom fewer non-farm employment options are available. Due to their physical and social exclusion, poverty in these areas is more prevalent due to physical, social, and political exclusion. Desperation-led migration exacerbates social problems, particularly for women. Insecure land and workers' rights make labour more casual. Women left on farms don't always have the time, assets or social capital to engage productively in farming. Thus, investing equitably in men's and women's needs is fundamental.

Farmers in marginalized areas are also the caretakers of some of the most degraded lands, shouldering the burden of conserving global crop biodiversity and managing some of the world's most fragile soils. Thus they are critical allies in the fight against climate change. A longer-term perspective on resource conservation means shifting from a technology-only approach to an environment-centred paradigm. Rather than focusing solely on improved yields, investments must also aim to promote environmental sustainability.

Looking ahead, investments in agriculture must invest in people. Cultivating the social and knowledge capital of poor people, particularly women, in rural areas, and enabling them to adopt environmentally sustainable farming methods through participatory design, must become centre stage. Operationally, investments need to be demand-driven, but also to include some combination of: cutting-edge science; low-cost farmer-driven models of technology development and diffusion; value chain expansion incorporating stakeholder empowerment; and instruments for better risk management. Producers and labourers need basic protection and enforcement of their labour rights, and governments must help retailers and employers to create an environment of 'development inclusiveness.'

Together, investments must aim to reduce poverty; respond to the needs of poor people; promote environmental sustainability; and empower women and rural communities to build sustainable rural livelihoods. Indicators of success for donors and governments alike must be measured against these criteria.

Oxfam recommends that donors, national governments and private sector investors:

1. **Make agriculture centre stage.** Ultimately, to reduce poverty, agriculture must once again become a top priority for governments and donors alike.
2. **Invest more, and more wisely.** Investments in agriculture must be greater than previously envisioned, predictable, transparent, untied, channelled through budget support, and complemented by funding for civil society groups, both as government watchdogs and as complementary service providers.
3. **Recognize that one size does not fit all.** Investments in agriculture and agricultural research for marginalized areas need to be tailored to the conditions of specific locations, participatory, and demand-driven.

Oxfam recommends that national governments, with the help of donors, must:

1. **Fill the gap left by the private sector.** Because private sector investors find few profitable opportunities in marginal areas, the public sector and voluntary sector must play stronger roles.
2. **Build sustainable rural livelihoods.** Public investments in agriculture are paramount, but must be complemented by investments in non-farm rural development, soft and hard infrastructure, education and health care, to have the greatest impact on productivity and ultimately on poverty reduction.
3. **Invest in marginal areas.** Agricultural investments must include those who have been left behind: an estimated 66 per cent of poor, rural people. Any strategy that exclusively emphasizes agricultural investments in favoured areas is ill-advised, particularly in countries with limited shares of high-potential land.

4. Support low external input technologies. Investments are needed in the development of low external input technologies that address resource conservation, reduce dependence on purchased inputs, and promote farmer empowerment in marginal and favoured areas.

5. Recognize that there is no silver bullet. Just as there is no one technology that will work everywhere, technology in and of itself is only part of the answer. Investments must also reach outside of agriculture entirely to provide safety nets for those affected by climatic and market shocks and who cannot engage consistently in the economy.

6. Empower farmers and their communities to participate in identifying their own needs and most suitable investments, by strengthening the capacity of producer organizations to undertake collective actions, and bargain for better prices and services and self-finance development priorities.

7. Treat people as the key resource to develop. Delivery of better technology will not in itself end hunger or improve food security. Investments in agricultural technologies that work in marginalized areas require substantial investments by farmers themselves. Most promising new technologies are knowledge-intensive. Their adoption and impact depends on farmer education outside formal schooling, such as farmer field schools.

8. Strengthen labour rights. Waged agricultural workers need enforceable legislation that provides better worker protection, minimum wages, pensions, and access to health care.

9. Invest in women's needs. Women are the key to food security. Investments in agriculture must involve women and address women's needs within agriculture and related sectors. Women's access to inputs and financial services must be improved in order for their potential to be realized.

Hidden high in the Andean hillsides of Peru, Jose Gonzalez Condo, an alpaca farmer in Chinosiri – perched 16,000 ft (4,900m) above sea level – does not have enough money to feed and shelter his alpaca herd. Aissa Tenin Sidibe, a mother and cotton farmer in the dusty fields of Bougouni in southern Mali, struggles to afford fertilizer for her crops and to manage her work alongside caring for her family. Alami Bera and her husband are wheat and *teff* farmers in Ethiopia's Bacho district, and worry whether they will be able to feed their eight children. Two thousand miles (3,200 km) south, in Zimbabwe, Beatrice Masuhu's family faces similar challenges of poor rainfall and limited access to seeds for staples like sorghum and millet. And across a continent, in Cambodia, Rort Kea strives to make a living from growing rice.

What do all these farmers have in common? Fairly little, based on the characteristics of their growing environments, customs, and asset endowments. But this holds true: they all rely on agriculture for their livelihoods, which are growing more precarious by the day from the threats of climate change, the recent food and financial crises, and falling investments in agriculture. Why? They live in marginalized, diverse and harsh growing environments. As a result, they are difficult to reach and have varying needs that are often unattractive to donors and the private sector. No single intervention can help them all. But reducing poverty, mitigating climate change, and building resilience to climatic and market shocks means empowering these farmers and their communities to identify the investments that will best meet their needs. This, however, will require serious commitments on behalf of donors, national governments, the private sector and farmers themselves to invest more, and more wisely, in agriculture.

Against the backdrop of three global crises, securing attention and funding for agriculture and rural development will be no small feat, particularly as all eyes remain on the financial sector. Despite attempts to coalesce a global coordinated response to the food crisis, as evidenced by the creation of the UN High Level Task Force (UHHLTF), the 2008 Rome and 2009 Madrid summits and G8 Agriculture Ministers meeting, the global community has come up very short. While AIG walked away with \$85 billion in US bailout money,⁹ countries like Eritrea, Jamaica, Panama and the Philippines have received a combined total of \$2.7 million from the USA in Official Development Assistance (ODA) for agriculture from 2002 to 2007.¹⁰

Donors and governments must stop the practice of crisis chasing and start making sound investments that comprehensively tackle the food, financial, and climate crises. Down-payments in the future of poor, rural people are paramount. On both moral and economic grounds, donors and governments must make them their top priority. Investing in agriculture in agriculture-based economies pays for itself by reducing poverty.

Investments in agriculture must not only be demand-driven, but also be developed and assessed based on their ability to achieve environmental sustainability, reduce gender inequities, and promote empowerment. Each of these elements is fundamental for achieving poverty reduction. This paper illustrates the challenges involved and proposes options to address them, providing a platform for public investment in agriculture. Failure to rethink how and in whom to invest will make poverty reduction an ever distant, if not impossible, goal. This paper:

1. makes the case for why investing in agriculture is critical to poverty reduction
2. identifies trends in agricultural investments over the last three decades
3. demonstrates that public investments are essential to fill the gap left by the private sector to meet the needs of society
4. locates and describes the conditions of poor people who have been left behind by agricultural growth
5. outlines options for investing in them, and raises challenges and recommendations for addressing social inequities in high-value agriculture
6. suggests options for future investments that build sustainable rural livelihoods.

In addition, governments, poor and rich, must create the right enabling environments for poverty reduction through appropriate and fair pricing, regulatory, trade, and agriculture policies. However, these issues are not addressed here.

2 Agriculture is key to poverty reduction

The strongest reason for governments to invest in agriculture is that it can reduce poverty. Seventy-five per cent of the 'dollar-poor' work and live in rural areas; projections suggest that over 65 per cent will continue to do so until 2025.¹¹ Sales and exports from agriculture constitute the main source of revenue for many poor countries; and in some cases, upwards of 40 per cent of gross domestic product.

Investing in agriculture leads to broad-based growth. Labour-intensive, it has the capacity to tap underused labour, such as rural workers who own no land and farmers who own too little to make a living. Agricultural growth reduces food prices and acts as a multiplier in local economies, leading eventually to higher rural wages and vibrant rural markets where farmers and workers spend their earnings. Studies show that in Ethiopia, Ghana, Rwanda, Uganda and Zambia, when smallholders produce more food staples like cereals, roots, tubers, pulses, oil crops and livestock and trade in rural markets, equitable growth is more likely. In Rwanda, a one per cent growth in gross domestic product (GDP), driven by increased production of staple crops and livestock, had a greater effect on poverty reduction than the same rate of growth generated by export crops or non-agricultural sectors.¹² In-depth, multi-country analyses have shown that income among the poorest households rises much more with each one per cent increase in agricultural – as compared with non-agricultural – GDP for the poorest households.¹³

Investing in agricultural research and development (R&D) has generated large social benefits¹⁴ and has stimulated more growth in agricultural GDP than other forms of public spending.¹⁵ Looking at public spending allocations by sector in China, India, Thailand, and Uganda, investments in agricultural R&D generated one of the top two greatest impacts on poverty reduction in every case. Education and infrastructure were the other 'runners-up'.¹⁶

Based on economic principles, there is a strong case for public, rather than just private, investments in agriculture. Relative to other industries, the agricultural sector has numerous, spatially dispersed producers. Innovation is uncertain – many dollars must be invested and options pursued before any single one pays off. Most private investors will not take on a risky investment with a payback period that can span decades. Public investments must compensate in order to meet the needs of society.¹⁷

While no country has been able to develop without growth in agriculture, some analysts argue that agriculture-led growth may no longer work as a development strategy, suggesting instead that trade liberalization and foreign direct investment can open better opportunities. Claiming that linkages between agriculture and other sectors have weakened, the best technological advances exhausted, and that farmers increasingly rely on non-farm sources of income, some

contend that poor farmers would be 'better off laying down their hoes'.¹⁸ Yet, many poor countries have no viable, industry-based engine of growth. Income diversification is common worldwide and not in itself a signal that farmers are exiting agriculture; and massive outmigration without enough demand for labour will just exacerbate urban poverty.¹⁹ Thus, the case is undeniable: in poor countries whose people depend on agriculture for their livelihoods, donors and governments must invest in agriculture to reduce poverty.

3 Public expenditures on a slippery slope

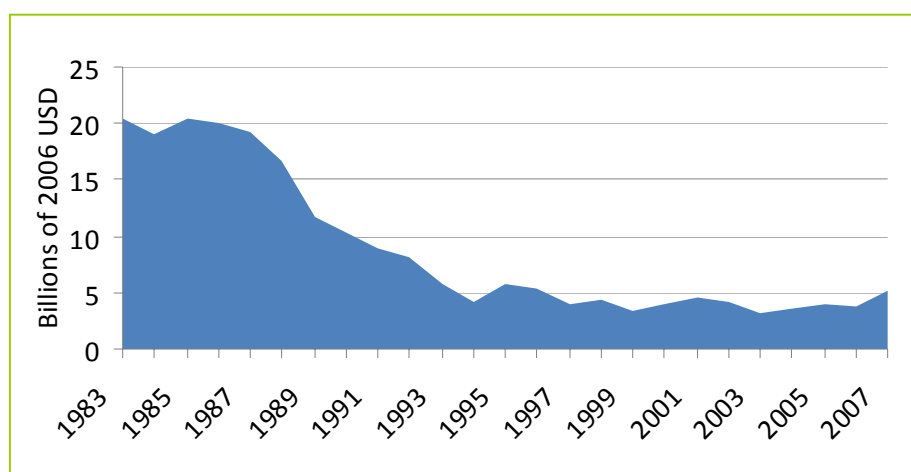
The 20th century witnessed unprecedented growth in agricultural productivity, spurred by government commitments to agricultural R&D and supporting sectors. In developing countries, this growth occurred most visibly in the rice and wheat ‘Green Revolutions’ of Asia. Ironically, although the same advances did not occur across the globe, progress contributed to public complacency about the world food supply. Following the oil and debt crises of 1970s and 1980s, fiscally burdensome government programs were reined in to ‘let markets work’ in the process of structural adjustment. The result? Investments in agriculture in developing countries declined precipitously.

Band-aid to agriculture?

Faltering public investments in agriculture over the last two decades were undoubtedly an underlying cause of poor people’s vulnerability to the 2008 global food crisis. ODA to agriculture dropped 75 per cent during the late 1980s and early 1990s (see Figure 1). Total donor investments in agriculture have since remained low, at around \$4 billion per year. In 2007, US and EU ODA commitments to agriculture increased slightly to \$1.2 billion and \$1.4 billion, compared with the astonishing \$41 billion and \$130 billion lavished on their own agriculture sectors in 2006.²⁰

Yet, millions of families in poor countries depend on agriculture for their livelihoods. If donors and governments in developing countries had invested in smallholder agriculture over the past two decades, many countries would be far less vulnerable to the price shocks experienced today. The few countries, such as Brazil and Mexico, which followed different paths and invested in smallholder agriculture and social protection, have proved to be far more resilient to the crisis than other developing countries.²¹ In response to the food crisis, donor spending began to increase, reaching \$5 billion in 2007.

Figure 1. Global Official Development Assistance (ODA) to Agriculture



Source: Authors' calculations based on data from OECD.Stat, includes forestry and fishing

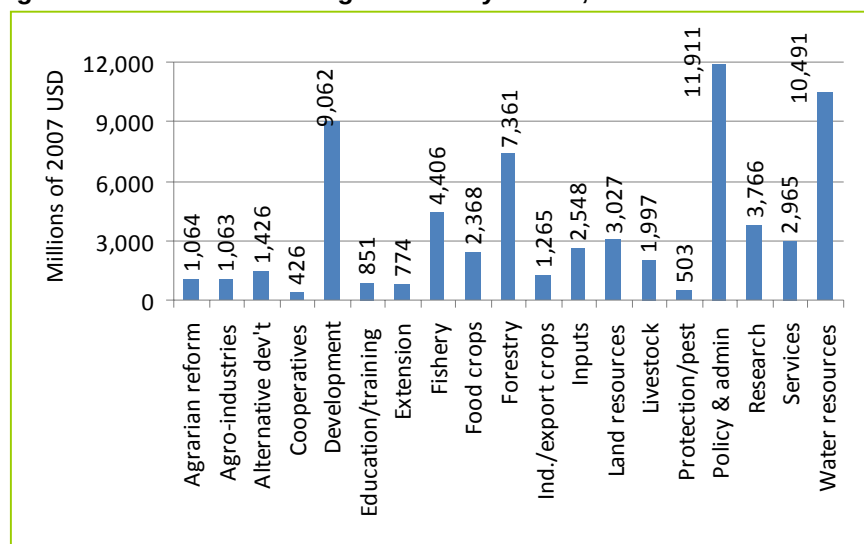
Renewed donor interest in agriculture began in 2004, and more commitments are trickling in to address the food and financial crises, but whether or not the downward trend will be permanently reversed remains to be seen. A return to 1986-7 levels of commitment to agriculture (about \$20 billion per year) would be in line, although not quite sufficient to meet the recommendations made by the United Nations High-Level Task Force on the Global Food Crisis (UNHLCF) in the Comprehensive Framework for Action (CFA). The CFA estimates that \$25–40 billion per year is needed for recovery from the current food crisis and prevention of another. At least 50 per cent of the estimated needs should be invested in agriculture and the local transport and market systems supporting smallholder farmers; the remainder is recommended for emergency interventions, nutrition programs and social protection.

While emergency food aid is a first-order response to the food crisis, indefinite reliance on it does not address the underlying challenges to food insecurity, nor does it help poor, rural people build up assets to become more resilient to shocks in the future. On the whole, member countries of the OECD's Development Assistance Committee (DAC) have spent twice as much on emergency response than on agriculture in recent years. Food aid has served as a band-aid. Investing more in agriculture would contribute to long-term food security, climate change mitigation and poverty reduction.

Turning the tables, sector by sector

Within the agriculture sector, the bulk of commitments are allocated to agricultural development, agricultural administration/agrarian reform, water resources, forestry and fishing (see Figure 2). Fewer commitments have been designated for cooperatives, inputs, research, food crop production, livestock and pest and post-harvest control – areas which are crucial for enabling poverty reduction. These data do not explain the multitude of factors that contribute to determining spending priorities, particularly because they measure commitments and not disbursements. Nonetheless, they raise questions about whether these resources are allocated effectively.

Figure 2. Commitments to agriculture by sector, 1995–2007



Source: OECD statistical database, amounts expressed in 2007 USD

From 1995 to 2007, donors invested most in policy and administration and agricultural water resources. As climate change experts forecast an increase in water scarcity and, as a result, a potential increase in conflicts threatening food security for millions of people, investments in water management are crucial. Agricultural water resources, as a sector, includes irrigation, reservoirs, hydraulic structures and groundwater exploitation. However, large-scale irrigation, reservoirs, and dams may not be the most practical water management systems for poor farmers and those most affected by climate change and water scarcity in coming years. Improving access to water has a profound impact on food production and security, especially by increasing the productivity of smallholders. Women farmers in Africa are often among the smallest smallholders,²² and can spend four to five hours per day carrying water for their families.²³

Assistance to cooperatives and producer organizations all but disappeared during the 1990s, re-emerging this decade to make up roughly one per cent of aid to agriculture. Producer organizations are invaluable in the design and dissemination of new technologies, adopting conservation measures; strengthening indigenous knowledge; pooling resources; and empowering rural people. Empowering poor people leads to greater transparency and better government accountability. If loud enough, rural voices can affect the structure of public expenditures and demand that their governments invest in ways that will have better outcomes for them, their food security, environments and livelihoods.

Globally, donors invested more ODA in food crop production than in export and industrial crop production, but the reverse is true for Africa. From 1990 to 2005, the African agriculture sector grew by 3.72 per cent – more than any other developing region – yet poverty has actually been rising.²⁴ The size of a country's agriculture sector is typically measured by agricultural GDP. However, this fails to include subsistence farming, non-market transactions, underground markets, and the non-monetary economy, and may not be representative of the distribution of growth. Thus, growth measured by agricultural exports may not be a good indicator of food security and poverty rates.

Around 20 per cent of agricultural ODA to sub-Saharan Africa was allocated for land resources such as soil improvement, water drainage in logged areas, desalinization, erosion and desertification control. Plagued by barriers to natural resource management as a region, it is mystifying why greater resources are not allocated towards these priorities. Further, the onset of the impact of climate change on food production demands greater attention to natural resource management overall.

Box 1. Climate change affects food security

The catastrophic effects of climate change are hitting poorest people first and worst. Continued excessive greenhouse-gas emissions, primarily from industrialised nations, are – with scientific certainty – creating floods, droughts, hurricanes, sea-level rise, and seasonal rainfall unpredictability. The result is failed harvests, disappearing islands, destroyed homes, water scarcity, and deepening health crises, all of which can reverse the advances made towards poverty alleviation in the last half century.

While higher average temperatures may lead to yield increases in northern countries, southern countries, mostly developing, will experience the greatest negative impacts. Projected increases in the frequency and severity of extreme weather events and water scarcity will undoubtedly affect food production. Agricultural production accounts for an astounding 70 per cent of fresh-water use. Five hundred million people already live in water-stressed zones, and the number is projected to increase to four billion by 2050 as unsustainable water-use practices and climate change leave many agricultural areas vulnerable to conflict over scarce water resources.

According to the Intergovernmental Panel on Climate Change (IPCC), climate change could reduce yields from rain-fed crops in parts of Africa by 50 per cent as early as 2020, putting between 40 and 170 million more people at risk of hunger worldwide.²⁵

A study by the International Rice Research Institute (IRRI) showed that when temperatures increase by 1°C (33.8°F) at night during the growing season, global rice yields could be decimated. Another study showed that rice and wheat production could fall globally by eight per cent and 32 per cent respectively by the year 2050.²⁶ In Asia, where more than half of the world's population resides in just two countries – China and India – if no measures are undertaken to halt the impacts of climate change, agricultural production in China could drop by five to ten per cent; in India, where there will likely be less water for rain and meltwater-fed agriculture, production could decline by nearly a third.²⁷

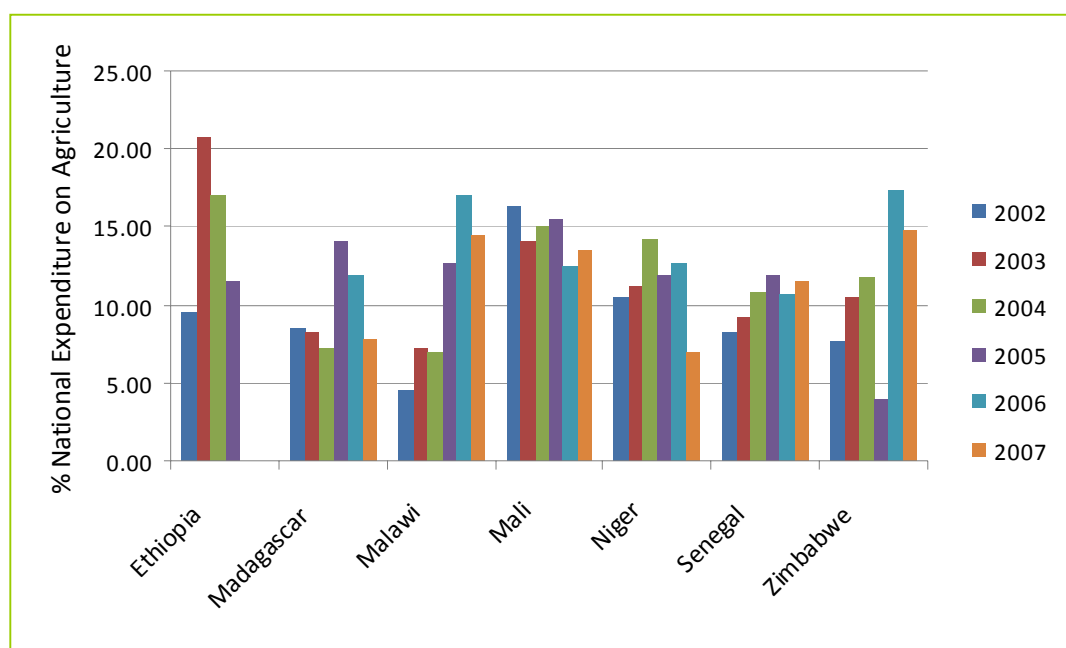
Climate uncertainty and risk are a fact of life in the high Andes (above 2,500m), but climate-related pressures are worsening. Most of the world's tropical glaciers are found in the mountains of Peru, Bolivia, and Ecuador. Rates of de-glaciation are expected to increase, leading to changes in the rates and timing of water discharge from mountain rivers. In turn, this will destabilize slopes, creating natural hazards like landslides, worsen water stress during dry seasons, and reduce water availability for food preparation and power generation. Future climatic conditions could bring changes in rainfall, and higher risk of drought. All of these factors contribute to making farming systems more vulnerable to erosion, a major threat to the agricultural livelihoods of Andean communities.²⁸

Reducing the impact of climate change on food security requires global cooperation. Rich countries must commit to finance adaptation in developing countries, with new resources to support the efforts of communities to build their resilience by adopting appropriate technologies and diversifying their livelihoods.²⁹

Maputo in the distance

At the same time as donor support to agriculture was declining, investing in agriculture also went out of fashion for developing country governments, with the exception of Brazil, China and India. In Africa, governments spend on average 4.5 per cent of their budgets on agriculture – despite an overwhelming number of Africans who depend on agriculture for their livelihoods and an African Union (AU) target of ten per cent agreed to in the 2003 Maputo Declaration. While many African countries have increased their national agricultural expenditures, only a few – Ethiopia, Madagascar, Malawi, Mali, Niger, Senegal and Zimbabwe – have been able to reach this target.³⁰

Figure 3. Countries with more than 10% national expenditure on agriculture



Source: NEPAD-CAADP

Due to the long, steady decline in ODA to agriculture and national public investments, it will be difficult to fill this gap. Donors cannot expect poor national governments to fill it alone. Financing and implementation must occur through innovative partnerships that, when appropriate, include the public, private and voluntary sectors. Aid should be channelled as budget support when possible; provided in a predictable and transparent manner; untied; free from economic conditions; and – in conjunction with budget support – it should ensure continued funding for civil society groups both as government watchdogs and as complementary service providers. In all cases, farmers themselves must have a strong voice in the planning and implementation to ensure that the assistance is sustainable and appropriate.

4 Filling private sector gaps with public investments

Agricultural R&D in rich countries is increasingly conducted by the private sector and geared to cutting edge research for industrialized growers, rather than the technologies needed for poor farmers in marginalized areas. ODA to agriculture overall and agriculture R&D as a sub-sector are miniscule compared with private sector investments: private investments in agricultural R&D totalled \$25 billion in 2000 compared with ODA to agriculture that barely exceeds \$5 billion today. Much of the growth in agricultural productivity in poor countries during the past century, including the Asian 'Green Revolution', was spurred by technological spillovers from rich countries. The changing landscape of agricultural research in rich countries means that only high-value agriculture in emerging economies (such as Brazil, India, and China) is likely to benefit from the paradigm of the past. Poor farmers will depend on the public sector.

Private sector neglect

As the face of agriculture has changed in rich countries, the research agenda has shifted away from the interests of poor countries. Private sector dollars are targeted towards those investments that will generate the highest rates of return, not to where they may be needed most to reduce poverty. Technologies developed by 'life science' research corporations focus on the world's most heavily traded or high-value crops – neglecting many crops that are minor in global commercial value, but often of major importance to the diet and income of poor people.

Global agricultural R&D reached \$25 billion in 2000, more than five times that of total ODA. Private firms accounted for 41 per cent of spending and 96 per cent of the research was conducted in rich countries. At the same time, private sector investment in agricultural research and development in low-income countries is negligible.

Figure 4. Public and private shares of agricultural R&D 2002/03

	Sub-Saharan Africa	Latin America and Caribbean	Asia and Pacific
Public	97.7	96.6	91.6
Private, for profit	2.3	4.4	8.4

Sources: Beintema and Stads (2006, 2008), Stads and Beintema 2009.³¹

Advanced agricultural and food system technologies developed by the

private sector are designed to meet the needs of industrialized agriculture in temperate climates, rather than developing agriculture in tropical climates. Most are particularly unsuitable for farmers in marginalized areas where poor soils and/or inadequate moisture, often combined with poor market access for inputs and services, mean that farmers face both production and price risks. The private sector cannot make a profit in such circumstances. The primary reason why continued and enhanced public sector investment is desperately needed in these environments is that the private sector just will not go there yet.

Box 2. The great scientific 'divide'

High-income countries as a group continue to invest more in public agricultural R&D than do developing countries.³² And except for a handful of developing countries – Brazil, China, and India – many face serious funding and institutional constraints that inhibit the effectiveness of their agricultural R&D systems. Regionally, these limitations are most pronounced in sub-Saharan Africa.

In 2000, the top ten countries in terms of public investments in agricultural R&D were the United States, China, India, Japan, Brazil, Germany, Australia, South Korea, the United Kingdom and Canada. China and India led the investment growth in the Asia-Pacific region, where total expenditures more than doubled from 1981 to 2000, reaching 20 per cent for the region. The shares for sub-Saharan Africa and Latin America and the Caribbean declined over the same period.

Agricultural R&D investment and capacity in Latin America and the Caribbean is varied and unequal.³³ About three-quarters of all investments in 2006 (\$3 billion) were spent by only three countries – Brazil, Mexico and Argentina. The investment gap has widened between the region's low- and middle-income countries since 1996. Some of the poorer, more agriculture-dependent countries (such as Guatemala and El Salvador) have experienced the sharpest cuts. By contrast, Argentina and Mexico experienced growth.

In a number of ways, African agricultural research systems were better off in the 1960s than they are today. First, the funding base was better, and the number of scientists declined by 25 per cent from 1991 to 2000. Over the years, these systems have become more reliant on donor funding, as donors have become more fickle. Second, the quality of human resources declined over time, due to deteriorating salary levels and retirement packages, outdated scientific infrastructure, low operating budgets, and the 'brain drain' of researchers to more remunerative areas.³⁴

Ups and downs: what the Green Revolution did and did not accomplish

Public investments in the rice and wheat-based Green Revolutions of Asia in the 1960s and 1970s were initially targeted to irrigated areas, neglecting rain-fed and marginal lands.³⁵ The benefits – greater demand for labour and food at affordable prices for poor, urban people – were transmitted through

markets. But there were many downsides. Initially, the Green Revolution was criticized for widening the inequality gap.³⁶ By the 1990s, it was clear that the benefits of technology were uneven across farming areas and poor farmers in marginal areas had remained poor. Meanwhile, farmers in the more favoured areas were beset by stagnating yields;³⁷ the adverse effects of unsafe chemical use on human health;³⁸ and environmental problems such as salinity and waterlogging.³⁹ Further, the number of poor people remains high in Asia: 912 million in India and 488 million in China.⁴⁰

Box 3. What was the 'Green Revolution'?

The Green Revolution was the spread of short-strawed, fertilizer-responsive varieties of wheat and rice in the 1960s and 1970s that led to 'quantum leaps' in food supplies in many Asian countries. Rice yields grew by 32 per cent and wheat by 51 per cent. The area under irrigation in developing countries grew by 82 per cent over the same period.⁴¹ Agricultural growth in Asia, particularly in China and India, exploded with the widespread adoption of improved seeds, inputs, and irrigation alongside public investments in land reform and infrastructure. Even as the world's population has more than doubled over the half-century since 1960, global aggregate food production has kept pace. It is widely recognized that without the Green Revolution, there would be large food deficits in the world today,⁴² but these gains were not achieved without losses to the environment and human health, increased rural inequality, and insufficient solutions to establishing better policy frameworks for tenure security, labour regulations and enforcements, and women's empowerment.

Many advocate for another Green Revolution to bring about large increases in food productivity and economic growth in developing countries. For instance, the Alliance for a Green Revolution in Africa (AGRA) takes an approach that draws heavily on the first Green Revolution, with a strong emphasis on developing more productive and resilient varieties of Africa's major food crops along with other interventions to promote input suppliers, fortify depleted soils, and improve access to water. For others, the history of the Green Revolution demonstrates that the environmental, human health, and equity costs of such an approach are too high. Standardized technology packages based on intensive use of purchased inputs and improved seed have not proved suitable for many marginal areas. Not only are these options environmentally unsustainable given their associated soil depletion, water salinity and scarcity problems, one-size-fits-all approaches never did and never will have what it takes to reach these marginalized populations and make significant strides towards poverty reduction.

Yet, experiences show that two aspects of the Asian Green Revolution are worthy of replication: its smallholder, family farm base; and the massive public commitments and investments by national governments, research and extension systems, and donors. A reinvigoration of public commitment and dollars to these priorities is needed to undo the damage caused by decades of neglect. But, moving forward, there is limited potential for the remaining conventional approaches to be successful. Addressing many of today's food security challenges will require new approaches to investing in technologies for marginalized areas as well as revamping approaches in favoured areas.

5 Investing in poor farmers pays

Nobody has worked at this height... No one wants to come up here. Only us.

Rivera, a llama herder from Caylloma, Peru

Decades of underinvestment has left stagnating yields, degraded lands, and a scarcity of fresh water. Moving forward, new investments must be both greater than previously envisaged, predictable, committed over the long term and strategically focused on poor farmers in marginalized areas, while emphasizing environmental sustainability, the needs of women and building empowerment. These challenges cannot be met by the private sector alone, either in rich or poor countries. Investments in and of themselves cannot reduce poverty; they must be supported by public accountability and matched by public policies and institutions that support poverty reduction. Renewed public investments must also reach beyond agriculture to build rural economies and strengthen the asset base of poor people by bolstering social protection programs where they exist and creating them where they do not.

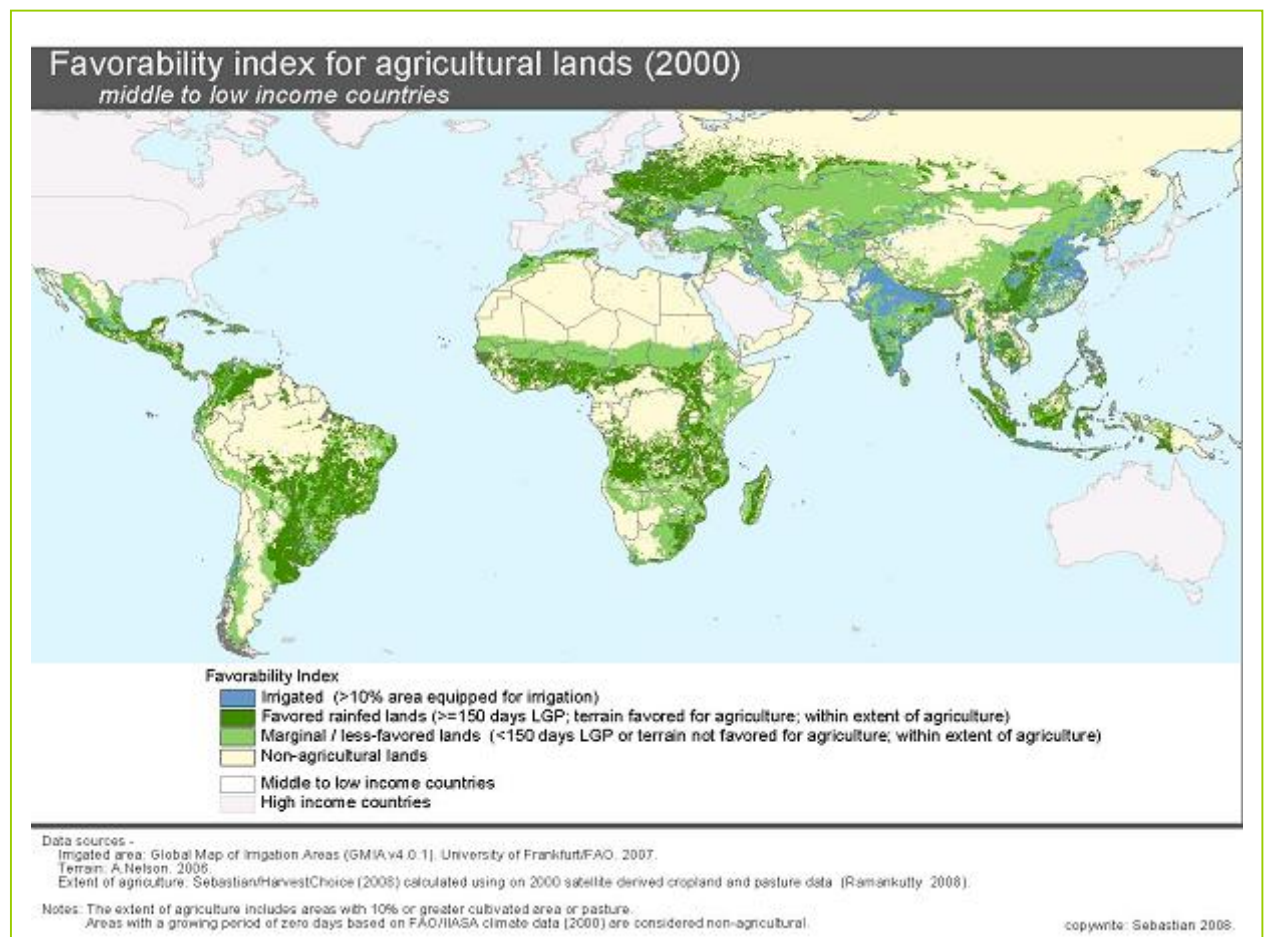
The forgotten farmers

Globally, location has a lot to do with poverty, and is expected to do so for the next few decades. The incidence and severity of rural poverty exceeds urban poverty almost everywhere. Vocation does too. In each region of the world, smallholder farmers and communities in rain-fed areas are among the poorest socio-economic groups, and their poverty may be intensified by displacement, caste or tribe, or gender. Other poor groups are comprised of waged labourers, artisanal fisherman, pastoralists and displaced people.⁴³

Marginalized areas – ‘lands neglected by man and nature’ – are characterized by highly diverse climates, with low productivity potential due to degraded lands and poor soils that usually correlate with market isolation. As a consequence, people in marginalized areas are often socially disfavoured and exposed to greater price and production risks than those in more favourable growing environments. Rural markets are open-air and not well equipped; often they lack regulation to protect farmers and small-scale traders from bad practices. For farmers in 45 per cent of agricultural communities in poor countries, it takes over four hours by car to get to the nearest market town.⁴⁴ In many cases, motorized transport is not an option, so ‘transport’ is really ‘carrying’; a task that generally falls disproportionately on women and girls.⁴⁵ For these communities, opportunities to improve growing conditions through sustainable methods, and to supplement income and offset risk, are in great demand.

‘Push’ migration – where poor farmers feel there are no other opportunities except to search for work in distant urban centres or abroad – increases the likelihood that the households left behind are headed by women. *De facto* rather than *de jure*, these women heads of

household often have no legal protection or rights to their land, limited access to credit or other means to access inputs for food production, and often are ill-equipped to participate in cash crop production or marketing activities. Disempowered to participate in farming, their poverty is exacerbated. Migration also increases the prevalence of pandemics such as HIV and AIDS in already undernourished populations. And while remittances are a welcome source of income, work conditions for the migrant family member are often appalling.⁴⁶



According to Oxfam's definition,⁴⁷ in sub-Saharan Africa (SSA) and the Latin American and Caribbean (LAC) region, about 46 and 43 per cent respectively of the agricultural population live in marginal areas, as compared with only 25 per cent in Asia. The share of agricultural land that is marginal is also slightly greater in SSA (54 per cent) than in either LAC (40 per cent) or Asia (50 per cent). However, the greatest numbers of people living in marginal areas are in Asia (505 million) and Africa (157 million). But when market isolation is added as a factor of marginalization, and all low- and middle-income countries are included, the numbers increase dramatically.

Twenty per cent (542 million) of the farm population in low- and middle-income countries is 'neglected by nature and man'. Ten per cent (290 million) is neglected by nature, although not by 'man'. Investing in agricultural technologies for these farmers is necessary, but probably will not be sufficient to lead them out of poverty – they will need multiple pathways.

An additional 34 per cent (906 million) of the farm population in low- and middle-income countries is 'neglected by man' but not by nature.⁴⁸ Adequate public investments today in markets and the critical institutions that enable these farmers to participate can offer them the social and economic resources they need to pull themselves out of poverty. Together, farmers 'neglected by man and/or nature' represent two-thirds of the farmers in all low- and middle-income countries or a total of 1.7 billion farmers.

Figure 5. Rural population and marginal land area by region

Developing region	population (millions of persons)					share of agricultural rural population (%)			
	Not in agriculture	Irrigated	Favored	Less Favored	Total	Irrigated	Favored	Less Favored	Total
Sub-Saharan Africa	110	9	176	157	451	2.6	51.5	45.9	100.0
Latin America/Caribbean	29	14	64	57	164	10.1	47.4	42.5	100.0
Asia	162	1106	389	505	2161	55.3	19.4	25.3	100.0
Middle East/North Africa	35	26	11	51	123	29.7	12.6	57.7	100.0
Total	335	1154	640	770	2899	45.0	25.0	30.0	100.0
Developing region	area (millions of square kilometers)					share of agricultural land (%)			
	Not in agriculture	Irrigated	Favored	Less Favored	Total	Irrigated	Favored	Less Favored	Total
Sub-Saharan Africa	11	0	5	7	24	1.4	44.2	54.4	100.0
Latin America/Caribbean	10	0	6	4	20	4.7	55.7	39.6	100.0
Asia	7	4	3	7	21	27.6	22.2	50.2	100.0
Middle East/ North Africa	6	1	0	2	9	23.7	9.2	67.1	100.0
Total	35	5	15	20	74	12.9	37.3	49.8	100.0

Data: Sebastian 2009; includes low and middle income countries, except CIS, Eastern Europe, Central Asia, certain island nations, and countries with negligible agricultural land. The data does not include persons or land area marginalized by market isolation.

Poor people in marginalized areas have been overlooked because they are difficult to reach physically and often, as socially marginalized groups, have little political voice at the national level. Consider the pastoralist areas in East Africa. Pastoralist communities, which cover 70 per cent of arid land in the Horn of Africa and represent ten per cent of the population in Kenya and Tanzania, are marginalized on the basis of their geographical remoteness, their ethnicity, and their livelihood, which is viewed as 'out-moded' by many governments across the region. Unable to defend their traditional land rights or secure access to health and education services, they have the highest incidence of poverty in the region. In Uganda, 64 per cent of the pastoralist population lives below the poverty line compared with 38 per cent nationally. In Tanzania, illiteracy afflicts 75 per cent of the pastoral population. In Kenya, the majority of public spending for agriculture has been allocated to 'high potential' areas, dwarfing investments in pastoral lands ten to one.

Box 4. The Jie and Maasai left behind

Pastoralist communities, like the Jie in northern Uganda, tend to have the highest incidence of poverty and the least access to basic services such as schools and health care. The Jie also have higher rates of infant mortality and lower literacy levels than any other communities in the country. The district administration is unable to address the needs of the Jie, partly because they earn little income, creating a low tax base for the government. Limited work is available in nearby towns and food insecurity has increased significantly. The Jie communities have been chronically reliant on emergency food relief since the 1980s.

The livestock, and thus the livelihoods, of the Maasai in Tanzania is disappearing. Livestock growth has not kept pace with population growth, because of disease epidemics and livestock starvation associated with floods and recurrent drought. As a result, households started selling off female livestock to purchase food, thus depleting their core reproductive herds. Increasingly, many pastoralists can no longer rely on livestock alone to provide them with a livelihood, yet other income-earning opportunities remain limited, as evidenced by the growing number of destitute ex-pastoralists. Continuing successful pastoral livelihoods, and healthy rangelands and ecosystems, will depend on reinvigorating pastoralism as a way of life in eastern Africa as well as generating alternative income-earning opportunities in rural marginalized areas.

Source: Oxfam Briefing Paper 116: 'Survival of the Fittest'

Few opportunities for alternative employment have led to stagnating incomes, under-employment, migration of men to urban areas, and greater responsibilities for women. Despite having some strong social institutions, in general, the pastoralist areas are politically weak and disorganized as a result of their social and economic marginalization. Where pastoral civil society groups exist, they remain relatively weak.

On the other side of the world, in the Andean hillsides of Peru, Ecuador and Bolivia, indigenous farmers are some of the poorest in the hemisphere, suffering from high rates of child malnutrition.⁴⁹ They typically grow and raise native crops and animals such as local potatoes, quinoa, amaranth, and llamas, which can withstand the harsh conditions and climatic extremes. The environments are diverse, and these farmers work landholdings that range from under half a hectare to a few hectares in size. Most rely on some form of off-farm employment, and migration to seek out this employment is high – reaching 18 per cent in Ecuador. This has major implications for the responsibilities of women, particularly in some Bolivian and Peruvian communities where there is a marked division of labour between men and women. Women in these communities often do not feel empowered to take part in most farming and market-related activities.⁵⁰

Investing in marginalized areas will improve food security and mitigate climate change. Farmers and communities in these areas depend directly on their harvests for food because the locations are remote and often hard to reach by transport. Lack of well-adapted improved seed or the absence of a commercial seed industry also means that many rely on their own harvests and each other for seed. Thus, with little

connection to wider, better functioning markets, ensuring food security in marginalized areas will depend on farmers themselves.

These farmers also shoulder the burden of conserving global crop biodiversity and managing some of the most environmentally fragile lands in the world. Living on the edge of deserts and watersheds, climate change mitigation will require their participation in better resource conservation and management. Mounting land pressures for food, fuel and urban growth mean that more expansion of land for cultivation will also occur in marginalized areas. Many of these areas may also become more vulnerable to climate shocks: extreme cold, heat, drought and floods. Adapting to weather-related disasters and variable rainfall patterns posed by climate change must be a precursor for reducing poverty.

A new look at agriculture

Farmers in diverse, risk-prone environments cannot take advantage of the standardized packages developed for farmers in well-watered, fertile, production areas. The search for technologies to improve the productivity of smallholders in a sustainable manner must be as wide as possible, and there are some promising technologies underway for difficult environments; such as seed varieties with tolerance to drought, or to low phosphorus and nitrogen in the soil. But technology itself is not the answer. There is no one single strategy for investing successfully in marginalized areas, due to the diversity of their physical environments, asset endowments and, in many cases, the social exclusion of certain groups.

In addition to investments in agricultural research, direct public investments in decentralized and innovative extension services, alongside sectors that support agriculture – such as rural enterprise development, health, infrastructure and education – are fundamental. Enhancing farmers' capacity to manage risk, promoting value chains for 'orphan crops', and supporting the development of input markets, are obvious options for program investments. To reach those who cannot participate in or benefit from these options, such as the elderly, orphaned and sick, safety nets may prove more successful.

A closer look must also be taken at innovative ways to invest in the livelihoods of poor women in marginal areas. Achieving food security depends on women's involvement, but fundamental problems such as low rates of literacy and numeracy, poor nutrition and inadequate health services impede the capacity of many of these women to participate productively in agriculture. Women's time burdens must be reduced, and they must be empowered through education, training, self-help, and women's groups. To this end, local and national institutions must be strengthened to reduce vulnerability, build resilience and unleash women's untapped potential. Empowering poor women will mean in part that they understand all of their livelihood options, including the option to exit farming altogether.

Low external input technologies pave the way

Low external input technologies (LEIT) for farmers in remote, less productive areas may be their only option precisely as a consequence of the challenges they face. They may also be a fundamental underpinning for approaches everywhere. LEIT complement or substitute for external inputs and, as a result, may be more accessible, provide significant environmental benefits and, as a principle, focus on farmer empowerment.⁵¹ Unlike standardized packages, LEIT often result from the experimentation of farmers themselves, or farmers in a hands-on collaboration with researchers.

As a consequence of where and how they are developed, LEIT have no single prototype. The nature of their success is their specificity to location. They follow a general set of principles, centred on the promotion of natural resource management and conservation; reduced use of externally acquired inputs; and farmer empowerment through participatory design. Because they often depend on labour investments by entire communities, LEIT encourage group activities, social learning, and development of human and social capital where strong producer or rural associations play a key part. Thus, LEIT have the potential to reduce poverty among hard-to-reach populations and preserve global public goods through resource conservation.

Operationally, these varied and overlapping technologies (practices, techniques) aim to:

- enhance soil fertility (manures, composts);
- protect soils against water erosion (water harvesting, conservation tillage, mulches, cover crops); and
- control weeds and pests (integrated pest management, intercropping).

Some combine nutrient and water management to improve crop establishment (planting pits, system of rice intensification).⁵²

BOX 5: LEIT successes⁵³

Water harvesting in the Sahel	Green manure on the hillsides of Central America	Integrated pest management in Asian rice
During the 1970s and 1980s, farmers constructed contour lines, planting pits and small dams across the Yatenga Plateau in Burkina Faso, recapitalizing land they had lost to the desert. The improved, indigenous technology was diffused by farmer-innovators, NGOs such as Oxfam and the <i>Groupements Naams</i> , a federation of farmer associations that evolved from traditional Mossi mutual assistance groups. Rates of return to some areas were as high as 40 per cent.	Farmers call <i>mucuna pruriens</i> the fertilizer bean. A cover crop, it is best known as a soil amendment. A 2002 study showed average smallholder maize yields were 3–9 times higher after a period of 10–22 years relying on cover crops and velvet bean in Honduras. More recent research documents its enduring use on steep hillsides and poor soils. Asian in origin, the plant was originally adopted by indigenous Guatemalans working on United Fruit Company plantations. Since then, it has been widely diffused by farmers and NGOs.	Integrated pest management (IPM) approaches seek to reduce unsafe use of synthetic insecticides. Farmers learn principles and develop adaptive responses to pest pressures in their own farming system. Compared with soil and water conservation, they can earn benefits from IPM in a single season, whether or not they own the land. The most successful examples come from the irrigated rice fields of the post-Green Revolution – in Indonesia. FAO has widely promoted IPM in Asia through farmer field schools.

Sceptics are concerned that these approaches, like others, are adopted first by better-off farmers in the community. The approaches tend to be knowledge- and labour-intensive, making them costly for women, the aged, and the poorest in farming communities, who must often sell their labour to survive. While LEIT approaches typically rely on farmers' investments and seek to promote empowerment, attention should be made to reaching the poorer farmers in communities, particularly women.

With the increasing pressures on land and water, and the threats of climate change, most experts agree that few other, if any, approaches will be appropriate for marginalized areas, and increasingly for favoured ones too. Improving LEIT successes has less to do with improving existing technologies than on how to develop and diffuse them more widely.

Farmer field schools (FFS), one very promising diffusion method, is an adult education method originally developed and widely promoted in Asia to teach integrated pest management (IPM) practices. While there is considerable variation in form and content, the basic approach involves teaching farmers how to solve problems, set priorities, and conduct experimental research through facilitated, hands-on sessions in fields allocated by the farming community for study.

In Myanmar, Oxfam works with the Metta Development Foundation to

promote community development through FFS. At school, a farmer-to-farmer model enables trained farmers to educate their peers about seeds, crops and new technologies. After implementing 125 projects in nine regions, the school trained 600 farmer facilitators, and expects to reach a total of 18,000 farmers.⁵⁴ Such approaches have also been successful in Peru, where farmers who participated in FFS about IPM for potato cultivation generated higher yields as a consequence.⁵⁵ FFS in the Sahel enabled farmers to combat yield losses from millet headborer, a devastating pest.⁵⁶ In the region of San, Mali, FFS were used to improve farmer management of genetically diverse millet and sorghum varieties in order to combat their insect damage and drought problems.⁵⁷ Other aims of FFS include the promotion of aquaculture, vegetable production, and social causes such as combating HIV and AIDS.⁵⁸

Empowering producer organizations drives development

Empowering farmers and the rural poor must be a key component of investing in agriculture. Collective bodies such as producer organizations (POs), self-help groups, and women's groups are fundamentals to building sustainable rural livelihoods. POs, in particular, can enable communities to exploit economies of scale and create greater bargaining power in markets for prices, inputs and services. Particular attention must be paid towards the ability of women to access these resources, especially due to cultural barriers.

The number of POs and their prominence has been growing. Between 1982 and 2002, spurred by the human and environmental crises caused by serial drought, the number of villages with a PO rose from 21 per cent to 91 per cent in Burkina Faso.⁵⁹ Between 1966 and 1998 in India, the total number of cooperative societies increased from 346,000 to 488,000, involving 65 per cent of all rural households.⁶⁰ POs have an increasingly important role to play in climate change adaptation and resiliency.

Box 6. Cotton farmers get organized

For the first time cotton farmers are represented at a national level and taken seriously by government and the cotton companies. We are now able to put pressure on government, raise the concerns of the small cotton farmers, and begin to address the imbalance of power between the concessions and the cotton growers.

Alberto Malico, Mozambique

'Cotton has been one of the most stable cash crops in Mozambique for the last 100 years,' said Alberto Malico. 'There are more than 350,000 cotton farmers supporting some 1.5 million dependants. Income from cotton pays school fees, medical bills and many other essential expenses.' Two years ago, Alberto Malico was just one of 300,000 cotton farmers in Mozambique struggling to make a living against overwhelming odds – the forces of nature, unfair contracts binding him to the cotton companies, and inequitable international cotton markets.

Today he is an independent cotton producer and the President of the National Cotton Producers Forum (FONPA), which has organized small cotton farmers and has become an equal partner with government and industry in improving the lives of small-scale cotton farmers across Mozambique.

'For the first time cotton farmers are represented at a national level and taken seriously by government and the cotton companies. We are now able to put pressure on government, raise the concerns of the small cotton farmers, and begin to address the imbalance of power between the concessions and the cotton growers,' said Mr Malico. "By joining together in associations, we have found it easier to negotiate a better price for our cotton and to help each other by working together to improve our production and harvesting.'

At the same time, studies and anecdotal evidence indicate a relatively high failure rate of POs.⁶¹ Many new POs collapse because they did not get the support they needed to invest in management and capacity building, in addition to weak markets being unable to deliver better services to their members. But this is precisely why POs need greater institutional support. POs and their members need capacity building and training, not just for marketing their products, but also in many cases in literacy and numeracy. Without these basics, poor farmers won't be able to fully access resources or new technologies. But reaching the poorest and most marginalized farmers will require working through local organizations and institutions.

Tapping into the potential of local seed markets

Making seed markets work in marginalized areas is critical to food security. Farmers rely on themselves and each other for seeds because their own seeds often perform better, because the state is absent, and because the private sector is nascent. Yet, making seed markets work in these environments poses unique challenges. Farmers in marginalized areas grow crops for which well adapted, high-yielding varieties have not been developed or are not widely adopted. They face high risks since seed quality may not be assured and the costs of obtaining certified seed from distant outlets may be prohibitive. Given these limitations, seed demand in these areas is irregular, reducing incentives

for private firms to supply seed.

Supply and farmer access to certified seed in risk-prone areas can be improved by making certification requirements less stringent, introducing small seed packs, and hosting seed auctions by NGOs and farmer associations where market infrastructure is sparse. Some countries, such as Mali and Kenya, actually prohibit the trade of uncertified seed, even though farmer seed suppliers are often recognized by other farmers for their knowledge and the quality of the seed they provide. Permitting the sale of farmer- or community-certified seed, or truthful labelling, could be a boon to farmers and help salvage crop biodiversity. Any reforms aimed at 'formalizing' seed trade should be mindful of the risk of driving out women, unless specific efforts are made to include them, for example, through cooperatives for seed production and sales.⁶²

Developing seed markets can happen through innovative public-private partnerships and research-producer association partnerships. For example, the Initiative Service Conseil (ISC), an agro-dealer and input shop in Niger, partners closely with the national research institute (INRAN) on seed multiplication. ISC-certified seed is truthfully labelled and sold through agro-dealer social networks; farmers' radio clubs and competitions; field demonstrations; public meetings; and displays in local markets.⁶³

Innovative partnerships for seed development and certification can also improve access to other inputs and address larger marketing challenges. In the same countries, farmers' associations achieved a real productivity 'kick' by working with researchers and input shops to make mineral fertilizer with certified seed cost-effective for poor farmers. When they identified lack of phosphorus as the most limiting cause of soil infertility, researchers found a fertilizer that was high in this element, and recommended that farmers apply 'micro-doses' to each plant, cutting costs and the time required for application. Yields rose dramatically, but farmers were stuck selling their grain surpluses at a low price after harvest; new solutions were needed. Farmers' associations resolved this problem by managing an inventory credit system. They purchased fertilizers in bulk, lowering costs, and stored them in village input shops, selling smaller, affordable packets. They built warehouses for grain storage so farmers could sell at better prices. Lastly, offered a credit of 80 per cent of the grain price, farmers could diversify into fruits and vegetable production, fattening sheep and extracting groundnut oil during the dry season.⁶⁴

Moving into the market: value chains for orphan crops⁶⁵

Women tend to lose control over income as products move from farm to market.⁶⁶ They find it difficult to maintain market niches and are even at risk of losing control of 'women's crops' when they are profitable. Thus, their market access is more limited. Value chain

approaches can strengthen the linkages among many actors in the supply chain – producer groups, women’s groups, service providers – and increase incomes. Value chains for orphan crops offer equitable and participatory integration into markets for poor producers, especially women.

Orphan crops have minor importance in commercial trade, limited cropped area and use relative to economic potential, and because of this, have been neglected by both public and private agricultural research. But they persist because they are highly valued in many local communities, retain biodiversity, demonstrate better productivity on marginal lands and contribute to land restoration. Others are a source of food, dietary diversity, micronutrients or herbal remedies. Traditional knowledge is usually associated with their use, since scientific information is limited.

While orphan crops – such as rice bean in the hills of Vietnam and baobab fruit and leaves in the drier savannahs of Africa – continue to be grown or collected, developing value chains can improve livelihood security of poor people in marginalized areas. For example, in the Syrian drylands, cultivating or collecting herbs and plants such as fig, jujube, laurel, caper, purslane and mallow generated 23 per cent of household income. Depending on the species, 64–95 per cent of the product was sold in local markets. The involvement of women was very high, particularly in collection (53 per cent of workers), growing (38 per cent) and processing (34 per cent), as compared to trading (12 per cent).⁶⁷

Commercializing orphan crops requires expanding demand, increasing the efficiency of supply and marketing channels, and creating niche markets.⁶⁸ Public awareness can stimulate demand, including from consumers in rich countries, who demand socially, environmentally and ethically sourced products. Product fairs, rural theaters, poetry or local festivals, religious and cultural events have been useful venues to draw attention to these products in local and regional markets. For example, in southern India, products made from minor millets have been promoted and sold at temple festivals. Nepalese writers created rural roadside dramas based on village stories to highlight the value of conserving local crops and varieties. Public programs can be used to support a stable local or national demand through school feeding programs and hospital meals.

Successfully marketing a product of satisfactory quality at a reasonable price requires basic communication tools that are often missing. Producer organizations, farming and women’s cooperatives can address this problem. By vertically integrating, farmers may benefit from cooperating to collectively demand better prices and access to inputs and services and by engaging in processing to sell valued-added products.

Box 7. Improving market access for Kolli Hills

Kolli Hills is a mountainous area with a temperate climate located in Tamil Nadu, India. Almost all 50,000 residents are from the Malayali tribal community occupying 28,000 ha, about half of which are agricultural lands. Filled with valleys, springs, wetlands, and forests, the region is diverse. The Malayalis produce minor millets and cassava on dry or rain fed lands and the outskirts of the valleys are planted to pineapple, coffee and pepper among other spices and herbs. Despite the lush and productive areas, Kolli Hills is only linked to the rest of the Namakkal district by a single paved road, and most places are only accessible by foot.

With financial and educational support from NGOs, the Malayalis were able to organize into self-help groups (SHGs), a common type of grassroots organisation in India. Through the SHGs, task-driven groups were formed by local communities to streamline the marketing and processing of millet. Millet productivity was improved through farmer selection of superior seeds tested in their own fields, alongside practices for procurement, de-husking and processing. A women's group took the lead in gathering individual harvests and transporting them to a village assembly point for collective transport to the mill. Demand was generated through organic branding and labeling, and labels were written in both Tamil and English. Finally, the organic millet was advertised at road shows, temple festivals and agricultural fairs.

Source: Gruère et al. 2008⁶⁹

Product differentiation is also a key component to preserve returns through geographical indication, branding and labeling. Yet engaging farmers in these activities depends often on the support of well-developed institutions, including cooperative arrangements, joint-ventures (NGOs, public or private where appropriate), and legal frameworks to ensure access to resources, property rights, grading schemes and quality standards. Companies must also be regulated to control for environmental and social externalities.

Public investments should be made in the development of open-air village markets, including both soft and hard infrastructure. Informal, rural social networks are good sources of information, as are more formal producer associations. But both are exclusive: marginalized people are less likely to belong to them. By investing in information systems that are publicly available, better market facilities, and simple operating rules in village markets, the state can play a role in leveling the playing field.⁷⁰

Managing risk and building resilience

Farming is a risky business. Risks and dangers come from all angles – changes in weather patterns, natural disasters, pest outbreaks, market prices, resource scarcity – and these challenges are expected to intensify with the onset of climate change, water scarcity, and population growth. Investing in agriculture and rural livelihoods also means reducing vulnerability to risks, building resiliency to disasters when they strike, and helping people to get back on their feet when they fall

down. Escaping poverty altogether and preventing further slides into poverty requires alternative financial tools, strong safety-net programs, and reliable exit strategies.

Agriculture is inherently uncertain because of a lapse – sometimes long – between investing in and harvesting crops. Farmers in marginal areas bear more production and price risk because of their more challenging growing environments and disconnection from larger markets. They participate in thin markets where volumes are small and prices more tightly linked to local production levels. Thus, when many farmers suffer crop failure simultaneously, limited access to food from alternative markets causes prices in local markets to skyrocket, threatening their food security as net-food buyers.

Strategies that reduce risk directly include yield-enhancing or yield-stabilizing technologies or practices. Vertically integrated market chains, such as those of high-value export crops and perennials, spread the risk among actors. Participating in producer associations and cooperatives may be another way of offsetting the price risk faced by individual farmers in local markets.

Other strategies help farmers manage under risky conditions. These include better information about markets and weather. Income or crop diversification is common in marginalized areas, through crop biodiversity, intercropping, sequential planting, agroforestry, and integrated crop and livestock production. However, the range of non-farm options is narrower than in favoured areas.

For poor farmers, the most promising interventions are not always within agriculture. Safety nets are needed to help them cope with shocks and prevent them from making irreversible decisions with long-term consequences to meet short-term needs. When poor people barely have enough to meet basic needs, shocks can lead to harmful cuts that affect long-term household welfare: illness left unattended; children pulled out of school; worsening diets. When forced to make choices to meet short-term needs that ultimately undermine the capacity for future productivity, poor people can be pushed even further into poverty.⁷¹

When widespread famine and distress-sales of assets occur, social protection programmes or 'safety nets' are desperately needed. Short-term food aid transfers, cash transfers, and public works programmes can be live-savers – those most affected by the current financial crisis are a prime example. If present, safety nets could help lessen the blow to the more than 200 million people expected to lose their jobs and for the additional 53 million people that will be trapped on living on less than \$2 a day as a result of the crisis. Social protection needs to be at the forefront of interventions to reduce poverty in order to help poor people access food and other basic needs during hard times, and to assist those who are unable to engage in productive activities consistently due to impediments such as old age, ill-health or disability.⁷²

Box 8. Horn of Africa Risk Transfer for Adaptation (HARITA)

Human induced climate change will create unprecedented climatic stress for many of the world's most vulnerable communities. People are unable to cope effectively with shocks, less predictable weather patterns, and the increasing intensity and frequency of natural disasters. Poor farmers and those in already drought-stricken regions of Ethiopia are no exception. Ethiopians regard drought as the primary risk to their livelihoods, since 85 per cent of Ethiopians depend on rain-fed agriculture for their livelihoods.

Weather index insurance could help farmers reduce their negative risk exposure and feel more comfortable taking on productive risks, such as taking credit for improved seeds. Oxfam and Swiss Re, in collaboration with partners Relief Society of Tigray (REST) and the International Research Institute (IRI) for Climate and Society, launched an innovative pilot for weather index insurance for the cereal crop *teff* in the water-stressed village of Adi Ha, in Tigray, Ethiopia. The Horn of Africa Risk Transfer for Adaptation (HARITA) is founded on a participatory model for empowerment that works with farmers and farmer organizations to identify their needs and create meaningful participation in insurance product design.

Source: Oxfam America

Reducing poverty by building resilience to future shocks through productive safety nets – that generate income growth and stimulate multiplier effects in the economy and labour markets – shows promise. The value in productive safety nets is their ability to first mitigate the impact of shocks after they occur, and second, to create an enabling environment for greater asset and income growth. While the benefits of these approaches are not yet proven, several pilots are underway. For instance, the Hunger Safety Net Program, sponsored by the UK's Department for International Development and the Government of Kenya, offers monthly cash transfers of \$15 to households in extreme poverty in Kenya. Beginning in late 2009, poor households will also be offered an index-based insurance policy. Losses will be measured with satellite imagery of livestock populations. Often these schemes can be too expensive for poor farmers, so subsidies or links to other income-enhancing interventions to reduce the policy premium might be ways of overcoming this barrier. Additionally, because insurance can improve the eligibility of farmers for credit, this could also be a pathway towards improved access to cheaper credit if bundled together.

Farmer-financed development

Where there is strong niche market potential, farmers' associations may have the option of commissioning private research and development, paid by levies on sales. The revenue enables producer organizations to have a voice in establishing the research agenda. Research on export crops in many East African countries is increasingly financed by producers themselves. Significant shares of coffee, tea, cotton, tobacco, cashew and sugarcane research are financed in this way in Tanzania, Kenya and, to lesser extents, in Uganda and Zimbabwe. In Latin

America, a number of countries – including Colombia, Costa Rica, Guatemala and Honduras – use production or export taxes to fund agricultural R&D on high value crops (cotton, coffee, sugarcane, oil palm), via producer associations.

Most suitable for commodities that pass through a narrow, well-integrated market chain such as export commodities or horticultural crops, the farmer-financed approach is also feasible for staple food crops, under similar market conditions. For example, farmers in Kenya and India have financed research for maize and wheat, respectively. Farmer-financed development could be suitable in marginalized areas when markets are developed for high-value orphan crops. Further, much of the development and adaptation of LEIT will by necessity be funded privately by farmers and their communities, linking value chain development for orphan crops to improving food security and mitigating climate change.

6 Building sustainable rural livelihoods

While it is generally true that farmers in favoured areas work land that is potentially more productive and enjoy better access to markets, they face mounting environmental challenges due to input-intensive farming; inequality in the distribution of land; and land quality that is often pronounced, as are social inequities related to land and labour rights, especially for women. Some smallholders are 'virtually landless',⁷³ participating in increasingly casual and informal labour markets. With highly profitable, capital-intensive farming go other forms of risk engendered by the volatility of world prices and financial markets. Smallholders in favoured areas are likely to benefit from employing agro-ecological approaches to resource management, improving women's access to inputs and services, generating better income and livelihood diversification options, and minimizing post-harvest loss. Social protection programs and productive safety nets must also be available options.

Soil erosion, nutrient depletion, and water salinity are all serious environmental impacts and challenges, in part due to reliance on input-intensive farming. Some of the most promising innovations for addressing these challenges, especially in Asia, are zero tillage and integrated pest management (IPM) because many areas are irrigated.⁷⁴ LEIT, likely the most favourable option for marginalized areas, have actually demonstrated very high success rates in favoured areas.⁷⁵ And with the onset of climate change, adopting agro-ecological – environmentally sustainable – approaches in favoured areas is a necessity.

Women are key

Women are the key to food security for their households.⁷⁶ However, investments in food production typically target men rather than women, because it is assumed that knowledge will be shared throughout the family. Yet, often this information is unsuitable for women's needs. Technology adoption, for instance, depends on many factors, sometimes unrelated to the technology itself. Access to resources such as land, credit, inputs and information are often lacking. So even if a woman has access to her own plot, yield differences are imperceptible if other constraints are not addressed first.

Female farmers, especially female-headed households, often are not contacted by extension services.⁷⁷ Lower yields of women farmers are attributable to lower levels of inputs, such as fertilizer and credit, symptomatic of less access to land, extension, and financial services.⁷⁸ Statistically, once these factors are taken into account, men and women maize growers in Western Kenya are equally efficient, and will respond equally to higher maize prices.

The 'missed potential' in agricultural productivity from failing to invest

in women and women's needs is great. The World Bank found that in Burkina Faso, shifting labour and fertilizer between men's and women's plots could increase output by 10 to 20 per cent; in Kenya, giving women farmers the same inputs and education as men could increase yields by more than 20 per cent; in Tanzania, reducing time burdens of women could increase cash incomes for smallholder coffee and banana growers by ten per cent; and in Zambia, if women enjoyed the same overall degree of capital investment in agricultural inputs, including land, as their male counterparts, output could increase by up to 15 per cent.

When provided with a combination of land rights, input and credit that address multiple constraints simultaneously, female-headed households in favoured areas will be equal contributors to agricultural growth.⁷⁹ However, attention must be paid to the many demands on women's time. For example, women are often unable to attend extension meetings because of such demands, but ensuring their access to these services will in turn improve women's crop productivity and subsequently their families' nutrition while generating greater demand for goods and services in the economy.

Harnessing fairness in high value markets

Small is not always poor or inefficient. Competitiveness has a lot to do with assets, including human, social, financial, and physical capital other than land. Many small-scale farmers participate in high-value market chains, including supermarkets, when they have access to irrigation, information, education and transportation, which enables them to build their knowledge and social capital. For instance, lettuce farmers in Guatemala who farm on 2 ha plots – the generally recognized definition of a small farm – are more likely to participate in supermarket supply chains when they have some degree of education, irrigated farms, live closer to roads, own trucks, and are members of a producer organization.⁸⁰

But it is under rare conditions that an emphasis on high value export chains will reach poor farmers because, if supermarkets have a choice, they prefer medium and big farms as suppliers. Yet those workers employed by medium and big farms, increasingly women, are often subject to appalling conditions that take their toll: long hours, low wages, unsafe and unhealthy environments. Workers need to get organized and retailers and farmers must commit to respecting labour standards.⁸¹

To improve the chances that high value export chains will reach poor farmers, public investments should encourage farmers to 'follow demand.' National governments should upgrade transport infrastructure, and provide credit to traders, processors and farmers.⁸² Governments can put in place a number of policies to help retailers contribute to 'development inclusiveness'. These include:

- enforcing appropriate regulations in the supermarket sector, such as policies to promote competition in oligopolistic chains such as those found in Latin America;
- upgrading the infrastructure and services provided to retailers and farmers in wholesale markets;
- helping farmers organize to become suppliers to supermarkets;⁸³ and
- implementing and enforcing internationally accepted labour standards.

Post-harvest losses are also a major constraint to integrating productively in value chains. The steps between harvesting and consumption are many: sorting, cleaning, packing, storing, transporting and processing; leaving many opportunities for spoilage and damage. In fact, field studies show that 40 to 50 per cent of horticultural crops grown in Africa are lost before they can be consumed.⁸⁴ In India, post-harvest loss accounts for 40 per cent of annual production.⁸⁵ Fruits and vegetables are lost mainly due to bruising, water loss, and decay during handling.

Solutions to these challenges, however, can be simple and cost effective. For instance, the containers usually used in Africa for handling fruits and vegetables are made of rough materials and don't stack well. Wooden containers could be fitted with fibreboard liners, costing little and protecting against scrapes and cuts. Where more resources are available, stackable plastic crates could be considered. In rice growing regions of South-East Asia, sometimes farmers just need more durable bags that can prevent spillage, spoilage, contamination, and make for easier transport. Other simple activities include building structures and awnings to provide shade for recently picked produce to reduce the temperature where they are handled when cold storage isn't feasible. Low-cost investments in these areas could have very high pay-offs.

Making financial services work for poor farmers

Farmers can be assisted to better manage risk through provision of financial services. Financial services offered by micro-credit institutions have made great strides incorporating poor farmers into income generating economic activities, but their success in agriculture has been more limited. Typically, farm credit isn't offered for crops or on-farm investments such as irrigation, as they have proven too expensive and inflexible. Financial services, even micro-credit, are notoriously hard to come by in rural areas, particularly for marginalized groups and women. Globally, women receive an estimated one per cent of all agricultural credit.⁸⁶ And where women do receive credit, it is often through male relationships. To overcome these challenges, where culturally appropriate, many rural women are participating in rotating or accumulating savings and credit associations (ROSCAs). Oxfam

supports many of these initiatives in West Africa, East Asia and Central America. They have proven to be easily replicable at low cost, to build solidarity and confidence, and to create new opportunities for poor rural women and men.

BOX 9. Saving for change

Sometimes just having a safe place to save, or access to a small loan, can help a family work its way out of poverty. But many poor people can't go to banks and credit unions for that kind of help. Often, these services aren't available, especially in rural areas, and where they are available, poor people may not qualify.

Through 'Saving for Change', Oxfam helps poor women in Mali, Senegal, Burkina Faso, El Salvador and Cambodia to improve their livelihoods and build a better future by increasing their access to financial services. Village groups are supported to act as their own community banks, where savings group members save, lend, and pay each other interest without the risks of taking on debt from a credit provider, moneylender or intermediary. These loans are used to start small business, participate in petty trade and buy much-needed supplies for their families.

As more women participate in the program, they gradually change how they think about themselves and their place in their family and village. In Mali, group meetings provide a forum for villagers to learn how to prevent and treat malaria. In Cambodia, Saving for Change participants learn about the System of Rice Intensification (SRI), a new way of growing rice that increases productivity while decreasing the use of pesticides and harmful chemicals.

Since Saving for Change was launched in April 2005, more than 250,000 poor women and men in five countries have joined savings and lending groups. Their savings add up to \$4 million so far, and the program continues to grow.

Source: Oxfam America

Poor farmers generally under-invest in their farms because the wrong move could prove disastrous. Farmers need financial tools that will encourage them to undertake risk that is potentially rewarding. Weather insurance packages, where feasible to design and operate, can protect against revenue, yield and price loss. Insurance policies can also be bundled with credit and other types of inputs, like improved seed or fertilizer and linked to cash transfers for labour in public works programmes. Appropriate financial tools must be created through participatory design models to limit the risks and reduce the impact of economic and climatic shocks for poor farmers.

Diversifying income and securing labour rights improves livelihoods

Off-farm income is important to most farmers in the world, regardless of farm size or location. In fact it accounts for a third to two-thirds of

smallholder income everywhere.

Figure 6. Smallholder off-farm income by region, per cent

Region	Mean farm size	Mean non-farm income share (%)
Africa	1.6	42
Asia	1.6	32
Latin America and Caribbean	67.0	40

Source: Nagayets (2005); Haggblade, Hazell, and Reardon (2005).

Recent Oxfam studies show that in Chile, small-scale farmers earn 50 to 60 per cent of their income from farm production, but 26 to 29 per cent is secured off-farm. Nearly two-thirds of all small-scale farmers engage in waged agricultural work to survive. For women, this can result in extraordinarily long days that can exceed 12 hours while they divide their labour among their own plots, others' plots, and care of their families. In Colombia, waged work constitutes 30 per cent of farm family income. But nearly 70 per cent of rural workers earn less than the minimum wage, 50 per cent of jobs are informal and 90 per cent receive no benefits.

Figure 7. Composition of rural non-farm employment by region (per cent)

	Nonfarm Share of Rural Workforce	Women's Share of Rural Nonfarm Employment	Rural Nonfarm Employment Shares				Total Rural Nonfarm
			Manufacturing	Trade & Transport (1)	Financial and Personal Services(2)	Construction, Utilities, Mining and Other(3)	
Africa	10.9	25.3	23.1	21.9	24.5	30.4	100
Asia	24.8	20.1	27.7	26.3	31.5	14.4	100
Latin America	35.9	27.5	19.5	19.6	27.3	33.5	100
West Asia and North Africa	22.4	11.3	22.9	21.7	32	23.2	100

Notes:

1. Trade and transport includes wholesale and retail trade, transport and storage.

2. Other services includes finance, insurance and community and social services

3. Other includes mining and quarrying, utilities, construction and other non-classified activity.

4. Country data weighted by size of total primary work force.

Source: 31 population censuses as summarized by Hazell, Haggblade and Reardon (forthcoming). Regional aggregates weight country data by size of total primary workforce.

In Asia, farms have dwindled in size, and the number of landless and virtually landless people has increased. In South Asia, it is common to find one-third to one-half of the rural population without land.⁸⁷ A recent study in Ghana confirms that female-headed households make up a larger share of the virtually landless population.⁸⁸ As a result, nearly half of all people working in agriculture are farm labourers, and the number of waged workers as a share in the agricultural labour force is growing. Agricultural labour is often temporary or seasonal, and

casual and increasingly feminine. Wages are low relative to other sectors and conditions hazardous and unfavourable. The ILO reports that 170,000 agricultural workers are killed every year.

The number of waged women working in agriculture is rapidly increasing. Women's share of rural non-farm employment is at least 20 per cent in all regions of the world except West Asia and North Africa. Women's labour is also increasingly casual, has a distinct gender bias, and the wage gap is large. Protection for women's labour rights is limited and often poorly enforced, if legislation even exists.

Agricultural waged workers face many hazards and are rarely covered under national labour laws. Since most labour laws favour industry employment, agriculture is often excluded entirely. And where laws do exist, they are barely enforceable. Waged agricultural workers need enforceable legislation that provides better worker protection, minimum wages, pensions and access to health care.

7 Conclusions and recommendations

To reduce poverty, achieve food security and mitigate climate change, investing in agriculture must become a top priority for donors and national governments. In whom and where to invest is equally, if not more, important than how much. Investments must be predictable, transparent, untied, and reach farmers in marginalized communities in a participatory and empowering manner. Despite the low returns on investing in marginalized areas perceived by the private sector, investing in poor farmers pays. Although developing innovative agricultural technologies may prove crucial, to address the needs of these farmers, the gap left by private sector neglect must be filled by the public sector. Investments must be tailored to their growing environments and needs, which vary widely. Given the challenges faced by these farmers, the best investments may be outside of technology and agriculture altogether. In favoured areas, more concerted efforts should be made to reduce inequality and to ensure environmental sustainability. Above all, investments in agriculture will need to be context specific, demand driven, socially and environmentally sustainable, empowering and participatory, and they must treat women and men equitably.

Oxfam recommends that donors, national governments and private sector investors:

1. **Make agriculture centre stage.** Ultimately, to reduce poverty agriculture must once again become a top priority for governments and donors alike.
2. **Invest more, and more wisely.** Investments in agriculture must be greater than previously envisioned, predictable, transparent, untied, channelled through budget support, and complemented by funding for civil society groups both as government watchdogs and as complementary service providers.
3. **Recognize that one size does not fit all.** Investments in agriculture and agricultural research for marginalized areas need to be tailored to the conditions of specific locations, participatory and demand-driven.

Oxfam recommends that national governments with the help of donors must:

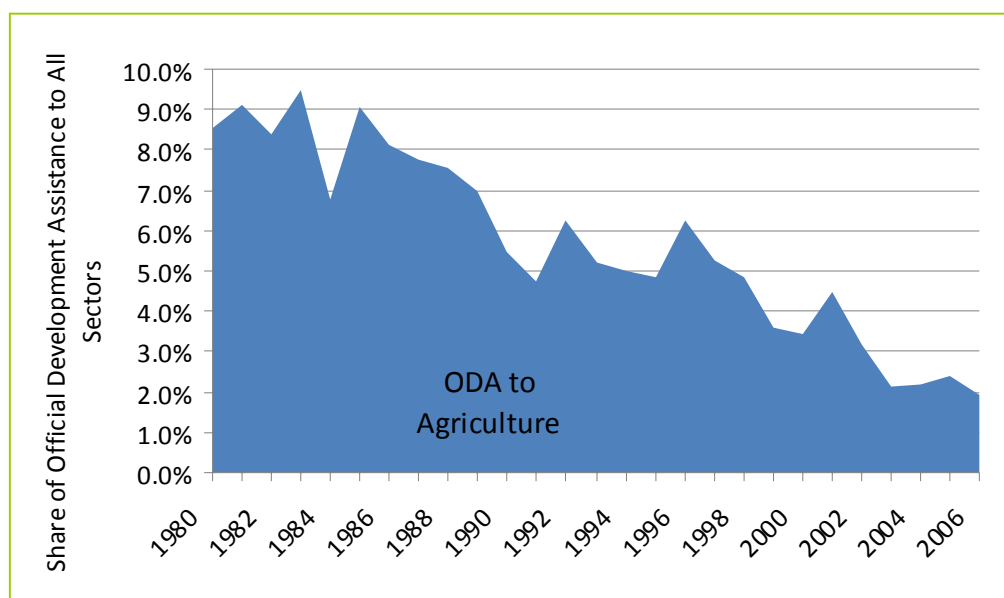
1. **Fill the gap left by the private sector.** Because private sector investors find few profitable opportunities in marginal areas, the public sector and voluntary sector must play stronger roles.
2. **Build sustainable rural livelihoods.** Public investments in agriculture are paramount, but must be complemented by investments in non-farm rural development, soft and hard infrastructure, education and health care to have the greatest impact on productivity and ultimately poverty reduction.
3. **Invest in marginal areas.** Agricultural investments must include

those that have been left behind – an estimated 66 per cent of poor, rural people. Any strategy that exclusively emphasizes agricultural investments in favoured areas is ill-advised, particularly in countries with limited shares of high-potential land.

4. **Support low external input technologies.** Investments are needed in the development of low external input technologies that address resource conservation, reduce dependence on purchased inputs and promote farmer empowerment in marginal and favoured areas.
5. **Recognize that there is no silver bullet.** Just as there is no one technology that will work everywhere, technology in and of itself is only part of the answer. Investments must also reach outside of agriculture entirely to provide safety nets for those affected by climatic and market shocks and who cannot engage consistently in the economy.
6. **Empower farmers and their communities** to participate in identifying their own needs and most suitable investments by strengthening the capacity of producer organizations to undertake collective actions, bargain for better prices and services and self-finance development priorities.
7. **Treat people as the key resource to develop.** Delivery of better technology will not in itself end hunger or improve food security. Investments in agricultural technologies that work in marginalized areas require substantial investments by farmers themselves. Most promising new technologies are knowledge-intensive. Their adoption and impact depends on farmer education outside formal schooling such as farmer field schools.
8. **Strengthen labour rights.** Waged agricultural workers need enforceable legislation that provides better worker protection, minimum wages, pensions and access to health care.
9. **Invest in women's needs.** Women are the key to food security. Investments in agriculture must involve women and address women's needs within agriculture and related sectors. Women's access to inputs and financial services must be improved in order for their potential to be realized.

Annex I. Official Development Assistance (ODA) to agriculture

A. Agriculture as a share of total Official Development Assistance (ODA)



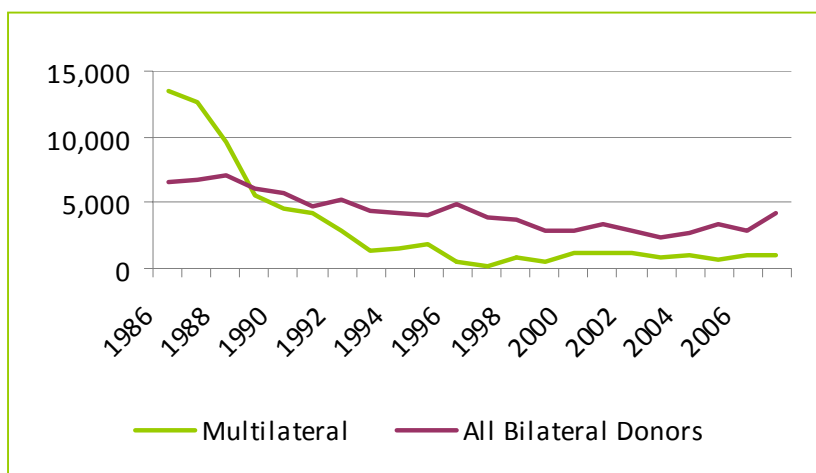
Source: Authors' calculations based on data from OECD Stat

B. Sector allocation of Official Development Assistance (ODA) 1998–2007

Sector	Average Allocation per Year, 1998-2007
Action relating to debt	\$11,399,698,000
Transport, Storage, Communications, Energy	\$9,177,494,000
Multi-sector/Cross-cutting/Unallocated/Unspecified	\$8,982,732,000
Government and civil society	\$7,762,319,000
Education	\$7,376,472,000
Health, including population and reproductive	\$6,393,776,000
Humanitarian aid	\$6,040,225,000
Commodity aid	\$4,679,909,000
Administrative costs of donors	\$4,320,966,000
Other social infrastructure and services	\$4,183,097,000
Agriculture, Forestry, Fishing	\$4,029,451,000
Water Supply and Sanitation	\$3,695,842,000
Business, Banking, Financial and other services	\$2,305,185,000
Support to NGOs	\$2,167,924,000
Industry, Construction, Mining, Tourism, Trade, etc.	\$2,012,173,000
Refugees in donor countries	\$1,623,935,000

Source: Authors' calculations based on data from OECD Stat

C. Multilateral vs. bilateral Official Development Assistance (ODA) to agriculture



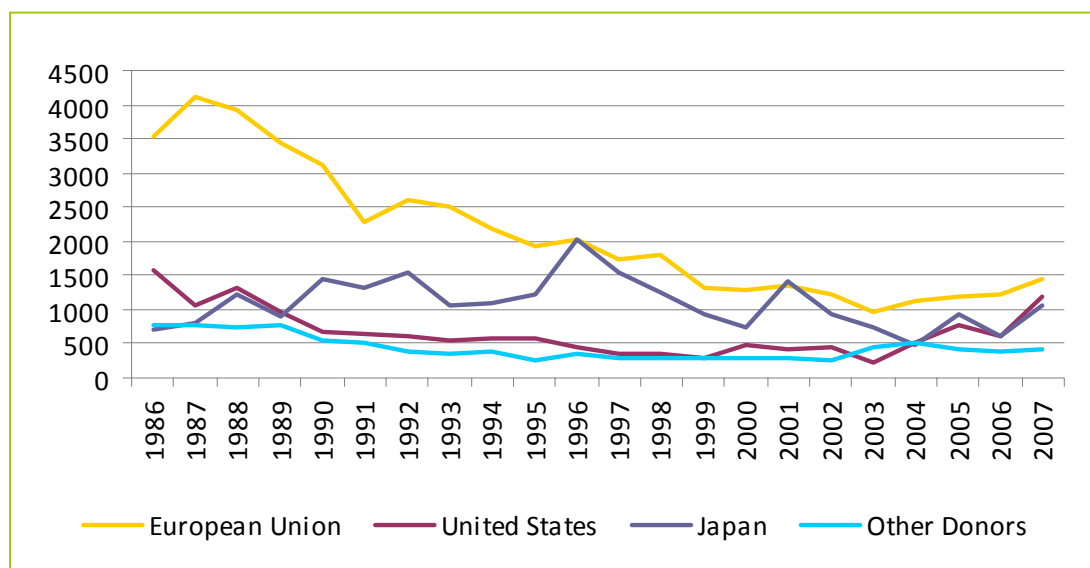
Source: Authors' calculations based on data from OECD Stat

D. Top ten bilateral donors of Official Development Assistance (ODA) to agriculture 1995–2007

Rank	Donor country	ODA to agriculture 1995–2007
1	Japan	\$8,175,243,942
2	United States	\$5,777,363,181
3	France	\$2,832,595,248
4	Germany	\$2,230,933,842
5	United Kingdom	\$1,733,700,679
6	Netherlands	\$1,582,827,797
7	Canada	\$1,187,265,396
8	Denmark	\$1,178,342,676
9	Belgium	\$938,555,998
10	Australia	\$802,428,409

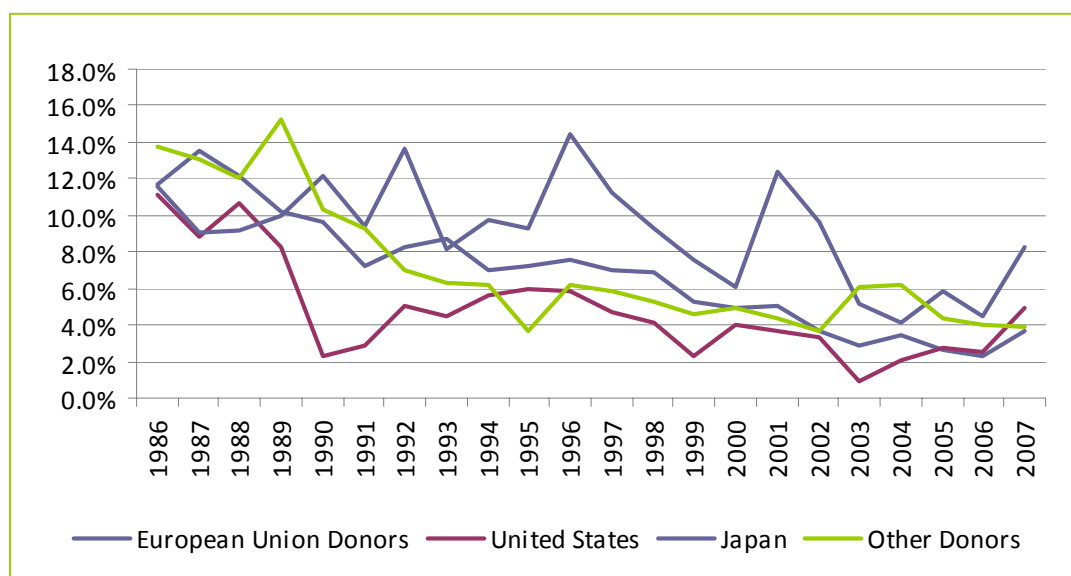
Source: Authors' calculations based on data from OECD Stat

E. Bilateral Official Development Assistance (ODA) to agriculture
In millions of constant 2006 dollars



Source: Authors' calculations based on data from OECD Stat

F. Bilateral Official Development Assistance (ODA) to agriculture as a share of total ODA



Source: Authors' calculations based on data from OECD Stat

*Other donors include New Zealand, Korea, Norway, Switzerland, Turkey, Canada and Australia.

G. Top 15 cumulative recipients of Official Development Assistance (ODA) to agriculture 2000–2007

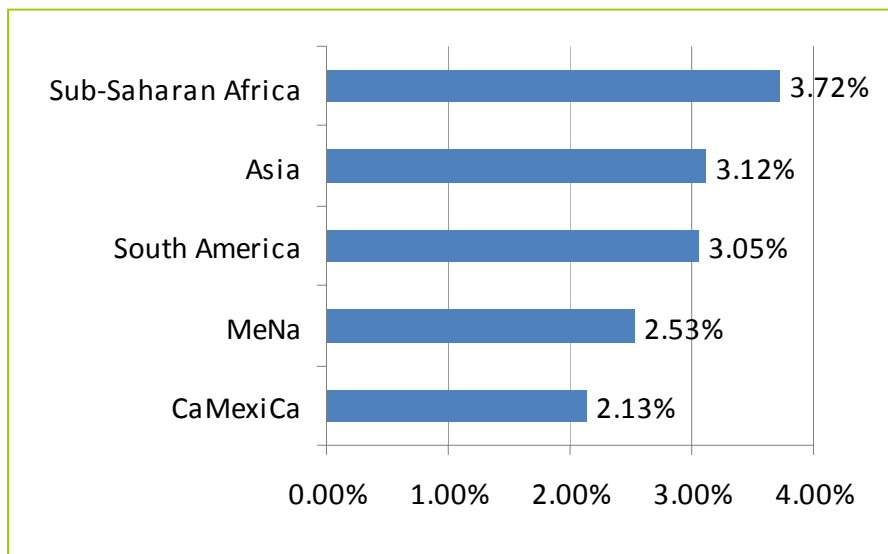
Rank	Recipient country	ODA to agriculture 2000–2007
1	India	\$2,474,233,636
2	Viet Nam	\$1,570,924,335
3	Afghanistan	\$1,191,400,812
4	Indonesia	\$1,093,409,343
5	Ethiopia	\$959,114,225
6	China	\$933,912,192
7	Kenya	\$758,517,856
8	Pakistan	\$744,527,632
9	Mali	\$718,027,230
10	Ghana	\$709,315,061
11	Tanzania	\$621,554,504
12	Bolivia	\$591,571,847
13	Egypt	\$577,144,065
14	Bangladesh	\$530,893,288
15	Colombia	\$516,261,103

Source: Authors' calculations based on data from Creditor Reporting System of OECD Stat

*Agriculture includes forestry and fishing

Annex II. Recipient regions

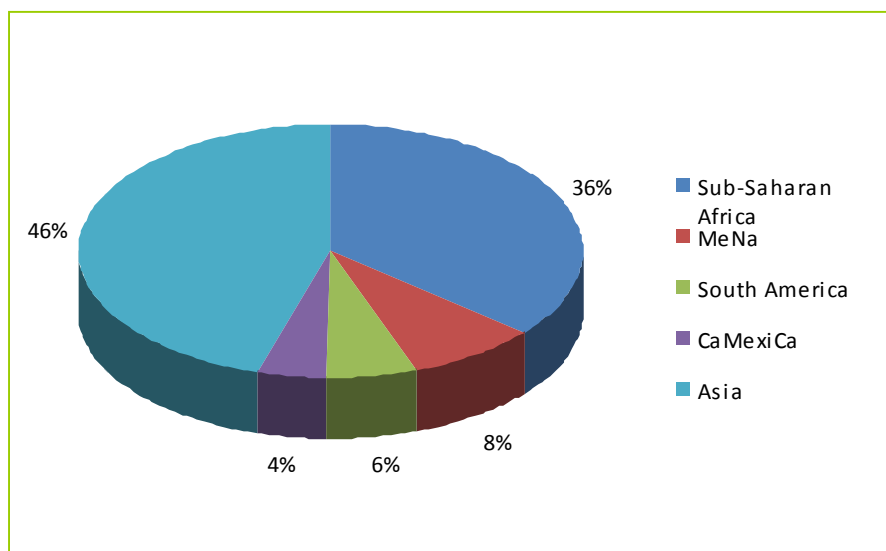
A. Regional average annual growth rates of agricultural Gross Domestic Product (GDP) 1990–2005



Source: Authors' calculations based on data from World Bank Group's World Development Indicators database and 2008 World Development Report

* Countries weighted by 2003–05 agricultural GDP from 2008 World Development Report

B. Official Development Assistance (ODA) to agriculture by recipient region 1986–2006



Source: Authors' calculations based on data from Creditor Reporting System of OECD.Stat

*Coverage ratios prior to 1995 average 68% for agriculture sector

C. Magnitude of Official Development Assistance (ODA) to agriculture by region

Region	Cumulative ODA to agriculture (1986–2006)	Mean annual ODA to agriculture (1986–2006)	Growth rate of ODA to agriculture (1986–2006)	Mean annual ODA to agriculture per rural capita (1986–2006)	Mean annual ODA to agriculture per rural capita (last five years)
Asia-Pacific	\$39,271,590,062	\$1,870,075,717	-6.12%	\$0.87	\$0.53
CaMexiCa	\$3,895,138,186	\$185,482,771	-7.03%	\$2.78	\$2.30
Mid-East/North Africa	\$7,246,334,764	\$345,063,560	-7.94%	\$2.80	\$1.50
South America	\$5,014,838,893	\$238,801,852	1.31%	\$2.46	\$3.06
Sub-Saharan Africa	\$31,475,875,799	\$1,498,851,229	-11.14%	\$3.32	\$2.33
Total	\$86,903,777,704	\$4,138,275,129	-7.70%	\$1.43	\$0.98

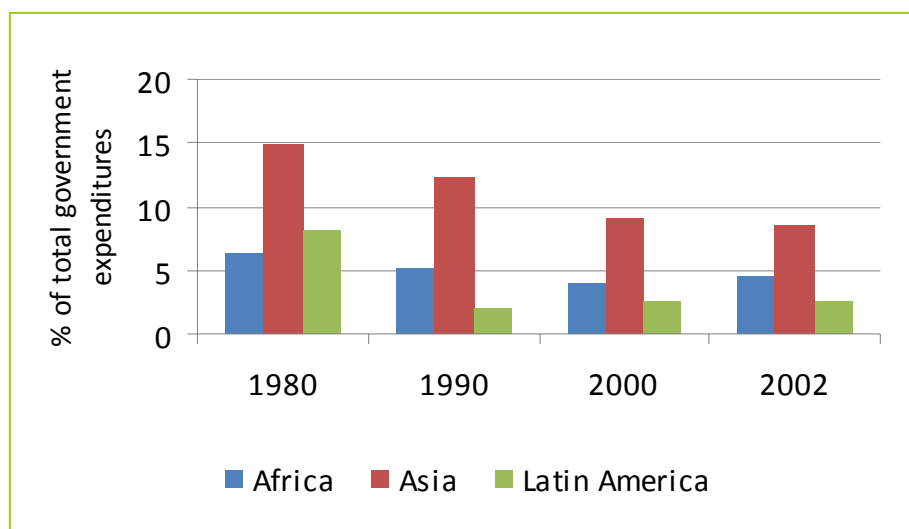
Source: Authors' calculations based on Creditor Reporting System (CRS) of OECD.Stat and Sebastian

* CRS coverage in agriculture sector prior to 1995 averages 68%

** Total growth rate of ODA to agriculture is a weighted average of regional growth rates.

*** Total mean annual ODA to agriculture per rural capita is a weighted average.

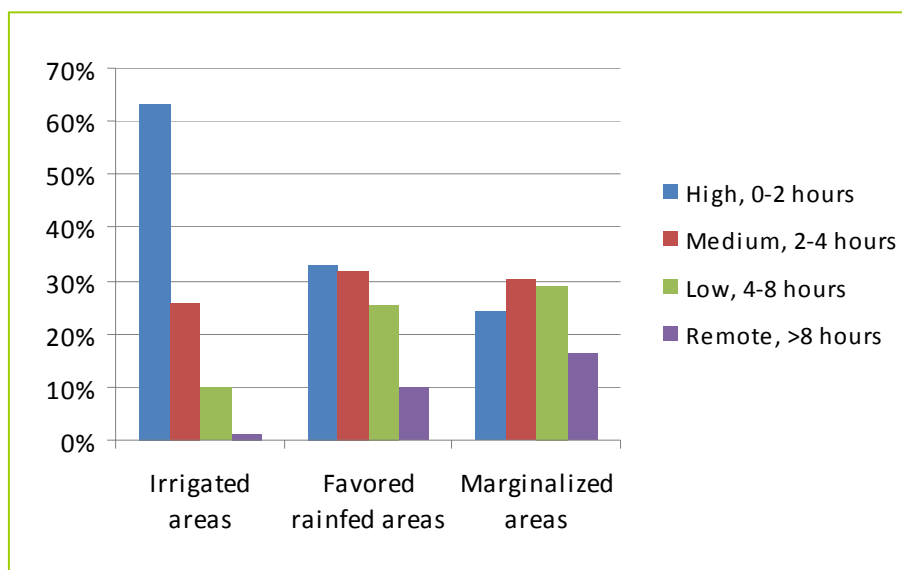
D. National government expenditures on agriculture



Source: Data from *Public Expenditures, Growth, and Poverty*, edited by Shenggen Fan

ANNEX III. Marginalized areas

A. Market proximity by car within low-income countries by favourability of areas



Source: Authors' calculations based on Sebastian data

B. Top 25 countries by share of population (within agricultural lands) living in marginalized areas

Rank	Country	Percentage of population (within agricultural lands) living in marginalized areas	Population (within agricultural lands) living in marginalized areas	Mean annual (1995–2007) ODA to agriculture, in 2006 US\$	Mean annual (1995–2007) ODA to agriculture per rural capita, in 2006 US\$	Mean annual (1995–2007) ODA to agriculture, as a percentage of agricultural GDP
1	Botswana	99.96%	659,409	2,010,929	2.03	1.21%
2	Eritrea	99.84%	2,505,016	14,238,724	4.65	10.95%
3	Namibia	99.71%	614,138	5,770,132	5.51	1.55%
4	Niger	98.73%	8,545,284	29,413,783	3.34	3.50%
5	Mauritania	98.68%	532,721	18,895,966	24.79	5.67%
6	Mongolia	98.28%	729,846	11,754,720	11.31	3.33%
7	Somalia	92.60%	3,863,086	2,349,816	0.35	N/A
8	Lesotho	92.57%	1,359,427	4,254,415	2.88	3.14%
9	Senegal	79.88%	3,769,490	50,869,971	10.04	5.82%
10	Gambia	75.58%	417,631	5,574,975	9.44	3.93%
11	Bolivia	74.90%	1,847,485	65,468,639	19.76	4.88%
12	Mali	74.29%	5,592,134	69,069,734	8.05	5.59%
13	Iran	73.64%	18,060,272	489,587	0.02	<0.01%
14	Zimbabwe	73.18%	4,438,963	21,264,126	2.71	1.87%
15	West Bank	73.16%	257,594	8,908,503	18.48	N/A
16	Burkina Faso	72.62%	6,872,834	57,498,417	5.76	6.08%
17	Jamaica	71.24%	781,125	6,198,252	5.36	1.00%
18	Ethiopia	69.73%	27,611,376	120,046,287	2.16	2.45%
19	Panama	68.71%	687,676	1,546,342	1.28	0.16%
20	Morocco	67.81%	7,751,584	37,662,568	2.85	0.51%
21	Peru	67.18%	4,998,902	52,537,044	3.82	1.08%
22	Jordan	66.48%	444,583	12,971,447	11.37	4.97%
23	Afghanistan	65.78%	10,619,156	92,350,831	5.27	N/A
24	Turkey	63.80%	12,647,787	6,568,703	0.28	0.02%
25	Ecuador	63.59%	2,847,878	27,696,959	5.41	1.31%

*Sources: Authors' calculations based on data from Sebastian data, Creditor Reporting System of OECD.Stat, World Bank Group's World Development Indicators

C. Top 25 countries by share of agricultural lands considered marginalized areas

Rank	Country	Percentage of agricultural lands considered marginalized areas	Agricultural lands considered marginalized areas, in km2	Mean annual (1995–2007) ODA to agriculture, in 2006 US\$	Mean annual (1995–2007) ODA to agriculture per rural capita, in 2006 US\$	Mean annual (2005–2007) ODA to agriculture, as a percentage of agricultural GDP
1	Namibia	99.97%	277,771	5,770,132	5.51	1.55%
2	Botswana	99.97%	252,277	2,010,929	2.03	1.21%
3	Eritrea	99.77%	71,916	14,238,724	4.65	10.95%
4	Niger	99.51%	339,543	29,413,783	3.34	3.50%
5	Mauritania	99.47%	170,878	18,895,966	24.79	5.67%
6	Mongolia	98.67%	762,854	11,754,720	11.31	3.33%
7	Somalia	97.05%	226,350	2,349,816	0.35	N/A
8	Lesotho	92.09%	28,644	4,254,415	2.88	3.14%
9	Mali	83.55%	389,134	69,069,734	8.05	5.59%
10	Kenya	82.99%	338,875	76,687,199	3.16	1.69%
11	Afghanistan	82.62%	392,862	92,350,831	5.27	N/A
12	Bhutan	82.15%	10,545	4,824,409	2.05	3.26%
13	Zimbabwe	81.97%	242,268	21,264,126	2.71	1.87%
14	Peru	81.21%	279,228	52,537,044	3.82	1.08%
15	Gambia	80.29%	8,818	5,574,975	9.44	3.93%
16	Ethiopia	78.53%	530,253	120,046,287	2.16	2.45%
17	Senegal	78.07%	133,934	50,869,971	10.04	5.82%
18	Iran	77.17%	723,856	489,587	0.02	0.00%
19	Chad	76.07%	446,825	18,251,784	3.00	2.58%
20	Morocco	75.17%	200,216	37,662,568	2.85	0.51%
21	Jamaica	72.82%	10,898	6,198,252	5.36	1.00%
22	Chile	70.00%	243,645	1,727,396	0.48	0.03%
23	Panama	68.35%	44,568	1,546,342	1.28	0.16%
24	Jordan	68.30%	5,813	12,971,447	11.37	4.97%
25	Burkina Faso	67.82%	168,000	57,498,417	5.76	6.08%

Notes

- ¹ Three interrelated background papers and a technical annex have been drafted by Oxfam America to support Oxfam International's briefing paper on public investments in agriculture. One summarizes the arguments for investing in agriculture as a pro-poor growth strategy, and explores sector allocations at national and regional scales (M. Smale, K. Hauser, N. Beintema and E. Alpert, 2009, 'Turning the Tables: Global Trends in Agricultural Sector Investments'). A second, in progress, examines Official Development Assistance (ODA) to agriculture. A third explores options for engaging farmers in marginal areas, focusing more on program options at a sub-national scale (M. Smale and E. Alpert, 'Making Investments Pay for Poor Farmers: A Review of the Evidence and a Sample of Options'). The technical annex by K. Sebastian presents the methodology and data used to map marginal areas (K. Sebastian, 2009, 'Mapping favorability for agriculture in low and middle income countries: technical report, maps and statistical tables'). In addition, the Oxfam International Discussion Paper on Agriculture has been extensively consulted.
- ² Unless otherwise indicated, 'agriculture' includes forestry and fishing.
- ³ A. Evans (2009) *The Feeding of the Nine Billion*, London: Chatham House
- ⁴ R.E. Evenson and M. Rosegrant (2003) 'The economic consequences of crop genetic improvement programmes', Chapter 23 in R.E. Evenson and D. Gollin (eds.) *Crop Variety Improvement and its Effect on Productivity: The Impact of International Agricultural Research*, Wallingford, Oxon, UK: FAO and CABI Publishing: 495.
- ⁵ Authors' calculations based on OECD DAC commitments, Producer Support Estimates, and FAO data on small farms. US and EU per farm ODA investments cover the 1983 to 2007 period.
- ⁶ OECD Development Assistance Committee (DAC) data for Official Development Assistance (ODA) to agriculture, accessible at www.oecd.org/dac. Note: 2008 figures were not available at the time of writing this report.
- ⁷ Oxfam GB calculations and Bank of Scotland data.
- ⁸ World Bank and UNESCO data.
- ⁹ M. Karnitschnig 'US to Take Over AIG in \$85 Billion Bailout', September 17, 2009, accessed at <http://online.wsj.com/article/SB122165238916347677.html>.
- ¹⁰ Official Development Assistance is defined as those flows to developing countries and multilateral institutions provided by official agencies, including state and local governments, or by their executive agencies, each transaction of which meets the following tests: 1) it is administered with the promotion of the economic development and welfare of developing countries as its main objective; and 2) it is concessional in character and conveys a grant element of at least 25 per cent. (OECD-DAC website).
- ¹¹ IFAD (2002) 'The Rural Poor', Chapter 2 of the *World Poverty Report*, Rome: IFAD.
- ¹² X. Diao, S. Fan, S. Kanyarukiga and B. Yu (2007) *Agricultural Growth and Investment Options for Poverty Reduction in Rwanda*, IFPRI Discussion Paper 00689, Washington, D.C: International Food Policy Research Institute.
- ¹³ E. Ligon, and E. Sadoulet (2007) 'Estimating the Effects of Aggregate Agricultural Growth on the Distribution of Expenditures', background paper for the *World Development Report 2008*.
- ¹⁴ J.M. Alston, C. Chan-Kang, M.C. Marra, P.G. Pardey, and T.J. Wyatt (2000) 'A MetaAnalysis of Rates of Return to Agricultural R&D: Ex Pede Herculem?', IFPRI Research Report 113. International Food Policy Research Institute (IFPRI), Washington, D.C.; R.E. Evenson (2001) 'Economic impacts of agricultural research and extension', Chapter 11 in B. Gardner and G. Rausser (ed.), *Handbook of Agricultural Economics*, Volume 1, Amsterdam: Elsevier.
- ¹⁵ S. Fan, B. Yu and A. Saurkar (2008) 'Public spending in developing countries: Trends, determination and impacts' in S. Fan (ed.), *Public Expenditures, Growth and Poverty: Lessons from Developing Countries*, International Food Policy Research Institute and Johns Hopkins University Press, Baltimore.
- ¹⁶ S. Fan (ed.) *ibid*. In India, roads had the largest return; in China, education had the greatest impact on decreasing the number of poor people below the absolute poverty line; in rural Thailand, electricity ranked first; and in Uganda, agricultural R&D was number one by far.
- ¹⁷ P.W. Heisey, J. L. King, K. Day-Rubenstein, D. A. Bucks, and R. Welsh (Forthcoming). *Assessing the Economic and Social Benefits of Public Agricultural Research*, Economic Research Service, US Department of Agriculture; P.G. Pardey, J.M.

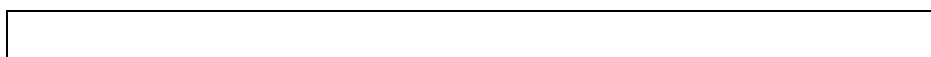
- Alston, and R. R. Piggott (eds.) (2006) 'Agricultural R&D in the Developing World: Too Little, Too Late?', International Food Policy Research Institute. Washington, D.C.
- ¹⁸ S. Maxwell, I. Urey, and C. Ashley (2001) 'Emerging Issues in Rural Development: An Issues Paper', London: Overseas Development Institute.
- ¹⁹ X. Diao, P. Hazell, D. Resnick, and J. Thurlow (2007) *The Role of Agriculture in Development: Implications for Sub-Saharan Africa*, IFPRI Research Report 153, International Food Policy Research Institute, Washington, D.C.
- ²⁰ OECD-DAC Commitments and Producer Support Estimate for 2006, accessed at www.oecd.org/dac.
- ²¹ Oxfam International (2008) 'Double-Edged Prices', Briefing Paper No. 121, Oxford: Oxfam International.
- ²² J. Chamberlin, (2008) 'It's a Small World After All: Defining Smallholder Agriculture in Ghana', IFPRI Discussion Paper 00823, International Food Policy Research Institute (IFPRI), Washington, D.C.
- ²³ P. Khosla and R. Pearl (2003) *Untapped Connections: Gender, Water, and Poverty*, New York: WEDO.
- ²⁴ P. Collier (2007) *Poverty Reduction in Africa*, Centre for the Study of African Economies, Department of Economics, University of Oxford, 2007. Accessed at <http://users.ox.ac.uk/~econpco/research/pdfs/PovertyReductionInAfrica.pdf>, 5/2/09.
- ²⁵ A. Evans (2009) *op cit*.
- ²⁶ H. Reid (IIED) and A. Simms (policy director, nef), with Dr V. Johnson (nef) and based on contributions from the Working Group on Climate Change and Development and their partners (2007) 'Up in smoke? Asia and the Pacific: The threat from climate change to human development and the environment', Fifth report by the working group on climate change and development, November 2007.
- ²⁷ 'Up in smoke? Asia and the Pacific', *op. cit*.
- ²⁸ C. Perez, C. Nicklin, O. Dangles, S. Vanek, S. Sherwood, S. Halloy, R. Martinez, K. Garrett and G. Forbes, unpublished manuscript, 'Climate Change in the High Altitude Andes: Implications and adaptation strategies for small-scale farmers.'
- ²⁹ Oxfam International (2007) 'Adapting to Climate Change', Briefing Paper No. 104, Oxford: Oxfam International.
- ³⁰ According to the article 'The 10 percent that could change Africa,' published in October 2008, IFPRI Forum online magazine, measuring national budget expenditures to agriculture has been difficult, and findings vary widely. 'Due to a lack of clear criteria for evaluation and different sources of data, reporting results tend to vary based on who is doing the calculating and how, and on how "agricultural spending" is defined.' As such, those countries that meet the Maputo declaration vary from year to year. This chart provides the latest available data from the *April – June 2008 NEPAD Agriculture Unit Quarterly Report*.
- ³¹ Although data from South Africa show that the role of the private sector is greater in South Africa, the authors report that these data are also underestimated. Data for Latin America are from 1996, the last year for which data on private investments are available. Data also excludes India and China.
- ³² N. M. Beintema, and G.-J. Stads (2008) 'Measuring Agricultural Research Investments: A Revised Global Picture', ASTI Background Note, Agricultural Science and Technology Indicators Initiative, Washington DC: International Food Policy Research Institute (IFPRI).
- ³³ G.-J. Stads and N. Beintema (2009) *Public Agricultural Research in Latin America and the Caribbean: Investment and Capacity Trends*, ASTI Synthesis Report, Agricultural Science and Technology Indicators Initiative, Washington DC: International Food Policy Research Institute (IFPRI).
- ³⁴ N.M. Beintema and G.-J. Stads (2006) *Agricultural R&D in Sub-Saharan Africa: An Era of Stagnation*, ASTI Background Report, Agricultural Science and Technology Indicators Initiative, Washington DC: International Food Policy Research Institute (IFPRI).
- ³⁵ S. Pal and D. Byerlee (2006) 'India: The Funding and Organization of Agricultural R&D - Evolution and Emerging Policy Issues', Chapter 7 in P.G. Pardey, J.M. Alston, and R.R. Piggott (eds.), *Agricultural R&D in the Developing World*, International Food Policy Research Institute (IFPRI), Washington, D.C.
- ³⁶ M. Lipton with R. Longhurst (1989) *New Seeds and Poor People*, London: Unwin Hyman.
- ³⁷ P. Pingali, M. Hossain, and R. V. Gerpacio (2007) 'Asian Rice Bowls: The Returning Crisis?' Wallingford, UK: CAB International.

- ³⁸ J. M. Antle and P. Pingali (1994) 'Pesticides, Productivity, and Farmer Health: A Philippine Case Study' in *American Journal of Agricultural Economics* 76(3):418–30.
- ³⁹ M. Ali and D. Byerlee (2001) 'Productivity growth and resource degradation in Pakistan's Punjab' in E.M. Bridges, I.D. Hannam, L.R. Oldeman, F.W.T. Penning de Vries, S.J. Scherr, and S. Sombatpanit (eds.), *Response to Land Degradation*, Enfield NH: Science Publishers: 186–99.
- ⁴⁰ Oxfam calculations based on the 2008 *Human Development Report*, UNDP.
- ⁴¹ A. Evans (2009) *The Feeding of the Nine Billion*, op. cit.
- ⁴² *Ibid.*
- ⁴³ IFAD (2002) 'The Rural Poor', Chapter 2 of the *World Poverty Report*, Rome: IFAD.
- ⁴⁴ K. Sebastian (2009) 'Mapping favorability for agriculture in low and middle income countries: technical report, maps and statistical tables', Washington, D.C: Oxfam America.
- ⁴⁵ C. Bertini and D. Glickman et al. (2009) *Renewing American Leadership in the Fight Against Global Hunger and Poverty*, The Chicago Initiative on Global Agricultural Development, Chicago: The Chicago Council on Global Affairs: 89.
- ⁴⁶ More detailed descriptions of farmers in these areas and their problems are found in R. Ruben, J. Pender, and A. Kuyvenhoven (2007) 'Sustainable poverty reduction in Less-favoured Areas: Problems, Options and Strategies' in *Sustainable Poverty Reduction in Less-Favoured Areas*, edited by the same authors, Wallingford, UK: CAB International.
- ⁴⁷ Sebastian (2009) op cit. Oxfam defines marginalized areas as lands within the extent of agriculture in low- and middle-income countries where the growing period is less than 150 days (arid or semi-arid) or terrain is less suitable for cultivation (high altitude plains, hills and rugged lowlands, and high altitude plateaus or mountains). The prominent farming systems in marginalized areas have been clustered into uplands (including perennial/tree crops, shifting cultivation, and mixed upland farming systems) and drylands (including migratory herders, agro-pastoralists, and mixed rainfed systems). The main locations include the East African highlands, Central American and Andean hillsides, Asian uplands, the semi-humid highlands of Southern Africa, South-East Asia and Central America; the arid and semi-arid areas of sub-Saharan Africa, the Middle East, North Africa and South-East Asia; and the dryland areas of Central and Southern Africa, South Asia, Coastal North Africa, North-East Brazil and the Yucatan peninsula in Mexico.
- ⁴⁸ We have excluded Eastern Europe, the Commonwealth of Independent States, and Central Asia. These add 1 per cent of rural people and 3 per cent of land to our estimates, but investment options for these farmers are not discussed here.
- ⁴⁹ C. Larrea and W. Freire (2002) *HRevista Panamericana de Salud Pública*, HVolume 11, Numbers 5–6, May 2002, pp. 356–64, HPan American Health Organization (PAHO)H.
- ⁵⁰ C. Nicklin, Regional Representative, Andean Community of Practice, Collaborative Crops Research Program, McKnight Foundation: pers. comm. August 2008.
- ⁵¹ R. Tripp with C. Longley, et al. (2006) *Self-Sufficient Agriculture: Labour and Knowledge in Small-Scale Farming*, London: Earthscan: 10.
- ⁵² This description draws heavily from R. Tripp (2006) op cit., N. Uphoff (2002) *Agroecological Innovations: Increasing Food Production with Participatory Development*, Earthscan; J. Pender (2008) *Agricultural technology choices for poor farmers in less-favoured Areas of South and East Asia*, Occasional Papers 5, Knowledge for Development Effectiveness. International Fund for Agricultural Development (IFAD), Rome; and P. Hazell, R. Ruben, A. Kuyvenhoven and H. Jansen (2008) 'Development strategies for Less-Favored Areas' in E. Bult and R. Ruben (eds.) *Development Economics between Markets and Institutions: Incentives for Growth, Food Security and Sustainable Use of the Environment*, Mansholt Publication Series, Volume 4, The Netherlands: Wageningen Academic Publishers.
- ⁵³ J. Pontius, R. Dilts and A. Bartlett (2002) 'From farmer field school to community IPM: ten years of IPM training in Asia', Bangkok: FAO; C. Reij and D. Steeds (2003) 'Success Stories in African Drylands, Supporting Advocates and Assessing Sceptics', paper commissioned by Global Mechanisms of the Convention to Combat Desertification, Amsterdam: Center for International Cooperation; M. Smale and V. W. Ruttan (1997) 'How Social Capital Can Enable Technical Change: the Groupements Naams of Burkina Faso' in C. Clague (ed.) *Institutions and Economic Development: Growth and Governance in Less-Developed and Post-Socialist Countries*, Baltimore and London: Johns Hopkins University Press; R. Tripp, with C. Longley et al. (2006) op cit..
- ⁵⁴ Oxfam Novib, personal communication with Seng Raw, director of Metta, November

2008.

- ⁵⁵ E. Godtland, E. Sadoulet, A. de Janvry, R. Murgai and O. Ortiz (2003) 'The Impact of Farmer-Field-Schools on Knowledge and Productivity: A Study of Potato Farmers in the Peruvian Andes', CUDARE Working Paper 963, Berkeley, California: Department of Agricultural & Resource Economics, University of California, Berkeley.
- ⁵⁶ Hamado Tapsoba, (pers.comm), Sahelian Community of Practice, Collaborative Crops Research Program, McKnight Foundation, March 2009.
- ⁵⁷ M. Smale, L. Diakité, and H. Jones (2008) 'Enhancing the Capacity of Sahelian Farmers to Manage their Millet and Sorghum Genetic Resources: A Econometric Analysis of Project Impacts', project report, International Fund for Agricultural Development, TAG 696.
- ⁵⁸ R. Tripp with C. Longley, *et al.* (2006) *op cit.*
- ⁵⁹ Arcand (2004) in Mercoiret and Mfou'ou, 'Rural Producers Organizations for Pro-poor Sustainable Agricultural Development', Paris Workshop, 'Rural Producer Organizations (RPOs), empowerment of farmers and results of collective action', October 2006, accessible at www.worldbank.org.
- ⁶⁰ U.S. Awasthi (2001) 'Resurgence of co-operative movement through innovations', *Co-op Dialogue*, 11(2):21–6.
- ⁶¹ E.g. Ortmann and King (2007); Stringfellow *et al.* (1997); Shepherd (2007).
- ⁶² M. Smale, L. Nagarajan and M. Cohen (2009) 'Local Seeds, Local Markets: Rising Food Prices and Small Farmers' Access to Seed', IFPRI Issue Brief 57. International Food Policy Research Institute, Washington, D.C.; Food and Agriculture Organization of the United Nations (2009) 'Seeds, Diversity and Development', <http://www.fao.org/economic/esa/seed2d/projects2/marketsseedsdiversity/projectteam/en/> Accessed on April 19, 2009.
- ⁶³ C. Longley, L. Nagarajan, T. Boye, I. Maizama, A. Boubacar, A. Y. Aboubacar, and I. Kassari (2009) 'Enhancing Seed Systems and Dissemination of New Varieties in Niger', draft manuscript, International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), Nairobi.
- ⁶⁴ <http://www.icrisat.org/Media/2006/media8.htm>.
- ⁶⁵ 'Orphan crops' are crops that are 1) locally, but not globally abundant in terms of cropped area; 2) known in practical terms by farmers and other users but relatively unknown by scientists; 3) limited in use relative to their economic potential. With a 'minor' importance in commercial trade, limited crop area and use relative to economic potential, orphan crops have been 'neglected' by both public and private agricultural research.
- ⁶⁶ C. Gurung (2006) 'The role of women in the fruit and vegetable supply chain in Maharashtra and Tamil Nadu, India: The new and expanded social and economic opportunities for vulnerable groups task order under the Women in Development IQC', Washington, DC: US Agency for International Development, in *Gender in Agriculture Source Book*, World Bank 2009.
- ⁶⁷ A. Giuliani (2007) *Developing Markets for Agrobiodiversity: Securing Livelihoods in Dryland Areas*, London: Earthscan and Bioversity International.
- ⁶⁸ This section draws from G. P. Gruère, A. Giuliani and M. Smale (2008) 'Marketing underutilized plant species for the poor: a conceptual framework' in A. Kontoleon, U. Pascual, and M. Smale (eds.) *Agrobiodiversity Conservation and Economic Development*, London: Routledge.
- ⁶⁹ G. L. Nagarajan, and E. D. I. Oliver King (2008) 'The role of collective action in the marketing of underutilized plant species: Lessons from a case study on minor millets in South India', *Food Policy* (In Press) doi: 10.1016/j.foodpol.2008.10.006
- ⁷⁰ C. Barrett, pers. comm.
- ⁷¹ J. Morduch and M. Sharma (2001) 'Strengthening public safety nets', FCND discussion papers 122, International Food Policy Research Institute (IFPRI).
- ⁷² J. Farrington, R. Slater, and R. Holmes (2004) 'The Search for Synergies between Social Protection and Livelihood Promotion: The Agriculture Case', Overseas Development Institute (ODI) Working Paper.
- ⁷³ In the Eastern and Southern African context, Jayne *et al.* (2003) identify farmers with under 0.1 ha as 'virtually landless', meaning that below this threshold, it is unlikely that a small farm can viably support itself through farm production alone. T.S. Jayne, T. Yamano, M. Weber, D. Tschirley, R. Benfica, A. Chapoto, and B. Zulu (2003) 'Smallholder income and land distribution in Africa: Implications for poverty reduction strategies', *Food Policy* 28: 253–75.

- ⁷⁴ J. Pender (2008) *op cit*.
- ⁷⁵ R. Tripp with C. Longley, *et al.* (2006) *op. cit*.
- ⁷⁶ A.R. Quisumbing, L.Haddad and C.Peña (1995) 'Gender and Poverty: New Evidence from Ten Developing Countries', Food Consumption and Nutrition Division Discussion Paper No.9, International Food Policy Research Institute.
- ⁷⁷ C. Doss (2001) 'Designing agricultural technology for African women farmers: Lessons from 25 years of experience', *World Development* 29 (12): 2075–92.
- ⁷⁸ E.g., C. R. Doss and M. Morris (2001) 'How does gender affect the adoption of agricultural innovations? The case of improved maize technology in Ghana', *Agricultural Economics* 25: 27–39; C. Gladwin (1992) 'Gendered Impacts of Fertilizer Subsidy Removal Programs in Malawi and Cameroon', *Agricultural Economics* 7:141–53.
- ⁷⁹ A.D. Alene, V. M. Manyong, G.O. Omany, H.D. Mignouna, M. Bokanga, and G.D. Odhiambo (2008) 'Economic Efficiency and Supply Response of Women as Farm Managers: Comparative Evidence from Western Kenya', *World Development* 36(7): 1247–60.
- ⁸⁰ World Bank (2007) *World Development Report 2008: Agriculture for Development*, p. 127, available at www.worldbank.org.
- ⁸¹ Oxfam International (2004) 'Trading Away our Rights: Women Working in Global Supply Chains', accessible at www.oxfam.org/en/policy/report-042008-labor
- ⁸² P. Hazell *et al.*(2008) *op cit*.
- ⁸³ T. Reardon and A. Gulati (2008) 'The Supermarket Revolution in Developing Countries: Policies for Competitiveness with Inclusiveness', IFPRI Policy Brief 2, Washington DC: International Food Policy Research Institute (IFPRI).
- ⁸⁴ K. Rosenbusch 'Appropriate Postharvest Technology for Africa: 8 Simple tools and techniques', Global Cold Chain Alliance and World Food Logistics Organization.
- ⁸⁵ World Bank (2007) *op. cit*.
- ⁸⁶ UN (2003) 'Empowering Women: The Key to Achieving the Millennium Development Goals', *International Women's Day Backgrounder*, accessible at: <http://www.un.org/events/women/iwd/2003/background.html>
- ⁸⁷ C. Thirtle, X. Irz, L. Lin, V. McKenzie-Hill and S. Wiggins (2001) 'Relationship between changes in agricultural productivity and the incidence of poverty in developing countries', DFID Report No.7946 27/02/2001.
- ⁸⁸ J. Chamberlin (2008) *op cit*.



© Oxfam International June 2009

This paper was written by Emily Alpert, Melinda Smale, and Kelly Hauser with help from Nienke Bientema and Javier Perez. Oxfam acknowledges the assistance of Kimberly Pfeifer and Joyce Kortland in its production. It is part of a series of papers written to inform public debate on development and humanitarian policy issues.

The text may be used free of charge for the purposes of advocacy, campaigning, education, and research, provided that the source is acknowledged in full. The copyright holder requests that all such use be registered with them for impact assessment purposes. For copying in any other circumstances, or for re-use in other publications, or for translation or adaptation, permission must be secured and a fee may be charged. E-mail publish@oxfam.org.uk.

For further information on the issues raised in this paper please e-mail advocacy@oxfaminternational.org.

The information in this publication is correct at the time of going to press.



Oxfam International **www.oxfam.org**

Oxfam International is a confederation of thirteen organizations working together in more than 100 countries to find lasting solutions to poverty and injustice:

Oxfam America (www.oxfamamerica.org); Oxfam Australia (www.oxfam.org.au); Oxfam-in-Belgium (www.oxfamsol.be); Oxfam Canada (www.oxfam.ca); Oxfam France - Agir ici (www.oxfamfrance.org); Oxfam Germany (www.oxfam.de); Oxfam GB (www.oxfam.org.uk); Oxfam Hong Kong (www.oxfam.org.hk); Intermon Oxfam (www.intermonoxfam.org); Oxfam Ireland (www.oxfamireland.org); Oxfam New Zealand (www.oxfam.org.nz); Oxfam Novib (www.oxfamnovib.nl); Oxfam Quebec (www.oxfam.qc.ca)

The following organizations are currently observer members of Oxfam International, working towards possible full affiliation:

Fundación Rostros y Voces (Mexico) (www.rostrosyvoces.org)

Oxfam India (www.oxfamindia.org)

Oxfam Japan (www.oxfam.jp)

The following organization is linked to Oxfam International:

Oxfam International and Ucodep Campaign Office (Italy)

Email: ucodep-oi@oxfaminternational.org

Please contact any of the agencies for further information, or visit www.oxfam.org.

Email: advocacy@oxfaminternational.org