



## **ACHIEVING HIGHER GROWTH AND POVERTY REDUCTION IN SUB-SAHARAN AFRICA**

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**A Note for the Commission on Africa**

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**Poverty has increased in Sub-Saharan Africa over the past 40 years**  
**On current trends there is no prospect of achieving the MDG poverty reduction target**

The dismal economic and social development record of Sub-Saharan Africa (SSA) over the past 40 years is well known. Per capita income growth over the period has been static and over the past 20 years it has been negative. Average incomes in 2000 were about 10% lower than in 1980 (UNCTAD 2001). Poverty over the period increased in absolute terms by about 60 million people and in relative terms from about 48% of the population in 1974 to about 60% in 1995 (Artadi and Sala-i-Martin). Private investment other than in the minerals and energy sectors has been very weak (IFC 2000-2). Increases in public spending have not generally been matched by significant improvements in access to public services. Chronic fiscal and monetary imbalances in many countries have resulted in high exchange rate risks and high real domestic currency interest rates, both deterring private investment by national and foreign investors.

Without major sustained increases in per capita GDP growth rates there is no prospect of reducing poverty significantly. To achieve the Millennium Development Goal (MDG) of halving extreme poverty by 2015, GDP growth will need to average 6-7% per annum from now until 2015 (IMF 2004, Artadi and Sala-i-Martin). There is nothing to suggest - on current trends - that growth rates even close to these levels will be achieved in SSA.

**The national private sector must be the engine of growth**

The much higher rate of economic growth necessary to achieve the MDGs can only be achieved if there is a major increase in investment by the private sector (UNIDO 2004). Higher private investment can occur only if there are sufficient profitable opportunities where the expected return on capital invested is high enough to compensate investors for the risks involved. In a competitive global marketplace this is likely to be primarily in sectors where the region has dynamic comparative advantage, where producers are able to access large and/or rapidly growing markets and even then only if producers can access intermediate goods and services, skilled labour and capital and entrepreneurship at a competitive cost. We argue in the next section that key sectors in which SSA has comparative advantage, and the potential to combine more rapid economic growth with poverty reduction, are agriculture and agribusiness. The development challenge is to create the conditions in which profitable opportunities in these sectors are created and exploited.

The national private sector is the key to growth and development. The national private sector in agriculture and agribusiness in SSA is made up of three groups: the established, larger businesses, small and medium size enterprises (SMEs) and smallholders (family farmers and individual traders). Growth and poverty reduction require that all three groups contribute to, and benefit from, national development. Generally there will be a need to stimulate modern intensive agriculture and competitively scaled agribusiness

ventures around larger corporate groups and linked SMEs. Extending the benefits of growth to the many millions of smallholders is often best achieved by using modern agribusinesses as hubs around which smallholder support operations can be built.

Clearly foreign corporate investors also have an important role to play alongside the national private sector. Companies based in the OECD and in Asia and South America have important expertise to contribute to SSA in agriculture and agri-business. Companies based in Asia and South America have recent experience of successfully developing profitable tropical and sub-tropical agri-enterprises. Some of them are already engaged in African agri-enterprise although as yet on a limited scale.

The challenge in SSA is to support all three groups of the national private sector and to create effective partnerships with foreign private investors, with host governments and with the international development community.

**Agriculture, agribusiness and related infrastructure are key to achieving rapid growth and poverty reduction**

It is increasingly well understood that agriculture and value adding agribusiness<sup>2</sup> are key to achieving rapid growth of incomes and poverty reduction in SSA (e.g. UNIDO 2004). Agriculture and agribusiness are sectors in which SSA has a dynamic comparative advantage in a globalising world (Wood and Mayer (2001), Wood (2002))<sup>3</sup>. They are also the sectors in which the great majority of the population are engaged, and will continue to be engaged for at least the next 25 years. Agriculture is the sector in which almost all the extremely poor are engaged. Without rapid growth in agricultural and agribusiness incomes, the MDG poverty reduction target cannot be met (Fafchamps, Teal and Toye).

Pessimism about the prospects for agricultural productivity in Africa are not justified (Sanchez 2001). Soil and climate conditions in many areas of SSA are no worse, and in some cases better, than the conditions encountered in other tropical and sub-tropical regions of the developing world, where yield per hectare and yield per capita are much higher and where growth in incomes of farmers has been sustained at a high rate and poverty has fallen sharply (Conway 1997, IFPRI 2001). It is true that in current circumstances there are few profitable agricultural opportunities to be exploited. However with the adoption of improved agricultural technologies and modern intensive agricultural techniques, access to agricultural inputs at lower cost and investment in improved cost effective infrastructure, rapid growth in agricultural incomes is achievable (CEPA 2002-1).

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<sup>2</sup> The term agribusiness is used here to include all industrial and service businesses that provide inputs to agriculture along the entire value chain. It includes production and/or distribution of e.g. seeds, fertiliser, pesticide, herbicide; primary product processing e.g. canning, milling; and post-harvest services e.g. bulk storage, packaging, export services.

<sup>3</sup> These are not the only sectors in which SSA has a comparative advantage. Others include tourism in certain locations and the extractive industries. These other sectors can make an important contribution to growth and poverty reduction in some countries. However agriculture and agribusiness are the only sectors where a large proportion of the population can expect to benefit from sector growth over the next 25 years.

Nor is pessimism about access to agricultural markets justified. Most agricultural output in SSA is supply constrained, not demand constrained. SSA already has preferential access to OECD markets but this access is not being sufficiently exploited (Page 2004)<sup>4</sup>. Demand for agricultural products, notably cereals and meat is growing rapidly in Asia but SSA is not meeting that growing demand. In SSA itself dependence on food imports has increased as the supply of food products from within the region has stagnated. If output from the region can be increased and transport costs reduced then regional and international markets can easily absorb sustained rapid growth in output from the region<sup>5</sup>. Moreover even producers of demand constrained products such as coffee and cocoa can enjoy large increases in on-farm incomes if production, transport and marketing costs can be reduced.

The argument about whether agriculture or industry is the key source of economic growth in Africa is a false dichotomy. There are many opportunities to grow output from both agriculture and value-adding agribusiness (UNIDO 2004). Often, to be profitable, agribusiness opportunities require simultaneous growth in agricultural output and complementary investments in infrastructure. The demand for agricultural inputs such as fertiliser and pesticides is a function of the volume of agricultural production and agricultural incomes. Agricultural processing businesses such as canning and milling need reasonable certainty about the quantity, quality and cost of agricultural inputs that will be available. This is a function of the volume and quality of local agricultural production which itself depends in part on the use made of agricultural inputs e.g. fertiliser and pesticides. Investments in input and output storage, packaging, distribution and marketing can improve access to, and reduce the cost of, agricultural services for farmers and thereby boost on-farm productivity and incomes. These investments not only increase on-farm incomes but also generate growth in employment and incomes in off-farm agriculture-related activities.

Numerous unexploited potentially profitable opportunities for investment in agribusiness exist in East, West and Southern sub-regions of SSA along the entire value chain (see Appendix 2 for examples). Often the reason these investments are not undertaken, or are unprofitable when undertaken, is a failure of coordination of investments along the value chain, each of which is dependent for success on complementary actions by others. In West Africa potentially viable fertiliser production capacity is currently mothballed while locally produced natural gas (the feedstock for the plant) is being flared and local farmers pay high prices for imported fertiliser. In several countries in the region product processing facilities have been built and then closed for want of reliable supplies of agricultural inputs of adequate quality and because of the poor reliability and high cost of intermediate inputs such as electricity and water. In East Africa in recent years increased food production by smallholders rotted in the fields for want of adequate modern post-

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<sup>4</sup> This does not mean that improvements in OECD agricultural trade policies are not important, but they are not needed in the short term in SSA to kick-start growth in agriculture and agribusiness. The immediate problem is on the supply side.

<sup>5</sup> Because SSA agricultural output is currently so small, large percentage growth in output from the region adds only marginally to total world supply.

harvest facilities such as bulk storage, transport and marketing services while urban consumers ate expensive imported food.

Figure 1 sets out the requirements for profitable investment along the agricultural value chain. The development challenge is to find effective mechanisms for coordinating essential complementary investments and for reducing the risks of coordination failure.

*Figure 1: Requirements for increasing agricultural and agribusiness incomes*

<p><b>Simultaneously to:</b></p> <ul style="list-style-type: none"><li>• Access improved agricultural technologies</li><li>• Access reliable and less expensive agricultural inputs e.g. fertiliser, pesticides</li><li>• Access improved reasonably priced post-harvest services e.g. bulk storage, marketing services</li><li>• Access improved reasonably priced infrastructure services e.g. power, irrigation, electricity etc.</li><li>• Increase national value added by investment in profitable processing e.g. milling, canning etc.</li></ul>
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Currently smallholders in SSA have particularly poor access to agricultural inputs and their on-farm costs are very high. Improving their access to modern farming technologies and reducing their costs of production can make a direct and significant impact on poverty.

Investment in agriculture- and agribusiness-supporting infrastructure is also crucial. If investors in agriculture and agribusiness have to absorb the full front-end costs of providing improved infrastructure then many will either be unable or unwilling to take the financing risk. If they have to rely on infrastructure services provided by State owned utilities then they may fear a continued poor quality and high cost of supply. Yet their investment will only be profitable if improved infrastructure (e.g. water, electricity, port and road transport) is available as and when needed and at a cost that allows the investment in agriculture and/or agribusiness to be competitive. The challenge is to find ways to provide and finance this infrastructure and make it available to farmers at reasonable cost, thereby facilitating profitable investment in agriculture and agribusiness.

The challenge of providing cost-effective infrastructure services for smallholders is particularly acute. The unit cost of infrastructure supplied to small rural communities is high. Smallholders have low purchasing power. User charges set to recover the full cost of the services will usually be unaffordable. However, if the services are not provided to smallholders then they will not be able to benefit significantly from growth in national agricultural production. The challenge is to find ways to efficiently deliver and finance affordable infrastructure service enhancements for smallholders particularly in situations where doing so can be expected to stimulate increased agricultural production and/or incomes.

An agriculture and agribusiness focussed strategy for poverty reduction must be based around investment by larger national corporate investors and by SMEs. This is necessary because of the strong links between scale of production, productivity and competitiveness. Many of the production and marketing costs in agriculture and agribusiness are highly scale dependent. If production is to be competitive in world markets

(and competing with imports in local markets) then fixed costs must be spread across a sizeable volume and value of production.

One proven way to ensure that SMEs and smallholders benefit from investment in modern agriculture is to create strong links between modern agricultural and agribusiness hubs and rural smallholders and SMEs through development of outgrower schemes. Around the modern farm ‘hub’, smallholder support services and rural infrastructure services can be built. Appendix 3 sets out an example of a pro-poor outgrower scheme currently under development in Uganda.<sup>6</sup>

If these complementary agricultural, agribusiness and infrastructure investments can be induced and they prove to be profitable then there will be a virtuous upward spiral of income growth and poverty reduction. In addition to the direct improvement in incomes and reduction in poverty; there will be an indirect multiplier effect as domestic and regional demand for other goods and services increases; and there will be higher fiscal revenues that will permit higher government spending, thereby improving public services and accelerating progress towards achieving the MDGs.

### **Good government policies are essential but not sufficient**

It is now widely accepted that without appropriate government policies there can be no growth in private investment or in poverty reduction:

- There must be law and order, reasonably robust institutions of government and respected rules of business.
- There must be sound macro-economic management. In the past, poor macro-management has often resulted in maintenance of an uncompetitive exchange rate, in high domestic inflation and high domestic real interest rates. These policies have inevitably deterred private investment.
- There must be appropriate micro-economic policies that encourage and facilitate private investment. Over the past 40 years, bad government policies in agriculture in SSA have been the prime cause of poor performance (Fafchamps et al). State marketing boards were often used to excessively tax agricultural producers, destroying incentives to invest. Excessive regulation has bred corruption, increased costs and further harmed incentives to invest. Although many improvements have been made in many countries in the region in recent years, there remain many unduly burdensome sector policies that continue to deter investment in modern agricultural technologies (Tripp 2002).

Although good government policies are necessary, they are not sufficient. As UNIDO observes, ‘The incipient [national] private sector can hardly be expected to engage in productivity catch-up with international competition [if] the policy environment does not go beyond good macroeconomic management, improved governance and a healthy investment climate’ (UNIDO 2004).

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<sup>6</sup> Of course the concept of outgrower schemes is not new. In the past benefits for smallholders have sometimes been eroded by the actions of the monopolistic hub investor. Successful schemes must ensure an appropriate sharing of benefits between the hub investor and smallholders.

There are three reasons for arguing that good policies alone are not sufficient:

- The immature nature of the agriculture and agribusiness sectors in SSA is such that they require sustained public good investment. In the OECD countries it has long been universally recognised that the agricultural sector in its early stage of development requires heavy taxpayer-funded investment in such areas as extension and information services, credit support for farmers and anticipatory development of agriculture-supporting infrastructure eg irrigation, roads, electricity. In SSA comparable support for agriculture and agribusiness is needed over the short and medium term if strong competitive businesses are to emerge. However over the past 40 years direct government involvement in agriculture in SSA has done far more harm than good. Most governments in the region have now withdrawn or de-emphasised involvement in agriculture. Yet the need for support to these important sectors remains. The challenge is to find new ways of providing effective support to build a competitive private sector in agriculture and agribusiness.
- In SSA there are pervasive market failures. Unless they are addressed effectively they will deter private investment. There are four important failures: (i) coordination failures which arise when complementary investments in related activities along the value chain do not take place as and when expected, with adverse implications for the return on investment at other points along the value chain; (ii) increasing returns to scale and barriers to entry which are widespread at various points along the agricultural value chain. As is well known, the consequence of increasing returns to scale and barriers to entry is appropriation of rents by first movers and a failure of the market to pass cost reductions to producers, especially small producers that lack bargaining power; (iii) failures in risk markets. Even when governments have taken appropriate action to reverse the poor policies of the past, there is a legacy of high perceived country risk for private investors. The most obvious legacy of bad past policies is the fear of investors and providers of finance that future governments may revert to the bad policies of the past, destroying value created by the private sector. These fears prevent the emergence of medium and long term risk markets (preventing hedging of the risks) and raise the cost of capital to investors. The net result is to increase the cost of doing business, thereby reducing the amount and the value of private investment. In short many investments are rendered uneconomic and do not proceed because of the market failures (CEPA 2002-1)<sup>7</sup>.
- Several governments in SSA in recent years have revamped their macro- and micro-policy environments to stimulate private investment. The response by private investors has generally been disappointing. The evidence indicates that in addition to continuing efforts to improve the macro- and micro- policy environment, host governments supported by donors need to create new impetus through effective interventions to overcome the market failures if the disappointing economic performance of recent years is to be reversed.

If targeted effective interventions can be designed to overcome the market failures then there will be more productive private investment leading to higher growth and greater poverty reduction. Over the medium and long term these interventions should be self-

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<sup>7</sup> Extensive discussion of the market failures and transactions costs in agriculture and agribusiness is contained in CEPA 2002-1.

financing from a combination of charges levied on users and growth in taxes as incomes grow.

Even if rapid growth in agricultural and agribusiness incomes can be achieved there remains the question of whether the very poor will participate sufficiently in the benefits of growth. History suggests that the low purchasing power and risk aversion of smallholders combined with their limited access to credit and information about new technologies and limited access to infrastructure at a reasonable cost may well act to limit the benefits that accrue to them as large and medium size enterprises grow. Significant expenditures on agricultural extension and information services, access to infrastructure on affordable terms, expanded access to credit and possibly ‘introductory’ price discounts on key agricultural inputs eg new seed varieties and farmer credit are likely to be needed if risk averse smallholders are to be persuaded to adopt new technologies and approaches that will benefit them in the longer term. It is not realistic to expect that the costs of this support will be fully recovered from future charges and taxes on smallholders. Given the central objective of donors of reducing poverty, donor grant funded programmes to support smallholder participation in the modern agricultural and agribusiness economy can be fully justified as part of a wider programme of growth and development. Given the scarcity of donor grant resources available to low income developing countries they should be deployed to benefit only the least well off, should be limited in amount per beneficiary and should be targeted on increasing productivity and sustainable incomes of smallholders.

**Targeted efficient interventions are needed to overcome market failure**  
**Additional support is needed to help smallholders participate in income growth**

It is far from a simple matter to overcome the market failures prevalent in SSA. In the OECD, national governments played, and still play, an active role in supporting agriculture both as funder and provider of services. However in SSA government involvement in agriculture in the past has proven disastrous. Perverse influences on resource allocation and major weaknesses in the capacity of public sector institutions have made matters worse, not better. These systemic weaknesses will persist for the foreseeable future in most countries in the region. Overcoming market failure will therefore require interventions that are funded by host governments/donors but delivered by appropriately incentivised private sector parties including NGOs. To ensure that private sector service providers are appropriately incentivised, payments to them must be contingent on their delivering pre-agreed measures of performance and success<sup>8</sup>.

Certain key principles should inform the design of interventions:

- They should correct market failures, not distort markets
- They should lever-in private sector risk capital, not crowd it out. Private sector parties should always share in the business risks

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<sup>8</sup> The design of relatively simple and effective contingent contracts is discussed further in CEPA-1.

- They should focus on investments that are expected to be viable and sustainable without ongoing support over the medium term
- Charges for services provided to large and SME beneficiaries should be set such that initiatives can be expected to be self-financing over the long term
- Grant-funded ‘subsidies’ to stimulate smallholder participation in the modern agricultural and agribusiness economy should be targeted on those that are poorest and limited in amount per person or household. They should be temporary subsidies deployed where sustainable businesses are expected to result once technologies and farming practices have changed. Service charges for smallholders should not be set to recover the full cost of the services provided.

### Proposed initiatives to reduce transactions costs and risks and support smallholders

There are four categories of intervention appropriate to address the market failures described above that affect all producers in SSA and which are consistent with the principles set out above. There are two additional categories of intervention specifically designed to support smallholders. The ideas draw directly on work undertaken for DFID (CEPA 2002-1, CEPA 2002-2, Tripp 2002) and the experience of DFID and other donors acting through the Private Infrastructure Donor Group (PIDG) to stimulate private investment in infrastructure in SSA and other low income developing countries<sup>9</sup>.

**Agricultural Policy Improvement Fund.** The creation of a technical assistance fund to help governments improve sector policies in agriculture and agribusiness. There are many unresolved policy issues in agriculture, many of them new issues relating eg to consenting of new agricultural technologies, introduction of standards consistent with access for products to OECD markets etc. Work undertaken for DFID concluded that there is a need for enhanced donor support to host governments to support agricultural sector policy improvement (Tripp 2002). Such a fund would be similar to PPIAF, the donor-supported fund set up to improve policies for private investment in infrastructure<sup>10</sup>.

**Adaptation and Uptake of Improved Agricultural Technologies.** There are already a number of valuable initiatives to support access by African farmers to agricultural technologies from the OECD, their adaptation, consenting and use in SSA. One such initiative is the Africa-led Africa Agricultural Technology Foundation (AATF), a Rockefeller Foundation initiative supported by DFID. AATF is a PPP between private sector companies in the OECD, private sector agribusinesses and farmers in SSA and governments. It provides royalty free access to technologies owned by OECD companies

<sup>9</sup> The Private Infrastructure Donor Group (PIDG) is made up of the development arms of the governments of the UK, Sweden, the Netherlands and Switzerland and the World Bank. Further details about PIDG and its facilities Emerging Africa Infrastructure Fund, GuarantCo and Infraco are set out in Appendix 4.

<sup>10</sup> PPIAF is a donor- funded technical assistance facility managed by the World Bank that supports governments in improving policies for private infrastructure investment – see Appendix 4.

for adaptation and use in SSA<sup>11</sup>. The distinctive feature of these initiatives is that they provide African farmers with access on favourable terms to existing agricultural technologies held by the private and public sector that can be adapted for use in African conditions; and a mechanism for reducing the cost and speeding the process of adaptation and uptake by African farmers. An expansion in the resources available to these sorts of initiatives focused in particular on uptake by smallholders would address one key area of market failure and contribute directly to poverty reduction.

**Partial Credit Guarantees.** An efficient and effective way to reduce ‘excess’ transactions costs and risks is through the provision to private sector investors and providers of finance of partial credit guarantees<sup>12</sup>. One or more private sector intermediaries would be appointed to administer the scheme and fees to the intermediary would be performance related<sup>13</sup>. Partial credit guarantees would be granted only when they would lever in private sector equity and/or debt. The guarantor would only ever assume a portion of the investment risks. Guarantee fees would be set, for large and medium size beneficiaries, as a percentage of the guaranteed amount with the intention of recovering over time from the beneficiaries the capital invested and a modest return on capital. By reducing front-end risks and therefore the cost of capital this scheme would stimulate private investment that otherwise would not take place. The concept draws on the PIDG experience with GuarantCo, a similar guarantee facility designed to stimulate investment in the infrastructure sector in low-income developing countries.

**Agricultural Development Company (Agdevco).** Agdevco would be a donor funded agribusiness development company. It would work with the national private sector, national and local governments, the foreign private sector and development institutions to structure a coordinated financeable agribusiness investment package. It would act as principal to structure commercial agreements whose effect would be to reduce private sector transactions costs and risks. It would seek commitments in principle to provide finance to these investments from private sector and development finance institutions. Agdevco would be donor funded but managed by experienced private sector professionals. The management would be remunerated by reference to pre-agreed measures of success in stimulating new agricultural and agribusiness investment. Agdevco would seek to bring potential investments to the point where there were firm commitments from private investors and providers of finance. Once firm private sector commitments were made it would have no further active role. It would charge for its services probably through taking of a ‘free’ interest in the equity of some of the resulting investments. The concept of, and rationale for, Agdevco is described in detail in CEPA

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<sup>11</sup> Further details about AATF can be found at [www.aatechfound.org](http://www.aatechfound.org). Other comparable technology transfer initiatives also exist, details of which are contained in CEPA 2002-1.

<sup>12</sup> Excess transactions costs and risks are those extra costs and risks that investors must bear by virtue of the market failures over and above what they would bear in more efficient markets. For further discussion of this concept see Palmer (2003).

<sup>13</sup> A successful model for contracting a private sector intermediaries on a performance-linked basis has been implemented by the Emerging Africa Infrastructure Fund.

(2002-1) and in CEPA (2003)<sup>14</sup>. It is similar in many respects to Infraco, a PIDG- funded development company created to address similar market failures in the infrastructure sector<sup>15</sup>.

**Smallholder Credit Guarantee Window.** It is unlikely that smallholders will be able to afford charges for credit guarantees that are fully cost and risk reflective. Nor is it likely that the manager of the guarantee facility would judge the credit risk of smallholders as acceptable at guarantee fee rates that smallholders can afford. It is therefore proposed that the partial credit guarantee facility described above have a separate window for smallholders. Guarantee fees would be set at affordable levels. This window would need to be sufficiently highly capitalised to be able to absorb the higher loss rates that might be expected from smallholder beneficiaries of the guarantee scheme.

**Smallholder Support Programme.** In view of the fact that public sector extension and information services in SSA have not proven effective, it is necessary to design mechanisms for supporting smallholders that are funded by governments/donors but delivered by private sector for-profit and not-for-profit agents. In work for DFID, CEPA has explored in detail feasible mechanisms to support the uptake and use of modern agricultural technologies by smallholders (CEPA 2002-1, CEPA 2002-2)<sup>16</sup>. Examples of approaches that might be adopted include donor funding of private sector-delivered demonstration projects showing smallholders how new seed varieties and/or new combinations of inputs can raise yields and incomes. Payments to the private sector provider of the services would be linked to its success in stimulating uptake of the demonstrated products by smallholders. Approaches of this sort have been successfully used in South America (CEPA 2002-2)<sup>17</sup>.

Table 1 summarises the proposals for strategic interventions to support agriculture, agribusiness and agriculture supporting infrastructure investment by the private sector in SSA. Rows 1, 2 and 3 set out the initiatives described above to support agriculture and agribusiness. Rows 4 and 5 set out related initiatives in the infrastructure area that already exist. No new institutions would necessarily need to be created to implement any of the proposals since they could all be undertaken by one or more of the existing development institutions or PIDG initiatives and/or contracted out to for-profit or not-for-profit private sector intermediaries. Additional resources committed to these initiatives need not be large relative to donor budgets but they can be expected to lever-in to SSA a significant increase in private capital flows to the agriculture and agribusiness sectors.

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<sup>14</sup> CEPA 'Justification and Possible Modus Operandi for Public Sector/Donor Support for Generation of Business Opportunities in Developing Countries' produced for DFID, 2003 built on the ideas discussed in CEPA (2002-1).

<sup>15</sup> See Appendix 4 for more details on Infraco. See CEPA (2002-1) for a detailed discussion of Agdevco.

<sup>16</sup> Some of the ideas set out in the CEPA work referenced above is summarised in Appendix 5.

<sup>17</sup> Many other examples of using the private sector to deliver government/donor funded services are set out in CEPA 2002-1 and CEPA 2002-2.

Table 1

Sector	Objective	Initiative	Comment
1. All agriculture/ agribusiness	<p>Improve micro-policy environment</p> <p>Stimulate adaptation and uptake of improved agricultural technologies</p>	<p>(a) Donor funded sector policy improvement fund</p> <p>(b) Expansion of PPP approach to technology transfer, adaptation and use</p>	<p>The need and rationale for this fund was set out in Tripp 2002</p> <p>Africa Agricultural Technology Foundation (AATF) provides basis on which to build but currently under-resourced in financial and HR terms</p>
2. Large/SME agriculture/ agribusiness	<p>Reduce front-end transactions costs</p> <p>Mitigate/share business and financial risks</p>	<p>(a) Donor funded project development company acting as principal to contractually coordinate linked components of ag/agbusiness/ag infrastructure developments</p> <p>(b) Partial credit guarantee facility. Guarantee fees set to recover capital and modest return over long term. Facility managed by private sector financial services company operating on performance linked basis.</p>	<p>Same approach as now used by PIDG in infrastructure sector (Infraco)</p> <p>Extension of approach now used in infrastructure sector (Guarantco/Emerging Africa Infrastructure Fund)</p>
3. Smallholder agriculture/ agribusiness	Stimulate smallholder participation in modern agriculture	<p>(a) Grant funded private sector/NGO delivery of extension services for smallholders. Payment to service providers linked to actual performance</p> <p>(b) Special window for partial credit guarantees for smallholders. Grant funded capital with user charges set below cost and risk reflective level</p>	<p>The approach was described in detail in CEPA Nov 2002</p> <p>A soft window for partial credit guarantees to stimulate smallholder participation in modern agriculture and agribusiness</p>
4. Large/SME ag/agbusiness -supporting infrastructure	<p>Reduce front-end transactions costs</p> <p>Mitigate/share business and financial risks</p>	<p>(a) Donor funded project development company</p> <p>(b) Long term donor finance and guarantees with user charges set to recover cost of capital over long term</p>	<p>Infraco already exists. Expand financial and HR resources following proof it works</p> <p>Guarantco/EAIF/DFIs already exist. Expand resources as demand grows</p>
5. Smallholder- supporting infrastructure	Make modern infrastructure services affordable for smallholders	(a) Output based grant funding from donors paid to infrastructure providers as and when they deliver affordable infrastructure to small farmers	Will often be outgrower schemes built around modern farming hub and delivering 'package' of infrastructure, extension services and other support to small farmers.

## Conclusions and Recommendations

The conclusions and recommendations of this memorandum are:

- Over the past 25 years per capita incomes in SSA have fallen and poverty has increased substantially. On current trends there is no prospect of the MDG poverty reduction target being met. GDP growth rates sustained at about 6-7% per annum until 2015 are needed if the poverty reduction target is to be met. There are no signs, despite some improvements in government policies, that growth rates anywhere close to this level will be achieved in the absence of new effective interventions
- The national private sector must be the engine of growth. Established larger national private sector companies, SMEs and smallholders must all contribute to national development if both rapid growth and poverty reduction are to be achieved. The national private sector must create effective, mutually beneficial partnerships with foreign private sector companies. Considerable relevant experience and expertise can be found in Asia and South America as well as in the OECD.
- Agriculture, agribusiness and agriculture-supporting infrastructure are key to achieving rapid growth with poverty reduction in SSA. Agriculture and agribusiness are the sectors in which SSA has a dynamic comparative advantage and in which rapid growth can be expected to benefit the great majority of the population living on very low incomes. Pessimism about agriculture in SSA and about demand side constraints are misplaced. The argument about ‘either agriculture or industry’ is misconceived. There is great under-exploited potential to grow incomes rapidly in both agricultural production and in related industrial and services businesses along the agricultural value chain.
- Good government policies at the macro-economic and sector level are essential, but on their own not sufficient to stimulate private investment either on the scale required or in a way that sufficiently benefits the majority of smallholders. Sustained investment in the infrastructure support for agriculture and agribusiness is needed. Important market failures affecting all producers increase transactions costs and risks and therefore deter private investment. Smallholders face special problems that need to be addressed if they are to participate in the benefits of economic growth. If the economies of the region are to launch onto a higher growth trajectory and reverse the trend to increasing poverty then new targeted effective initiatives are needed to overcome the market failures and stimulate a major broad based increase in private investment in the agricultural and agribusiness sectors.
- It is no easy matter to intervene in markets and end up making them better, not worse. Certain key principles must be complied with when designing interventions. Key principles are: (i) interventions should lever-in private sector risk capital, not crowd it out; (ii) interventions should focus on creating viable

and sustainable businesses without the need for ongoing support in the medium term; (iii) charges for services provided to large and SME beneficiaries should be set such that they can be expected to be self-financing over the medium term; and (iv) donor-funded grants to stimulate smallholder participation in the modern agricultural and agribusiness economy should be temporary subsidies deployed where sustainable businesses are expected to result once technologies and farming practices have changed. However service charges paid by smallholders cannot be expected to recover the full cost of providing the services.

- A strategic programme of linked and mutually supportive initiatives to stimulate agriculture and agribusiness is proposed. The proposals draw on the analysis set out in CEPA (2002-1) and on the experience of the PIDG in designing and implementing innovative approaches to stimulate investment in infrastructure in SSA and other low-income developing countries. Each proposed initiative is targeted either to attack a key market failure or to support productivity improvement and income growth by smallholders. The initiatives are: (i) a donor funded technical assistance facility to support improved sector policies in agriculture and agribusiness; (ii) expanded resources to support the transfer, adaptation and uptake of new improved agricultural technologies particularly by smallholders, building on such existing initiatives as the Africa Agricultural Technology Foundation; (iii) creation of a partial credit guarantee facility that would share in the front-end risks of new investment in agriculture and agribusiness. It would have a special ‘window’ to enable smallholders to access guarantees on preferential terms; (iv) creation of an agricultural development company, Agdevco, to help national private investors to structure and finance complex agriculture/agribusiness investment packages, thereby reducing transactions costs and risks for private investors; (v) donor funded/ private sector implemented extension and information support services for smallholders, building on examples of best practice elsewhere in the developing world; and (vi) encourage close coordination and cooperation between these initiatives and the ongoing PIDG-sponsored infrastructure initiatives and expand the resources available to the PIDG initiatives when current resources are committed.
- Adopting these strategic initiatives does not necessarily require creation of any new institutions. They can be delivered using existing development institutions and/or by contracting-out services provision to the private sector with service providers paid on a performance-linked basis.
- The required additional donor funding is not great. Much of the donor funding would be contributed as capital, not grants. There would be significant financial leverage. Total new investment and finance from the private sector would be a large multiple of the donor funds contribution.

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## **APPENDIX 1**

### **About the author**

Dr Keith Palmer is Chairman and Founder of CEPA. He is also Chairman of Emerging Africa Infrastructure Fund and of Infracore and a non-executive Director of Guarantco, all PIDG initiatives referred to in the paper. Until retiring in 2002 he was Executive Vice Chairman, Investment Banking at Rothschild. Earlier in his career he worked for the World Bank, the IMF and as a contract civil servant working for the governments of Papua New Guinea and Tanzania.

He co-led the work for DFID on pro-poor agricultural technology development and use by farmers in low-income developing countries referenced in the paper.

### **About Cambridge Economic Policy Associates (CEPA)**

CEPA is an economic and financial policy advisory firm focused on the role of markets and of the private sector in development and the use of public-private partnerships for the delivery of publicly-funded services. Details can be found at [www.cepa.co.uk](http://www.cepa.co.uk).

## APPENDIX 2: AGRIBUSINESS OPPORTUNITIES IN SUB-SAHARAN AFRICA

### East Africa

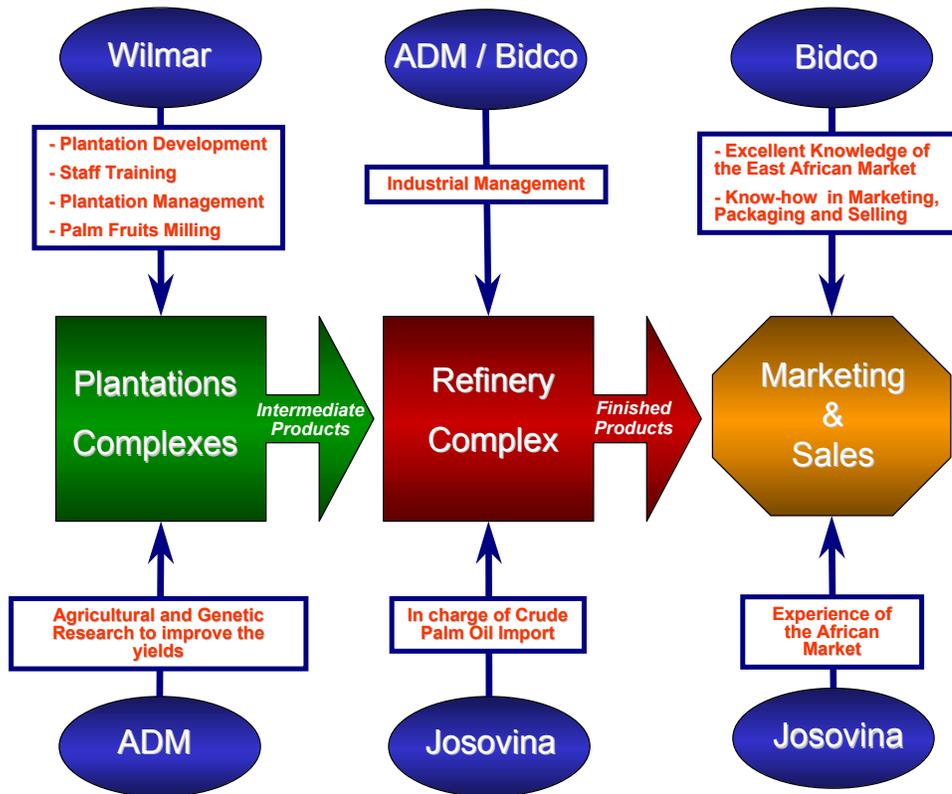
Technical studies undertaken by the FAO and IFAD have concluded that Uganda is an ideal location for growth of a major palm oil industry. Plans are being developed by a private sector consortium to develop a major palm oil scheme consisting of:

- A commercial oil palm plantation complex in Bugala Island, Kalangala District (the “Bugala Island Plantation Complex”), consisting of:
  - A 6,500 ha nucleus oil palm plantation;
  - A 3,500 ha outgrowers oil palm plantation;
  - A 60 TPH palm oil mill to process the FFB of this plantation.
- A commercial oil palm plantation complex on the shores of Lake Victoria, in Masaka District, (the “Lake Victoria Plantation Complex”), consisting of:
  - A 20,000 ha nucleus oil palm plantation;
  - Two 60 TPH palm oil mills to process the FFB of this plantation.
- An edible oil complex at Jinja (the “Jinja Edible Oil & Soap Complex”), consisting of:
  - A 300 TPD edible oil refinery to process the palm oil, fractionate and pack in consumer packs;
  - A 150 TPD oilseed processing facility to process palm kernel and traditional oilseeds;and
  - 150 TPD Soap Plant.

Two growers’ trusts will be formed to hold a 10% stake in the main companies and there will be associated and simultaneous development of outgrowers schemes. The main agribusiness investments will require significant investment in infrastructure enhancement to serve the main operations and the outgrower schemes will need to include provision of infrastructure services for outgrowers.

The total investment cost is expected to be in excess of \$300 million.

Chart 1: Private Sector Consortium for the Uganda Project



*Source: Bidco*

### Southern Africa

The Beira Corridor is a transport conduit through which agricultural produce from northern Zimbabwe is transported across Mozambique to the port at Beira. Whilst this traffic has been much reduced as a result of the current economic and political problems within Zimbabwe, the Beira Corridor has been identified as one of southern Africa's main spatial development initiatives (SDIs). As such it is a focus for priority infrastructure investment so as to develop economic activities along the length of its route. Agriculture is the major activity in the area and is seen as the most likely driver of future growth.

Extensive market analysis undertaken by TechnoServe and supported by the International Finance Corporation (IFC) – amongst others – has indicated the considerable horticultural potential within the Manica Province of the Beira Corridor, with 550,000 hectares of land that is suitable for horticultural production. There is considered to be significant potential to export horticultural products to the markets of South Africa, Europe and Asia. The analysis has shown that developing new horticulture ventures in the Beira corridor could generate up to US\$2.7 billion in revenues per year with short term revenue potential of at least US\$36 million.

In addition to the potential to develop new ventures, there are already a number of specific opportunities to expand output from existing producers. Various investors – Dutch, South African, Zimbabwean, and Mozambican – have established five high value horticulture farms producing vegetables, paprika, roses and mangoes. If the proposed expansion projects were implemented successfully, they have the potential to generate over US\$40 million in annual revenues by 2008.

During the evaluation of these potential projects it became clear, however, that there are a number of constraints to successful implementation. The most important of these are: (a) the lack of key transport infrastructure (specifically the quality of the Chimoio-Beira highway); (b) the lack of a mechanism to finance supporting agricultural infrastructure such as irrigation/dams, feeder roads, etc.; and (c) bureaucratic constraints that add to the costs and difficulties of implementing projects in the region.

## **West Africa**

### **Nigeria Fertiliser Distribution**

Fertilizer is a key input to improve crop yields for farmers. However, fertilizer use in Nigeria has declined significantly (by around 60%) over the past 15 years. This has been the result of a number of problems in sourcing, transporting and selling fertilizer in Nigeria:

Until 1997, Nigeria produced significant volumes of fertilizer. However, the local production plant (NAFCON) stopped production in 1997 and since then Nigeria has imported all its fertilizer. This has led to a number of problems. Importing fertilizer means that local farmers pay much higher prices than they would if local production continued to be available. Port operations, transport and warehousing of goods in Nigeria are problematic. Transporting fertilizer from Nigeria's ports in the south of the country to the north (where most farmers are based) is costly and risky.

There are significant levels of government involvement in the fertilizer market. Until recently, the Nigerian government subsidized fertilizer sales significantly. The scaling down of these subsidies (leading to increases in prices for farmers) has been one factor contributing to the decrease in demand. State governments are still involved in the purchase and distribution of fertilizer – this adds further to the risks and costs of supplying fertilizer to farmers.

Farming in Nigeria is almost entirely small-scale. Farmers very often do not have knowledge of good farming practices, including how best to use fertilizer. Nor do they have access to working capital to finance the purchase of fertilizer. Distribution of fertiliser in small packages to smallholders is high cost.

Nigeria can produce fertilizer competitively by using existing mothballed production capacity (Nigeria has a large production plant, NAFCON, although it is in need of major refurbishment) and accessing the main input (natural gas) at attractive prices. TechnoServe completed a project to identify commercially attractive investment opportunities in the agribusiness sector in Nigeria for the IFC in 2003. They identified

the acquisition and refurbishment of NAFCON as a potentially attractive investment opportunity. However, if demand is to recover to the higher levels of earlier years then investment will be needed not only in the plant but also in improved coastal and upcountry distribution, storage and packaging businesses.

## APPENDIX 3: AN EXAMPLE OF A PRO-POOR OUTGROWER SCHEME IN SUB-SAHARAN AFRICA

### Kakira Sugar Outgrowers Scheme

This scheme will support investment in infrastructure in and around Kakira area in Busoga, Uganda. It is envisaged as a partnership between Kakira Sugar Works (KSW) and the sugar outgrowers that supply KSW. The project was commissioned by the Emerging Africa Infrastructure Fund (EAIF) and takes forward an idea developed by the management of KSW.

The rationale for the partnership recognises the importance of making available finance for investing in infrastructure to address the needs of local communities. At present, community members have difficulty accessing finance and basic services such as healthcare, education and roads. The proposed partnership addresses this by leveraging the capacity of KSW and the sugar outgrowers in the Kakira area.

It has three objectives:

- to establish and operate a facility that enables farmers to access finance on reasonable terms;
- to identify and agree on a programme of investment in infrastructure that best addresses the needs of stakeholders; and
- to create an effective and locally accountable mechanism to manage the financing, delivery and operation of infrastructure services.

The proposal is to create an independent entity, Kakira Development Ltd (KDL) to manage the activities associated with achieving the programme objectives. KDL will not itself provide finance or carry out infrastructure development. Its activities will focus on (i) identifying needs and potential projects; (ii) getting agreement on project priorities; (iii) managing the financing of projects; and (iv) project management – ensuring the delivery of projects on time and to budget. In carrying out projects, it will largely use contractors, e.g. civil engineering contractors, with its role limited to channelling funds and overseeing and facilitating all activities. The overhead costs of KDL will therefore be low, thereby maximising the proportion of funds used to directly benefit the community.

**Projects portfolio.** Over time KDL will develop a portfolio of projects that are of direct benefit to outgrowers and the wider community. All projects will be financially viable, i.e. at least cover their operating and maintenance costs. The number of projects and the timing of their implementation will depend on the projects chosen, the level of donor grants available and the terms of any debt finance made available to the entity. KDL will start its activities by implementing two projects that are financially viable and are largely (although not exclusively) focused on providing benefits to outgrowers:

- In partnership with a local financial institution (e.g. a commercial bank), establish and operate a facility that provides access to finance to outgrowers.

- Either build and operate a primary healthcare facility or build and maintain roads infrastructure. Stakeholders will decide which of these projects to pursue first as part of setting up KDL .

**Funding approach.** It is expected that the resources required to cover operating activities and financing costs will come from contributions from outgrowers, matching contributions from KSW as well as revenue generated from users of the facilities created. The finance needed for investments is likely to be a mixture of debt, equity and grants and will be raised from commercial institutions (e.g. banks), Development Finance Institutions (DFIs) and donors. In the longer term, it may also be possible to use KDL to channel government and donor contributions for local projects, especially where these projects cannot be financed fully through contributions (from outgrowers and KSW) and user fees.

## APPENDIX 4: PIDG INITIATIVES TO SUPPORT INFRASTRUCTURE INVESTMENT

Programme	Public Private Infrastructure Advisory Facility (PPIAF)
Status	Operational since 1999
Partners	ADB, Canada, France, Germany, Japan, Netherlands, Norway, Sweden, Switzerland, World Bank, UNDP
DFID commitment (at 2003)	£15.3m

PPIAF is a multi-donor facility that provides technical assistance to developing country governments to improve the enabling environment for private sector involvement in infrastructure (water, sanitation, electricity, telecommunications, gas transmission and distribution, and transport). Since its inception in July 1999, PPIAF has approved funding more than 250 activities valued at \$58m. Following a review of performance a second tranche of funding has now been committed to PPIAF.

Programme	Emerging Africa Infrastructure Fund (EAIF)
Status	Launched in April 2002, operational since August 2002
Partners	SIDA, the Netherlands, SECO and DFID - US\$140m equity FMO, DBSA DEG - US\$85m Subordinated Debt Barclays Bank and Standard Bank - US\$120m senior debt
DFID commitment	US\$100m (c.£65m)

The EAIF provides long term loans to finance commercially viable and developmentally sound private sector infrastructure ventures in Africa, focusing initially on electricity, telecommunications, transportation and water. In 2004 it expects to have committed over \$100 million to support 5 investments and a further 4 projects and \$100 million per annum thereafter.

EAIF has leveraged \$120 million of long term private sector debt into the African infrastructure sector. As commitments by the FUND increase there are definite indications that it will be able to further mobilise private capital for long term investment in African infrastructure.

The management of EAIF is outsourced to a consortium of private sector banks and development institutions. The management is remunerated in accordance with a formula that rewards good performance against contractually agreed measures of success.

<b>Programme</b>	<b>Local Currency Guarantee Facility for Infrastructure (GuarantCo)</b>
Status	Launched in early 2004
Partners	SIDA, DFID, other PIDG donors and potentially EIB and IFC
DFID commitment SIDA commitment (Subject to final approval)	US\$25m (c.£17.9m) US\$20 million initially

Lack of long-term local currency finance is a major constraint to infrastructure development for private sector investors and for municipalities. In 2002, the Secretary of State approved a concept note and project submission for the creation of a new facility designed to mitigate risks for local currency financing of infrastructure, inter alia by local borrowers, banks and institutional investors. Market assessments indicated strong demand for local currency guarantee support. GuarantCo was established in early 2004 and is currently developing a pipeline of operations. Consultations with the IFC, the EIB and other donors indicate strong support for further donor and DFI participation in GuarantCo when it is operational.

<b>Programme</b>	<b>Infrastructure Development Company (Infraco)</b>
Status	Established July 2004 and currently developing detailed business plan and activity pipeline
Partners	Initially PIDG donor group
DFID commitment	US\$10m (c.£6.5m) for initial period

High up-front costs and risks make private firms reluctant to pre-invest in working up prospective infrastructure projects. Developments in OECD countries have reduced the interest and in many cases led to withdrawal from small developing countries of infrastructure developers – leaving a void in project preparation activity, in water, sanitation and rural electricity in most developing countries and in all infrastructure sectors in the poorer ones.

Infraco is a donor funded initiative whose purpose is to structure infrastructure opportunities and offer them to private sector investors when the front-end costs and risks have been reduced and in-principle commitments to provide finance are available, inter alia, from EAIF and GuarantCo.

Infraco's activities are designed to increase private sector infrastructure investment by reducing front end costs and risks. It was established following extensive consultations with host governments and private investors, which confirmed strong interest in such a new initiative.

<b>Programme</b>	<b>Global Partnership for Output-Based Aid (GPOBA)</b>
Status	Launched in March 2003
Partners	World Bank (with additional donors to be added in 2003/04)
DFID commitment	US\$10m (c.£6.5m)

Output-Based Aid (OBA) is a strategy for targeting public funding on the delivery of basic services to the poor. Traditionally, government and donors have focused on funding assets or other inputs (e.g. by building pipelines or subsidising the operating budgets of utilities). In contrast, OBA involves delegating service delivery to third parties (private firms or NGOs) under contracts that tie payment to evidence that the services or outputs have actually been delivered.

## APPENDIX 5: MECHANISMS TO SUPPORT UPTAKE AND USE OF PRO-POOR AGRICULTURAL TECHNOLOGIES

The following are extracts from the paper with the above title prepared by CEPA for DFID.

*Figure 2: Mechanisms to Promote Downstream Uptake and Use of Appropriate Agricultural Technologies*

- Facilitating access to existing technologies developed by the private and public sector, e.g. assisting the national private sector to identify appropriate technologies and technology partners, assisting with negotiation of IP / licensing, product development and delivery agreements and facilitating and (part) funding regulatory consent processes (on a basis where the resulting benefits accrue substantially to the developing country poor).
- Facilitating multiplication / manufacturing of new technologies by assisting the national private sector to develop viable business plans, negotiate partnership agreements and by underwriting part of the market risk via commercial contracts (thereby facilitating private sector financing) for a fee.
- Helping the national private sector to negotiate high volume / lower price agreements with input suppliers (e.g. fertilisers) as part of locally-led distribution system development activities such as the SG2000 project. The entity could take part of the demand risk for a deferred contingent fee and the benefit of lower prices would be passed to farmers. Lower prices will help boost demand with consequential producer gains and a reduction in the entity's risk exposure.
- Subject to national seed certification systems, the entity could arrange and (part) finance the establishment of independent quality control systems to raise consumer confidence in markets for new agricultural technologies. It could contract with appropriate private sector parties to establish quality control systems, with ongoing payments being linked to performance (e.g. uptake of service by companies) and at least partly met by companies using the service.
- Arranging and (part) financing contract farming demonstrations of new input packages to stimulate uptake by smallholders. The company could contract the private sector to do the demonstration farming on a payment-for-performance basis with a link to achieved success (e.g. smallholder uptake). Demonstration sites would be open access, i.e. they would not have exclusive arrangements with particular input suppliers.
- Facilitating uptake of new technologies by smallholders by contracting the private sector to provide distribution and extension services. Output-based contracts linking payment (in part) to actual uptake by smallholders has the advantage of incentivising contractors to build demand.
- Developing and disseminating models of private-private and public-private partnerships, disseminating best practice and assisting national private and public sector organisations in negotiation of project-specific agreements.

*Source: RETF Scoping Study*

Figure 3: Pest-Resistant Brassica

Nunhems ProAgro has developed transgenic strains of brassica that are resistant to pests, providing environmental and health benefits to farmers and consumers as well as reducing input costs. While the number of small farmers that could benefit from the technology is high, the extensive costs involved in obtaining regulatory approval render the project uneconomic for the IP owner.

**Intervention:** Assist national organisations to part-finance and secure regulatory consents; and assist in achieving delivery and uptake once consents are obtained. AATF could act as the holder of the perpetual royalty-free licence for the technology to ensure dissemination to countries where brassica is important, e.g. China, Vietnam, and potentially achieve some payback on sub-licensing to developed countries, e.g. US. It could also facilitate the establishment of PPPs, to promote the development of locally-adapted strains of pest-resistance brassica and other crops. In parallel, AATF could play a key role in building bio-safety capacity in developing countries.

Figure 4: Examples of Other Possible Interventions

**Input supply:** SG2000's major project in Uganda is to assist in the building of a network of rural stockists where farmers can purchase inputs (predominantly nutrients) and have home-grown seeds cleaned and checked before planting. The project builds on existing retail networks with SG subsidising start-up costs but thereafter the stockist is required to deposit part of the cost of stocks with the supplier thereby sharing in the risks.

*Intervention:* AATF could negotiate higher volume / lower price deals with suppliers on behalf of rural stockists, thereby reducing input costs. This would require that AATF assume some demand risk and perform the role of creditworthy counter-party. It would sub-contract with rural stockists passing the benefits to them and to smallholders. It could levy a small fee on sales or it could provide the service on a subsidised basis, paid by government.

**Biopesticide PPP negotiations:** Green Muscle™ is a FAO-approved, fungus-based biopesticide effective against locusts and grasshoppers, devastating pests in much of Africa and Asia. It is now available in Africa. CABI, a publicly-funded bioscience research institute, developed Green Muscle. Once developed, DFID and SDC were instrumental in persuading other donors to commercialise the product. CABI approached many companies with a prospectus and selected a South African and a French company to undertake commercialisation in Southern and West Africa, respectively - manufacturing and marketing the product under licence to CABI. However, CABI indicated that there was a lack of expertise available in how to structure and negotiate the PPP. CABI had no internal commercial expertise leading to delays and difficulties; and some concerns about whether the agreed arrangements will be sustainable – in fact the French company has since withdrawn. They also indicated that the acquired experience in CABI has dissipated as those involved at the time have moved to other activities.

*Intervention:* AATF could provide commercial and legal expertise to assist other public research institutes in designing and concluding sustainable and balanced PPPs. It could develop models of best practice for use by public research institutes in OECD and developing countries. PPPs involving the private sector in applied research, manufacturing and marketing are likely to be much more in demand in future.

**Drip irrigation systems:** International Development Enterprises (IDE), a not-for-profit organisation, has pioneered the development of private sector supply chains to provide small-scale farmers with affordable, income-generating technologies. Small-scale irrigation technologies have been particularly successful. IDE, with the assistance of partner organisations, plans to establish supply chains in six developing country regions to provide smallholders with low-cost drip irrigation systems that can be produced and distributed locally at less than US\$100 per half acre. The required budget for the initiative is estimated to be US\$10m.

*Intervention:* AATF would need to be satisfied that drip irrigation systems represent sustainable technology. It could then support the commercialisation process by aggregating demand and

stimulating local production of adapted technologies. Bulk orders will reduce costs and thereby help to stimulate demand. They will also help secure ongoing commitment to manufacture. AATF could also negotiate medium-term contracts to secure equipment supply and servicing in region, if appropriate.

*Source: edited from RETF Scoping Study*

*Figure 5: Banana Tissue Culture – Key Facts*

Bananas are an important subsistence crop and source of income for more than 20 million people in East Africa, mainly resource-poor farmers. However, a complex of pests and diseases has led to a significant deterioration in the quality of banana orchards and yields are now at an all-time low, causing local prices to soar. In Kenya, for example, at an average of 14 tons/hectare, production is now only a third of its estimated potential; and the situation is similar in Tanzania. In Uganda, the world's second largest banana producer, the situation is even worse. Average reductions in annual yields are particularly severe for smallholders – reducing food security as well as income.

The traditional banana orchard system relies on transplanting 'suckers' from existing plants. Diseases carried by the mother plant are passed on to offspring and so the orchard deteriorates with each generation. Although disease-resistant hybrids are available, consumer acceptance has been low due to palatability problems.

#### **The ISAAA-KARI-GTL initiative**

This decline in banana yields in East Africa prompted an ISAAA-led initiative to develop and distribute TC banana plantlets. TC enables the rapid multiplication of vigorous, disease-free plantlets. However, farmers ideally need to acquire new plantlets at least every five years and the requirement for other inputs (such as fertiliser) is greater than for traditional orchards, particularly early on.

The initiative, launched in 1996, built on the informal production and distribution activities of Jomo Kenyatta University of Agriculture and Technology. The programme is a PPP between ISAAA, KARI and Genetic Technologies Ltd (GTL) (a Nairobi-based private company), with the initial supply of plantlets coming from a South African company (DuRoi). Technical support has been provided by the Institute of Tropical and Sub-Tropical Crops (South Africa) and the John Innes Centre (UK). Funding was predominantly from the Rockefeller Foundation.

Both KARI and GTL developed capacity in TC and the production and distribution of disease-free banana plantlets has begun. Although increases in net income for poor farmers adopting the technology have been positive (around 35%), they have been significantly below potential. Further, uptake levels are low. A number of problems have been identified, including:

- Insufficient plantlet production capacity
- Insufficient distribution channels for plantlets outside the Nairobi area
- Insufficient variety of available tissue banana plantlets
- Credit constraints limiting farmer ability to purchase plantlets and other inputs
- Farmer unwillingness to use required complementary inputs
- Unavailability of pathogen-free land, water and irrigation facilities
- Poorly established post-harvest handling and marketing channels

The consortium is putting in place a number of further initiatives to address the problems identified above (e.g. commissioning research into new TC varieties, micro-credit schemes, promoting low-cost water-efficient irrigation technologies and promoting establishment of farmer field schools) in at least one Kenyan region (Maragua). It is also beginning the process of adapting the model in Tanzania and Uganda.

However, enabling the system to becoming fully self-sustaining and scaled up to cover the whole country, will require further intervention of the type discussed here.