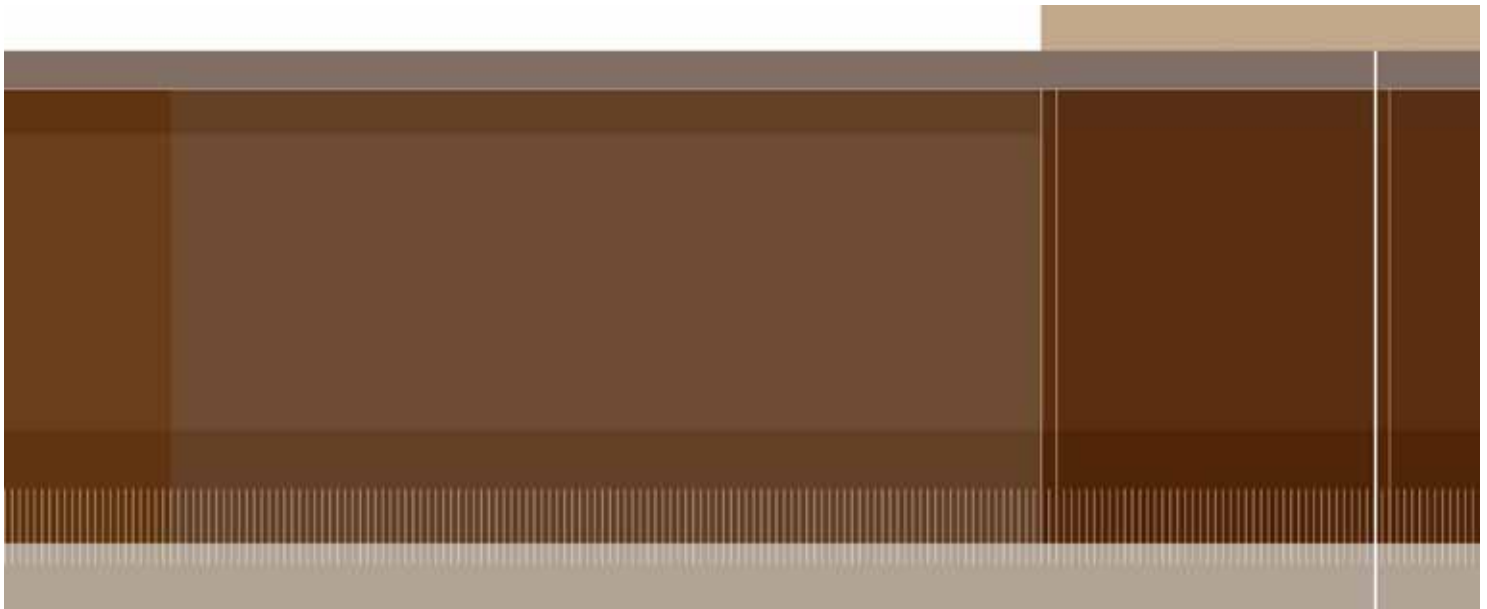

Food security in Africa

TOWARDS A SUPPORT STRATEGY FOR AUSTRALIA



Australian Government

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Acronyms

AATF	African Agricultural Technical Foundation
ACARE	African Centres of Agricultural Research Excellence
AFCAS	African Commission for Agricultural Statistics
AfDB	African Development Bank
AFS	agriculture and food security
AgPER	Agriculture Public Expenditure Review
AGRA	Alliance for a Green Revolution in Africa
ARD	Agriculture and Rural Development
ARI	advanced research institute
ASARECA	Association for Strengthening Agricultural Research in Eastern and Central Africa
ASC	Agricultural Statistics Committee
AU	African Union
BASF	Badische Anilin & Soda-Fabrik
BecANAT	Biosciences eastern and central Africa Network
CAADP	Comprehensive Africa Agricultural Development Program
CAPRI	Collective Action and Property Rights
CBD	Convention on Biological Diversity
CDD	Community-Driven Development
CGIAR	Consultative Group for International Agricultural Research
CIAT	International Center for Tropical Agriculture
CIFOR	Center for International Forestry Research
CIRAD	Centre de Coopération Internationale en Recherche Agronomique
COMESA	Common Market for Eastern and Southern Africa
CORAF/WECARD	West and Central African council for agricultural research and development
CSIR	Council for Scientific and Industrial Research
DAC	Development Assessment Commission
DFID	Department for International Development (United Kingdom)
EAP	East Asia and the Pacific
ECA	Economic Commission for Africa
ECOWAS	Economic Committee of West African States
EU	European Union

FAAP	Framework for African Agricultural Productivity
FANRS	Food, Agriculture and Natural Resources Statistics
FARA	Forum for Agricultural Research in Africa
FARS	Food, Agriculture and Rural Statistics
FAO	Food and Agriculture Organization of the United Nations
FAOSTAT	FAO's Statistical Data Base
FIVIMS	Food Insecurity and Vulnerability Information and Mapping system
GDD	General Data Dissemination System
GDP	Gross Domestic Product
GEF	Global Environment Facility
GFRP	Global Food Crisis Response Program
GM	genetically modified
GMO	genetically modified organism
IAC	InterAcademy Council
IARCs	International Agricultural Research Centers
IBRD	International Bank for Reconstruction and Development
ICRAF	International Centre for Research in Agroforestry
ICRISAT	International Crops Research Institute for the Semi-Arid Tropics
IDA	International Development Association
IFAD	International Fund for Agricultural Development
IFC	International Finance Corporation
IFPRI	International Food Policy Research Institute
IHSN	International Household Survey Network
IITA	International Institute of Tropical Agriculture
ILRI	International Livestock Research Institute
IMF	International Monetary Fund
IPR	Intellectual Property Rights
IRD	Institut de Recherche pour le Développement
ISI	International Statistical Institute
ISRA	Institute Senegalais de Recherches Agricoles
ITPGR	International Treaty on Plant Genetic Resources
IWMI	International Water Management Institute
JEE	Joint External Evaluation
LAC	Latin America and Caribbean
MAPP	Multi-Country Agricultural Productivity Program

MDG	Millenium Development Goals
MENA	Middle East and North Africa
M&E	Monitoring and Evaluation
NABNet	Northern African Biosciences Network
NARS	National Agriculture Research systems
NEPAD	New Partnership for African Development
NGOs	Non-Government Organisations
NRC	National Research Centre
NRM	natural resources management
NRMR	Natural Resource Management Research
NSDS	National Statistical Development Strategy
NSS	National Statistical System
ODA	Official Development Assistance
OECD	Overseas Economic Co-operation and Development
PARIS21	Partnership in Statistics for Development in the 21 st Century
R&D	research and development
RRSF	Reference Regional Strategic Framework for Stat Cap Building in Africa
SADC	Southern African Development Community
SANBio	Southern African Network for Biosciences
STATCAP	Statistical Capacity Building Credit/Loan
SROs	Sub-Regional Organizations
SSA	Sub-Saharan Africa
TFSCB	Trust Fund for Statistical Capacity Building
TRIPS	Trade-Related Aspects of Intellectual Property Rights
UN	United Nations
UNAIDS	United Nations Programme on HIV/AIDS
UNDP	United Nations Development Program
UNECA	United Nations Economic Commission for Africa
UNICEF	United Nations Children's Fund
WABNet	Western African Biosciences Network
WARDA	Africa Rice Center
WDR	World Development Report
WFP	World Food Programme
WHO	World Health Organization
WTO	World Trade Organization

1. Executive Summary

This paper seeks to inform Australia's thinking about increasing its development assistance to Africa, as part of the Australian Government's commitment to scale up Australian ODA to 0.5 per cent of Gross National Income by 2015. Specifically, it provides analysis to guide thinking around how Australia could contribute to efforts to enhance agricultural and rural development (ARD) and food security in Africa most effectively.

However, the paper does not present funding recommendations with budget scenarios for the expansion of the Australian program in support of ARD or enhanced food security. Instead it provides a set of funding options, but without discussing the budgetary implications or providing details on how to implement these options at either the global or national levels. These issues should be subject to further study and operational development.

The food security crisis

Decades of stagnant economic growth has left a terrible legacy of poverty and hunger in Sub-Saharan Africa (SSA). Growth in SSA has been the slowest of all regions in the world, characterised by low investment and productivity growth. As a consequence, rather than improving over the past five decades as in all other regions, poverty and hunger have deepened in Africa. Poverty, hunger and HIV/AIDS are significantly worse in East, South and Central Africa than they are in the North and West.

This legacy is now exacerbated by a severe spike in food prices. The long term decline in real food prices ended in 1987 and, since 2005, real food prices have exploded by more than 60 per cent over their 1998–2000 levels. While nobody expects food prices to stay at such high levels, all models and experts agree that they will settle at significantly higher prices than in the last decade (FAO 2008). In the short run, higher food prices, combined with high energy prices, have serious adverse consequences for the balance of payments of net food and oil importing countries, and for their poor citizens who are net buyers of food. In many African countries these include most small farmers, who are either too poor to have a food surplus, or have to sell their output at harvest time and repurchase food later in the season.

Defining food security

Food security means access at all times to the food needed to lead a healthy, productive life. Food security has two components—availability and access. Home production of food ensures both components for those who have enough land and labour to be self-sufficient. For all others, ensuring food security means: first, availability of food in the market at affordable prices; and second, the ability to purchase it out of income. Failure in either of these areas requires safety nets and other emergency interventions to address food *in*security. In extreme cases, emergency food assistance and distribution of food in kind may be required, though these should be a last resort. Any comprehensive food security strategy therefore involves a broad range of measures to ensure availability and access.

Agricultural growth for enhanced food security

Where economic growth has recently improved, it has reduced poverty in Africa. But it is only where agricultural growth has also increased that hunger has been reduced. *This fact provides a strong rationale for Australia to sharply focus on agricultural growth as a means of enhancing food security in Africa. However, assisting the development of broad food security strategies and associated programs over the medium and longer terms is beyond a small- to medium-sized donor, such as Australia. A more narrow focus on accelerating broad-based agricultural growth is the best strategy for Australia to contribute to long-term food security in Africa.*

Accelerating the rate of broad-based agricultural growth increases food security in several ways. First, it increases food availability and reduces the price of non-tradable or semi-tradable food. Second, broad-based agricultural growth is the most powerful way to reduce rural poverty (WDR 2008). More specifically it increases food availability for, and access to those able to produce it for themselves. It also improves the

incomes of small farmers and agricultural workers who are net food buyers. Third, through forward, backwards and consumer-demand linkages it increases non-farm economic activity in rural areas that tend to be highly labour intensive, and creates significant employment and incomes for the rural poor. Through similar linkages it also increases urban employment so that agricultural growth generally has a greater poverty reduction impact than urban growth (WDR 2008).

However, not all forms of agricultural growth have such beneficial impacts on food security. For example, the expansion of a large-scale mechanised farm sector that produces raw materials for biofuels or industrial raw materials could have overall growth benefits. But it would not increase national food availability or reduce national food price levels. It is also not sufficiently employment intensive to increase the purchasing power for food of many poor people. Only where such commodities are produced by smallholders using more labour-intensive methods and spending a high share of income on labour-intensive rural home goods will significant food access benefits occur.

The changing international context for agricultural growth

Despite the food crises, this paper is written in a period of optimism about the prospects for Africa. Since 2003, economic growth rates have averaged 6.5 per cent, more than four per cent above the population growth rate. Between 2001 and 2006 agricultural value-added grew at 3.6 per cent, also well above the population growth rate. Armed conflicts dropped to three, down from 15 in 2003. While there are setbacks, such as the recent Kenya and Zimbabwe election crises, democracy has advanced. Sub-Saharan Africa (SSA) now has faster progress in its business environment than the Middle East and North Africa (MENA) and Latin America (World Bank and IFC, 2006). Africa is in the process of strengthening its Regional and sub-Regional Institutions. Agriculture returned as a priority on the international development agenda even before the recent food price spike, and even more so as a consequence of it. The African Union (AU) in conjunction with the New Partnership for African Development (NEPAD) have developed the Comprehensive Africa Agricultural Development Program (CAADP), and are encouraging countries to allocate more fiscal resources to agricultural development. And while the recent sharp rise in international food prices is increasing poverty rates and food import bills in the short run, combined with economic growth, it is creating major opportunities for African farmers in domestic, regional and international markets.

This optimism ought to be tempered. In addition to the deep poverty and hunger afflicting many Africans, there are other reasons to be cautious. Climate change poses significant challenges. Sub-Saharan Africa contributes the least to greenhouse gas emissions, yet is expected to be among the most negatively affected by climate change. For African farmers the adaptation challenges are obvious: increased agronomic complexity and increased risks of shocks at the farm and community level imply additional changes in crops, cropping patterns, timing, agronomic practices and seed needs. But for particular African regions neither the specific nature nor the severity of the climate change impacts can yet be predicted with any degree of certainty. Therefore, it is not possible to plan specific measures of adaptation, such as the length of growing seasons of crops. Instead, in terms of adaptation in Africa, what is required is to *strengthen the capacities of African agriculture and food systems to adapt to climate change* via: improved technology generation and adoption systems; more and better irrigation and drainage; better markets; greater ability to import foods in bad years or on a year round basis; greater preparedness for extreme weather events; and better safety nets. *However, all these improvements are also urgently needed even if there were no climate change. Climate change, therefore, does not generate a separate agenda for agricultural and rural development—it only reinforces the existing priorities. This means adaptation to climate change needs to be mainstreamed into existing priorities for improving ARD and food security in Africa.*

The aid landscape in Africa is becoming more complex, compromising donors' ability to deliver effective aid that contributes to results. There has been an explosion in the number of players who claim a legitimate interest in Africa's development. They include: 233 multilateral development agencies; 51 bilateral donor countries; several hundred international NGOs; and tens of thousands of national NGOs. New bilateral donors from the South include large donors like China (2 billion US\$/annum), India and Saudi Arabia (more than US\$1 billion each), several more in the US\$0.5 billion range (Korea, Turkey, Kuwait and Taiwan) and a total of 21 more who have or are establishing aid programs.

This proliferation of actors fuels inefficient aid practices, ensuring that the classic problems of aid quality persist: increasing donor fragmentation, unchanged emphasis on technical assistance, little or no sign of increased selectivity with respect to policies and institutions. Of course, these discouraging trends have not gone unnoticed: calls for more harmonization and alignment of policies, procedures and practices of development actors were articulated in the Paris Declaration on Aid Effectiveness in 2005. But progress on the ground has been slow. *This reality provides a strong rationale for Australia to pursue a scaled up African aid program via partnering with other development actors – so as not to add to the debilitating fragmentation of aid.* This paper explores possible partners for Australia, focusing on those with the capacity to contribute to agricultural growth and food security in Africa.

The main constraints to agricultural growth in Africa

There are two main constraints to agricultural growth – and, therefore, food security – in Africa.

1. Inadequate partner country commitment to agricultural and rural development.

This constraint manifests in several ways. A lack of fiscal resources devoted to the agricultural sector. During the 1980s, the donor community partly filled this breach, but quickly moved on to other priorities. As a result, funding to the agricultural sector has withered significantly over time. This has had significant follow-on effects: under-developed farmer's associations; poor infrastructure, including irrigation; inadequate smallholder services for input supply, marketing, agricultural extension, and finance; poor food, agricultural and natural resource statistical systems. This neglect adds up to very few African countries that have developed home grown ARD and food security strategies. Capacity for planning and implementation is lacking.

2. A growing technology divide that is curbing agricultural productivity in Africa.

The growing technology divide is by far the most daunting—closing it requires long-term investments into research, agricultural education and science education institutions that are in poor shape. At the same time the rest of the developing world, in particular China, Brazil and India, which have invested heavily for several decades, are further stepping up their investments in biotechnology. Africa cannot afford to fall further behind. The growing technology divide is aggravated by many factors, including a growing lag in biotechnology research, still inadequate private sector involvement in research, inadequate public R&D funding (including for a number of regional initiatives), poor allocation of scarce R&D resources in CGIAR and other research programs, inadequate institutional frameworks for national agricultural research and technology transfer systems, and a seriously deficient agricultural education system.

There are multiple other constraints too. These include: a general lack of capacity; pervasive gender inequality; the impact of HIV & AIDS, particularly in rural areas; inadequate security of access to resources; poorly developed water resources and irrigation capacity; weak rural safety nets.

Australia could make significant and measurable contributions to addressing the two major constraints. However, addressing the multiple minor constraints would require the Australian aid program to divide its focus into too many, ineffectual components. Developmental impact would suffer as a result.

Funding Options for Australia

The Australian Government has indicated that it is serious about improving the effectiveness of its aid program. Accordingly, this paper suggests that in scaling up Australian support to enhance African ARD and food security, Australia should sharply specialize on two target areas:

- (1) the support of broad-based agricultural growth and food security strategies; and
- (2) specific support to agricultural research and science education.

A third funding proposal is proposed to inject technical expertise to assist implementation of programs in target areas (1) and (2).

(1) National ARD and Food Security Strategies and Program

To remedy the lack of commitment to ARD by African countries and to achieve rapid agricultural growth, the African Union and NEPAD have launched the Comprehensive Africa Agricultural Development Program (CAADP). African politicians have committed to significantly increase the share of national budgets allocated to agriculture to at least 10%. CAADP is assisting countries to develop agricultural development compacts, the first of which was developed in Rwanda in 2007. Thirty countries are negotiating CAADP compacts and three have already signed compacts. The CAADP process is the best chance to strengthen country commitments in the medium term and lay the foundations for home grown national ARD strategies and programs. *Therefore, Australia should support CAADP.*

Australia could pursue a number of funding strategies in support of CAADP. *Australia should encourage and insist on strong country leadership as a condition for its financial engagement.* Country leadership, demonstrated by partner country co-financing of a national ARD strategy, indicate a partner country's commitment to reduce rural poverty and address food security needs.

1. Co-financing the CAADP Trust Fund

Further country-led work will be required to translate CAADP compacts into fundable programs. However, the preparation of country led strategies and programs has emerged as a key bottleneck: analytical skills are scarce at the country level. The World Bank's CAADP Trust Fund is designed to assist partner countries and donors to develop national CAADP compacts and subsequent national ARD and food security strategies and programs. All countries and development partners are short of the capacities, skills, and financing needed to accomplish these tasks. The momentum created by the WDR 2008 and CAADP will be lost unless ample resources are made available via this Multi-donor Trust Fund. *Australia could contribute to the Trust Fund to help fill a critical financing gap.*

2. Co-financing of the Resulting National Programs

These national programs will deal with policy and program reforms in support of agricultural growth, all the smallholder services that are needed for broad-based agricultural growth, with Agricultural Research and Education, with improvements in agricultural infrastructure, including irrigation, and with the resolution of the other constraints discussed in the section on these constraints. *Australia should discuss with the other donors committed to budget support and basket funding (World Bank, AfDB, IFAD, the EU, DFID...but not USAID), on the modalities of such co-finance. The Donor Platform for Rural development is one good place to carry out these discussions.*

3. Financing a special window for FANRS in the Trust Fund for Statistical Capacity Building

Food, agriculture and national resource statistics (FANRS) are not sufficiently well developed to provide a solid basis for national program design and subsequent monitoring and evaluation. Funding for the preparation of FANRS capacity development and implementation is highly inadequate. *Australia could provide earmarked funding for FANRS development in the Trust Fund for Statistical Capacity Building managed by the World Bank.*

(2) Closing the Science and Technology Gap in African Agriculture

The growing technology divide is by far the most daunting challenge confronting African agriculture. Closing it will require long-term investments into research, agricultural education and science education institutions. Africa cannot afford to fall further behind. *Funding to close this gap is proposed as a special area of focus for Australia's aid to SSA agriculture.* Several funding options should be explored.

4. Increase Funding for plant genetic improvement, including biotechnology in the CGIAR

Two options for channelling funds are feasible: Co-financing CGIAR's Generations Challenge Program or by providing core support to the CGIAR institutions involved in this type of research in Africa.

5. Co-financing Competitive Research Grants Programs of Sub-Regional Organisations

The European Union has led the developing and financing of these competitive grant programs. They are relatively small, but functioning well in East, Central and West Africa but not yet in Southern Africa. *Australia could help expand these supranational programs that cannot be financed by other development partners such as the World Bank whose instruments are more suited to the national level.*

6. Co-financing initiatives to strengthen agricultural education and agricultural science education

This paper does not review all the organisations now becoming more interested in agricultural education and agricultural science education. *Australia would need to review how to engage in this area, perhaps via a scholarship program or twinning arrangement.*

(3) Support financing: A Trust Fund to finance Australian Consultants

Australia has a lot to offer in terms of economic and scientific skills. While heavy involvement of Australian experts is neither desirable nor appropriate in Africa, some limited involvement would bring benefits to African countries and Australia.

Establishing a demand-driven Trust Fund would allow for supporting involvement of Australian experts in all areas that attract Australian co-financing support in an expanded ARD and food security program. Examples include biotechnology, plant breeding, agricultural and agricultural science education, policy research (including in regional integration), dryland tropical farming systems, FANR statistics, monitoring and evaluation, impact evaluation, etc.

The Trust fund could be modelled on consultant Trust Funds managed by the World Bank, or incorporated as a special mechanism in the World Bank's CAADP Trust Fund. Consistent with the untied nature of the Australian aid program, the Trust Fund could also support involvement of top African experts.

Additional funding issues

Two further issues effecting all the above funding options deserve attention.

As a relatively small donor, Australia should determine whether to support ARD and Food Security across SSA, or to concentrate on Eastern and Southern Africa. A number of the scientific and educational challenges constraining technology generation are continent-wide. Further, if country commitment is a key criterion for support, then funding should follow such commitment wherever it comes from. These considerations favour a continent-wide strategy. However, a sub-regional concentration would deliver sharper specialization. Second, poverty and hunger are the deepest in East and Central Africa (plus the Democratic Republic of the Congo), and that it is also in this region that the AIDS crisis presents the greatest challenges. Finally, collaboration with African specialists is easier in these generally English-speaking countries. Such a sub-regional approach would also build on Australia's historical focus in this region. *The question of continent-wide or sub-regional concentration needs urgent analysis.*

In order to help mitigate the impact of the current food crisis on poverty and hunger in Africa, Australia will have to act fast and in concert with other ongoing programs. *Helping finance the World Food Program food purchases is an obvious option. The other major option is to co-finance the new World Bank Global Food Crisis Response Program (GFRP).* It will shortly provide support to 15 African countries.

2. Introduction

This paper is written in a period of optimism about the prospects for Africa and for African Agriculture and Rural Development (ARD), and consequently about poverty and food security in Africa.

Since 2003, economic growth rates in Africa have averaged 6.5 per cent, more than 4 per cent above the population growth rate. Between 2001 and 2006 agricultural value added grew at 3.6 per cent, also well above the population growth rate. The number of armed conflicts has fallen to 3 from 15 in 2003. While there are setbacks, such as the recent Kenya and Zimbabwe election crises, democracy has advanced. Sub-Saharan Africa (SSA) now has faster progress in its business environment than the Middle East and North Africa (MENA) and Latin America (World Bank and International Finance Corporation (IFC) 2006). Africa is strengthening its regional and sub-regional institutions. Agriculture returned as a priority on the International Development Agenda (IDA) even before the recent food price spike, and even more so as a consequence of it. The African Union (AU), in conjunction with the New Partnership for African Development (NEPAD), has developed the Comprehensive Africa Agricultural Development Program (CAADP) and is encouraging countries to allocate more fiscal resources to agricultural development. While the recent sharp rise in international food prices is increasing poverty rates and food import bills in the short run, combined with economic growth it is creating major opportunities for African farmers in domestic, regional and international markets.

However, past failure to grow has left a terrible legacy of poverty and hunger in Sub-Saharan Africa (SSA). Growth here has been the slowest of all regions in the world, characterised by low investment and productivity growth. As a consequence, rather than improving over the past five decades as in all other regions, poverty and hunger have deepened in Africa. Poverty, hunger and HIV/AIDS are significantly worse in East, South and Central Africa than they are in the North and West. Where growth has recently been improved, it has reduced poverty, although it is only where agricultural growth has also increased that hunger has been reduced. *This fact provides the rationale for the sharp focus on agricultural growth of this paper.*

Landlocked, resource-poor countries have had the slowest overall growth rates (Ndulu et al 2007). Slow growth has also been caused by continued high population growth rates, which has led to very high dependency rates. Poor governance, macroeconomic instability, and limited integration into global markets, have sharply reduced growth until the mid 1990s, when growth rates started to improve significantly. Today, poor policies are much less a negative factor. Instead, structural impediments continue to impede further growth. Infrastructure (roads, electricity and water supply) is poor, transport costs are high, and the cost of doing business is much higher than in other parts of the world. Financial markets in general, and rural finance in particular, are poorly developed and savings rates are much too low (Ndulu et al 2007). These factors are reviewed in detail in Annex 1, taken from Binswanger and McCalla (2008). Based on this report's analysis, Ndulu et al propose a medium-term strategy to accelerate growth. The strategy hinges on taking action in four areas (characterised as four 'T's): improving the investment climate; a big push toward closing the infrastructure gap with other regions of the world; a greater focus on innovation as the primary vehicle for productivity growth and enhanced competitiveness; and institutional and human capacity.

The factors behind the recovery of agricultural growth in SSA, and many of the remaining constraints to it are largely the same as for economy-wide growth. However, there are also agricultural-specific factors (discussed in Annex 1). The most important of these is the improvement in agricultural policies in SSA. Until recently, agriculture in much of Africa has been discriminated against by macro-economic, trade and agricultural policies, and starved of fiscal resources. Even at the height of donor support for agriculture in the 1980s, apart from often being poorly designed, support was insufficient to compensate for these negative policies and lack of domestic resources—especially after its dramatic decline in the 1990s and early years of this century. Combined, these negative factors have prevented agriculture from contributing to growth and reducing poverty and hunger as it has so powerfully made in East and South Asia. However, agricultural policies in Africa have now improved and, on average, net disprotection has disappeared.

This paper provides the context within which AusAID will significantly increase its financial support of agriculture and food security (AFS) in Africa. Food security means access at all times to the food needed to lead a healthy, productive life. Food security has two components—availability and access. Home production of food ensures both components for those who have sufficient land and labour to be self-sufficient. For all others, ensuring food security means first availability of food in the market at affordable prices, and second, the ability to purchase it out of income. When either of these fail, safety nets and other emergency interventions are needed. In extreme cases this is achieved through emergency food assistance and distribution of food in kind, although these approaches can only be a last resort. Any comprehensive food security strategy therefore involves a broad range of measures to ensure availability and access. *Assisting the development of broad food security strategies and associated programs is beyond a small- to medium-sized donor such as Australia. As a consequence, this paper proposes a more narrow focus on accelerating broad-based agricultural growth.*

Accelerating the rate of broad-based agricultural growth increases food security in several ways. First, it increases food availability and reduces the price of non-tradable or semi-tradable food. Even with tradable food it can reduce prices when it helps a country become a net exporter, rather than a net importer, and food prices drop from import parity prices to export parity prices. Second, broad-based agricultural growth is the most powerful way to reduce rural poverty (World Development Report (WDR) 2008). More specifically it increases food availability for, and access to those able to produce it for themselves. It also improves the incomes of small farmers and agricultural workers who are net food buyers. Third, through forward, backwards and consumer-demand linkages it increases non-farm economic activity in rural areas that tend to be highly labour intensive, and therefore creates significant employment and incomes for the rural poor. Through similar linkages it also increases urban employment, and therefore agricultural growth generally has a greater poverty reduction impact than urban growth (WDR 2008).

However, not all forms of agricultural growth have such beneficial impacts on food security. For example, the expansion of a large-scale mechanised farm sector that produces raw materials for biofuels or industrial raw materials could have overall growth benefits. But it would not increase national food availability or reduce national food price levels. It is also not sufficiently employment intensive to increase the purchasing power for food of many poor people. Only where such commodities are produced by smallholders using more labour-intensive methods and spending a high share of income on labour-intensive rural home goods will significant food access benefits occur.

This paper:

- (i) discusses the changing international context for agricultural growth
- (ii) reviews the main constraints to agricultural growth and food security
- (iii) discusses the role of multilateral partners with whom AusAID could collaborate
- (iv) discusses six funding options for AusAID
- (v) proposes criteria for assessing the effectiveness of support by AusAID.

Annex 1 discusses general and agricultural growth determinants in greater detail, Annex 2: elaborates on the food crisis, Annex 3 discusses a strategy to strengthen Food, Agriculture and Natural Resources Statistics (FANRS) in Africa; Annex 4 elaborates on the agricultural research system in SSA; and Annex 5 outlines an option for community-driven safety nets.

This context paper comes at a time when many organisations have summarised the state of knowledge on food and agriculture, including the FAO (2007), the International Food Policy Research Institute (IFPRI) (2006), InterAcademy Council (IAC) (2005), and the World Bank (2007). There are also recent studies on governance failure, conflict and natural resource dependence (Collier 2007), governance and regional integration (Economic Commission for Africa (ECA) (2006) and especially the causes and consequences of the recent food price rises (FAO 2008, the Overseas Economic Co-operation and Development (OECD)–FAO 2008, IFPRI 2008). The author and Alex McCalla have recently summarised this huge knowledge base (Binswanger and McCalla 2008). This paper draws on this knowledge base.

3. The changing international context

Global winds of change provide significant opportunities (for example, from the biotechnology revolution and in the longer run the production of biofuels), and significant impediments and threats (for example, the failure of the Doha Development Round of trade negotiations to start dismantling OECD agricultural subsidies and trade barriers, and the expected negative impact of climate change on agricultural productivity). While the Bali discussions on climate change (2007) promise support for climate change mitigation and adaptation in poor countries, the mechanisms and funding needed remain far away. Dramatic changes are also underway in consolidating private international agribusiness firms with the supermarket revolution that so far is being driven by SSA. Privatising much agricultural research as a consequence of the biotechnology revolution is a similarly dramatic change. This section further elaborates on the five major issues that should shape Australia's strategy in Africa: (i) the recent rise in food prices; (ii) biofuels; (iii) global warming and climate change; (iv) biotechnology; and (v) donor fragmentation and poor donor behaviour.

1 The current food crisis

The biggest global shock, and the most complex mix of new opportunities and new problems in food, comes from the recent sharp rise in global prices. Aggregate food prices, including beyond grains and oilseeds, have risen by approximately 60 per cent in real terms, while prices of individual commodities have risen even more sharply. (Annex 2 has a more detailed analysis of the global food crisis). The rise in real food prices comes after decades of continuous decline. But the real aggregate price increase is sharper than the one associated with the food crisis of the early 1970s. Nevertheless, aggregate real prices are still lower than they were in the early 1980s.

Rising food prices have been driven by permanent structural changes in supply and demand conditions, exacerbated by weather shocks, the dramatic rise in energy prices and low interest rates that may have incited additional speculative behaviour. On the demand side, rapid growth and rising incomes in emerging economies such as India and China have increased the rate of demand expansion. Urbanisation and global growth have led to demands for a larger, more varied food supply. At least some of the increase in biofuel demand will be around for a while. On the supply side, the rate of increase has slowed over the past decade because of declining rates of productivity growth, and increased competition for water and land. Investments in agricultural research and development (R&D) have declined globally as has investment in agricultural development. Finally, higher petroleum prices have permanently increased agricultural production costs. As a consequence of these trends, global grain consumption exceeded global production in seven of the last eight years resulting in a drawdown of stocks to critically low levels. Together with the weather shocks of the past three years and the dramatic surge in biofuel production, this has caused prices to rise sharply.

Are rising prices here to stay? Section 3 reviews the large amount of emerging literature on this question. The OECD-FAO (2008) conclusion is closest to this paper's interpretation of the literature: 'World reference prices in nominal terms for almost all agricultural commodities covered in this report are at or above previous record levels. This will not last and prices will gradually come down because of some of the transitory nature of some of the factors that are behind the recent hikes. But there is strong reason to believe that there are now also permanent factors underpinning prices that will work to keep them both at higher average levels than in the past and reduce the long-term decline in real terms (p. 11).'

In the short run, higher food prices increase poverty for urban populations and for poor net buyers of food in rural areas, especially in food importing countries with limited ways to prevent passing international prices through to consumers. In Africa food import bills will rise by more than one per cent of Gross Domestic Product (GDP) in most North, East and Southern African countries and in a few West African countries. At the same time many of these countries are being harder hit by the rise in global energy prices. *The spike in food prices therefore requires urgent action through safety nets and balance of payment support. An immediate and substantial*

expansion of AusAID's program is required to address this problem; a more gradual scaling up of Australian aid would not assist in solving this problem.

In the long run, after food prices settle back, there will be major additional opportunities for African farmers, especially in domestic and regional markets that will also grow because of rising incomes. In these markets farmers compete on import parity prices, rather than on lower export parity prices, and with fewer quality and phytosanitary barriers. African farmers will have a major opportunity to reconquer the domestic and regional markets lost over the past decades. Internationally the changing food demand and supply patterns will lead to more South-South Trade, which in the long run will also bolster opportunities arising from overseas trade. *AusAID can make a significant contribution to the urgent policies and programs needed to address these issues.*

There is no doubt that donors are responding to the food crisis. For example, the World Bank has created a Global Food Crisis Response Program (GFRP) to help: (1) reduce the negative impact of high and volatile food prices on the lives of the poor in a timely manner; (2) support governments in the design of sustainable policies that will mitigate the adverse impacts of high and volatile food prices on poverty; (3) support broad-based growth in productivity and market participation in agriculture to ensure an adequate supply response as part of a sustained improvement in food supply. Globally the program will add up to US\$1.2 billion of bank resources within three years—US\$1 billion from the IDA and the International Bank for Reconstruction and Development (IBRD), and US\$200 million in grants from a new trust fund using IBRD surplus for poorest countries. In Africa 15 countries are expected to benefit shortly. *For Australia, co-financing GFRP activities would be a fast way of helping to stem the negative impacts of the current food crisis on African countries and its poor populations.*

2 Biofuels

Brazil has been producing ethanol from sugar cane for more than 30 years and the country now makes up to more than 40 per cent of its auto fuel supply with ethanol. The United States has mandated an increase from five to ten per cent of its auto fuel supply coming from ethanol produced mainly from corn (maize) by 2011 and seems poised to increase it even more. Europe has embarked on a program of promoting biodiesel as a renewable substitute for diesel using temperate oilseeds such as rape, canola and soybeans.

There are serious issues of how much net energy savings there really are from using corn produced with high fossil fuel inputs—petrol, fertilisers, pesticides and other petroleum-based inputs—, processed into ethanol with a process that uses high amounts of energy and at high cost. Further there are significant differences in energy yields from different feed stocks. For example, one hectare of sugar cane yields 6000 litres of ethanol compared to 4500 litres of biodiesel from palm oil, 3000 litres of ethanol from maize, and 1000 litres of ethanol from barley. (Worldwatch Institute 2006). At some point a process using cellulosic feed stocks (grass, waste products, trees) to produce ethanol will become commercially feasible. This should provide a higher product yield, at a lower cost. The problem is in breaking down the cellulose to free the carbon; it can be done by enzymes but this process is hard to scale up.

In 2005, before the recent rise in food prices discussed in the next chapter, Schmidhuber computed the parity prices for oil needed to make biofuel production profitable. The most economical production of biofuel was from sugarcane producers in Brazil, with a parity oil price of US\$35 per barrel. Next was large-scale, cassava-based ethanol production in Thailand at US\$38 per barrel, followed by US\$45 per barrel for palm oil-based biodiesel in Malaysia. Given the crude oil prices that prevailed in 1995 these three feedstocks and locations were already profitable. Maize-based ethanol production in the United States was much less efficient with a parity oil price of US\$58 per barrel. For mixed feedstocks in Europe and for biomass-to-liquid-synfuel production parity prices rose to US\$80 and US\$100 per barrel respectively, requiring enormous subsidies (Schmidhuber 2006).

However, these break-even points depend on the price of the feedstock used for biofuel production. At US\$60 per barrel for crude oil, the break-even price of maize (above which biofuels production is not profitable without subsidies) would be US\$2.01 per bushel. At a US\$120 crude oil price, maize could cost

more than 2.5 times as much (US\$5.20 per bushel) before the breakeven point is reached. In June 2008, maize traded above US\$7 per bushel in Chicago, which means it was too expensive for ethanol production without subsidies. Steenblik 2007 provides estimates of total subsidy equivalents for biofuels production. Biofuels processors and farmers in the United States received about US\$6.7 billion in 2006. Those in the European Union (EU) received about US\$4.7 billion.

While the link between fuels prices and food prices has always been significant (the cost of running mechanical equipment, transportation to and from farms and the price of fertilisers, pesticides and herbicides), increased biofuels production has created a much more direct link. OECD-FAO (2008) has shown that future biofuels production expansion will have a large impact on projected future prices, as shown by several global food projection models.

For Africa these developments will have multiple, often competing impacts. Small farmers benefit from higher returns when prices rise. However, the urban poor and landless suffer the disadvantages associated with paying more for food. But beyond these impacts there are opportunities. The relative efficiency of the commodities used to produce biofuels (as noted above) varies greatly: sugar and palm oil so far have been the most efficient. Further investment in efficient biofuel production could provide opportunities for certain African countries to produce for the global market without subsidies. If Africa could produce biofuels at costs similar to Brazil, Thailand and Malaysia, it could make sugarcane, cassava and palm oil production more profitable. There are already some private investments, foreign and local, in African biofuels made from palm oil and jatropha. Production of biofuels from cellulose, in particular, could have huge potential, especially for the many areas of medium-quality crop land that are not yet intensively farmed, and in the humid tropics. *In all cases, the private sector should lead biofuels' expansion in Africa. Decisions to engage in biofuels production should not be made on a political basis, as often done in the developed world, but on a well-thought through cost-benefit analysis. Australia should only support biofuels production in Africa when it passes this type of analysis; and then only if the private sector investors involve smallholders, and thereby create a significant poverty reduction and food security benefit.*

3 Global warming and climate change

Africa has experienced major climate changes since it gave rise to mankind around 150 000 years ago. Ever since the onset of agriculture about 8000 years ago, the climate has changed periodically. The most important evidence of this is found in the records of two periods of pastoralism that covered almost the entire Sahara desert, only to retreat again about 4500 years ago (Reader 1998). The ability of African agriculture to adapt to these massive changes is well documented.

With a few exceptions, there is now agreement that human activity causes global warming. Basic questions posed today relate to mitigation and adaptation. On mitigation common questions are: Can global warming be slowed? Can it be stopped or even reversed? On adaptation the main question is: How will the world adjust to the outcome? Lomborg, in his recent book *Cool It: The Skeptical Environmentalist's Guide to Global Warming* (2007), makes the case that the world needs a serious cost-benefit analysis comparing the benefits of spending a great deal of money on minimal reductions of CO₂ as opposed to spending the same amount (or less) on pressing current development issues, on adaptation and on researching lower carbon technologies. SSA is the Region contributing the least to global warming, yet it has the most urgent economic and social problems. The case for putting less emphasis on mitigation in SSA (except for land-use changes), and more on dealing with pressing current needs and adaptation is therefore stronger here. The situation is different in North Africa, however, where the case for mitigation is stronger.

A growing number of modelling efforts suggest that temperature impacts will be greater in higher latitudes, and that night temperatures are likely to increase more than day temperatures. Precipitation may increase in higher latitudes but will reduce in areas such as the Mediterranean and Southern Africa, while elsewhere in Africa it may stay about the same or increase. Globally, adverse agricultural consequences are likely to be negative in lower latitudes where temperatures are already high and precipitation already limiting, and they may be positive in higher latitudes closer to the poles (Cline 2006). For Africa, the impacts are estimated to be

considerably more adverse than predictions for the developed world, but less alarming than, for example, India and Mexico. There is also a growing view that frequency and amplitude of extreme weather events may be increasing. All these happenings will negatively affect farmers and increase their risks.

Global warming implies changes in crops, cropping patterns, timing of growing crops, agronomic practices and seed needs. It reinforces the requirement for stronger research systems capable of improving the resistance of crops and animals to biotic stresses, as well as investments in irrigation and water management. Farmers will be better able to adapt if agriculture is highly profitable and they have savings to invest.

African agriculture can also take advantage of opportunities presented by global warming: 'Climate mitigation through carbon offsets and carbon trading can increase income in rural areas in developing countries, directly improving livelihoods while enhancing adaptive capacity (Gary Yohe et al 2007, p. 1).' 'Land use change (18.2%) and agriculture (13.5%) together create nearly one-third of greenhouse gas emissions ... this represents potential financial flows of US\$130–260 billion annually, comparable to [Official Development Assistance] ODA of US\$100 billion, and foreign direct investment in developing countries of US\$150 billion (Ibid p. 3).' *Australia already has an aid environment strategy and is collaborating with the Global Environment Facility (GEF), the World Bank and other partners to support harnessing these potentials, including in Africa. Specific approaches and programs are therefore not further discussed in this paper.*

Adaptation to climate change and the risks it brings should be part of overall development and coping strategies. Yohe et al conclude: '... the tendency has been to treat adaptation to climate change as a stand-alone activity, but it should be integrated into development projects, plans, policies, and strategies (Ibid p. 2).' Howden et al (2007) make a similar argument: 'We argue that achieving increased adaptation action will necessitate integration of climate change-related issues with other risk factors, such as climate variability and market risk, and with other policy domains, such as sustainable development.' *The lessons for AusAID and its partner countries are that responses to the challenge of climate change need to be integrated into their individual and collective agricultural strategies and programs. This paper, as one of the two major components for AusAID's program, recommends the preparation and financing of national agricultural strategies and programs in general, and of more agricultural research and science education in particular. Adaptation to climate change should be mainstreamed throughout these components.*

4 Biotechnology and the privatisation of agricultural research

Farmers have been genetically modifying plants and animals for 5000 years or more, and agricultural scientists have joined them since the Mendel revolution in the 19th century. Today the only controversial issue is whether it is appropriate to transfer genes from one species to another. Evenson and Raney (2007) address this political and scientific issue. Among developing countries, China and Brazil, followed by India, have invested significantly in agricultural biotechnology. On the other hand, the Consultative Group for International Agriculture Research (CGIAR) system is spending less than 10 per cent of its overall budget on biotechnology research, perhaps because of resistance of important European donors. The huge success of biotechnology cotton and the prospects of nutritionally fortified rice and other crops have somewhat countered the views of environmental critics. Biotechnology cotton has dramatically reduced pesticides use, produced higher yields and generated greater incomes for small farmers—with no adverse environmental consequences.

The potential of rapidly expanding knowledge of genomics and increased capacity to modify useful plants and animals can become an important factor in adapting to and mitigating climate change, desertification, increasing resource scarcity and threats from pests and diseases. Possibilities for building in stress resistance (drought, heat and cold), immunity to pests and diseases, and improved nutritional values, as well as manufacturing pharmaceuticals in plants which 20 years ago were wild dreams, are now much closer to reality. For example, Monsanto and Badische Anilin & Soda-Fabrik (BASF) have just announced a US\$1.5 billion R&D partnership using biotechnology research. 'Focus of efforts will be on the development of higher yielding crops that are more tolerant to adverse environmental conditions such as drought. (CropBiotech Update, 23 March 2007).'

But will these developments occur fast enough to offset continued population and income growth and rising stresses on natural resources? Answers will come mainly from private sector proprietary research with intellectual property protection. The fundamental question is how the benefits of biotechnology can accrue to small African farmers in a world of privatised research. But surely there remain major public goods issues? This paper lists three:

7. Conservation of global genetic resources: Significant progress has been made with the 64 plant varieties under the International Treaty on Plant Genetic Resources (ITPGR)—on issues of preservation, conservation, access, ownership and returns from genetic modification. But what about the rest of the plant kingdom, including forests, animals, fish and critical microbial life? Who is helping African countries deal with the conflicts between The Trade-Related Aspects of Intellectual Property Rights (TRIPS), the World Trade Organization (WTO), the Convention on Biological Diversity (CBD) and the ITPGR over the large number of non-traditional, little-traded crops grown in Africa?
8. Biosafety protocols: Rules and regulation for developing and testing genetically modified organisms (GMOs) are ubiquitous and in a state of flux. Competing and conflicting paradigms between North America and Europe place small developing countries at the mercy of large trading blocks as these small countries attempt to decide whether they want to develop, import or consume GMOs. Where is the FAO in helping countries develop necessary rules and processes around producing and testing GMOs? What role could the International Fund for Agricultural Development (IFAD) and the African Development Bank (AfDB) play in this regard?
9. Access to promising genetic materials and techniques: Molecular biology research is expensive. Six multinational firms dominate molecular genetic research on plants and animals: Monsanto, Syngenta, BASF, Bayer, Dow AgroSciences and Dupont. The challenge is find ways for these firms to share their promising technologies with developing countries without compromising their legitimate right to garner profits from their discoveries. The Danforth Plant Science Center and the AATF are possible models. Clearly, regional research organisations must acquire the capacity to participate as peers in the molecular biology revolution.

Even where gene technology is donated, there may be slow progress, despite there being at least three biotech initiatives in Africa: NEPAD, AATF and the Alliance for a Green Revolution in Africa (AGRA). Carl Eicher et al (2006) reviewed biotechnology development for six food crops and cotton in Africa, and found unexpected scientific, legal, economic and political barriers to the development of genetically modified (GM) crops and long delays in developing and implementing national biosafety regulations and guidelines. They unfortunately concluded that with the exception of BT cotton, most GM crops are at least 10 to 15 years from reaching smallholders in Africa. Can Africa afford to be left behind China, India, and Latin America? Should the continent adhere to the complex regulations being dictated by others?

Whatever the answer to the above questions, biotechnology approaches must be integrated into plant breeding programs. Special attention should be given to: raising public awareness of and political support for biotechnology; strengthening the commitment to build Africa's capacity in biotechnology, biosafety, food safety and Intellectual Property Rights (IPR); and training the next generation of African plant breeders and GM crop specialists.

5 Donor fragmentation and poor donor behaviour

The number of new players claiming a legitimate interest in development assistance has exploded: 'Estimates suggest that there are 233 multilateral development agencies; 51 bilateral donor countries (most with multiple official agencies); several hundred international NGOs; and tens of thousands of national NGOs, not including community-based organizations which could number in the millions (Kharas 2007 p. 3).' Kharas classifies the new players into two groups:

1. Bilateral donors from the South, including large donors like China (US\$2 billion per year), India and Saudi Arabia (more than US\$1 billion each per year), several more in the US\$ ½ billion range (per year) (Korea, Turkey, Kuwait and Taiwan) and 21 others who have or are establishing aid programs. 'Estimates of aid from new players equalled or exceeded official development aid from traditional donors in 2005 (Ibid, p. 6).'
2. Thousands of private organisations including international Non-Government Organisations (NGOs) like World Vision International with a budget exceeding US\$2 billion, four NGOs with budgets between US\$500 million and US\$900 million (Save the Children International, Care USA, Catholic Relief Services and Plan International) and thousands of philanthropic foundations who contribute to international causes (in 2004, the largest of these was the Bill & Melinda Gates Foundation at US\$1.2 billion and the Ford Foundation at more than US\$250 million).

It needs to be emphasised that new bilateral aid players, like China, India and Brazil, are also now major commercial development players in markets, inputs, technology and finance. The BBC News estimates that the most recent wave of Chinese migrants to Africa is '... thought to total up to 750,000 ... They are settling all over the continent, in rural and urban areas, are involved in agriculture, construction and trade (BBC News, 11 November 2007).'

In the United Nations (UN) sphere other agencies such as the World Health Organization (WHO), the United Nations Children's Fund (UNICEF), the Joint United Nations Programme on HIV/AIDS (UNAIDS), and the Food Insecurity and Vulnerability Information and Mapping System (FIVIMS) have become increasingly engaged in issues like nutrition and health. Millennium Development Goal (MDGs) Task Forces, particularly Task Force One, are also new players. New conventions on topics like desertification and The Montreal Protocol overlap with the FAO, the United Nations World Food Programme (WFP) and IFAD's roles, which are now more closely entwined in terms of emergencies, early warning and a renewed focus on Africa. African nations working through the AU identified joint action as critical and so created NEPAD, which includes the CAADP program for agriculture, and many other institutions for regional integration and specialised development tasks.

Homi Kharas (2007) concludes that aid for development from traditional donors in rich countries has hardly grown: 'Of the US\$100+ billion of official development assistance disbursed by rich countries to developing countries in 2005 only \$38 billion was oriented towards long-term development projects and programs. Of this \$38 billion, perhaps half reached the intended beneficiaries. The balance of the money is tied up in special purpose funds like debt relief and technical assistance, or in administrative costs incurred in both the donor and recipient country. Presumably some is lost to corruption, too. Traditional donors are splintering into many specialized agencies.'

Kharas's analysis of Africa is sobering: 'This same story is replayed on the ground in Africa. The rhetoric is one of progress: the G8 has an Africa Action Plan, with special representatives to keep a focus on the poorest continent. But so far, Sub-Saharan Africa (SSA) has hardly seen any funding increase at all. Astonishingly, our estimates suggest that only US\$12.1 billion of the overall official development assistance takes the form of funds that SSA countries can use to invest in social and infrastructure development programs—one cent for every US\$27 in rich country income.'

Official Development Assistance for agricultural and rural development in Africa in constant 2005 US dollars rose from a little over a billion in the early 1970s to more than three billion in the early 1990s. It spiked around five billion in 1986 and again in 1987. After falling back to around US\$2 billion in the 1990s, it has fluctuated between 1.5 and 1.8 billion. Of the total spent since the early 1970s a much larger share was for agriculture than for rural development (since the early 1990s this has been relatively stable at around US\$500 million. By 2005, assistance to agriculture was less than four per cent of ODA. Despite Australia's internationally recognised expertise in agriculture, Australian ODA has followed global trends, with only five per cent allocated to agricultural assistance in 2004–05. Even in the area of international agricultural research,

where the returns to investment have been very high,¹ global public investment has stagnated. World Bank investment in rural development followed a similar pattern but is now increasing, having risen threefold since 2001 to US\$3 billion per annum. For Australia to have a meaningful impact on food insecurity, a similar structural shift in investment priorities is required, to support a major expansion of assistance to agriculture and rural development.

Based on a statistical analysis of the OECD's Development Assessment Commission (DAC), Easterly draws even more pessimistic conclusions: 'The record of the aid agencies over time seems to indicate weak evidence of progress due to learning or changes in political support for poverty alleviation. The positive results are an increased sensitivity to per capita income of the recipient (although it happened long ago in the 1970s), a decline in aid tying, and a decrease in food aid as a share of total aid. Most of the other evidence—increasing donor fragmentation, unchanged emphasis on technical assistance, little or no sign of increased selectivity with respect to policies and institutions, the adjustment lending-debt relief imbroglio—suggests an unchanged status quo, lack of response to new knowledge, and repetition of past mistakes (Easterly p. 38).'

Collier et al. are somewhat more positive but still cautious. They estimate that on average aid has added one per cent to the growth rate of the Bottom Billion countries, sometimes preventing the rate from becoming negative. Indeed, Collier et al. conclude that aid has been more successful than oil revenues in improving growth. It has also reduced capital flight, because it makes private investment more attractive and keeps money in the country. Nevertheless, because of the fungibility of money, Aid inadvertently helps finance about 40 per cent of African military expenditures. It has been more successful where governance and policies are better. Also, aid allocation is not poverty efficient—far too much goes to middle income countries.

These discouraging trends have not gone unnoticed. Calls for more harmonisation and alignment of operational policies, procedures and practices of development institutions were articulated in the Rome Declaration on Harmonization and Alignment (February 2003). This was followed by the Paris Declaration in March 2005, to which more than 100 ministers, heads of agencies and other senior officials committed. But progress on the ground has been slow.

The Terms of Reference for this paper focus on how AusAID can work with other partners to improve food security in Africa. It demonstrates that the agency is now serious about implementing the Rome and Paris declarations. Evaluations of AusAID programs have also consistently criticised for dividing development assistance into too many small programs. *The strategy proposed in this paper suggests that in its future support to African agriculture and food security AusAID concentrate its development assistance into two target areas: (i) broad-based agricultural growth and food security strategies and (b) agricultural research and science education.*

¹ Alston et al (2000) found that of the 700 published cost-benefit analyses for agricultural research in the developing world, the modal rate of return was 43 per cent per annum.

4. Main constraints

This section discusses the main constraints to African food security under three headings:

3. inadequate country commitment to agricultural and rural development (ARD)
4. the growing technology divide
5. other constraints.

This paper concludes that Australian assistance could make significant and measurable contributions to the dealing with the first two main constraints, but that trying to deal with the individual items under the third constraint (rather than focusing on broad-based, country-driven agricultural growth strategies), would split the program into too many, ineffectual components. It also concludes that there are many consequences of inadequate country commitment, such as underdeveloped farmers associations, deficient agricultural services for smallholders, lack of home-grown ARD strategies, and poor ARD and food data systems that fail to provide an adequate basis for developing such strategies. The growing technology divide is aggravated by many factors, including a growing lag in biotechnology research, still inadequate private sector involvement in research, inadequate public R&D funding (including for a number of regional initiatives), poor allocation of scarce R&D resources in CGIAR and other research programs, inadequate institutional frameworks for national agricultural research and technology transfer systems, and a seriously deficient agricultural education system.

1 Inadequate country commitment to ARD and its consequences

As African countries became independent in the 1960s, in line with the development paradigms of the time, they saw agriculture and rural development as a backward sector that should contribute to industrial development by providing fiscal and labour surpluses. As a consequence, funding in these areas was largely left to donors, who stepped in mightily in the 1980s, but then drifted to different priorities. This negative attitude to ARD has changed only recently and has not yet been translated into strong home-grown, agricultural growth strategies funded from increasing fiscal resources. As explained in greater detail in Annex 1, the recovery of agricultural growth rates is largely due to improved governance and an improved policy and business environment, rather than expansion or improvements in agriculture-specific programs. The NEPAD has developed a CAADP that calls for countries to allocate at least 10 per cent of public resources to agricultural development. Most countries now profess to take agriculture seriously, but only a small number have reached CAADP's funding goal. *It is proposed that one criterion for judging the success of future Australian aid in the agriculture and rural development sector be whether the aid contributed to strengthened political commitment and allocation of domestic fiscal resources to the sector.*

Lack of political commitment is partly due to the still poor development of farmers' associations and to their dependency on donors. The consequences of this include underdevelopment of smallholder services (including research and science education), the paucity of home-grown ARD strategies, and the poor status of food, agriculture and natural resources data needed for developing and implementing such strategies.

2 Under-developed farmers' associations

The development of a modern commercial agriculture sector usually leads farmers to seek better forms of horizontal and vertical coordination so they can take advantage of economies of scale, access technical and financial services and have a political voice (all discussed in earlier sections). Farmers' associations can help smallholders borrow from agribusinesses or financial institutions. Producers that join associations or cooperatives benefit from a higher negotiating power by: augmenting the range and quantity of produce;

reducing transport and storage costs; buying in bulk and negotiating lower prices; representing their members in decision-making fora. Producer organisations that belong to industry associations or formal farmer associations can also better ensure quality standards and help their members comply with international quality standards and traceability of produce. Finally, these organisations play an important role as pressure groups, strengthening political commitment to agriculture and allocating the necessary fiscal resources to smallholder services and other public- and semi-public agricultural growth factors.

In a recent review of the growth of commercial agriculture, the World Bank found that producer associations in Brazil and Thailand only started to thrive when the political environment became more democratic and made room for civil society (World Bank 2008). In Africa, civil society organisations were also often suppressed—until the spread of democracy in the past two decades—and they remain suppressed in Zimbabwe and other authoritarian regimes. During the early post-colonial period there were, however, many attempts to introduce farmer cooperatives, but they were largely top-down creations of the state and frequently failed. More recently, and as part of the movement towards civil society in general—often supported by donors—new producer organisations have emerged all over Africa in a more autonomous fashion. The World Bank study looked at Nigeria, Zambia and Mozambique. It found that sustainable farmer organisations were usually built upon pre-existing organisations and/or social groups, where members already share considerable trust and familiarity and had a strong sense of local ownership. Successful producer associations were not associated with subsidies and donor support, but always with viable business objectives and financial and managerial capacity. Farmer organisations, formed on an ad hoc basis (e.g. as a result of government programs) or on a large scale as part of development projects, usually failed (Agridev Consult Ltd. 2005). Overall the study found that farmers' organisations are still not sufficiently developed in Nigeria, Zambia and Mozambique and few can provide essential services to their members. Their involvement in negotiating on behalf of members with agro-industry remains weak and their political influence modest. Therefore, further strengthening of farmers' associations remains a major priority for service provision as well as the generation of political will.

3 Under-developed agricultural smallholder services and markets

Even where modern crop varieties have spread in Africa, they have led to significantly lower yield increases than in other regions of the world. There are two major reasons for this: (i) irrigated areas, where the green revolution achieved its early triumphs, are very limited in Africa; and (ii) inputs generate lower profits than elsewhere. This is due to poor marketing and input supply systems, poor agricultural extension systems, inadequate farmer knowledge of the best timing and application rates, and poor agricultural credit systems.

Input markets: The WDR 2008 argues that developing efficient input markets is a necessary prerequisite for expanding the use of improved seeds and fertilisers in SSA. Yet these markets are influenced by highly seasonal demand for small quantities dispersed over wide geographic areas that have poor infrastructure. The WDR shows that domestic port and transport costs make up to 50 per cent of farm gate fertiliser costs in Nigeria, Malawi and Zambia compared to slightly more than 25 per cent in the United States. Scale economies in fertiliser production are substantial so for the vast majority of small African countries domestic production is not feasible and, as the WDR notes, cost-effective minimum import lots of 25 000 tons are '... considerably above the annual demand in most Sub-Saharan African countries (WDR 2007 p. 150).' *This suggests a need not only for domestic market development, but for regional initiatives and coordination—a theme that recurs throughout this paper.*

Poor input market development also raises the perennial issue of fertiliser subsidies (addressed in detail in the WDR, Box 6.7, p. 152) with a proposal for what is called 'market smart' subsidies targeted at poor farmers to encourage initial use of incremental amounts of fertiliser. The WDR also notes that the widespread use of fertiliser subsidies is expensive. Zambia spent 37 per cent of its public budget for agriculture in 2004–05 on their fertiliser support program. Of course other inputs will become important in the commercialisation process as needs for tools, machinery, pest management and possibly irrigation equipment emerge. A market-

oriented agriculture requires access to functioning input markets. The challenge is how to encourage and support their development.

Rural finance: One critical input market is rural finance. The macroeconomic instability that has characterised Africa well into the 1990s has resulted in exceptionally high real interest rates. Agriculture is rarely so profitable that it can compete with urban investments in such environments. In addition, rural areas in general, and small farmers in particular, face crippling disadvantages in financial markets. Clients are usually small and widely dispersed, and seasonality and covariant risk make financial intermediation difficult (Binswanger and Rosenzweig 1986). While cooperative institutions have been a success for larger farmers in middle-income countries such as Brazil, specialised agricultural financial institutions have been a failure all over the World (World Bank 1996b). The micro-finance movement can make a contribution, but it has found it difficult to overcome the rural disadvantages and emerge as an important agricultural lender (Gine 2004).

Successful approaches to improving rural financial intermediation have focused on savings mobilisation, postal systems, improving access to finance by the rural non-farm sector, input suppliers, marketing systems, and contract farming (Yaron et al. 1998). The government of India has forced commercial banks to open rural branches and reserve a proportion of their lending for agriculture and the agro-industry. Two separate studies have shown significant impact on agricultural growth and the rural wage (Binswanger and Khandker 1996).

In light of this analysis, it is not surprising that countries and their development partners have found it difficult to achieve more than spotty success in rural finance in SSA. Yet all still put rural finance high on their agricultural-program agendas. *An alternative approach to fostering rural investment is to focus on agricultural profitability in general, and give support to effective, easily accessible and low-cost savings mechanisms, such as postal savings systems linked to rural savings clubs. A complementary approach would be to finance more agricultural and rural investments by matching grants from community contributions in kind to individual savings.*

Output markets: The same problems which negatively affect input markets also impede the development of output markets. Most of these have already been discussed: low population density; being land-locked; poor road and port infrastructure; high transport costs for infrastructure; illegal extractions along roads; inadequate competition; poor financial markets and the resulting high costs of finance; and a business environment that is only slowly improving. Market development in food crops is also impeded by frequent, unpredictable government interventions. Fortunately, farmers' associations are increasingly entering into both input and output markets, but a lot more support will be needed if they are to achieve the kind of prominence these types of associations have in East Asian countries or Brazil, for example. The 2008 WDR provides a comprehensive analysis of how to foster output markets in general and how to encourage the participation of producer organisations in particular. Intra-regional trade in basic commodities offers real possibilities for African agriculture but is constrained by barriers to trade that urgently need to be removed.

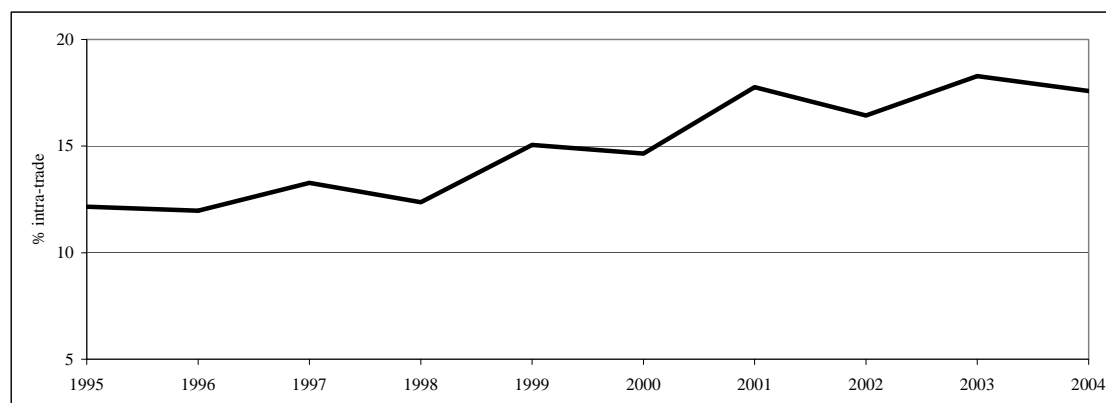
Barriers to intra-regional trade: As discussed later in this paper, intra-regional trade now offers perhaps the most important trading opportunity for SSA agriculture. Domestic demand for most agricultural commodities is both price and income inelastic, therefore rapid gains in production will often lead to lower domestic prices and quickly reduce gains in farm profits. Moreover, high-production volatility translates into high-price variability and risk. Opening sub-regional trade can reduce the impact of these factors and increase regional food security. Intra-Africa trade in agriculture was a small share of total African trade, but it rose from 11 per cent to 18 per cent between 1995 and 2004 (Figure 1). The largest deficits are in cereals, followed by oils, fats, dairy products and meats. Thus it seems there is substantial potential to expand intra-Africa trade in agricultural and food products as long as a range of barriers are overcome (including transport and handling costs, sanitary and phytosanitary issues, tariff and non-tariff barriers to trade, and market information).

Nevertheless, regional integration in agriculture has been slow. The ECA has shown that '... there have been some strides in trade, communications, macroeconomic policy and transport. Some regional economic communities have made significant strides in trade liberalization and facilitation ... In free movement of people ... in infrastructure ... and in peace and security ... Overall, however, there are substantial gaps between the goals and achievements of most regional economic communities, particularly in greater internal

trade, macroeconomic convergence, production and physical connectivity (Economic Commission for Africa 2004, p.1).’ The AfDB is placing major emphasis in its programs on regional integration and, together with the ECA, may be an interesting partner for advocacy and analytical support by Australia.

Figure 1: Trends in intra-Africa trade in agriculture (a)

(Africa’s imports from Africa as a percentage of total imports)



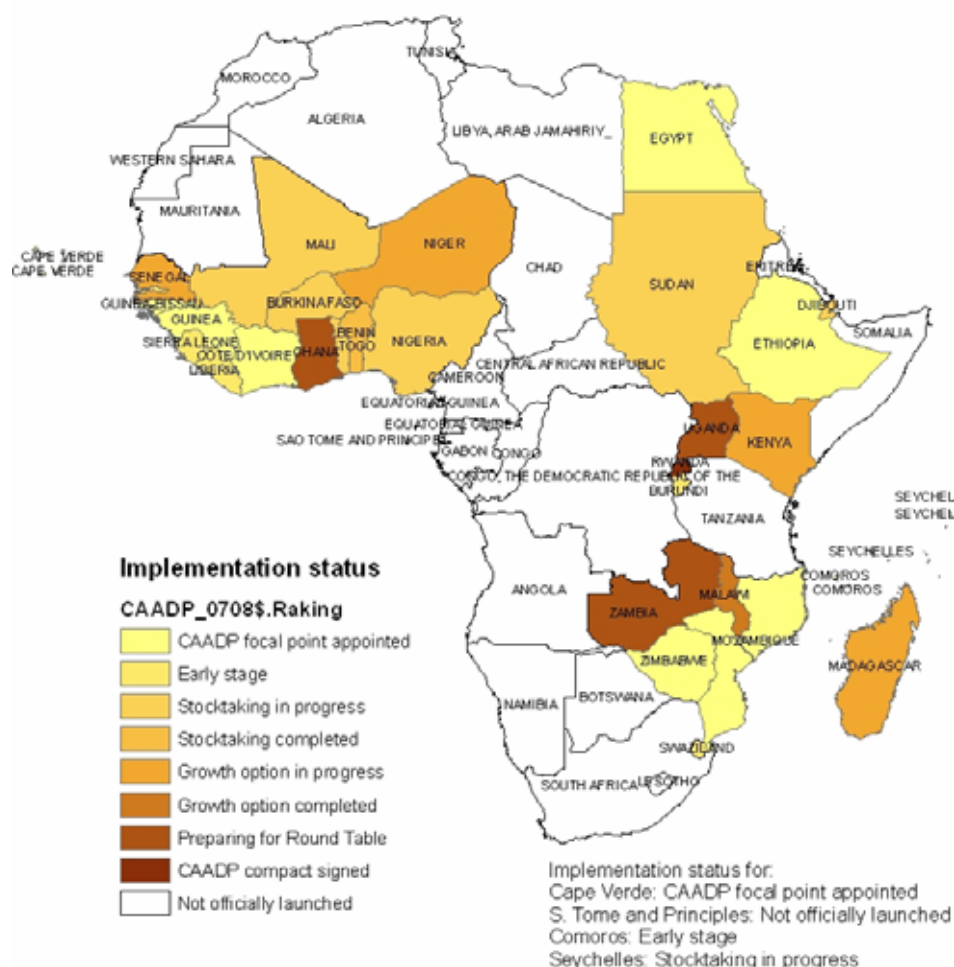
Source: FAO 2006, based on the WTO annual trade statistics

(a) Includes all foods (except fish) and nonfoods

Phytosanitary rules and regulations are steadily emerging as more important barriers for developing country agricultural and agro-industrial exports. Their increasing stringency is driven by consumer demand factors, as well as by their potential to replace tariff barriers as a protection against imports (World Bank 2005a). Developing countries have little choice but to insert themselves into standard-setting processes and bodies, and to build capacity to comply with regulations (Ingco and Nash 2004). Small countries are especially disadvantaged because they find it difficult to provide the necessary services. *Regional collaboration and integration will be necessary to enable compliance at an affordable cost.*

4 Few home-grown ARD and food security strategies

After initially focusing primarily on health and education, country Poverty Reduction Strategy Papers have gradually broadened to include ARD. However, very few of the following Poverty Reduction Support Credits supported by multilateral and bilateral donors include ARD issues as part of their explicit support programs. However, the AU and the NEPAD have developed the CAADP that is helping countries develop agricultural development compacts, the first of which was in Rwanda in 2007. Figure 2 shows the 30 countries in Africa that have initiated roundtables and the three that have already signed CAADP compacts.

Figure 2: The progress of Common African Agricultural Development Program Compacts

CAADP Compacts are not yet fully fundable. They are useful advocacy and consensus documents containing analyses of constraints, agreed upon objectives and broad implementation approaches. They also list desirable project and program options. However, the hard work of translating these into budgets and programs that can be implemented involves much more: It has to start with an agriculture public expenditure review (AgPER), and be followed up with the preparation of a fundable program that fits within an agreed expenditure envelope to which both government and donors are committed. Monitoring indicators, oversight arrangements, policy and public sector reforms and detailed implementation mechanisms also need to be agreed upon. While this process is country led, the World Bank collaborates with other donors to support these processes, and the subsequent co-financing of programs through budget support or basket funding. *It is to this complicated but necessary process that Australia should contribute analytical skills and finance.*

CAADP also supports the development of regional agricultural policies and development programs. They have been developed furthest in the Economic Committee of West African States (ECOWAS) and the Common Market for Eastern and Southern Africa (COMESA) regions which together represent about 40 African countries. The resulting regional and national strategies analyse constraints, set objectives and provide a catalogue of projects and programs for funding. No coherent implementation strategies or mechanisms are usually included and few countries or multilateral donors have found the strategies to be an adequate basis for financing programs. A Global Donor Platform on Rural Development, with a Secretariat in Berlin, supports the CAADP. The World Bank manages a multi-donor CAADP Trust Fund that provides resources for

program preparation. *If Australia wants to support the development of home-grown ARD strategies it should become a member of the Global Donor Platform and contribute to the CAADP Trust Fund.*

5 Poor food, agricultural and natural resource data and statistical systems

National and sub-regional ARD strategies depend on good data for monitoring and evaluation. However, Food, Agricultural and Natural Resources Statistics (FANRS) in Africa are poorly developed. The MDGs seek to measure progress against reducing hunger but the available data bases to analyse this are poor. Early warning about and management of food emergencies is data intensive. Monitoring, evaluation and impact evaluation of agricultural and other development programs requires data on agricultural and food production, prices, incomes, food consumption and the environment. This includes monitoring and evaluating policy and technology changes that might be brought about with the support of the Bill & Melinda Gates Foundation (Annex 3). Impact evaluation requires data with strong baselines on multi-dimensional panel households and data on the community environment in which households live. Measuring risk and understanding adaptation to risks requires continuous household data on the model of the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) village studies the Bill & Melinda Gates Foundation is already supporting in India. Data on fisheries, forestry, water, soils and biodiversity are critical for managing these resources.

But many technical challenges make collecting data complicated and expensive. Rural people, for example, live in widely dispersed, heterogeneous environments and rural environments have diverse agroclimate and soil endowments, infrastructure, market access, farming systems and technology. These challenges, combined with poverty in rural areas, leads to highly variable livelihood strategies involving farming, the rural nonfarm sector, temporary migration and splitting families across several locations all make it difficult to capture data. It also makes it difficult to integrate all dimensions of production (incomes, consumption, input and natural resource use) in rural data sets. Many technical measurement problems stem from these complexities.

In addition there are many systemic problems in collecting and analysing quality data. Development of Food, Agriculture and Rural Statistics (FARS) has tended to be supply-driven. Data were often not analysed or used. Poor quality and lack of analysis led to low demand, loss of data and limited budgets. FARS are rarely well integrated into national statistical systems (NSS). Activities focus on numerous ad-hoc requests from donors. Past investments and technical assistance have failed to produce sustainable systems. While donor support for general statistical systems has increased, for FARS such support limited to a few sector programs and paltry support to the FAO.

Since 1997 the FAO, the AFCAS and the World Bank have collaborated in the development and implementation of a new vision for FARS in Africa, based on an integrated approach to the development of the National Agricultural Statistics Systems of which FARS would be an integral part. FARS would be based on the harmonisation and rationalisation of data collection and dissemination activities. Data collection would be organised within a ten-year cycle starting with the decennial population census into which a modest agricultural module would be integrated. Agricultural censuses would be increasingly completed using sample surveys with household samples derived from the population census. Other required data samples, including for production data and crop forecasting, would be derived from sub-samples of the agricultural census. FARS would increasingly make use of, and contribute to, broader household data, including panel data. The agricultural activities of households could be viewed in the context of complex rural livelihood strategies, and output, input and labour market linkages, as well as against data on education, health and other social aspects of life. These data collection efforts would be designed so they could generate data for monitoring and evaluating major agricultural and rural investment programs and for carrying out impact assessments of development programs and external shocks. To achieve this, household data would need to be associated with sufficient community data. This broad vision was first discussed with the African Commission for Agricultural Statistics (AFCAS) in their 1999 meeting in Guinea.

Since then FAO, PARIS21, and the AFCAS have progressively arrived at a consensus around this vision and have attempted to implement it. Implementation was supported through FAO technical assistance projects,

the FAO Cooperative Program, resources from the Trust Fund for Statistical Capacity Building (TFSCB) managed by the World Bank, and through support from France. Unfortunately the bigger project designed to enable the FAO to provide the needed support was never funded. In addition, the World Bank supported national agricultural statistical capacity development through sector-support operations, as realised finally in Ghana and Mozambique. Despite the paucity of support both the FAO and AFCAS have refined the vision and developed additional strategies and tools for improving agricultural statistics.

The Bill & Melinda Gates Foundation is considering a proposal to fund the international capacity support component for strengthening the FANRS systems in collaboration with the AFCAS, the FAO and PARIS21. An implementation strategy for this program is at Annex 3. These efforts will integrate the FANRS's development programs into the NSDS and the resulting programs that require funding. At present, development of NSDS and resulting programs can be funded from the TFSCB and Statistical Capacity Development Credit or Loans (STATCAP) (managed by the World Bank) and from other donors. These programs focus on countries that have shown an interest in improving their statistical systems and a willingness to finance their share of costs. However, little funding has yet become available for preparing the FANRS components of the NSDS. *Australia could consider adding to the TFSCB at the World Bank, perhaps as a dedicated window for FANRS. This would greatly enhance the productivity of the proposed capacity-building program for FANRS of the Bill & Melinda Gates Foundation. Australia could also then participate in financing the FANRS's strategies emerging from these processes, by co-financing STATCAP programs or national ARD programs that include FANRS development.*

6 Growing technology divide

Of all the challenges African agriculture faces, the growing technology divide is by far the most daunting—closing it requires long-term investments into research, agricultural education and science education institutions that are in poor shape. It may take more than two decades to close the divide. At the same time the rest of the developing world, in particular China, Brazil and India, which have invested heavily for several decades, are further stepping up their investments in biotechnology and not letting outsiders distract them from doing so. Africa cannot afford to fall further behind. *It is for this reason that technology and agricultural and agricultural science education have been singled out for special coverage in this paper, and as the only proposed special area of focus for Australia's aid to SSA agriculture.*

Despite the enormous growth in human population and incomes, for more than 150 years agricultural commodity prices have declined. This phenomenon has been caused by increasing international trade combined with sustained technical change in agriculture (Mundlak 2001). Steady price declines show that eventually most, if not all, benefits from technical change in agriculture elude farmers and are transferred to consumers as lower commodity prices. This is famously known as the agricultural treadmill. Evenson and Collin (2003) show this effect once again for the Green Revolution that took place from 1996 to 2000. It is therefore not sufficient to improve the institutional environment and eliminate barriers to profitability in low-income countries so they may adopt technology already available. In a global agricultural system, profits go to those more advanced in technology implementation, human capital and institutions. Under-performing countries need to produce a steady stream of new technology by strengthening and rebuilding their agricultural research and technology adoption systems.

Around 1961, average cereal yields—around 1 ton per hectare in the developing world—rose to nearly 3 tons per hectare by 2005. During the same period they increased to around 4.5 tons in East Asia and the Pacific (EAP), to around 2.3 tons in the MENA, and stagnated to around 1 ton in SSA (WDR 2008 Figure 2.1). In 2000, improved varieties covered 84 per cent of cereal yields in EAP and 61 per cent in MENA and LAC. They only covered 22 per cent in Africa, however. In 2002, fertiliser consumption had reached a staggering 190 kilograms per hectare of arable, permanent crop land in East Asia and the Pacific, 73 kilograms in MENA, but only 13 kilograms in SSA. As a consequence, even high-yielding varieties led only to limited yield growth in SSA.

As noted by the Inter Academy Report of 2006 and others, African agriculture is characterised by a multitude of diverse farming systems, heterogeneity within farming systems (rather than dominance by one or two crops), the presence of many endemic plant and animal diseases, weathered soils with low fertility, erratic rainfall, and a predominance of rainfed, rather than irrigated crop production. In terms of its resource endowments and production mixes, *African agriculture differs more sharply from the developed world than other developing regions of the world (Pardey et al 2006), therefore limiting the ability of Africa to benefit from intercontinental or sub-regional technology transfer and spillover of scientific and research results. The enormous diversity of the research also implies a greater need for basic scientific research and strategic research than in other regions.* Such research is only rarely financed by the private sector, which tends to concentrate on more downstream research activities. *These features therefore imply that SSA requires a greater scientific and adaptive research effort than other regions, and that public agricultural research or public-private partnerships will continue to be important.*

7 Highly inadequate research and development funding

In 2000, global agricultural R&D spending was US\$36.3 billion, of which 37 per cent was conducted by the private sector and 63 per cent, or about US\$23 billion, by the public sector. Ninety-three per cent of the private research was conducted in developed countries (all figures from Pardey et al 2006). On the other hand, public agricultural R&D grew faster in the developing world, and is increasingly concentrated in China, India and Brazil. In stark contrast, public agricultural research in SSA grew at only about one per cent per annum in the 1990s, and in 2000 was around US\$1.6 billion. Sub-Saharan Africa has the lowest share of private agricultural R&D spending in the world—only 1.7 per cent of already low public spending (Ibid). Of total agricultural research spending, donors provide about 40 per cent (in some countries 60 per cent). Only five African countries—Nigeria, South Africa, Botswana, Ethiopia and Mauritius—are paying the recurrent budget of their NARS from national sources. ‘Collectively these data point to a disturbing development—a growing divide regarding the conduct of (agricultural) R&D—and, most likely, a consequent growing technological divide in agriculture. The measures also underscore the need to raise current levels of funding for agricultural R&D throughout the region while also developing the policy and infrastructure needed to accelerate the rate of knowledge creation and accumulation in Africa over the long haul (Ibid p. 68).

8 The African institutional framework for agricultural technology generation

Sub-Saharan Africa has more than 400 public and private entities engaged in agricultural research (nearly 200 public research institutions and 200 universities)—compared to 20 in 1960. However, 40 per cent of these have fewer than five researchers and 93 per cent fewer than 50 full-time researchers (Beintema and Stads 2004). Sub-Saharan Africa has nearly 50 per cent more agricultural scientists than India and about a third more than the United States, but all of SSA spends only about half of what India spends on agricultural research and less than a quarter of what the United States spends. Only a quarter of African scientists have a PhD, compared with all or most scientists in India and the United States.

All institutions engaged in research within each African country are collectively aggregated into National Agricultural Research Systems (NARS). In the different sub-regions of Africa the NARS form Sub-Regional Organizations (SROs) the strongest of which are the West and Central African council for agriculture research and development (CORAF/WE CARD) and the Association for Strengthening Agricultural Research in Eastern and Central Africa (ASARECA). The SRO for Southern Africa is SADC/FANR, the Southern African Development Community’s (Food, Agriculture and Natural Resource Directorate. A North Africa SRO initially comprising Morocco, Algeria, Tunisia and Libya is under development. The SROs foster research collaboration in their sub-regions—ASARECA and CORAF/WE CARD have established research grant funding mechanisms of their own, with significant support from the European Union (source: FARA website and websites of SROs). In 2001, the three SROs for SSA established the Forum for African Agricultural Research (FARA) that has its secretariat at the regional FAO office in Ghana. FARA has been

entrusted by the AU and the NEPAD to coordinate Pillar 4 of its CAADP which focuses on Agricultural Research and Technology Dissemination.

In 2006, FARA developed the Framework for African Agricultural Productivity (FAAP) setting out guiding principles for how research is to be fostered, institutionalised and financed in Africa. In particular it defines an ambitious reform agenda for the NARS that has been agreed to by all the African leaders of agricultural research. Under the framework, FARA, the SROs, and the NARS will collectively guide the evolution and reform of agricultural institutions and services; foster an increase in the scale of Africa's agricultural productivity investments and help align and coordinate financial support.

A joint donor evaluation analysed FARA and its programs as follows: 'FARA is a young organization ... it has developed a strong organisational framework in its first three years of full existence ... The Secretariat has demonstrated that it is both efficient and effective in its operations ... with increasingly significant tasks being assigned to the FARA Secretariat and the various FARA constituencies, these ... urgently need to increase their human resource capacity ... Joint External Evaluation (JEE) believes that the FAAP provides a framework for harmonizing donor support, and that committing to consolidated funding of the FARA Rolling Work Programme & Business Plan [RWPBP] is the best means of pooling resources (JEE report 2007 p. 11).'

Despite these favourable developments and external assessments, the work programs of the FARA, the SROs and the NARS remain seriously under-funded. The EU is providing support to ASARECA and CORAF/WE CARD, including their competitive grant funds. The AfDB has recently approved a US\$25-million program in support of FARA. And the World Bank has recently approved modest funding in West Africa through its Multi-Country Agricultural Productivity Program (MAPP) program and is preparing similar funding for Eastern and Southern Africa. But all these additions will not bridge the enormous funding gap with other regions.

To strengthen biotechnology research, four regional biosciences networks initiatives were established under the auspices of the NEPAD. The Biosciences eastern and central Africa Network (BecANet) facility was established in 2004. BecANet consists of a secretariat and a hub located on the campus of the International Livestock Research Institute (ILRI) in Nairobi, Kenya that aims to provide a common biosciences research platform, research-related services, capacity building and training opportunities), regional nodes, and other laboratories throughout eastern and central Africa that conduct research on priority issues affecting Africa's development. In addition, the NEPAD has initiated three other African biosciences initiatives which are networks of leading centres and consist of hubs and nodes in northern, southern and western African (the Southern African Network for Biosciences (SANBio) with its hub at the Council for Scientific and Industrial Research (CSIR), Pretoria, South Africa; the West African Biosciences Network (WABNet) with the hub at Institute Senegalais de Recherches Agricoles (ISRA) in Dakar, Senegal; and the Northern Africa Biosciences Network (NABNet) with the hub at National Research Centre (NRC) of Cairo, Egypt). These hubs are strengthening the physical infrastructure needed to develop and implement regional and continental biosciences projects. (NEPAD, 2007)

In the early 2000s a public-private sector partnership was created to foster access to proprietary research, funded by the Rockefeller Foundation. The AATF is an international not-for-profit organisation designed to facilitate and promote public-private partnerships for accessing and delivering proprietary technologies that meet the needs of resource-poor smallholder farmers in SSA. Through a catalytic and facilitative role, the AATF serves as an honest broker between owners and/or holders of proprietary technologies and a support for those promoting food security and improving livelihoods for smallholder farmers in SSA. The AATF was incorporated in the United Kingdom in January 2003 and in Kenya in April 2003.

9 The Consultative Group on International Agricultural Research

The CGIAR supports the research of 15 international centres, of which 13 are located in developing countries. In 2006, the group comprised 1115 internationally recruited scientists and 8154 staff working in more than 100 countries. A strategic component is the ex-situ germplasm collections of 11 of the

International Agricultural Research Centers (IARCs). Since the early 1990s, the CGIAR, building on earlier independent initiatives, has rapidly broadened its focus from crop genetic improvement to natural resources management (NRM), environmental issues and policy research.

In 2006, of the \$458 million the CGIAR spent around US\$220 million, or 48 per cent, went to SSA (Note: this is only about 10 per cent of total research spending in SSA). All centres currently have programs in SSA. Two are in West Africa—the International Institute of Tropical Africa (IITA) and the Africa Rice Center (WARDA)—and two are in East Africa—the ILRI and the International Centre for Research in Agroforestry (ICRAF). The centres handled 162 programs/projects in SSA. To implement these, the centres engaged 389 internationally recruited staff, 121 regionally recruited staff, and 2607 local staff. However, as discussed previously, the CGIAR spends less than 10 per cent of overall resources on biotechnology research, and little of this is likely to be spent in or for Africa. The CGIAR is not the only set of advanced research institutes (ARIs) operating in or for Africa. France's Centre de Coopération Internationale en Recherche Agronomique pour le Développement (CIRAD), and the Institut de Recherche pour le Développement (IRD), formerly the Office de la Recherche Scientifique et Technique Outre-mer, also operate on the continent. The combined budget of these two institutes is as large as the CGIAR budget (NEPAD 2007).

The CGIAR research has made significant contributions to SSA agriculture. Many previous studies highlight agricultural successes such as the high-yielding cassava varieties that include resistance to mites, mealy bugs, cassava bacterial blight, tolerance to drought, low cyanogens potential, and good cooking quality; the famous biological pest control, especially in cassava but also in other crops; biological pest control in potato, including through pest resistant cultivars; improved hybrids and open-pollinated varieties of maize in western, eastern and southern Africa; higher-yielding wheat in eastern and southern Africa; hybrid sorghum in Sudan; semi-dwarf rice for irrigated regions in West Africa; early maturing cowpeas in West Africa; and disease-resistant potatoes in eastern and central African highlands.

10 Returns to agricultural research

BOX 3 : ESTIMATED RATES OF RETURN TO INVESTMENT IN AGRICULTURAL RESEARCH

Region	Number of estimates	Median rate of return (%)
Africa	188	34
Asia	222	50
Latin America	262	43
Middle East/North Africa	11	36
All developing countries	683	43
All developed countries	990	46

Source: Alston and al (2000)

The adoption of new crop varieties in Africa has been significant. In the late 1990s the adoption rate of improved varieties of all crops was 22 per cent of total area planted, and of this 11 per cent was for the CGIAR-related varieties, usually produced in collaboration with the NARS. (Pardey et al Table 6). In eastern, central and southern Africa 10 million farmers are reported to plant and consume improved varieties of beans.

Alston et al. (2000) assembled more than 1500 rate-of-return estimates to agricultural research and extension (Box 3). The median was 48 per cent per year for research, 62.9 per cent for extension studies, 37 per cent for studies that estimated the returns to research and extension jointly, and 44.3 per cent for all studies combined. Box 3 shows that the median return in the developing world is about the same as in the developed world, and that the median rate of return in Africa is slightly lower than elsewhere, but still a very high 34 per cent. The lower return might reflect poorer adoption of varieties in Africa and generally poorer yields of new varieties once adopted (discussed elsewhere in this paper).

The African return estimates come from 47 studies, indicating that the studies report more than one rate. Only

four of the 47 assess agricultural research primarily conducted by a CGIAR centre (Alston et al 2000). The others are classified as research conducted by governments (40), universities (1), or others (2). It is likely that many studies conducted by governments or others may have indirectly benefited from CGIAR research.

Evenson (2003) estimates that CGIAR contributions to yield growth resulting from the group's research in SSA ranges between 0.11 and 0.13 per cent per year. This range is much smaller than the 0.30 to 0.33 per cent per year average yield growth across all developing regions (Evenson 2003). *Despite substantial introduction of new varieties there has not been a great aggregate impact on yields in SSA, compared with other regions, partly because of the much lower adoption rates and partly because of lack of irrigation, fertiliser, and inappropriate policies.*

BOX 5: Aggregate returns to the CGIAR across the world and in Africa

Against an aggregate investment into the CGIAR research of US\$7120 million from 1960 through 2001, all scenarios produced benefit-cost ratios in substantial excess of one. Focusing only on 'significantly demonstrated' studies that empirically attribute CGIAR-derived contributions to collaborative efforts, results in a benefit-cost ratio of 1.94. A more plausible scenario with less restrictive assumptions results in a ratio of 4.76. Under both scenarios the benefits of many innovations were assumed to stop long before 2001, when in fact research benefits continue long after study periods. When study benefits were extrapolated to 2001 and included, the benefit-cost ratio rises to 9.00. And when benefits were further extrapolated through to 2011 the benefit-cost ratio rises to 17.26. The true value of benefits arising from the CGIAR, however, is probably in excess of even the upper bounds of the results demonstrated here, because only a small subset of system impacts have been assessed. To illustrate this, 98.1 per cent of 'significantly demonstrated' and 93.4 per cent of plausible benefits were generated by just three research areas—cassava mealybug biocontrol, breeding of spring bread wheat and modern varieties of rice. Anecdotal evidence suggests these are not the only areas of CGIAR research success, so there is substantial scope for expanding impact coverage and better illustrating how system activities influence target beneficiaries (adapted from Raitzer 2003).

For Africa the total investments by the CGIAR–NARS partnership in SSA to date are estimated at US\$16.9 billion (2004 US\$)—the study estimates that slightly more than one half was spent by collaborating NARS institutions. Compared to global research, the benefit-cost ratios are more modest: Documented total benefits aggregated across all measured and projected benefits, the 'potential', 'plausible', and 'substantially demonstrated' scenarios fully recover the total investment made to date. On the other hand, if only reported benefits to 2004 (which frequently assume that benefits stop long before 2004) are considered, in at least one extremely conservative scenario, the aggregated benefits are not enough to cover total investments to date by the CGIAR–NARS partnership. The estimated deficit in the level of ex-post benefits to justify the total CGIAR–NARS costs is US\$1.3 billion (in compounded 2004 dollars). Several missing or non-quantified estimates of plausible or substantially demonstrated benefits for which adoption is documented, and/or time coverage is limited suggest the deficit may be lower than reported in this assessment, or even non-existent. The Benefit Cost Ratios (BCR) and the Internal Rate of Returns (IRR) reported in this study should therefore be viewed as the lower bounds of possible ratios and rates of return—these are likely to be substantially higher and will grow over time.

The other peculiarity of the findings is that the bulk of the benefits came from biological pest control, which contributed more than 80 per cent of total present value of benefits of US\$17.3 billion. Most important was the biological control of mealybug of cassava, which spread all over Africa.

Studies of crop genetic research cover eight food crops—beans, cassava, maize, millet, potato, rice, sorghum and wheat. Together, these contribute US\$2.4 billion (14 per cent of estimated benefits) to the present value of potential benefits (US\$17.3 billion). The documented impacts are attributed to six CGIAR centers and their NARS partners: ICRISAT (US\$440 million for millet and sorghum); IITA (US\$418 million for maize); Centro Internacional de la Papa (US\$369 million); the International Maize and Wheat Improvement Center, better known by its Spanish-language acronym CIMMYT, from Centro Internacional de Mejoramiento de Maíz y Trigo (US\$337 million for maize and wheat); WARDA (US\$321 million for rice); CIAT (US\$276 million for beans); and CIAT/IITA (US\$250 million for cassava). Research in fodder bank technology contributed US\$55 million of benefits while research on broad beds and furrows contributed less than US\$1 million. Other natural resource, farming systems, environmental and policy research programs of the CGIAR in SSA did not provide benefit estimates.

(Adapted from Maredia and Raitzer, 2006)

Two studies commissioned by the CGIAR's Science Council asked whether total research benefits have justified costs since inception (Raitzer 2003) and whether the benefits in Africa justify the costs of CGIAR research and related NARS research (Maredia and Raitzer 2006). Box 5 summarises the analytical process and results of the global and SSA studies.

11 Poor allocation of scarce agricultural research resources

There is a strong body of opinion—most recently articulated by the InterAcademy Council's study of African agriculture (2005)—that suggests integrated soil fertility and water management represent more constraining factors on improvements in agricultural productivity than crop genetics resources, especially in food staples. This body of opinion also suggests that poor seed systems in Africa means that improved genetic material often does not reach farmers' fields to realise impacts on development goals. This report takes the position that these serious constraints reflect past poor incentives in Africa for agricultural investments in general and for soil fertility enhancement through fertilisers and organic matter in particular; poor agricultural inputs and outputs markets, combined with grossly inadequate small farmer support systems; and adverse (but declining) government interventions in seed development and distribution systems. Remedying these constraints depends on the design and implementation of the home-grown ARD and food security strategies discussed in the last section. Policy change, government investments and rapid private sector development are needed and more agronomic, farming systems and environmental research can play only a supplementary role.

Nevertheless, CGIAR investments in increasing productivity have fallen from 47 per cent of the total in 1994 to 34 per cent in 2002. Within this main activity, investments in the sub-activity germplasm enhancement and breeding fell from 23 per cent (1994) to 18 per cent (2001), while investments in production systems development and management fell from 24 to 17 per cent. At the same time, CGIAR investments in protecting the environment rose from 15 to 18 per cent and for improving policies from 10 to 15 per cent. Between 1992 and 2001 the CGIAR investment allocated to protecting the environment amounted to almost US\$500 million (in nominal dollars) and US\$630 million to production systems development and management. Not all this investment can be defined strictly under the Natural Resource Management Research (NRMR), but it offers some indication of the significant level of investment.

To begin rigorously evaluating this type of research the Science Council resolved to evaluate seven case studies of benefit and costs of policy and natural resource management research, only two of which are in SSA (aquaculture in Malawi and fertiliser trees in Southern Africa) and have not spread widely. Another study evaluated the oldest system-wide program of the CGIAR—the Alternatives to Slash-and-Burn Programme. (Science Council Standing Panel on Impact Assessment 2006).

The case studies varied in clearly defining and quantitatively assessing impacts. In the two policy-oriented cases—the Center for International Forestry Research (CIFOR) and the International Water Management Institute (IWMI)—only impact pathways could be identified (but not quantified). For the only five cases where benefits and costs could be quantified and internal rates of return calculated, the benefits substantially exceeded costs only when future benefit projections were included. That means that the cases have not yet been adopted widely enough to pay for their own costs. Moreover, the internal rates of returns fall short of those typically associated with plant genetic improvement. They could be higher if all environmental benefits could be quantified. The studies, however, cover only a few flagship cases and the NRM research conducted on most has never been evaluated. As a consequence returns to the aggregate CGIAR investment in NRMR have not yet been evaluated (Ibid). Given the paucity of widely accepted NRM practices coming out of the CGIAR, and the large amount of resources devoted to this type of research, it is likely that the returns are not positive. This is distressing because the resources devoted to NRMR and other types of resources now dominates the allocation of CGIAR resources to plant genetic improvement and biotechnology in Africa and globally.

The CGIAR's Generations Challenge Program is global and hopes to make a difference with heat and drought tolerance of food crops, and thereby help them adapt to climate change: 'For the majority of crop

farmers in the developing world, the ravages of drought, low soil fertility, crop pests and diseases are aggravated by their limited access to improved crops. Moreover, irrigation, fertilisers and pesticides are often beyond their reach ... By using advances in molecular biology and harnessing the rich global stocks of crop genetic resources, the Generation Challenge Programme (GCP) of the CGIAR aims to bridge this gap. Through its five sub-programs GCP creates and provides a new generation of plants that meet farmer needs (www.generation.cp.org/index.ph).’ Important crops for Africa, such as sorghum and maize, are involved.

The Generations Challenge Program does not directly focus on SSA. Instead the CGIAR funds the African Challenge Program which does not focus on plant genetic improvements. Instead this program takes a broad systems approach to agricultural improvements including natural resource management and the entire value chain (from farm to market). While this new research paradigm is widely advocated by the World Bank and other proponents, there are no international examples where significant, broad-based agricultural growth was triggered by the new paradigm. In other words, it reflects hope, rather than practice. At the same time, research on the main biological and environmental stressors of plants and animals, including biotechnology, remains dramatically under-funded in Africa, in sharp contrast to China, India and Brazil.

While the Bill & Melinda Gates Foundation more systematically focuses its international agricultural research funding on key plant and animal stressors, the amount of resources remain inadequate. In addition, the Alliance for a Green Revolution in Africa, co-founded by the foundation and supported by them, plans to fund the training of several hundred African plant breeders. If these breeders are to be productive, they must be absorbed into reformed and better funded African agricultural research systems—if not, they will emigrate to greener pastures. The breeders also need a vastly improved science base for all major African production regions, crops, pests and diseases from which to conduct adaptive breeding on the research stations and in farmers’ fields.

An additional source of misallocation of resources in the CGIAR system is widely recognised to be the decline in core funding by donors to the group and its substitution by way of project funding. Not only has this placed an enormous fundraising burden on institutions, it has distorted their research from upstream science and technology development work to downstream support to implementation of agricultural development programs. The Meta Evaluation of the CGIAR of 2003 and the Science Council have deplored this trend. It is at the root of the difficulty of the system to set its own science and technology agenda and to attract the necessary high level scientific talent to carry it out. Even the World Bank has retreated from core support. Only the Department for International Development (DFID) in the United Kingdom appears to recently have had second thoughts about it.

It is therefore suggested that Australia concentrate its support on crop genetic improvements and animal diseases, including through biotechnology, where resources remain exceptionally scarce and returns are proven to be high. The IAC (2005) report signals opportunities to assist in the evolution of selected African Centres of Agricultural Research Excellence (ACARE) such as Baca in East Africa. Australia should also increase its support to genetic improvements, including biotechnology, in the CGIAR. Much of this should be provided as core system support, earmarked only to genetic improvement, rather than project support. Channelling some of the support through the Generations Challenge Program is also an option.

12 Agricultural science and education institutions:

Africa now houses roughly 300 universities and three-quarters of African countries offer some tertiary level training in agricultural sciences. At least 96 public universities teach agriculture and natural resources management. Of these, 26 are in Nigeria, ten in South Africa, six in Sudan, five in Kenya and three in Ghana. Nineteen separate faculties of veterinary science exist in 13 countries, five in Nigeria alone (Johanson and Saint p. 15).’ Despite these many facilities, agricultural aid funding ‘dropped precipitously’, according to Johanson and Saint, and agriculture ‘received a diminishing portion of a shrinking development assistance pie.’ Country expenditure has paralleled the drop in donor assistance. What is left is a proliferation of institutions with limited staff and virtually no research support money—now that the need for agricultural technology development has regained high priority for Africa, the continent is left with a deteriorating,

oversized and fragmented infrastructure, many vacant positions, an aging staff, outdated equipment and no operating funds (Johanson and Saint p. 34).

Johanson and Saint conclude that: 'Agricultural education and training has been demonstrated to be a vital, but much neglected, component of agricultural development in Africa. It is under-valued, under-resourced and under-provided. Human capital in agriculture has been depleted by long neglect' (p. 67). The InterAcademy Study states: '... It is the conviction of this study panel that much of what would be necessary to improve agricultural productivity and food security in Africa hinges on strengthening agricultural educational systems, more specifically the coverage and quality of higher education' (p. 184).

However there are hopeful signs. '... even American foundations have formed the Partnership for Higher Education in Africa and pledged to invest at least USD 200 million over the next five years [and] the Gates and Rockefeller Foundations recently formed a separate partnership, called the Alliance for a Green Revolution in Africa (AGRA)' (Ibid). The UNDP is supporting a community of practice, SEMCA—Sustainability, Education and the Management of Change in Africa—which focuses on agricultural education.

Australia could creatively link some of its agricultural universities, especially in the tropics, with stronger ones in Africa through twinning arrangements. Faculty exchanges, graduate scholarships, 'sandwich' programs as Wageningen Agricultural University in the Netherlands does in Africa, should be a primary focus (IAC 2005).

13 Conclusion

It is clear that African regional and national institutions for agricultural science, technology and agricultural science education have started to respond to the huge scientific and technological challenges Africa faces. Challenges are intensified by increasing competition for resources, climate change and rising international agricultural prices. Responses are occurring in a rapidly changing global research system which includes biotechnology, intellectual property rights and patent systems, and a growing range of players, especially from the private sector. However, significant institutional responses have not been matched by adequate funding from international donors and national governments, especially in genetic improvements, biotechnology and agricultural science education. *Australia should specifically seek to bridge these funding gaps through its support to African agricultural growth strategies and programs.*

5. Other constraints

This section discusses a number of other constraints that have to be accounted for in national agricultural growth strategies and programs. Australian support to such strategies and programs should pay attention to the processes used to ensure mainstreaming.

1 Inadequate capacity

A World Bank report—Building Effective States and Forging Engaged Societies (2005)—concludes that a capable state requires an engaged society that holds governments accountable. Only five SSA countries were rated above the global average on state effectiveness—Botswana, South Africa, Mauritius, Namibia and Mauritania. A further seven were rated above the global average on societal engagement—Cape Verde, São Tomé and Príncipe, Ghana, Mali, Benin, Lesotho and Senegal.

Capacity development is a learning process engaging existing capacities and providing them with better incentives and checks and balances. It is a process not amenable to shortcuts. The earlier technocratic approach ignored the links between governance, policy and capacity development. It therefore required effective political leadership from the highest level of government, as illustrated in the 12 countries studied for the World Bank report. Therefore, state capacity development (often including decentralisation) does not emerge from a gradual, incremental approach but rather large-scale, nationwide, multi-sectoral, and demand-driven programs and the devolution of power and resources to local governments. Systems for allocating and managing money in-country need to be strengthened and relied on, rather than parallel systems. The share of technical assistance funding going to capacity-building activities must increase. This is best done by pooling fragmented financing arrangements to fund prioritised capacity-development activities or filling country-identified, short-term needs. This requires untying and pooling funding for technical cooperation (World Bank 2005).

2 Gender equity

In many parts of the developing world women form the majority of the agricultural labour force. In SSA, the majority of farmers are women. Ambler et al argue that: 'Poverty and hunger cannot be conquered without meeting the specific needs of poor women. Like poor men, they lack the assets and income necessary to exit poverty, but poor women and girls are also subject to a confluence of gender-based vulnerabilities that keep them trapped in poverty. Women have fewer benefits and protections under customary or statutory legal systems than men; they lack decision making authority and control of financial resources; and they suffer under greater time burdens, social isolation, and threats or acts of violence.'

While gender equity issues are now better understood, the world seems slow in responding. Holmes and Slater compares the 2008 World Bank WDR on Agriculture and Economic Development to the last one, published in 1982, and conclude: 'Comparing how gender equality is analysed in the recently published 2008 report to the 1982 report indicates that much progress has been made. Nevertheless, significant gaps remain in the 2008 report' (Holmes and Slater 2007 p. 1). 'For all its merits, there are also substantial areas in the 2008 report that lack important gender analysis. The report focuses little on the impacts and implications for the global economy, such as the impact of deregulated and liberalised economic policies, and global *agricultural trade markets, on gender equality and subsequently, for growth and poverty reduction. ... The report also lacks a rigorous analysis of some key gender-specific constraints—for example, women's reproductive responsibilities or cultural barriers—when identifying mechanisms for increasing the role of efficient and equitable labour markets in enabling agricultural growth and poverty reduction.*

Furthermore, at both the household and community level, the 2008 report does not discuss the economic constraints to improving women's participation in farmers' organisations or community committees' (Ibid p. 2).

Changing gender norms in society is difficult and far from complete in the developed world. Growth and economic opportunities for women have been a main factor in driving change, again putting the emphasis onto achieving higher growth. This paper noted earlier that in many countries fewer than half of women aged 15 to 24 can even read a simple sentence, and their drop-out rates from school are high. Thus the challenge of gender equity in accessing education and health care remains huge. The same applies to agricultural opportunities, which is why national agricultural growth strategies have to mainstream gender issues into their resulting programs.

3 Security of access to resources

Farmers will rarely invest in fixed assets unless they have secure land rights. While traditional tenure systems have often provided secure inheritable usufruct rights, in many parts of Africa these have come under pressure from rising population density and increased market access (World Bank 2004, Economic Commission for Africa 2005c). Traditional systems also often failed to provide secure tenure rights to women and manage the potential conflicts arising when immigrants need to be accommodated and when enclosing pastures threaten the livelihood of herders. Evolving these systems is therefore an important priority for aid assistance and has been a topic of intense interest in Africa in recent years. DFID sponsored a workshop in 1999 which resulted in a valuable compendium of information published as 'Evolving Land Rights, Policy, and Tenure in Africa' (Camilla Toulmin (ed) 2000). The World Bank's recent book 'Land Policies for Growth and Poverty Reduction' (2003), contains a major chapter on Africa and most recently the CGIAR's Systemwide Program on Collective Action and Property Rights (CAPRI) has released a set of 12 policy briefs in a volume entitled 'Land Rights for African Development: From Knowledge to Action' (2006). Ngaido argues that '... ensuring access to and control over land for poor and marginalized rural households, women, and groups (equity) are critical policy objectives for promoting agricultural growth and combating poverty in Africa' (2004).

Excessive inequality of land ownership tends to reduce access to land and efficiency of its use (Binswanger, Deininger and Feder 1995). Large-scale farms from Brazil to the Philippines and in Zimbabwe and Namibia have underused their land, and depended on subsidies to increase mechanisation and reduce dependence on hired labour. Small farms, on the other hand, have inadequate access to capital to make their operations more efficient and improve profits. As a consequence, both farm sectors suffer an efficiency loss. For these reasons, the World Bank has become a major player in land reform programs in countries that still have an important land reform agenda (Binswanger and Deininger 1995). However, a great deal of controversy still surrounds the best way to implement land reform, and this has slowed progress in the countries most in need (van den Brink et al 2006).

4 Rural HIV/AIDS and agriculture

Following a decade of HIV infections in Africa, the AIDS death toll has risen, leading to stabilisation or a slight decline of HIV prevalence rates in a number of countries. The third wave of orphans has also started but is far from its peak, with predictions it could reach 20 million in Africa in the next decade. Rural areas are now suffering almost as much as urban areas, and maybe even more so from the orphan crisis, as many orphaned urban children are returned to rural homes.

The prevalence of HIV varies sharply across SSA countries, for reasons still poorly understood. Four countries in SSA have HIV prevalence rates above 20 per cent, another seven between 10 and 20 per cent, seven between 5 and 10 per cent, and 26 below 5 per cent. The nine countries of Southern Africa and the Central African Republic are experiencing the biggest demographic impact. The impact on the age structure of these countries is distressing. In 10 years, for example, Southern Africa went from having one-third of

annual deaths from the working-age population to two-thirds. It is unclear whether fertility will increase or decrease. So far population growth rates have not turned negative in any SSA country. But age-dependency rates will increase and reduce economic growth rates.

While a significant body of indirect biomedical evidence suggests poor nutrition and parasitic infections should make a person more vulnerable to HIV infection, major epidemiological studies cast doubt on this conventional wisdom and instead suggest that food intake and nutrition are not major determinants of the differences in prevalence rates (Binswanger 1980). In longitudinal studies in Africa the median survival rate after infection with HIV was estimated at between eight and nine years in the absence of anti-retroviral treatment. These survival rates are only about 20 per cent lower than the survival rates in OECD countries before the advent of anti-retroviral therapy, leaving little room for food intake and nutrition to be important determinants. Clearly, therefore, therapy, not food and nutrition interventions, is the only way to significantly increase survival rates (Ibid).

Mahter et al (2005) conclude that roughly a constant number of working age adults will become infected with HIV. Many affected agricultural households quickly recruit new adults, and the agricultural labour shortages are likely to induce urban-rural labour migration. HIV/AIDS is likely to progressively decapitalise highly affected rural communities, and increase the scarcity of capital (land, savings, cattle and draft animals), potentially posing the greatest limit on rural productivity and livelihoods. *IFAD's focus on all assets of the rural poor is therefore as applicable to households having experienced a death, from HIV/AIDS or any other cause, as to any other household affected by a negative shock.*

Orphans usually face serious psycho-social consequences of the loss of one or both of their parents. Extended families are most likely to choose better-off members as fostering parents. As a consequence, studies have shown that orphan-fostering households are not necessarily the poorest and most vulnerable (Rivers et al 2005). On the other hand, households with more than one orphan reported significantly more food insecurity and hunger than households with no or only one orphan.

The longitudinal data set in Kenya (Yamano and Jayne 2004) shows that the death of an adult male household head is associated with a larger negative impact on household crop production, non-farmer income and crop production than any other kind of adult death. In addition, the Kenya data show that the impact of adult mortality on household welfare is more severe for households in the lower half of the per capita income distribution (i.e. the target group of the IFAD).

5 Interventions against HIV/AIDS in rural areas

Agricultural, food and nutrition interventions are not likely to be powerful against the spread of HIV/AIDS or the progress of an infected individual from infection to death. Instead, direct prevention interventions are required, making antiretroviral treatment (ART) widely available rural areas. On the other hand agricultural, food and nutrition interventions are likely to be important in mitigating the impact of the disease on affected households. And better and more food may also help the adherence of patients to ART. These differences are important for designing rural interventions.

In rural areas of Africa, prevention interventions not only require inter-personal communication, but the participation of whole communities, such as the model of the Tanzania-Netherlands Project to Support AIDS Control, which was scaled up to all villages in an entire district. The Global Donor Platform for Rural Development put community involvement as a central pillar for all rural development efforts. *Therefore all rural development interventions should be designed to contribute to mainstream community-based HIV/AIDS prevention efforts. This does not necessarily have to be costly, as other programs to strengthen community institutions can be entrusted with the task. Mainstreaming HIV/AIDS prevention should receive equal emphasis as other mainstreamed agendas, such as improving gender relations and managing natural resources.*

The WHO guidelines for HIV/AIDS treatment, including ART (WHO 2004) have been designed so that a nurse in a rural health post can, without laboratory equipment, use syndromic management (i.e. diagnosis based solely on observable symptoms) to diagnose advanced HIV disease and prescribe a standard first-line treatment to adults. The WHO guidelines recommend the strong involvement of communities in providing other components, such as training in healthy living and survival skills, providing food and nutrition, and providing adherence support. *All community-based programs therefore should closely follow what is happening in rural areas where AIDS treatment is being scaled up, and help through projects wherever possible.*

Care and support for those living with HIV/AIDS involves psycho-social support, health care, home-based care, education, food and nutrition interventions and livelihood support. The consensus of the literature is that care and support for affected individuals and their families should be holistic, rather than individual, sector-specific interventions. However, very few holistic, community-based care and support initiatives have been scaled up—they remain small operations. The impact of HIV/AIDS is highly differentiated according to who is sick or dies in a family, how well off the household was before experiencing HIV/AIDS, and how large and well off the extended family network is. Therefore only a fraction of affected households and individuals need care and support interventions from outside. Stigma associated with HIV/AIDS may be further exacerbated by providing support only to families and individuals affected by HIV/AIDS. Caution, for example, needs to be exercised when deciding to provide direct support to children orphaned as a result of AIDS that excludes other orphans. *Care and support to AIDS orphans should therefore be within a broad, community-driven social safety net.*

6 Rural safety nets

The rising number of orphans in SSA is an important reason to focus more on rural safety nets. Other reasons include rising food prices, disruptions from globalisation and global warming. Employment generation programs have often been used as partial social safety nets, sometimes as part of social funds and other local development funds (Serrano-Berthet). But unlike in South Asia their size and scope has been fairly limited. While helpful, they do not support those who cannot work. Clearly rural safety nets need to be expanded. In SSA, South Africa, Botswana and Namibia have developed significant cash transfer mechanisms, in both rural and urban areas, to help the most vulnerable groups, including the aged, the disabled, children and those living with HIV/AIDS. However, financing such cash-transfer programs may be beyond the reach of many of the poorest countries. Alternatives are to strengthen traditional community safety net mechanisms along the lines discussed in Annex 5.

7 Water resources and irrigation

Developing and managing water supplies costs money, but some see access to water as a right and over use this free good. In developed and developing countries, water use in agriculture is often highly wasteful, a consequence of past subsidies for developing irrigation, and low water and electricity tariffs. Powerful vested interests defend these privileges. As a consequence improved water use efficiency, necessary for managing the competition for water, is rarely achieved. If these issues are not addressed in the rest of the world, Africa may once again be hit with rising food prices due to increasing global water scarcity.

Water is crucial to Africa's development but it is becoming increasingly scarce. To quote the 2007 Africa Development Report: 'Available statistics reveal that nine African countries already face 'water scarcity' on a national scale (less than 1,000m³ of water per person annually), eight countries face 'water stress' (less than 1,700m³), while at least another six countries are likely to join the list in the coming decades. More than 300 million people in Africa still lack access to safe water and adequate sanitation. The majority of these people are in sub-Saharan Africa, where only 51% of the population has access to safe water and 45% to sanitation. By 2025, almost 50% of Africans will be living in an area of water scarcity or water stress (p. 12).' While in the aggregate Africa would seem well endowed with water, having 17 major rivers and 160 lakes, the distribution is spatially and temporally uneven. For example, the Congo River Basin, which receives more than 35 per cent

of annual African rainfall, is home to just 10 per cent of Africa's population. This means that in some areas there is high dependence on ground water (North Africa and Southern Africa). In other areas major rivers routinely dry up for several months a year. Despite limited irrigation development, agriculture is responsible for 86 per cent of water withdrawals. Furthermore, the major rivers cross several national boundaries, which complicates water development.

The Inter Academy Council Report provides useful additional points: 'The implication of water scarcity for much of Africa, especially in semi-arid farming systems, is that more water-efficient farm management systems will be needed. They will incorporate drought-tolerant varieties, choose species with higher water use efficiencies, and use crop and simulation modelling for increased water use efficiency, but they still will not be sufficient . . . Most of the additional investment should not be in classic large-scale irrigation systems. There is considerable potential for capturing rainfall through improved soil surface management practices, small water harvesting systems and small-scale irrigation systems, enabling intensification of farming and crop diversification in inland valleys, and in upland systems using supplementary irrigation of high-value rainfed crops (p. 51).'

The green revolution has shown how important water control is to make high levels of input use profitable. In India new crop varieties and higher input use spread first to those areas with the best water control in the Northwest and South, and moved East and to the Centre later, partly as a consequence of farmer investment in irrigation and drainage, and partly because research has made high-yielding varieties available for dry-land crops. Sub-Saharan Africa is lagging badly in irrigation and drainage—less than seven per cent of crop area in Africa is irrigated, compared to 33 per cent in Asia (Gelb et al 2000). Large-scale irrigation has suffered from unaffordable costs and centralised bureaucratic institutions. While models for changing these institutions into autonomous entities partially or fully controlled by farmers have been successful in some countries (such as Mexico or the Office du Niger), this approach has not yet been replicated elsewhere. Therefore even rehabilitation is often not yet viable. Small-scale irrigation is a more promising option, but investments are constrained by low profitability of agriculture and therefore low investment capacities of farmers. *Thus future development of irrigation capacity is a priority that needs to be carefully planned in the context of increasing competition for water.*

8 Communities, civil society and social capital

In the 1980s the development community woke up to the important role of communities, civil society and social capital, which activists and academics had emphasised much before then. A broad range of NGOs started to sharply criticise donor financed projects, policies and structural adjustment programs (Mallaby 2004). The focus on communities came from two additional sources—sector specialists and social funds. In the 1980s, sector specialists in water supply and natural resource management had begun to involve communities systematically, and found this enhanced project performance significantly (World Bank 1996b). Social funds quickly discovered the power communities had for helping with project design and implementation. In some early funds, NGOs were used as intermediaries to substitute for the presumed lack of capacity at the community level. From letting communities participate in the design, finance, and maintenance of micro-projects, Community-Driven Development (CDD) programs now empower them to choose, design and execute a large range of micro-projects, by transferring both the responsibility and the co-financing resources for these projects to them. IFAD has been a strong champion of this empowerment. At about the same time social scientists discovered the merits of social capital and traditional institutions, and they are now often systematically assessed and integrated into policies and programs (Economic Commission for Africa, 2005 a, b, World Bank 2003b).

Social, local and community funds have greatly expanded across SSA, often as part of externally-financed projects, in particular those of the World Bank. IFAD puts community empowerment centre stage in the projects it finances. A recent review of such projects in the Africa portfolio is Serrano-Berthet (2008). Between 1989 and 2007 the World Bank lent or granted US\$3.5 billion for 102 projects in about 40 SSA

countries. Unlike integrated rural development, these projects have a high rate of satisfactory completion, even though their sustainability ratings are more problematic. From being enclave projects they have become more integrated into the decentralisation architecture of countries and become an important instrument for fostering decentralisation along with community empowerment. Such funds have also been useful in assisting communities to recover in post-conflict and other emergency settings (Ibid). How to adapt them to such settings is discussed in Cliff et al (2003).

While NGOs have become a player in ARD all over Africa their capacity as service providers has been more limited than in South Asia. In low population density countries they tend to concentrate around major cities and find it hard to operate in remote rural areas. Using NGOs as implementers and intermediaries in CDD programs has proved to be costly and has increasingly been abandoned in favour of direct empowerment of communities. NGOs of course remain important facilitators, sources of knowledge, innovators and advocates for change in ARD-relevant sectors.

The donor platform for rural development has made community involvement and community-driven rural development into a central pillar of its agreed strategy, and CAADP principles also include it. Mainstreaming CDD into agricultural strategies is therefore a generally agreed strategy in Africa.

9 Inadequate fiscal and administrative decentralisation

During the late 1980s democratisation in Latin America, and later in other parts of the world, led to the restoration or strengthening of local governments. Another factor was the inability of central states to deliver services in widely heterogeneous environments. But decentralisation was often viewed as a dangerous development because provincial and state governments were perceived to be fiscally irresponsible. Fortunately by the mid 1990s, the negative views on decentralisation had given way to a more balanced assessment. (Faguet 1997, Piriou-Sall 1997, World Bank 1995).

Equal emphasis on political, administrative and fiscal decentralisation is needed. Unsuccessful decentralisation programs are almost always characterised by inadequate allocation of fiscal resources to the local level (Manor 1999, Shah 1994). Successful decentralisation is often pursued by strong leaders in relatively strong states, and emphasises accountability at all levels (Manor 1999). Local governments can, of course, become an instrument for elite capture and corruption. To prevent this, they must be democratic institutions, but in itself this is not enough. Without strong communities and civil society, and a strong private sector, local governments will not be subject to the scrutiny and the bargaining processes needed to make local development inclusive and efficient.

In the early 1990s the World Bank first discovered the power of local governments in its CDD programs in Mexico (World Bank 1991b), and later in North-East Brazil. The innovation spread from there to Indonesia and East Asia, then to Africa and the rest of the world. Social funds started to build the capacity of local governments, and entrust them with coordination and implementation of some functions. Eventually the distinction between CDD and social funds disappeared. A research program on Decentralization, Fiscal Systems and Rural Development in the mid 1990s strengthened understanding of this nexus of issues (McLean et al 1998, Piriou-Sall 1998). It analysed the level of decentralisation of rural service delivery in 19 countries (or provinces thereof) across the world. Four African countries had the lowest scores, while Jianxi province in China had the highest. Latin American countries scored in the upper half, while Karnataka state of India ranked ninth and Punjab, Pakistan thirteenth. The recent Governance Report of the Economic Commission for Africa (2005) shows that not much progress has been made in the past decade and a half. Decentralisation, along with corruption, still receives some of the lowest scores of a series of governance indicators studied in 28 African countries.

In most OECD countries and in high-performing China, local governments perform functions in education, health, social protection, environment, agriculture, land, local and community infrastructure, and promotion of private sector development. Local governments take a multi-sector approach, even though their coordination capacity is always imperfect. There are powerful reasons for using the lowest level of local

government for coordinating and executing rural development. At the local level people have direct knowledge of local conditions and transparency is relatively easy to achieve because people can often verify the result of expenditures first hand. Empowered and properly resourced local governments can mobilise latent capacities in communities and at the local level. And finally, local governments exist in remote areas where neither NGOs nor the private sector usually operate.

Most countries in SSA have decentralisation initiatives underway. But with few exceptions, such as Uganda, administrative and fiscal decentralisation lags badly behind. Australia should ensure that in supporting agricultural and rural development strategies it also furthers the decentralisation agenda, including by encouraging central sector institutions to adapt support to local governments and communities.

6. Key partners

This section covers selected important partners for ARD and food security in Africa that AusAID could collaborate with in expanding its program. Not included are some important global players with which AusAID is already collaborating, including the FAO, WFP, UNDP, UNICEF, the WHO and UNAIDS. Also not included are the Global Conventions on topics such as biodiversity, desertification and climate change, although many African ARD and food security programs subscribe to them. The discussion of key partners is limited to their broad involvement in Africa, and not based on an up-to-date analysis of their current programs and priorities. The CGIAR, the Forum for Agricultural Research in Africa (FARA) and the SROs have already been discussed in the technology section of this paper.

1 Advocacy and technical partners

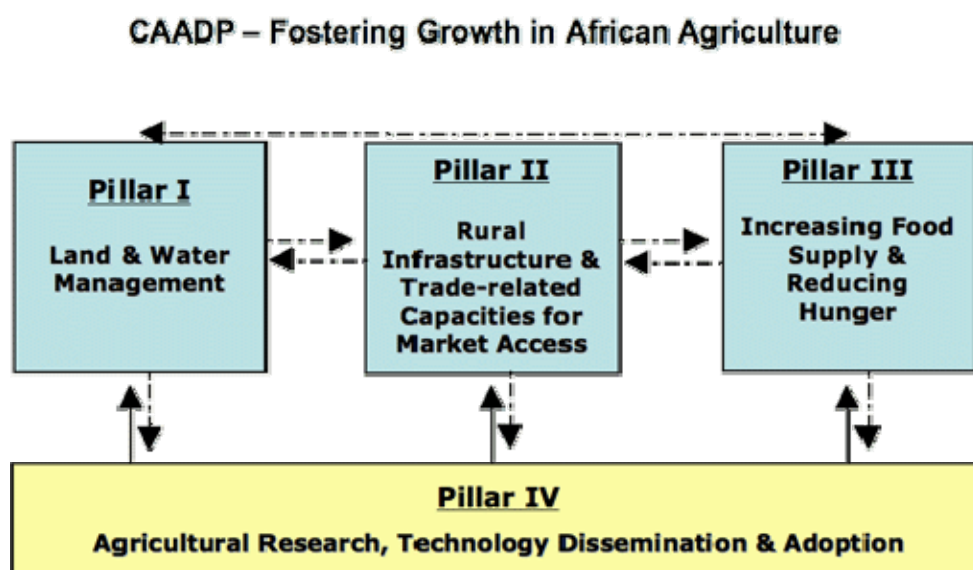
Comprehensive Africa Agriculture Development Programme

The CAADP of the AU is the most ambitious and comprehensive agricultural reform effort ever undertaken in the continent. It addresses policy and capacity issues across the agricultural sector and the continent and is a valuable mechanism for reducing hunger and poverty.

The African Union and the NEPAD launched CAADP to drive agricultural growth. African politicians have committed to significantly increase the share of national budgets allocated to agriculture, in compliance with the Maputo Declaration, to at least ten per cent. Within this framework an AU vision on agriculture has emerged on what should be achieved by 2015:

- improved productivity to attain an average annual production growth rate of six per cent, with particular attention to small-scale farmers, especially women
- dynamic agricultural markets within countries and between regions
- integrated farmers into the market economy and have improved access to markets to become a net exporter of agricultural products taking into account Africa's comparative and competitive advantage
- a more equitable distribution of wealth as a result of rising real incomes and relative wealth for rural populations through more equitable access to land, physical and financial resources, and the knowledge, information and technology for sustainable development
- become a strategic player in agricultural science and technology development to meet the growing needs and demands of African agricultural development
- practise environmentally-sound production methods and have a culture of sustainable management of the natural resource base through increased knowledge, information and technology application.

Four pillars constitute the core activity fields for implementing the CAADP, as outlined in this chart.



Pillar 4: Agricultural research, technology dissemination and adoption

Pillar 4 aims for an enhanced rate of adoption of new technologies to increase productivity (through better delivery systems and mechanisms that reduce the costs and risk of adoption), as well as increased ability of research systems to generate and adapt new knowledge and technology. The FARA is leading in the implementation of CAADP Pillar 4 and has developed a strategic document—the Framework for African Agricultural Productivity (FAAP)—setting out the principles and orientations for agricultural research and extension in the near future. It also aims to make research more relevant and establish the capacity to implement an integrated agricultural research approach, ensuring that researchers work together with smallholders, pastoralists, extension agencies, the private sector and NGOs to improve impact on the ground.

Although the CAADP is continental in scope, the implementation of the common framework it provides with all its key principles and targets has to be convened by the Regional Economic Communities and thereafter in each country where it has to be transformed into country strategies and investment programs. At country level this is a two-part process.

One part of the process is about stock-taking and planning at country level through creating Country CAADP Round Tables or Implementation Platforms. The second part concentrates on building partnerships and alliances between key actors under the leadership of national governments.

The final outcomes of the round tables are the CAADP Compacts. These guide implementation in the long term. Rwanda was the first country to complete a CAADP compact in 2007. Six countries were planning to hold CAADP roundtable meetings in the first half of 2008.

RECs are the building blocks for Africa's economic integration into the framework of the African Union. They play an increasingly important role in the harmonisation and implementation of agricultural policies, particularly with respect to the agricultural and food security aspects of regional integration and trade and market development. Regional agricultural policies and development program have been developed furthest in the ECOWAS and COMESA regions which together represent about 40 African countries.

So far the CAADP has been a relatively cumbersome consensus building and advocacy process. However, as shown earlier in Figure 2, its country process has now gathered considerable momentum, and has the buy in of all major bilateral and multilateral donors. As discussed earlier, the resulting CAADP Compacts require further work to be translated into fundable ARD strategies and programs. For this purpose a CAADP Trust Fund has been established at the World Bank to help countries serious about moving forward prepare the

necessary programs in collaboration with major donors. *The CAADP processes should be the main entry point for Australia's country dialogue on ARD strategies and programs. Australia will not need to finance CAADP institutions. Instead, co-financing the CAADP Trust Fund and the resulting national ARD programs would come from associated funding mechanisms.*

2 Global Donor Platform for Rural Development

Current members of the Global Donor Platform for Rural Development include the German Federal Ministry for Economic Cooperation and Development (which also hosts the secretariat in Berlin), the Canadian International Development Agency, the DFID, the Directorate-General for Development of the European Commission, the FAO, the French Ministry of Foreign and European Affairs, the Swiss Development Cooperation, the United States Agency for International Cooperation and the World Bank. There are also 22 associated member organisations.

The platform's goal is to reduce poverty and promote economic growth in rural areas in developing countries. Bilateral and multilateral development agencies are united in a coordinated endeavour to get the rural development agenda right, in line with the Paris Declaration on Aid Effectiveness (2005) and the Rome Declaration on Harmonisation (2003). It seeks to enhance coordination, communication and shared learning between all development partners by: (i) formulating common donor policies; (ii) reducing the duplication of effort and improving mutual understanding between all development partners; (iii) advising how harmonisation and alignment can make agriculture and rural development initiatives more effective; and (iv) aligning donor coordination and alignment to African Countries Strategies with respect to the CAADP.

Activities include advocacy and outreach, shared learning and promoting aid effectiveness on the ground (e.g. in Burkina Faso). The platform supported the elaboration on and dissemination of the WDR. It has also elaborated on a joint donor concept on rural development, a code of conduct for agricultural and rural development and policy briefs on hot topics. *Australia should become a member of the platform.*

Economic Commission for Africa

The ECA has a broad analytical and advocacy program on all issues pertaining to economic growth and development in Africa. It issues annual reports on African economic development and specialised reports on topics ranging from governance to economic integration, the environment and HIV/AIDS. It has recently revived its statistics division. In its superb facilities in Addis Ababa the ECA hosts conferences and platforms for scholars, civil society and decisions makers in Africa. *Australia can collaborate with the ECA in advocacy, analysis and consensus building for ARD and food security.*

Regional offices of the Food and Agriculture Organization of the United Nations

The largest regional office of the FAO is in Accra, Ghana, to which the FARA office is affiliated. The second largest is in Harare, Zimbabwe. The regional offices include a wide range of technical experts and participate in the implementation of the FAO's programs and programs of collaborators all over the region.

3 Multilateral lending and grant-making institutions

The African Development Bank

The AfDB is a regional, multi-sectoral lending institution. Its primary objective is to promote sustainable economic growth to reduce poverty in Africa (Annual Report, 2006). Total bank loan and grant approvals have increased steadily over the past decade from under US\$2 billion annually to more than US\$3 billion in 2006.

Agricultural operations made up a high 32 per cent of approvals in 1985–88 but declined to 19 per cent in 1989–97 (Agriculture and Rural Development Sector, Bank Group Policy Paper–OCOD January 2000). They have further declined since. In 2006, ARD loans and grants totalled US\$362 million and made up slightly more than 10 per cent of total loan and grant approvals of US\$3,472 million (Annual Report, 2006). The Strategic Plan for 2003–2007 says that within the broad focus of reducing rural poverty, the bank will focus on adoption of modern technology, diversification of production systems, efficient management of natural resources and improvement of productivity of farm and non-farm activities. It will take a leadership role in the development of rural financial services and will support bank-wide efforts in rural infrastructure and water (AfDB 2002). The most recent document is a Draft-Agric-Sector-Strategy (AfDB 2007a) which concludes that while progress has been made, the bank's efforts have been too focused on production aspects '... with virtually no backward and forward linkages.' Specifically identified weaknesses are agribusiness development, limited private sector engagement and partnerships. The new Sector Strategy is selective and focused more on agriculture than broad rural development issues. It would see the Department of Agriculture and Agro-Industry's (OSAN) (AfDB Group) interventions, in partnership with the private sector where possible, largely concentrated in these key areas: 1. support to rural infrastructure; 2. crop production productivity growth; 3. agro-industry development; 4. livestock production; 5. natural resource management—particularly land, water, fish and forest resources; and 6. climate change adaptation. Efforts would '... contribute to the Bank's vision of poverty reduction through increased agricultural production and productivity, efficient marketing and expanded trade in its (RMCs), thereby increasing farm incomes and the welfare of rural populations in general, and agricultural produces and enterprises in particular' (p. 7).

In response to the food crisis, the AfDB recently held a major conference on agriculture and rural development during which it articulated a broader vision for the ARD and pressed for improved donor coordination in ARD strategies and financial support. Even within the confines of the strategies developed so far, there are important additional opportunities for the AfDB to assist the ARD by improving rural infrastructure, the road infrastructure connecting landlocked countries to the sea, agricultural technology, and in strengthening regional and sub-regional institutions. *In further developing its own ARD strategy the bank will have to address whether the strategy and its planned magnitude will be in line with its intended focus on poverty reduction and the magnitude of the current food crisis. To fully understand all options for collaboration under the new strategy, Australia will need to maintain close communications with the bank.*

International Fund for Agricultural Development

Australia withdrew its support to the IFAD six years ago. In the meantime the fund has embarked on a broad-base reform program. It therefore may be worthwhile for AusAID to review the fund's progress to determine if it is worthwhile to re-engage.

Since 1992, the IFAD's annual loan and grant operations have slowly increased from US\$300million to more than US\$500 million in 2005 and 2006. It is a small, tightly focused global organisation less than one fifth the size of the AfDB. IFAD's overarching goal is that rural women and men in developing countries are empowered to achieve higher incomes and improved food security at the household level ... IFAD aims to ensure that, at the national level, poor rural men and women have better and sustainable access to, and have developed the skills and organisation they require to take advantage of (a) Natural resources (land and water);

(b) Improved agricultural technologies and effective production services; (c) A broad range of financial services; (d) Transparent and competitive agricultural input and produce markets; (e) Opportunities for rural off-farm employment and enterprise development; and (f) Local and national policy and programming processes, in which they participate effectively.'

To realise these objectives, the IFAD applies a set of principles of engagement to its programs, including: *Selectivity and focus*. 'IFAD ... will not work outside rural areas. It will not target the non-poor. It is not mandated to respond directly to emergencies and provide relief. IFAD will finance social service delivery—local water supplies, health and education facilities—only in response to the defined needs of local communities, where the facilities are limited in scope and critical for the achievement of project objectives, and where other financing sources are not available. IFAD's expertise is specific to the rural sector: it will engage in policy dialogue only in the areas of its competence, and it will not use general budget support as a means for disbursing its resources...' and *Targeting*. '... Its target group is made up of extremely poor rural people who have the capacity to take advantage of the economic opportunities offered by IFAD engagement ... All elements of IFAD's country programmes will be expected to be innovative. Yet innovation without scaling up is of little value.' (Strategic Framework for IFAD 2007–2010).

The IFAD has also produced several policy papers including on Rural Finance (2004), SWAP's (2006), Supervision and Implementation Policy (2007b) and Knowledge Management (2007c). The Private Sector Development and Partnership Strategy/Policy (2007 d) contains a very wide and innovative definition of the rural private sector: 'IFAD's direct target group is the rural poor, who tend to be concentrated at the smaller end of the private-sector continuum. This group is considered part of the private sector because, in essence, it comprises agro- or rural-based micro-entrepreneurs who make their own economic decisions regarding what to produce and how to produce it, what to buy and sell, who to buy from and sell to, how much to buy or sell, and when' (p. 6).

In sum the IFAD has a highly focused, selective and well-articulated vision and strategy as to what they will and will not do. And it has translated these into appropriate policies in a number of areas. *The IFAD is therefore exceptionally well positioned to take advantage of the improving African and international environment on behalf of its well-defined client group, and could be good partner for Australia, especially in reaching small farmers.*

World Bank

The World Bank is trying to climb back from a steep decline in lending and grant-making activities to improve ARD and food security in Africa. From an annual baseline funding of US\$450 million in 2006–08, the World Bank hopes to reach US\$1,420 million by financial year 2010. While it still has high-quality staff in this area, their numbers fall very short of what it needs. The bank will have to rebuild its capacity.

In Africa, the World Bank is pursuing a strategy of supporting countries willing to invest in their own agricultural development through significant funding of home-grown agricultural and rural development strategies. These will be anchored in the CAADP country roundtable process. The main gap in analytical work is up-to-date agricultural public expenditure reviews. Only four countries currently have them (Ethiopia, Niger, Nigeria and Uganda), and only four have them in their current work programs with the World Bank (Ghana, Mali, Mozambique and Zambia). Both staff resources and financial resources to carry out these reviews are scarce.

As part of its African operations, the World Bank houses several trust funds already mentioned in this paper that are of potential interest as funding channels for Australian support to African agriculture—the CGIAR, the CAADP trust fund for preparing national ARD strategies and programs and the Trust Fund for Statistical Capacity Building. *Collaborating with the World Bank within the CAADP framework and the Global Donor Platform for Rural Development is an excellent opportunity for Australia.*

European Union

The EU and its member countries are one of the most important external funding sources for Africa. The Africa-EU Strategic Partnership, A joint Africa-EU strategy, was endorsed by the Africa-EU Ministerial Troika at the meeting held on 31 October 2007. Strategic priorities include peace and security, governance and human rights, trade and regional integration, and accelerating progress towards the MDGs. The strategy's section on agriculture and food security states:

'In the area of agriculture, Africa and the EU will promote policy coherence for, development, food security, food safety and food quality, strengthen farmer organisations and inter-professional associations; improve policy and strategy development processes; increase domestic and foreign investment; promote diversification in rural areas; strengthen livestock disease surveillance and control systems, including through fighting against the avian flu; promote risk management approaches and the use of early-warning systems; strengthen capacity vis-à-vis regional and international trade and SPS standards, promote institutional reforms, strengthen agricultural research for development and make the best use of the opportunities opened up by advances in biotechnology.

'A new EU-AU partnership on agricultural development will support Africa's agricultural agenda, as set out in the Comprehensive Africa Agricultural Development Programme (CAADP). This includes putting emphasis on improved governance of agriculture and supporting capacity-building on the part of African public and private organisations involved in agriculture, particularly at regional and continental level. It also includes a strong engagement in Africa's agricultural research for development agenda as coordinated by the Forum for Agricultural Research in Africa (FARA).' *The options for collaboration with Australia are obvious.*

4 Alliance for a Green Revolution in Africa

AGRA, chaired by Kofi Annan, the past Secretary General of the UN, is an African-led partnership that helps small-scale farmers and their families lift themselves out of poverty and hunger. The alliance's programs aim to develop practical solutions to significantly boost farm productivity and incomes for the poor while safeguarding the environment. AGRA advocates for policies that support its work across all key aspects of the African agricultural value chain—from seeds, soil health, and water, to markets and agricultural education. AGRA, with initial support from the Rockefeller Foundation and the Bill & Melinda Gates Foundation, maintains offices in Nairobi, Kenya and Accra, Ghana. The alliance responds to and strongly endorses the African Union's CAADP.

An important AGRA initiative is the development of new crop varieties that can withstand pests and disease; cope with drought, marginal soils and other environmental stresses; and dramatically increase farmers' yields. AGRA's goal is to develop 1000 new varieties as rapidly as possible, using conventional breeding and participatory methods in which plant breeders work closely with farmers to develop varieties with the traits farmers need. AGRA is not at this time funding the development of new varieties through the use of genetic engineering.

As part of its focus on plant breeding, AGRA is also sponsoring the education of several hundred plant breeders.

AGRA's first collaborations, launched in 2006, focus on developing more productive and resilient varieties of Africa's major food crops. In 2006, AGRA also initiated programs that support agricultural education in Africa and monitor and evaluate all of its work. In 2007, AGRA launched a program to improve the health of Africa's soils, now the most depleted in the world. This year the alliance will launch a water management initiative to help Africa's small-scale farmers get the most 'crop for each drop'. Next year AGRA will start addressing major challenges in off-farm systems and markets, including improvements to crop storage, finance systems, market information and transport systems. The alliance will also advocate for policies that support small-scale farmers, including those that promote rural development and environmental sustainability and address trade and tariffs.

AGRA will seek to attract a large, diverse group of donors and other partners to develop a donor pool sufficient to provide the significant resources needed to revitalise African small farmer agriculture. AGRA has made grants for agro-dealer development in Kenya, Malawi, Mali, Nigeria, Tanzania and Zambia; for education in African crop improvement in Ghana, South Africa, Uganda, and SSA (at Cornell University); for the improvement and adoption of African crops in Ethiopia, Ghana, Kenya, Malawi, Mali, South Africa, Tanzania, Uganda and SSA; and for seed production in 12 countries and SSA.

AGRA is a new organisation and its work has not yet been evaluated. Nevertheless, its high political profile, its focus on plant breeding at the adaptive end, and on education of plant scientists, make it an interesting potential partner that should be investigated by AusAID.

5 Institutions involved in agricultural statistics

Over the past decade, the institutions and initiatives for statistical development have multiplied enormously. The full landscape is in Annex 3. While few institutions deal directly with the FANRS, most have a strong bearing on them. The FAO is the responsible UN Agency for Food and Agricultural Statistics, as well as data on a number of natural resources including soils, forests and fisheries. The FAO is carrying out an ambitious plan to reorganise the way it manages the statistics and unifies the many databases it maintains for easier accessibility. The organisation is also the secretariat of regional agricultural statistics commissions, most importantly the AFCAS. The FAO and AFCAS therefore sit at the centre of a network of organisations and programs that are relevant for FANRS in Africa. Of all the institutions only the Task Team on Agricultural Statistics of the PARIS21 Initiative and the Agricultural Statistical Committee of the International Statistical Institute deal specifically with agricultural statistics.

African Commission for Agricultural Statistics

Every two years, the AFCAS brings together the agricultural statisticians of Africa and their counterparts in national statistical Offices. It is the policy making body and training focus for much of what has happened in the area and has been driving the new vision for FANRS discussed in this paper.

Paris21

The *Partnership in Statistics for the 21st Century (Paris 21)* was set up by the international community at the OECD in Paris in 1999. The PARIS21 consortium is owned by more than 300 members including policy makers and statisticians, international organisations, professional bodies and academic institutions from donor and developing countries. PARIS21 focuses on encouraging all low-income countries to design NSDSs and to have nationally owned and produced data for all MDG indicators by 2010. It has developed guidelines for developing national strategies and integrating sector statistics into them. These are then published.

The Rural and Agricultural Statistics task team of PARIS21 advocates for greater visibility of FARS within the overall national statistics system. The team, convened by the FAO, works on mobilising resources; exchanging innovative experiences and practices; cost-effective methodologies; and promoting stakeholder coordination. In 2003, the team prepared an Interim Regional Project Proposal for 'Strengthening Agricultural Statistics for Poverty Reduction and Food Security in Rural Africa', which was approved by the World Bank Trust Fund for Statistical Capacity Building. In collaboration with the IFAD, the FAO and with the financial support of the French Ministry of Foreign Affairs, the team has been carrying out a project supporting agricultural statistical development in Africa. For example, in December 2007 they held a workshop in Tunis in the run-up to the AFCAS meeting to discuss integrating agricultural statistics into the NSDS.

The ASC of the ISI was originally set up to improve the representation of agricultural statisticians in the institute. The ICAS meets biannually, and last met in Beijing in 2004. Its most worthwhile proceedings are

published on its website. The ASC is planning to prepare a new consensus vision on the future development of the FANRS.

Training for statisticians in Africa is provided by academic institutions and five sub-regional training centres, namely: the Institute of Statistics and Applied Economics, Uganda; the Eastern Africa Statistical Training Centre Tanzania; Ecole Nationale Supérieure de Statistique et d'Economie Appliquée, Côte d'Ivoire; Institut Sous-Régional de Statistique et d'Economie Appliquée, Cameroon; and Ecole Nationale d'Economie Appliquée, Senegal. Statisticians also train in developed countries universities and in specialised institutions which are particularly strong and involved in France and the United Kingdom.

Funders for statistical development

The most important funders of statistical capacity building in Africa are the AfDB, the World Bank and the IMF, as well as the EU, the United Kingdom, France and other bilateral donors. These donors provide resources to the TFSCB managed by the World Bank and to other funding vehicles and directly to institutions and initiatives. The World Bank's STATCAP facility provides loan and grant resources from IBRD and IDA for national statistical development programs. These funding agencies also provide training and support to training in Africa in various ways. The AfDB coordinates the Africa component of the International Comparison Program (ICP–Africa) that focuses on capacity building for monitoring the MDGs and the Poverty Reduction Strategy Processes. The IMF developed the General Data Dissemination System (GDDS) that is built around four dimensions—data characteristics, quality, access and integrity—and is intended to provide guidance on the overall development of macroeconomic, financial and socio-demographic data. Forty SSA countries adhere to the GDDS and associated data standards, and received capacity-development supports. France and the United Kingdom are the most active bilateral partners in statistical capacity development, using various academic and specialised training institutions and initiatives. *There are, however, no donors that focus specifically on FANRS in Africa. This is a gap Australia could close.*

7. Funding options for Australia

This section does not present a plan or scenarios for expanding the Australian program in support of ARD and food security, nor provide details on how to implement these funding options at global or national levels. Instead it provides a set of options that should be further studied.

This paper suggests that Australia's increased funding for ARD and Food Security in Africa should specialise and deal with only two broad areas and some supporting functions. The two broad areas are: (1) the development of national home grown ARD and food security programs that are co-financed by an increasing share of domestic resources and a reducing share of donor co-financing resources; (2) support to closing the growing technology gap of African agriculture at the supranational level (support at the national level should be provided through national ARD strategies).

Given that it is a relatively small donor, Australia should evaluate whether to support ARD and food security across SSA, or concentrate on Eastern and Southern Africa. In favour of a continent-wide strategy is the fact that in technology generation, a number of scientific and educational challenges are continent-wide. In addition, if country commitment is a key criterion for support, the funding should follow such commitment wherever it comes from. In favour of sub-regional concentration is first that Australia is a relatively small donor and regional concentration would be part of sharper specialisation. Second, poverty and hunger are the deepest in East and Central Africa (plus the Democratic Republic of the Congo), and it is also in this region that the HIV/AIDS crisis presents the greatest challenge. Finally, collaborating with African specialists is easier in these generally English-speaking countries. *Australia should urgently consider the question of a regional versus sub-regional concentration.*

1 Mitigating the negative impact of the current food crisis

To help mitigate the impact of the current food crisis on poverty and hunger in Africa, Australia will have to act fast and in concert with other ongoing programs. Helping finance the WFP food purchases is an obvious option. The other major option is to co-finance the new World Bank GFRP, which will shortly provide support to 15 African countries. GFRP components are to: (1) reduce the negative impact of high and volatile food prices on the lives of the poor in a timely manner; (2) support governments in the design of sustainable policies that mitigate the adverse impacts of high and volatile food prices on poverty; (3) support broad-based growth in productivity and market participation in agriculture to ensure an adequate supply response as part of a sustained improvement in food supply. In Africa, 15 countries are expected to benefit shortly.

National African Agriculture and Rural Development and the Food Security Strategies and Program

These programs are expected to emerge from the CAADP Compacts requiring further country-led work to be transformed into fundable programs. Country leadership and co-finance should be a key criterion in evaluating the seriousness of a country in reducing rural poverty and addressing food security needs. All donors, including Australia, should encourage and insist on such strong country leadership as a condition for financial engagement.

Through co-financing national program preparation and funding, Australia would have the opportunity to provide broad-based support to ARD and food security by way of a full range of interventions including policy and institutional reform; rural infrastructure, in particular into rural roads, water supply and irrigation; national institutional capacities in agricultural research, agricultural and veterinary education, phytosanitary

management, agricultural policy; farmers organisations and small farmer services in agricultural extension, rural finance, marketing, and input supply; and rural safety nets. Specific technical support in any of these areas could be provided through the Australian Consultant Trust Fund proposed below.

In terms of monitoring and impact evaluation, the proposed approach presents advantages and disadvantages for Australia. The advantage is that strong national programs will be undoubtedly made conditional by the donors on strong monitoring and impact evaluation. The disadvantage is it will be difficult to identify specific sub-programs supported by AusAID to which highly specific impacts can be linked.

Co-financing to the Comprehensive African Agricultural Development Program Trust Fund

This Multi-donor Trust Fund, managed by the World Bank, is an obvious candidate for support. It helps countries and their development partners create national CAADP Compacts and subsequently national ARD and Food Security Strategies and Programs. In doing so, it helps all countries and development partners which do not have the capacities, skills and financing needed to accomplish these tasks. The momentum created by the WDR 2008 and the CAADP will be lost unless ample resources are made available through this fund.

Co-financing of the resulting national programs

These national programs will deal with policy and program reforms in support of agricultural growth, all the smallholder services that are needed for broad-based agricultural growth, with Agricultural Research and Education, with improvements in agricultural infrastructure, including irrigation, and with the resolution of the other constraints discussed in the section on these constraints. *Australia should discuss with the other donors committed to budget support and basket funding (World Bank, AfDB, IFAD, the EU, DFID...but not USAID), on the modalities of such co-finance. The Donor Platform for Rural Development is a good place to carry out these discussions.*

Financing of a special window for Food, Agriculture and Natural Resource Statistics in the Trust Fund for Statistical Capacity Building

Such an initiative could complement proposed Bill & Melinda Gates Foundation Support to FANRS capacity building by providing resources for the preparation of program components at national level which could then be included through national ARD programs. The Trust Fund is a demand-driven funding vehicle that supports countries committed to upgrading their statistical systems. It does not try to help build statistical systems everywhere.

Focusing on agricultural statistics would have several monitorable benefits for Australia. Better data would improve decision-making on food and agriculture at the national level. It is an essential component of improved monitoring and evaluation systems for agricultural and food programs. The outputs of Australian support are easily measurable, and the impacts could be measured through special research studies. These outputs and impacts could then be directly linked to Australian funding.

2 Closing the technology gap of African Agricultural Research

Increase funding for plant genetic improvement, including biotechnology in the Consultative Group for International Agricultural Research

Rates of return to agricultural research in Africa have been almost as high as in other regions. And well above 25 per cent of the cropped area now benefits from improved varieties and hybrid seeds. However, gains associated with high-yielding varieties is much less than in other regions, owing to the heterogeneity of agriculture, inadequate input and output markets, poor smallholder services and poor infrastructure. As a consequence the use of irrigation, fertilisers and pesticides is much less than in other regions, sharply limiting yield gains.

Despite the much higher need for agricultural research, Africa invests significantly less in this area than other regions and limited research resources seem to have been increasingly misallocated. Given the heterogeneity of African agriculture, the poor borrowing opportunities, and the enormous challenges from pest, diseases and water stress, basic innovations at the science level are urgently needed for a wide variety of crops and livestock diseases. Yet the proportion of research going to basic sciences has been declining in national and international research systems. They have instead gone to agronomic and farming systems and environmental research that has little record of high rates of return. While Africa has created not less than four regional centres for biotechnology, these remain severely under-funded. The blame may lie primarily with donors impatient for immediate results, or distracted by donor priorities. Despite their commitments to the CAADP agricultural priorities, national governments have also not significantly increased funding for agricultural research in general or in biotechnology in particular.

There is a strong body of opinion, most recently articulated by the 2005 Inter Academy Council study of African Agriculture, that integrated soil fertility and water management represent more constraining factors on improvements in agricultural productivity than crop genetics resources, especially in food staples. Additionally, poor seed systems in Africa mean that improved genetic material often does not move into farmers' fields or impact on development outcomes. This report takes the position that these serious constraints are not caused by lack of research but rather reflect the: past poor incentives in Africa for agricultural investments in general and for soil fertility enhancement using fertilisers and organic matter in particular; poor agricultural inputs and outputs markets combined with grossly inadequate small farmer support systems; and adverse, (but declining) government interventions in seed development and distribution systems. Remedying these constraints depends on the design and implementation of the home-grown ARD and food security strategies discussed in the last section. These areas need policy change, government investments, and rapid private sector development—more agronomic, farming systems and environmental research can play only a supplementary role.

Closing the technology gap, starting at the science end is therefore the most important issue for African agriculture. For plant genetic resources, there is some relief in sight. AGRA intends to fund the training of 1000 plant breeders. However, unless they can be posted in better-funded institutions, the best will be lost to emigration. Private sector technology research has grown considerably, albeit less than in Asia and Latin America. However, unless the science base improves, gains from conventional breeding in the public and private sectors may be insufficient to close the growing technology divide. The Bill & Melinda Gates Foundation, a founding member of AGRA, has also invested in basic research in a number of crops, but given the enormous needs, funding remains inadequate. There is little hope that the crisis of the growing technology divide will be solved quickly, unless African governments muster the political will to sharply increase funding.

Four options for channelling the funds are feasible:

1. Co-financing the Generations Challenge Program and as core support to the CGIAR institutions involved in this type of research operating in Africa

While the CGIAR has a very good monitoring and impact evaluation capacity, the proposed funding options will not provide opportunities to link specific scientific breakthroughs to AusAID support.

2. Co-financing the Competitive Research Grants Programs of the SROs

The EU has been in the lead of developing and financing these competitive grant programs. They are relatively small, but functioning very well in ASARECA and CORAF, and not yet set up for Southern Africa. Australia could help expand these supranational programs that cannot be financed by other development partners such as the World Bank whose instruments are more suited to the national level.

The impact evaluation opportunities and challenges are the same as for support to the CGIAR

3. Co-financing initiatives to strengthen agricultural education and agricultural science education

I have not been able to review all the organisations now becoming more interested in agricultural education and agricultural science education, but know that AGRA and USAID are involved. AusAID would need to review how to engage in this area. Ideas could include a scholarship program or the twinning arrangement discussed in section 6.12, or possible Centres of Excellence with Australian institutions, a practice that has worked well in the past.

Monitoring and evaluating the impact of support in this area would require special arrangements that should be included in the financing by Australia, and supported by Australian scholars.

4. Supporting financing: A trust fund to finance Australian consultants/scholars

Australia has a great deal of economic and scientific skills to offer. It also has a tradition of intense Australian involvement in its bilateral aid programs. While such heavy involvement is neither desirable nor appropriate within this proposed strategy, more limited involvement would bring benefits to African countries and Australia. It would also help to strengthen political commitment in Australia to the expanded aid program for Africa.

A demand-driven trust fund should finance Australian experts, across a broad range of areas, to enable an expansion of Australia's ARD and food security program in Africa. Areas of expertise could include biotechnology, plant breeding, agricultural and agricultural science education, policy research (including in regional integration), dryland tropical farming systems, FANR statistics, monitoring and evaluation, and rigorous impact evaluation.

The trust fund could be modelled on Consultant Trust Funds managed by the World Bank, or incorporated as a special window into the CAADP Trust Fund managed by the World Bank. An issue to be considered is whether such a trust fund should also support involvement of top African experts.

Monitoring of outputs and impacts would be feasible for larger support intervention that would be financed by the trust fund, but would also have to be specially designed and supported.

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Annex 2: Proposed criteria for the assessment of effectiveness of Australian support

This section briefly summarises the criteria that should be used to judge the effectiveness of future support to African ARD and food security by Australia. These come directly from the analysis in this paper and the reasons are stated in brackets:

With respect to the ‘what’

1. Results in greater commitments to and national or regional African funding of ARD and food security programs (because such commitment is still more in words than in deeds, and because of the growing fiscal space of African countries out of which they could finance ARD):
 - a. More specifically, results in the preparation, funding and implementation of broad ARD programs.
 - b. Provides the improved FARNS necessary to plan and monitor and evaluate these programs.
2. Leads to the measurable reduction in the alarmingly growing technology divide (because it is the single most important threat to agricultural growth in Africa, and because it is needed to deal not only with agricultural growth but also with Climate Change):
 - a. Leads to the resolution of key biological stressors in plants and animals (because Africa has the greatest number of crops and environments with which it has to deal, because it has fewer borrowing opportunities than other regions of the world, because this is where proven returns to research are the highest, and because the CGIAR and its donors have increasingly diluted their efforts in this area).
 - b. Results in sharply improved agricultural and agricultural science education (because capacity in this area has deteriorated so massively and because few donors are willing to work in this area).

With respect to the ‘how’

3. Results in the enhancement of sustainable national and regional human and institutional capacities (because human and institutional capacities are key to sustainability).
4. Ensures that programs are properly monitored and include impact-evaluation components (because only that way can these programs be evaluated and continuously adapted based on evidence).
5. Is provided as general or earmarked budget support or basket funding, rather than project funding (because otherwise Australian support would add to the enormous costs of donor fragmentation and poor donor behaviour).
6. Is used transparently and cost-effectively (to contribute to improved governance in the recipient countries, and to account to Australian tax payers).
7. Appropriately and cost-effectively involves Australian scientific and other human capacities in Africa’s ARD (because Australia has much to offer and because it will improve commitment to Australia’s ARD aid program in Africa)

Annex 3: Economic and agricultural growth: their sources and their constraints

This Annex first summarizes the key findings of the report on 'Challenges of Economic Growth in Africa' (Ndulu et al 2007). The report is based on an impressive body of SSA growth research. This section includes additional information on North Africa and information from other sources. It then looks at the contributions agricultural growth can make to economic development.

Growth in 41 SSA countries for which data for the full, 45-year-period is available was only 0.5 per cent, compared to 3 per cent in 57 countries in the rest of the developing regions, including North Africa. Growth performance has been quite diverse: Six of 47 SSA countries more than tripled their per capita incomes between 1960 and 2005; nine have per capita incomes at the same level where they started or below; and the remaining 32 have seen modest growth in per capita income, but not enough to make a significant dent into poverty. As a consequence the number of middle income countries has risen from 2 in 1960 (Mauritius and South Africa) to 13 in the region in 2005. Seven of these acquired their middle-income status largely because of mineral wealth.

The prolonged period of economic decline between 1975 and 1994 started with shocks to energy and tropical commodity markets and ended with a wave of democratic reforms between 1989 and 1994. During 1994–2004 there was more rapid per capita income growth—20 countries grew more rapidly than the average of the rest of the developing world. New entry into this high-growth club was associated either with natural resource exploitation (Angola, Chad, Equatorial Guinea and Sudan), or with strong reform movements (Benin, Ethiopia, Ghana, Mali, Malawi, Mozambique, Senegal and Tanzania). Economic growth further accelerated in all of Africa between 2004 and 2006, fuelled by strong global economic growth and higher raw material and energy prices (ECA 2007). Since 2003, economic growth rates have averaged 6.5 per cent, more than 4 per cent above the population growth rate. Between 2001 and 2006 agricultural value added grew at 3.6 per cent, also well above the population growth rate. The only sub-region that is not participating is West Africa, where growth slowed from 5.4 per cent in 2005 to 4.6 in 2006 (ECA 2007), perhaps associated with higher oil prices and the appreciation of the FCFA. The likely slowdown in global growth could of course threaten these gains.

Over the long haul, slightly less than one half of the lower growth in Africa relative to the rest of the developing world is associated with lower growth of physical capital, and slightly more than half with lower productivity growth. The share of investment in GDP has been only about half as high as elsewhere, and for given investment, Africa has only achieved about two thirds of the productivity growth. To understand the 'why' Ndulu et al. looked at constraints to investment incentives and returns to investment, or conversely to what sources of growth could be activated.

Poor resource endowments are a major negative factor: The more than 90 per cent of SSA that lies between the tropics suffer from much higher incidences of diseases that impact negatively on life expectancy, human capital and labour force participation. This compares to 3 per cent of OECD countries and 60 per cent for East Asia. SSA has 48 small economies with a median income of only US\$3 billion. Forty per cent of the population lives in landlocked countries, as against only 7.5 per cent in other developing countries, and none in North Africa. This combines with a road density of only 0.13 kilometres per square kilometre, versus 0.41 kilometres in other developing countries. Twenty six per cent of SSA countries are both landlocked and resource-poor, while six per cent are landlocked and resource-rich. Coastal resource-poor countries make up 43 per cent of SSA, while coastal resource-rich ones make up 26 per cent.

Resource-rich landlocked countries did better than their resource-poor, landlocked counterparts, especially in the 1970s and since 2000. Coastal-resource poor and coastal-resource rich countries did about the same over this time frame. Oil revenues are still poorly invested and the recent rate of growth of the African countries

benefiting from the oil bonanza has not been greater than that of the other countries suffering from higher oil prices. Clearly it is not just the presence of resources that counts, but the use of the money made from them. Interestingly, except for the 1960s, coastal-resource poor countries fared no better than landlocked resource-poor countries. Again, geography and natural resources are not complete destiny. Geographic isolation and poor management of natural resources may explain about one third of the growth gap in SSA compared to the rest of the developing world.

Rapid demographic change: The demographic transition in Africa began later than elsewhere and is slower than in the rest of the world. This delay consistently predicts two thirds of the difference in growth performance with the rest of the developing world. Lower life expectancies also contribute to poorer growth performance, and the HIV/AIDS epidemic has made this much worse, especially in Eastern and Southern Africa. The current situation results in a high level of age dependency, which reduces saving, reduces investment in human capital, slows the growth of the labour force, and therefore slows growth overall. Declines in fertility rates are linked to income growth, urbanisation, girls' education and reduced infant and child mortality rates, all of which have been delayed in Africa because of slow growth. It is a vicious cycle. As growth begins to accelerate, declining age-dependency ratios can accelerate per capita growth rates by one per cent or more. It would be wise to revisit the relative priority of investments in family planning.

Poor governance and policy: As discussed in his book entitled 'The Bottom Billion: Why the Poorest Countries are Failing and What Can Be Done About It' (Section 5), Collier shows that three quarters of the bottom billion countries have suffered from prolonged periods of poor governance and poor policies. Poor governance can ruin the most promising prospects, as, for example, in Zimbabwe. These countries cannot provide the essential services required for growth. Resources get eaten up in corruption. Poor governance and poor policies create a trap because powerful vested interests that benefit from them oppose reforms. In addition, correcting this situation requires skills which often have migrated from or fled the country. Donor conditionality cannot substitute for the lack of political will and skills. Failing states have stayed in this trap for a long time and, in doing so, have accumulated huge costs. The cumulative cost of a failing state to itself and to its neighbours is about US\$100 billion. The benefits of helping turn around a failing state are therefore enormous (Collier 2007).

Controlling for differences in opportunities, the impacts of poorer governance and policy contribute between 25 and 50 per cent of the difference in growth performance between SSA and the rest of the developing world (Ndulu 2006). Greater integration in the world economy consistently is associated with higher growth performance. This factor operates at both country and firm level.

Policies have significantly improved over the last decade in SSA: unweighted consumer price inflation sharply fell within a decade, from 27 per cent in 1995, to about six per cent by 2004. *In a median SSA country, government spending as a proportion of GDP also fell sharply in the past decade, as it has in other developing countries in the world, and the average fiscal deficit was halved to two per cent of GDP by 2000. Except in a few countries, black market exchange rate premiums now average just four per cent. Through unilateral trade reforms, SSA countries have also compressed tariff rates—the average rate is currently 15 per cent. As a consequence of the major policy reforms initiated in the continent since 1990, growth has resumed, and the impact of poor policies on growth may have waned (Ndulu et al 2007).*

Deficient infrastructure and business environment: In addition to low road densities, transport costs are among the highest in the world in SSA, and can reach as high as 77 per cent of the value of exports (Economic Commission for Africa 2004). Sub-Saharan Africa farmers have to pay up to three times the price for fertiliser than farmers in Thailand, India or Brazil. But it is not just the state of infrastructure which matters. Before the 1980s most transport businesses in SSA, including railways, bus and trucking companies, airports, seaports and civil aviation, were publicly owned and managed, and heavily regulated. These enterprises charged low tariffs, and their reduced viability imposed heavy costs on users and national economies. Since the 1990s, transport businesses have mostly been deregulated and privatised. Concessions for operating railways, ports and airports have become common. Remaining public enterprises have been given more autonomy, and arbitrary regulation has been replaced by regulation through consensual performance contracts. In the highway sector, establishing more sustainable institutions—autonomous road

agencies and dedicated road funds—has become the norm, and started to show positive results (World Bank, Africa Transport Unit website).

A serious problem in Africa is the extractions and bribes imposed by the police and others at border posts and road blocks. 'Along the West African road corridors linking the ports of Abidjan, Accra, Cotonu Dakar and Lomé to Burkina Faso, Mali, and Niger, truckers paid US\$322 million in undue costs at police customs and gendarmerie checkpoints in 1997, partly because the Inter-State Road Transport Convention had not been implemented' (Economic Commission for Africa, 2005). Well-organised producer organisations are needed to ensure governments crack down on these practices.

Energy costs are higher and power outages more frequent than in any other region of the world, in particular compared to China. Firm-level data from a major cross-country study shows that the indirect costs of infrastructure, security and unofficial payments imply that indirect production costs (other than for materials, capital and labour) are a larger share of total costs in SSA than elsewhere. In China, Nicaragua, Morocco, India, Senegal and Bangladesh they are close to 15 per cent of total production costs, whereas in a sample of SSA countries they vary between 27 and 19 per cent. (Ndulu 2001). The higher costs reduce investment incentives and returns.

While Africa has made significant improvements in basic education, progress in skills development has been distressingly slow. The sheer scale of what needs to be done to achieve growth, basic health care and improved government dwarfs the capacity on the ground. And the pandemics of AIDS, Malaria and Tuberculosis add to losses. African countries should expand tertiary education enrollment and achievement. After decades of decline, many African universities are reforming themselves, pursuing self-sufficiency in finance, and partnering with the private sector. Private universities are mushrooming. *The opportunities that arise from these areas for AfDB and IFAD are explored in sections six and seven.*

Underdeveloped financial sectors and low savings: SSA financial sectors are the least developed in the world. Because of high operating costs, risks of policy instability, high concentration and the lack of competition, the median spread of interest rates is 13 per cent in SSA as opposed to between 5 and 10 per cent for other developing regions. The lending environment across Africa is characterised by a poor credit culture, poor contract enforcement and absence of protection of creditor rights. Access of small firms to loans is low, and costs and collateral requirements are very high compared to China and India.

While South Asia and SSA both had savings rates of around 10 per cent in the 1970s, in South Asia, between 1991 and 2003, these have climbed to more than 20 per cent compared to a mere nine per cent in SSA. Excluding resource-rich countries brings the average savings rate down to three per cent. Both public and private savings rates are below that of other developing regions. Reasons include low incomes, low interest rates paid by banks on deposits, and the scarcity of savings infrastructure. In addition, much savings in the rural areas is in the form of trees, livestock land improvements, dwellings and investment in children's education. In rural Ghana, for example, the median household saved more than 30 per cent of its annual income in these areas. Mobilising the capacity to save for agricultural development is a major opportunity and a challenge. But poor people are kept out of formal financial systems by very high balance requirements, complex administrative procedures and astronomical transaction costs in the formal banking sector. Micro-finance institutions have only managed to mobilise a small pool of savings, have limited coverage and narrow areas of operations. High management costs have been the norm and lead to negative net worth and high probability of failure. For micro-finance to fulfill its role as a complement to formal finance, institutions will need to become much more efficient. At the same time the formal sector will need to reach out to poorer segments of the population, including through technological and process innovations.

Based on the analysis in the report, Ndulu et al propose a medium-term strategy that hinges on taking action in four areas (characterized as the four 'Is'): improving the investment climate; a big push toward closing the infrastructure gap with other regions of the world; a greater focus on innovation as the primary motor for productivity growth and enhanced competitiveness; and institutional and human capacity. The African Development Bank Strategy already includes three of these areas.

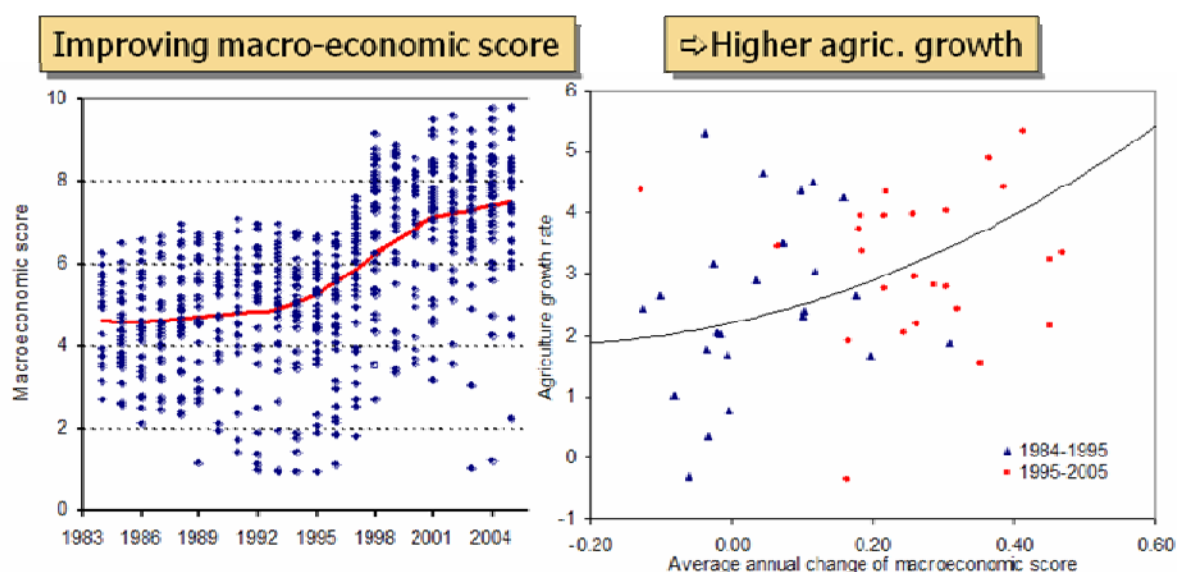
Specific factors affecting agricultural growth

Agricultural value-added in SSA has grown at an average of around three per cent per year for the past 25 years, close to the average for all developing countries, and the same as the Middle East and North Africa (MENA). Livestock growth was a significant contributor to this growth all around the world, and especially so in Africa. But in SSA growth per agricultural population, a crude measure of income of the rural population, has only been 0.9 per cent less than half of any other developing region. Fortunately, in line with the general growth trends in SSA, agricultural growth has accelerated recently and reached 3.5 per cent per capita in the first half of this decade, 1.5 per cent above the population growth rate. Unlike in Asia, this growth was primarily achieved by area expansion rather than growth in productivity.

The conditions that have led to higher economic growth have also led to higher agricultural growth.

Figure 4.1 shows that improving agricultural growth was very much driven by improved macroeconomic policies. In addition this paper shows that agricultural policies have improved tremendously over the past two decades. It is these policy factors and the general environment for growth discussed previously that have led to the agricultural recovery in Africa, not agricultural-specific interventions and programs. Indeed, few African countries have as yet increased their investments in agricultural technology and services, and in many they have continued to decline. But two additional factors are discussed here, namely the continuing adverse policies of the developed world and the sharp improvements in agricultural policies in the Africa itself.

FIGURE 4.1 MACROECONOMIC CONDITIONS AND AGRICULTURAL GROWTH



Source: WDR 2008

The continuing adverse policy environment in the developed world Average nominal rates of assistance in the developed world peaked at more than 50 per cent between 1985 and 1989. They have declined only slightly since then, to a little less than 40 per cent. The impact of this protection on world prices and trade shares is severe: The prices of cotton, oilseeds, dairy products and cereals are reduced by 21, 15, 12 and 7 per cent respectively, and the trade shares of developing countries in these commodities by 27, 34, 7 and 5 per cent respectively. In processed meats and sugar the impacts on developing country trade shares are 19 and 9 per cent respectively (WDR 2008). The universally-common practice of tariff escalation, under which processed goods are charged higher tariffs than raw products, further aggravates the impact of these policies on the prospect of agro-industrial development. Global trade models show that with unilateral trade reform across all goods in Africa alone, African agriculture trade would change little in the aggregate, as the

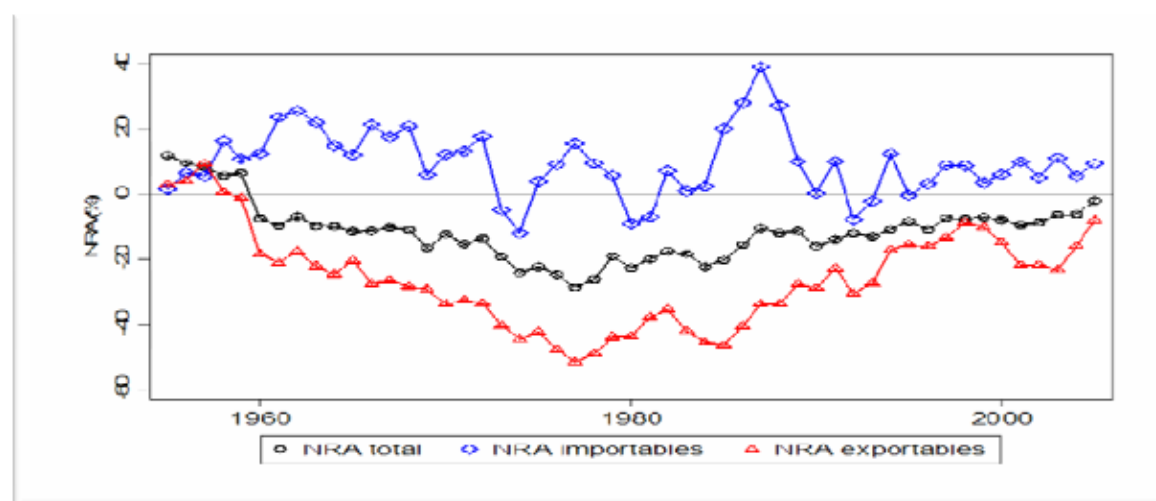
barriers imposed by the developed world and other developing countries would remain significant.² But with multilateral reform of all goods globally, African agriculture and food exports would increase by 38 per cent while imports would increase but 29 per cent. Clearly African agriculture stands to gain the most from multilateral trade reform. (Anderson et al. 2006). Moreover, in the absence of a breakthrough in the Doha Round of trade negotiations, China and India could follow the rich world, including Korea and Taiwan, in protecting their agriculture to close the rising urban-rural income gap. This would close the major future export opportunity for African agriculture.

While the international price reductions caused by developed countries now look small compared to the price changes under the current price spike, they clearly had an adverse impact during the long period of declining and low international prices that preceded it. In addition, they would again have a significant impact after the spike if prices should settle at or at only modestly higher levels than they had been before the spike. African countries have, of course, recognised the adverse consequences of these trade restrictions in agriculture and have become active participants in trade negotiations. The price spike should not change their policy stance. The African Development Bank is well placed in providing support through its advocacy role.

Reduced discrimination against agriculture through domestic policies

After the end of colonisation, African countries started to discriminate sharply against agriculture by way of overvalued exchange rates, industrial protection and direct agricultural taxation. A major study now has measured the combined effects of these three interventions on the net rate of agricultural assistance and compares them across the developing and developed world. A negative rate of protection is a rate of taxation, sometimes called disprotection. As shown by the black line in Figure 4.2, for Africa as a whole the net protection rates have improved from about minus 20 per cent in 1975–1979 to less than minus 10 per cent in the first half of the present decade; and to near zero since 2005 (Figure 4.2). Undoubtedly these policy improvements were major contributors to the agricultural recovery.

FIGURE 4.2: NATIONAL AGRICULTURE RESEARCH SYSTEMS IN AFRICA OVER THE PAST 50 YEARS



Source: Ibid

As Figure 4.2 also shows, the bias against agriculture was concentrated on exportable commodities, which in the late 1970s were taxed at around 50 per cent, whereas importables were almost always slightly protected.

² This simulation does not evaluate the reduction of intra-African food trade barriers, that are suggested elsewhere to be of potentially high benefit.

The figure also shows that disprotection of exportables has further declined in the last two years. Among the agricultural commodities, in the first half of this decade, the Nominal Rates of Protection for tobacco, soybeans, groundnuts, cocoa, cotton, beans, beef and tea remained at between minus 60 (for tobacco) to minus 20 (for tea) per cent across Africa (not including South Africa). *Clearly there remain important opportunities for improving the incentive regime of African agriculture.*

Annex 4: The current food crisis

On June 10, 2008 the *Wall Street Journal* reported that the cereal import bill of 82 low-income countries had doubled since 2006. To put the dramatic recent food price changes into perspective, the history of food price trends since the early 1960s, both in nominal and real terms, are reviewed and then compared to some exchange rate movements and changes in prices of energy that have also dramatically changed. The drivers of the rising global demand for food are then discussed, followed by the emerging demand for food crops from biofuels. Finally whether these price changes reflect a permanent shift in the global balance of agricultural supply and demand is discussed.

How much have prices changed?

Figure 3.1 shows that most of the sharp rise in nominal international food prices has come about between 2006 and 2008. But it is not nominal prices that count, but real prices. The footnote below discusses why the FAO chose the index of unit value of exports of manufactured goods from the G5 countries to developing countries.³ Using real prices reduces the shock felt during 1998–2000 to about a 65 per cent increase. The figure also shows that this is a much sharper percentage increase than the food price shock

³ Purchasing power impacts should deflate by an index of wage rates, or a consumer price index of low-income consumers. Such price indices are available for individual countries and are needed by them to analyse their own food price impacts on consumers. Analysing purchasing power countries requires deflation by a price index of their exports. But the export mix of developing countries varies enormously between oil and mineral exporters and exporters of labour-intensive manufactured goods or agricultural goods. Each country will need to conduct their own analysis. An alternative is to examine the cost of manufactured imports, since countries might have to give up some manufactured imports to buy more food. Again, no such global price index is available. The FAO, in its analysis for the recent food crisis meeting, therefore chose the index of unit value of exports of manufactured goods (MUV) from the G5 countries to the developing world, as calculated by the World Bank. A merit of this index is that it already reflects changes in the relative exchange rates between G5 countries

The index is a weighted average of export prices of manufactured goods for the G5 economies (the United States, Japan, Germany, France and the United Kingdom), with local-currency based prices converted into current US dollars using market exchange rates. Weights are the relative share in G5 exports of manufactured goods to developing countries in a base year (currently 1995), with these values: United States (32.2%), Japan (35.6%), Germany (17.4%), France (8.2) and the United Kingdom (6.6%). The MUV tends to be dominated by movements in the cross exchange rates between the dollar-yen, -euro and -sterling. At a time of dollar depreciation, for example, the index will rise, suggesting higher-dollar-based prices from non-United States G5 countries. In contrast, a rising dollar will tend to lower growth in the MUV, as diminishing values of local-currency prices in dollar terms dominate the movements of MUV.

Figure 3.1: Extended annual Food and Agriculture Organization of the United Nations' nominal and real food price indices: 1998–2000 = 100

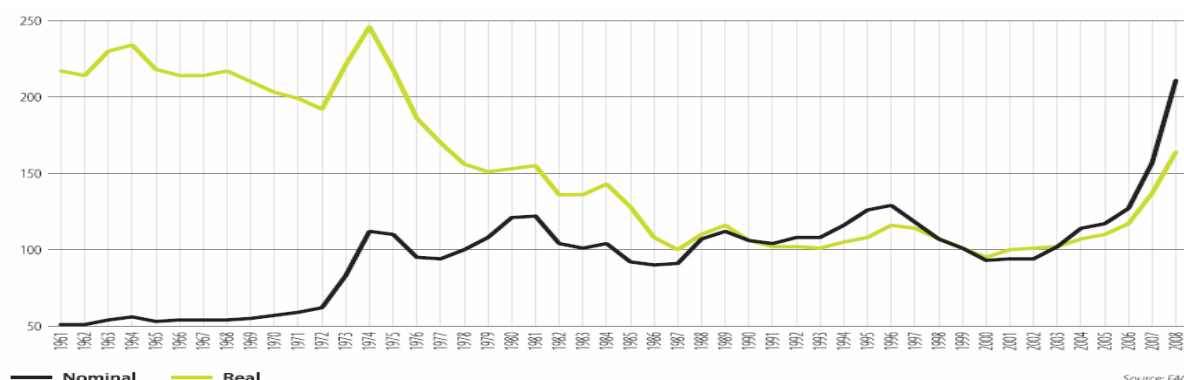


Figure 3.1 also shows that from 1961 to 1987, except for the spike in the early 1970s, real food prices in US dollar terms dropped steadily to about half their levels in the early 1960s. This created huge benefits for food consumers and poor farmers who are net buyers of food, but also implied large losses for net sellers of food not able to adopt new and more efficient technologies to offset the price declines, many of who were in Africa. It benefited net food importing countries and hurt net food exporters not able to compensate for falling prices with efficiency gains in production. Africa could not compete in many food commodities and therefore became a net importer for food. From 1987, the overall decline stopped for about 15 years (to 2003), which means the period of declining food prices has now been over for about 20 years. Despite the rapid rise in food prices since 2003, the real price index has not yet offset the gains of the nearly three decades to 1987. However, more than half the gains have now been lost, and real food prices are again at the level of the early 1980s.

The long-term trends in real food prices hide many factors that can drastically change the impact of aggregate world price changes on food consumers and food producers in specific countries. This paper examines three: *Exchange rates, oil and input prices, and the specific commodities involved.*

Exchange rates

The real price index used in Figure 3.1 is in US dollar terms, and already reflects the changes in the exchange rates between US dollars and G5 countries on whose costs of manufacturing exports to the developing world the deflator is based to convert to real prices (footnote 2). Countries that experienced appreciation of their currency relative to the US dollar similar to the developed countries included in the MUV price index need not make any further adjustments to arrive at their real cost of food. A typical low-income country experienced an adjustment in its real exchange rate to the US dollar of 16 per cent between 2003 and 2007 when the bulk of the food price increases happened, while a typical high-income country experienced a real appreciation of about 12 per cent (FAO 2008). For example, if a country experienced an appreciation of 50 per cent against the dollar, while the average exchange rate of high income appreciated by only 12 per cent, its real food costs in domestic currency would not have increased by 65 per cent as discussed above, but by 42 per cent.⁴ But this is only a back-of-the-envelope calculation and individual countries should do their own analysis using their own import mix and trading partners.

⁴ The additional appreciation of the country is $50 - 12 = 38$ per cent. But this translates into a 23 per cent reduction of the new food price level of 165 per cent.

Energy and fertiliser prices

Global energy prices started to rise modestly in 1999 and then much more sharply in 2003. While nominal energy prices have more than tripled since 2003 (with petroleum prices rising more than six fold), nominal food prices have 'only' doubled. Clearly the rise in energy prices is much sharper than in food prices. The energy price increases have transmitted themselves to higher fertiliser and pesticide prices, higher costs of running farm machinery and higher freight costs for inputs and outputs. For example, world fertiliser prices rose steadily from 2004 through 2006, and then exploded (Table 3.1). The sharpest increase came for diammonium phosphate, followed by muriate of potash, with the lowest increase in urea of only 63 per cent.

Table 3.1: Selected international fertiliser prices 2007–2008, US\$ per ton

Fertiliser	January 2007	April 2008	% increase
Diammonium phosphate	252	1230	388
Muriate of potash	172	500	190
Urea	277	452	63

Data source: IFDC

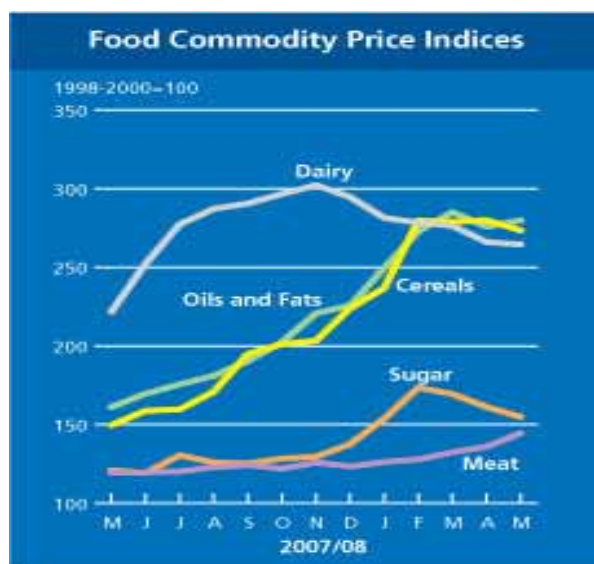
As a consequence of energy and input costs, the costs of purchased inputs have increased much more than food prices across the world, and have dampened the rises in profits of food producers. This will negatively impact on the supply responses from the producers. How much depends on their energy and fertiliser intensity in production, both of which are higher in the developed than the developing world, and higher in South and East Asia than in SSA. The change in energy and other raw material prices also influences a country's ability to afford food imports. While net energy and mineral exporters can likely afford higher food prices, the net energy importers confront a double shock from both higher energy and higher food prices.

Prices of individual food groups

Between 1961 and 2002 the real international prices of meat, dairy and horticulture products have roughly stayed constant. On the other hand real prices of cereals, oil crops, tropical beverages, agricultural raw materials and sugar were roughly between 50 per cent (raw materials) and 100 per cent (oil crops) higher in the 1960s than in the last five years up to 2002 (FAO 2008). This means that price declines were concentrated heavily in basic staple foods, tropical beverages, agricultural raw materials and sugar. The significant erosion in these prices implies a major shift in relative prices relative to the former group to meat, dairy and horticulture, which unlike some staples, are higher-valued commodities. Only countries experiencing rapid technical change remain competitive in cereals, oilseeds, tropical beverages and sugar. Another major feature of the period was high volatility in prices, with staggered sharp peaks of all prices (other than dairy and horticulture).

Figure 3.2 looks at the recent evolution of nominal prices of most of these commodity groups between the base period of 1998–2000 and the immediately past year. Note again that during this period real prices rose at about a third less than nominal prices. The sharpest increases are in dairy, oils and fats, and cereal prices, while sugar prices and meat prices increased much less dramatically. Except for meat, price peaks occurred between November 2007 and February 2008, with meat, however, still rising until the last data in April of this year.

Figure 3.2: Nominal food commodity price indices: 1998–2000 = 100



Source: FAO

Putting these recent price changes into perspective requires reviewing food commodity prices over a longer period. Since overall food price indices are not available this paper examines real grain prices. Since the 1870s real grain prices have declined substantially. Except for price increases between 1910 and 1914, a spike between 1972 and 1974 and another brief blip between 1996 and 1998, the long-run rate of supply increase has been greater than the rate of demand growth. Malthus is still waiting for the opposite. Thus the historical record is clear—a long-term decline with sharp peaks, followed by even lower trends. Historically farmers have always invested excess profits into capacity, and output has always expanded to put long-run downward pressure on peak prices. Declining trend food prices stopped in 1987 and in 2000 for cereal prices. Therefore the current sharp nominal price increase could well be just another blip. To better understand what could likely happen, this paper examines what has been driving recent trends.

The drivers of demand for food

The drivers of food demand are population, income growth and urbanisation. The latter two change demand patterns away from direct consumption of cereals towards, meat, dairy, fruits and vegetables. World population growth is slowing but remains at around one per cent per year. Population growth remains much higher in the developing world than the developed world where it is falling fast to zero. It remains at around slightly less than two per cent in Africa. Clearly the main impetus of population growth on demand will come from developing countries, and among them from Africa, and least developed countries elsewhere. Most population growth will be in the urban areas of developing countries, including in urban Africa. Again this suggests that Asia and Africa will be the major source of changes in food demand patterns and the corresponding opportunities for African agriculture.

The demographic transition to longer lives and lower population growth leads to lower dependency rates, and higher labour force participation. This so-called population dividend is discussed in Section 4, coupled with the wider processes of globalisation, technological change, information and financial integration, lead to prospects for global income or GDP growth that have rarely been brighter than they are now. Therefore, income growth, in addition to population growth, will be the major factor driving the demand for food and other agricultural products.

Global income growth per capita has been at 2.7 per cent in for a decade between 1996 and 2005. In 2007, it was still at 2.6 per cent, but because of the financial crisis that hit in late 2007, it is now projected by the World Bank to fall to two per cent during the period 2008–2020. The developing world will see a per capita income growth decline from 6.5 to 5.3. But in SSA the decline will only be from 4.1 to 3.9 per cent, implying an aggregate growth rate still close to six per cent (Source: World Bank website). Despite the financial crisis that hit the world since the fall of 2007, the per capita income growth rates could remain high and continue to drive sharp increases in food demand.

Because of expected shifts in consumption away from rice and wheat towards more diversified diets, growth in human demand for these commodities is expected to be slow (FAO 2007). Higher incomes, on the other hand, will drive demand for fruits and vegetables very rapidly, followed by poultry. Pig meat, beef and milk demand will grow at between one and one half per cent. Demand for animal products will drive demand growth for feed grains and oilseed cakes. Clearly, the secular trend in relative prices from food grains to feed grains and foods with higher-income elasticities is likely to continue—a trend that should be accounted for in future agricultural development strategies. However, these demand projections do not yet reflect the impact of biofuels on land use, production and commodity mixes.

Are higher food prices here to stay?

Predicting prices is hazardous at any time but perilous for the long term. The situation now is particularly difficult. In addition to the demand factors already discussed, there are many factors on the supply side that have also been discussed, or will be later in this report, including little progress in reducing agricultural trade barriers and subsidies in rich countries; slowing yield growth; constraints on the use of biotechnology; little investment in irrigation; deterioration of existing irrigated areas; environmental constraints; loss of land to competing uses such as urbanisation, infrastructure, environmental set asides; and water constraints.

While the history reviewed earlier suggests that today's higher food prices may well be another major spike, it is not clear whether food prices will settle to the same level they were in the early years of this century, or at a lower or higher level. The fact that their long-term decline has stopped for almost 20 years, and that demand forces are expected to be strong makes it unlikely they will resume their secular decline.

Within the past few months IFPRI (May 2008), IMF (March 2008), FAO (April 2008), UNCTAD (May 2008), OECD–FAO (2008), USDA–ERS (Trostle May 2008) and Australia (Stoeckel June 2008) have all published analysis. *The New York Times* ran a series under the general heading 'The Food Chain' from January through June 2008 and *The Economist* has carried many articles in the last six months. These analyses do not, however, agree on the causes of the food crisis, its likely duration or the ultimate end of the spike. They do agree that prices will come down from current levels. At least four competing theories are briefly reviewed here.

Story one—Macroeconomic factors driving price rises: What the world is experiencing is a broad commodity boom. Oil, minerals (especially gold and copper) and agricultural commodity prices are rising in a similar pattern which suggests broad macroeconomic variables are driving the boom. Given that all global commodity markets are denominated in dollars, the declining dollars makes all commodities cheaper to the rest of the world, driving up demand and prices (Hanke & Ransom WSJ, 25 April 2008). In parallel, the United States' concerns about recession led to successive cuts in nominal and real interest rates which reduced the price of storage and encouraged buying and holding real commodities. This phenomenon drives up all real commodity prices (Frankel 2008).

Story two—Speculators are driving prices up and increasing volatility: In periods of uncertainty or recession, investors shift assets to real assets including commodities. Further, the rise in hedge and particularly index funds has led to large increases in non-traditional investments in commodity markets. These fund investors are currently staying for very long periods (betting on continued price increases) in the commodity markets.

Story three—Simultaneous and big shocks are driving prices up: Several years of weather impacts in Europe in 2006, in North America in 2006 and 2007 and a continuing severe drought in Australia in 2006 and 2007 have drawn stocks down to critical lows. This coupled with the surge in biofuel demand has created a price spike that will surely end when conditions return to normal.

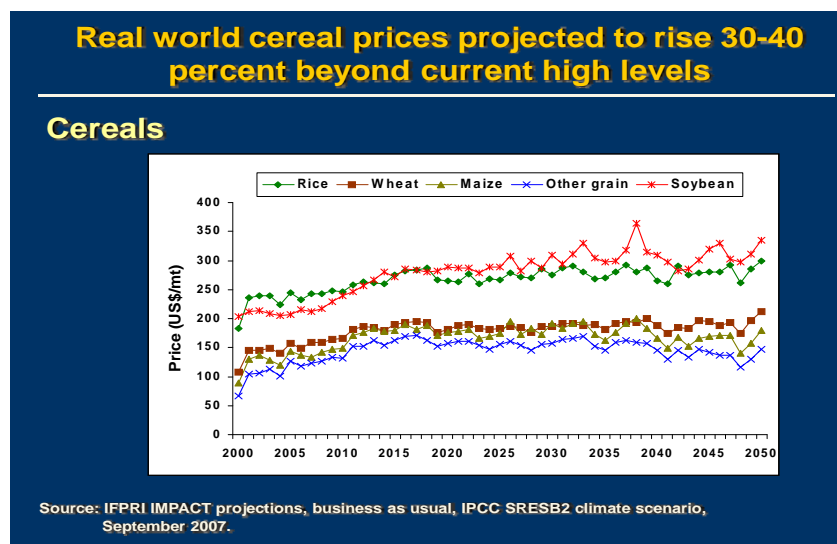
Story four—Combination of permanent structural changes in supply and demand conditions exacerbated by shocks: This is the predominant story in the global literature. It argues that there is a confluence of permanent and transitory factors driving the current price situation. On the demand side rapid growth and rising incomes in emerging economies such as India and China has increased the rate of demand expansion. Urbanisation and global growth means demands for a larger and more varied food supply. Finally at least some of the increase in biofuel demand will be around for a while. On the supply side, the rate of increase supply has slowed over the past decade because of declining rates of productivity growth, and increased competition for water and land. Investments in agricultural R&D have declined globally as has investment in agricultural development. Finally, higher petroleum prices have permanently increased the costs of agricultural production. Global grain consumption has exceeded global production in seven of the last eight years. The result has been a drawdown of stocks to critically low levels. Thus shocks, like weather and the surge in biofuel demand, cause prices to rise sharply.

The real explanation probably combines elements from all four stories. However, if one favours any or all of the first three stories what will happen in the long run is clear—when contributing factors revert to normal the bubble will break and the global economy will resume the same long-run, downward path in real prices that happened in earlier episodes. Only story four proposes the possibility of a different ending. Two outcomes seem possible. After the spike nominal prices fall but stabilise at higher levels of real prices and continue their secular decline likely at a slower rate. Permanent structural changes are sufficiently strong that the historical pattern of declining real prices is over and real prices will rise modestly over the foreseeable future. This paper reviews empirical estimates that support each possible outcome.

For the decade 2008–17, OECD–FAO (2008) project constant or slightly declining real prices for beef and pig meat. Real sugar and rice are expected to increase by between five and ten per cent, reflecting, in the case of rice, the expected slow growth of demand in Asia, and for sugar a high supply-response capacity. By far the highest real price increase is expected in vegetable oils (more than 50 per cent) while for other commodities the real price increases range between 25 and 30 per cent. Compared to the prices experienced in the early part of 2008, this means a number of high prices are expected to drop significantly over the next year or two, but remain much higher than in the last decade.

A recent IFPRI analysis using their IMPACT Model makes much longer term projections—to 2050. It projects that real grain and oilseed prices will not decline from levels they reached in late 2007 and will show a modest increase through 2050 (Figure 3.3 for rice, wheat, maize, oil seeds and soybeans). This is one of the first substantive analyses that seem to support the proposition that the long-term secular decline in grain and oilseed prices may be over.

Figure 3.3: Long-term crop price projections to 2050

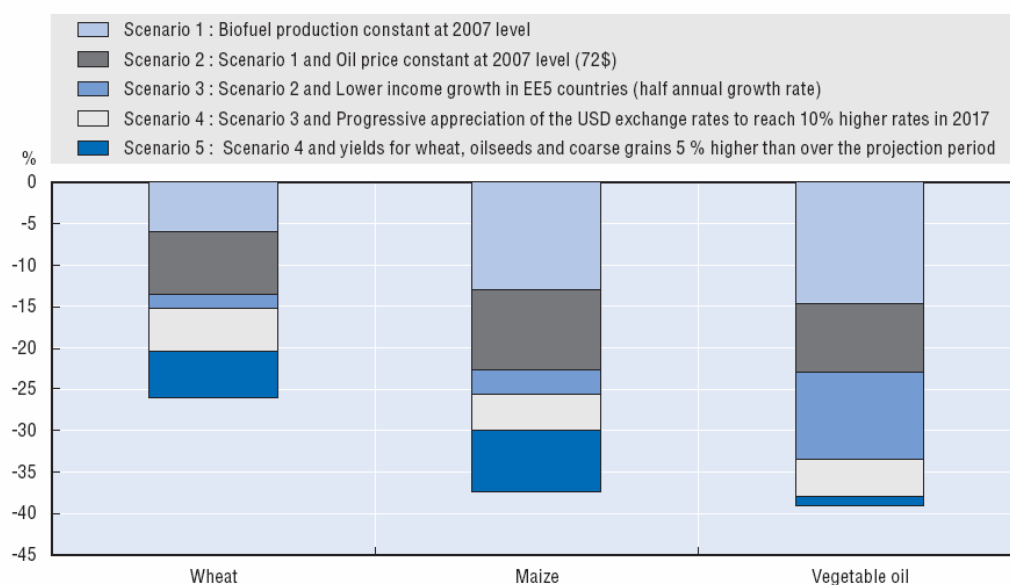


Sensitivity of projected prices to key assumptions

Figure 3.4 shows how sensitive projected world wheat, rice and oilseeds prices are to key assumptions. It shows the reductions in prices from the baseline projection in 2017 that would come from five different scenarios (OECD-FAO, 2008)

1. If instead of rising rapidly over the next decade, biofuels production would be maintained at the 2007 level. For the two main biofuels inputs (vegetable oils and coarse grains) this would reduce 2017 prices by between 15 and 12 per cent respectively, more than any other scenario change. For wheat, which would be affected indirectly, the reduction would be around six per cent. Simulations by Rosegrant using the IFPRI's IMPACT Model reach the same conclusion. Clearly there is no longer any question that biofuel policy and the resulting production will have a major impact on future food prices.
2. If oil prices stayed at US\$72 per barrel, the average 2007 level would reduce maize and oilseed prices by around 10 per cent and wheat prices by seven per cent compared to their baseline 2017 prices. *This shows the very high sensitivity of food production costs and prices to energy prices.*
3. If their rate of growth in EE5 countries (China, India, Brazil, Indonesia and South Africa) were reduced by half, relative to current high projections, this would lead to price reductions in vegetable oils (that are highly income elastic) of about 10 per cent, while it would reduce maize by significantly less and leave wheat prices almost unchanged.
4. If the United States dollar were to appreciate by 10 per cent relative to the baseline scenario (which already incorporates a modest expected US dollar appreciation), it would increase incentives in exporting countries to produce more, and reduce import demand elsewhere. The combined effect would reduce all three prices by about five per cent relative to their baseline.
5. If crop yields at the end of the period would rise by an additional five per cent, it would reduce wheat and maize prices by six to eight per cent, but leave vegetable oil prices relatively unaffected.

Figure 3.4: Sensitivity of projected world prices to changes in five key assumptions, percentage difference from baseline values, 2017



Source: OECD and FAO Secretariats.

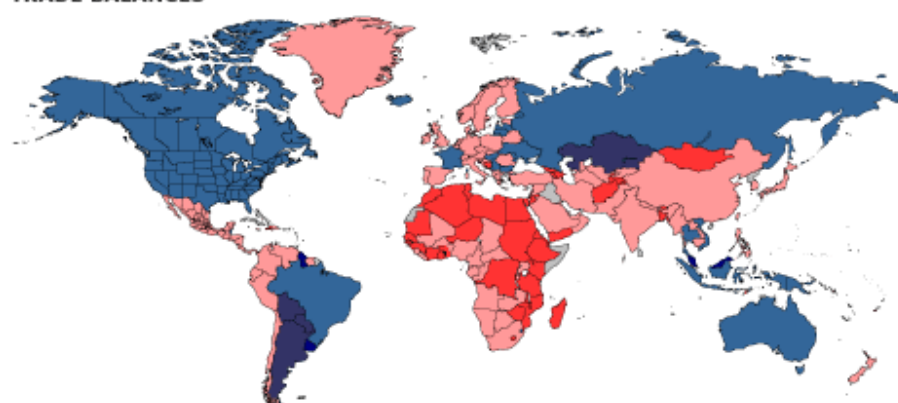
The OECD–FAO conclusion is worth quoting because it comes closest to our current views.

‘World reference prices in nominal terms for almost all agricultural commodities covered in this report are at or above previous record levels. This will not last and prices will gradually come down because of some of the transitory nature of some of the factors that are behind the recent hikes. But there is strong reason to believe that there are now also permanent factors underpinning prices that will work to keep them both at higher average levels than in the past and reduce the long-term decline in real terms’ (p. 11).

Implications of rising food prices

Impact on the balance of trade

Higher food prices have important implications for the balance of trade for countries include in Figure 3.5. Highly specialised net exporters of food, such as Argentina, will see their trade balance improve by more than one per cent, while other food exporters, such as Brazil, the United States, Russia or Australia, will see their trade balances improve by less than one per cent. All of Africa will be hurt, with the hardest-hit countries including all of Northern Africa and much of Eastern Africa, which will see net trade balance deteriorate by more than one per cent. Of course these impacts have to be seen in the context of the rising prices of energy and other raw materials. In Algeria and Libya, for example, the higher costs of food imports will be more than offset by higher oil prices, while Eastern African countries will see a double hit from higher oil and food prices. *For this review it is striking that the Eastern and Southern African countries that have the highest rates of poverty and unemployment, and also the highest rates of HIV/AIDS, are also the hardest hit by rising food prices. Clearly special balance of payment support measures are urgently needed for these and other highly-affected countries. This raises the question: Should donors, such as the AfDB and Australia, participate in balance of payment support operations for these countries?*

Figure 3.5: Impact of food price increases on trade balances**2007 - 2008 IMPACT OF PROJECTED FOOD PRICE INCREASES ON TRADE BALANCES**

- Large losers (trade balance worsening > 1% 2005 GDP)
- Moderate losers (trade balance worsening < 1% 2005 GDP)
- Moderate gainers (trade balance improving < 1% 2005 GDP)
- Large gainers (trade balance improving > 1% 2005 GDP)
- No data

SOURCE: The World Bank

Impact on domestic producer and consumer prices

Mundlak and Larson (1992) have shown that international food prices fully transmit to domestic prices over the medium- to long-run, both across the developed and the developing world. However, in the short run policy can slow down this transmission considerably. Developing countries have acted quickly to reduce the impact of international prices on their consumers: Almost half of the 77 countries surveyed by the FAO in early 2008 had reduced import taxes on food (FAO 2008). Such reductions may worsen the fiscal imbalances that may arise from higher food bills. For these countries the price reduction achievable is sharply limited, and cannot exceed the tax collected prior to their reduction. Therefore even more countries (55 per cent) have resorted to food subsidies or price controls. More sustainable is dipping into domestic food reserves, which may have been accumulated precisely for episodes of scarcity arising from international price increases or domestic production shortfalls. Only about 25 per cent of countries have been able to do so, however. An even lower percentage of countries, only about 17 per cent, have yet responded with measures to increase the food supply. Net exporting countries have much stronger possibilities to influence food prices, either by imposing export taxes (recently done by Argentina) or export restrictions (recently done by India and Vietnam). About 25 countries have limited exports in one way or another. As a consequence of these policy measures, the pass-through of higher rice prices to domestic prices ranged from 6, 9 and 11 per cent of the international price rise respectively in the Philippines, India and Vietnam, all of which are net food exporters. The price rises were 43, 53 and 64 per cent respectively in Bangladesh, Indonesia and China which import some and export other foods. Argentina, a major wheat exporter, has been able to keep the price rise of wheat to less than a third of the price rise in the international price arena, while in Chile domestic prices almost fully reflect the rises in the international price (FAO 2008).

Short-term impact on poverty

In the longer run, higher food prices are good for rural populations because they lead to greater investments, outputs, profits and rural wage rates. For economies dominated by agricultural sectors, there may also be important positive linkage effects on urban economies, as well as higher unskilled urban wages. The higher food prices projected for the future are therefore likely to provide important long-run benefits for many African economies, and especially for rural populations.

However, these positive impacts take time to achieve, and in the short term higher food prices tend to increase poverty, confronting countries with difficult political management problems. Ivanic and Martin 2008 took high-quality household data from ten countries to simulate the short-run impact of the rise in commodity prices from 2005 to 2007 on poverty incidence and depth. Longer-run impacts that arise from rural linkage effects (forward, backward and consumer demand linkages) that come about as a consequence of higher farm profits associated with higher output prices are not included in the analysis. Ivanic and Martin's analysis brings out the disparities in short-term poverty impacts of identical food price rises around the globe.

For urban populations in Nicaragua, who spend a large share of their income on food, the impact is a more than 10 per cent rise in the poverty rate. Rural populations of Zambia, who are net buyers of maize, are the second worst affected and are seeing their poverty rate increase by around 7 per cent. In Malawi and Madagascar, poverty rates have increased between 3 and 4 per cent. On the other hand, the rural poverty rate in Vietnam declines by 3.1 per cent, because the asset distribution in rural areas is very equal and most are net sellers of rice, maize and poultry. The changes in depth of poverty paint a similar picture to the changes in the poverty rates.

The authors then did a back-of-the-envelope calculation to estimate the short-run global rise in the number of poor people across the world. They calculated that the overall short-run poverty increase in the nine countries studied would have been 4.5 per cent, rather than only 3 per cent. When they apply this average to the entire 2.4 billion people living at less than US\$1 a day in the world, they find that the food price rises have thrown an additional 105 million people into extreme poverty. This corresponds to all the gains in poverty reduction achieved in the seven years before the food price crisis.

These back-of-the-envelope calculations ignore all the positive impacts that higher food prices could have in the medium- to long-term by way of forward, backward and consumer demand or wage improvements. They therefore measure the poverty impact of what is most likely to be a transitory spike in food prices. Nevertheless these estimates are a good indicator of what policy makers need to do if they want to mitigate the adverse poverty effect in the short run. Clearly this is a monumental task. It is not only the additional poor people who need help most of those among the 2.3 billion who were poor before the food price spike. Small increases in safety net programs that rarely have significant coverage in the first place will not be up to the task. No wonder, therefore, that policy makers have preferred the aggregate measures such as reducing taxation of food, general food subsidies or price controls, and releases from stocks and export controls. Of course some of these measures have poor fiscal sustainability and prevent necessary adjustments in consumption and production of food. But if these measures are indeed used only to mitigate the short-run impacts and then quickly phased out, they may well have been justified.

This paper notes that neither the IFAD nor the AFDB have mitigation of short-term shocks and safety nets as part of their mandate and portfolios. As a consequence the major implication anticipated higher food and agricultural prices are for longer term agricultural and rural development, topics pursued in Sections 6 and 7.

Annex 5: Bill & Melinda Gates Foundation support to African Food, Agricultural and Natural Resources Statistics in Africa

List of acronyms

AFCAS	African Commission for Agricultural Statistics
AfDB	African Development Bank
AFRISTAT	Economic and Statistical Observatory for Sub-Saharan Africa
AFRITAC	African Regional Technical Assistance Centre
CountySTAT	Program to align Country data with FAOSTAT
EASTC	Eastern Africa Statistical Training Centre Tanzania
ENEA	Ecole Nationale Supérieure de Statistique et d'Economie Appliquée, Côte d'Ivoire
ENSEA	Ecole Nationale d'Economie Appliquée, Senegal
EU	European Union
EUROSTAT	European Statistical Office
FAO	Food and Agriculture Organisation of the United Nations
FAOSTAT	FAO's Statistical Data Base
FARS	Food, Agriculture and Rural Statistics
FASDEV	Forum on African Statistical Development
GDDS	General Data Dissemination System
ICP-Africa	International Comparison Program for Africa
ICRISAT	International Crops Research Institute for the Semi-Arid Tropics
IFPRI	International Food Policy Research Institute
IHSN	International Household Survey Network
IMF	International Monetary Fund
ISI	International Statistical Institute
NSDS	National Statistical Development Strategy
NSS	National Statistical System
PARIS21	Partnership in Statistics for Development in the 21 st Century
LSMS	Living Standards Measurement Survey
M&E	Monitoring and Evaluation
OECD	Organisation for Economic Co-operation and Development
RRSF	Reference Regional Strategic Framework for Stat Cap Building in Africa
STATCAP	Statistical Capacity Credit/Loan

SSA	Sub-Saharan Africa
TFSCB	Trust Fund for Statistical Capacity Building
RRSF	Reference Regional Strategic Framework for Statistical Capacity-Building in Africa
UNCS	United Nations Statistical Commission
UNECA	United Nations Economic Commission for Africa

Introduction

The number of poor people in Africa has been increasing more in Africa than anywhere else in the World. Poverty and hunger are concentrated in rural areas, among resource poor farmers and agricultural workers. As part of its Agenda for SSA, the Foundation is supporting a abroad initiative to *Achieve Growth and Food Security in Africa*. This includes the *Mobilization of Investments in SSA Agriculture* and programs to *Enable a Green Revolution*. This will take place in a context of climate change, where extreme events will continue to be as important as in the past or more important, and where biotechnology and proprietary agricultural technology open new opportunities and challenges. The Foundation is or will support programs in Science and Technology, Food Policy, and Monitoring and Analysis.

As part of this program, why would the Foundation want to focus on food, agricultural and rural statistics (FARS) in Africa? International Development Goals include hunger and nutritional objectives, but the data bases to analyse them are poor. Early warning and management of food emergencies is very data intensive. Monitoring, evaluation, and impact evaluation of agricultural and other development programs requires data on agricultural and food production, prices, incomes, food consumption, the environment. This includes the monitoring and evaluation of policy and technology changes that might be brought about with the Foundation's support. Impact evaluation requires multi-dimensional panel household data with strong baselines and data on the community environment in which households live. Measurement of risk and understanding adaptation to risks requires continuous household data on the model of the ICRISAT Village Studies that the Foundation is already supporting in India. Data on fisheries, forestry, water, soils and bio-diversity are critical for the management of these resources.

But there are many technical challenges: Rural people live in widely dispersed, heterogeneous environments that make data collection a complicated and expensive and matter. Rural environments are diverse in terms of the agroclimate and soils endowments, infrastructure, market access, farming systems, and technology used. These, combined with poverty, lead to extremely varied livelihood strategies involving faming, the rural nonfarm sector, temporary migration, and the splitting of families across several locations that are hard to capture in data collection. It therefore is difficult to integrate all dimensions of production, incomes, consumption, input and natural resource use in rural data sets. Many technical measurement problems stem from these complexities.

In addition there are many systemic problems: Development of FARS has tended to be supply-driven. Data were often not analysed or used. Poor quality and lack of analysis have led to low demand, loss of data, and limited budgets. FARS are rarely well integrated into national statistical systems (NSS). Activities focus on numerous ad-hoc requests from donors. Past investments and technical assistance have failed to produce sustainable systems. While donor support for general statistical systems has increased, for FARS such support limited to a few sector programs and paltry support to FAO.

Since 1997 FAO, The African Commission for Agricultural Statistics, and the World Bank have collaborated in the development and implementation of a new Vision for FARS in Africa that is based on an integrated approach to the development of the National Agricultural Statistics Systems of which FARS would be an integral part. FARS would be based on the harmonisation and rationalisation of data collection and dissemination activities. Data collection would be organized within a ten year cycle starting with the decennial population census into which a modest agricultural module would integrated. Agricultural censuses would be increasingly done via sample surveys whose household samples would derive from the Population Census. Other required data samples, including for production data and crop forecasting would then be derived from subsamples of the agricultural census. FARS would increasingly make use of and contribute to broader household data, including panels, within which the agricultural activities of the households could be viewed in their entire context of complex rural livelihood strategies, and output, input and labour market linkages, as well as data on education, health and other social aspects of life. These data collection efforts would be

designed so that they could generate data for monitoring and evaluating major agricultural and rural investment programmes and for carrying out impact assessments of development programs and external shocks. To achieve this, the household data would be associated with sufficient community data. This broad vision was first discussed with African Commission for Agricultural Statistics in their 1999 in Guinea meeting.

Since then FAO and AFCAS have progressively strengthened the consensus around this vision and have attempted to implement it. Implementation was supported via FAO technical assistance projects, the FAO Cooperative Program, and resources from the Trust Fund for Statistical Capacity Building (TFSCB) managed by the World Bank, and via support from France. Unfortunately a bigger project to enable FAO to provide the required support never got funded. In addition the World Bank supported national agricultural statistical capacity development via Sector Support operations, as realized finally in Ghana and Mozambique. Despite the paucity of support FAO and AFCAS have refined the vision and developed additional strategies and tools for improving agricultural statistics.

The Landscape of Institutions and Programs

Over the past decade, the institutions and initiatives for statistical development have multiplied enormously so that by now they form the bewildering landscape and list of acronyms. While few of them deal directly with AFRS, most of them have a strong bearing on them. In figure 1 the landscape is arranged so that FAO and the AFCAS sit at the centre. They are surrounded by not less than eight blocks of institutions and initiatives. Of all the initiatives only the Task Team on Agricultural Statistics of the PARIS21 Initiative and the Agricultural Statistical Committee of the International Statistical Institute deal specifically with agricultural Statistics.

The apex body of the International Statistical System is the *UN Statistical Commission*, a normative and coordination body. Affiliated with it are the *UN Statistical Institute* within which the statistical capacities of the UN reside, and the *Statistical Commission for Africa*. Also associated with the UN is the United Nations Commission for Africa (UNECA). In the past few years UNECA has re-entered the field of statistics with several initiatives: *The African Statistical Coordination Committee* and the *African Symposium on Statistical Development* are coordinating and dissemination bodies that meet regularly to review progress in general (the Committee) and specific statistical development issues (the Symposium), using the superb meeting facilities of UNECA in Addis Ababa. It is not entirely clear how the various statistical coordination bodies for Africa interact. UNECA has also recently created the *African Center for Statistics* that is in the process of rebuilding its statistical capacity, and that is headed by Dr. Ben Kiregyera, one of the most active drivers of statistical development in SSA.

The most important funders of statistical capacity building in Africa are the African Development Bank (AfDB), the World Bank and the IMF, as well as the EU, the UK, France and other bilateral donors. These donors provide resources to the Trust Fund for Statistical Capacity Building (TFSCB) managed by the World Bank and to other funding vehicles and directly to various institutions and initiatives. The World Bank's STATCAP facility provides loan and grant resources from IBRD and IDA for national statistical development programs. All these funding agencies are also providing training and support to training in Africa in a variety of ways. The AfDB coordinates the Africa component of the International Comparison Program (ICP-Africa) that focuses on capacity building for monitoring the Millennium Development Goals and the Poverty Reduction Strategy Processes. The IMF developed the General Data Dissemination System (GDDS) that is built around four dimensions -- data characteristics, quality, access, and integrity -- and is intended to provide guidance for the overall development of macroeconomic, financial, and socio-demographic data. Forty SSA countries have adhered to the GDDS and the associated data standards, and received a variety of capacity development supports. France and the UK are the most active bilateral partners in statistical capacity development, using a variety of academic and specialized training institutions and initiatives.

Established in 1885, the *International Statistical Institute (ISI)* is one of the oldest scientific associations operating in the world. It is composed of more than 2000 individual elected members who represent more than 133 countries, plus additional members in specialized sections. It is renowned for its biannual meetings for the exchange of ideas and networking. It has an office in Voorburg, Netherlands. The *ISI Agricultural Statistics Committee* was originally set up to improve the representation of agricultural statisticians in the ISI. The International Conference of Agricultural Statisticians (ICAS) meets biannually, and last met in Beijing in 2004. Its most worthwhile proceedings are published on the ICAS website.

The *Partnership in Statistics for the 21st Century (Paris 21)* was set up by the international community at the OECD in Paris in 1999. The PARIS21 consortium is owned by over 300 members who include policy makers and statisticians, international organisations, professional bodies and academic institutions from both donor and developing countries. It is headed by Antoine Simonpietri, one of the team members that developed the vision for the AFRS strategy for Africa. PARIS21 focuses its efforts on encouraging all low-income countries to design **National Strategies for the Development of Statistics (NSDS)** and to have nationally owned and produced data for all MDG indicators by 2010. It has developed guidelines for the development of NSDS and the integration of sector statistics into national strategies and systems which are published in an outstanding publication that is a must read for all involved in this area.

A major initiative of PARIS21 is the Accelerated Data Program (ADP) that uses uniform procedures to assemble and make publicly available all micro-data sets that have been collected in the countries that participate in the ADP program. For example in Ethiopia, the Gambia and Malawi respectively the ADP has recovered 40, 50, and 32 micro-data sets. The ADP does not just copy the data sets onto CD-Roms, but first uses its *micro-data management toolkit* to implement data quality control measures, cataloguing, and standardisation measures so that they become more user-friendly. The CD-Roms also include relevant documents such as the questionnaire. The data then are put into a National Data Archive (NADA). The ADP also puts negotiates new dissemination policies with the countries using its *Dissemination policy guidelines*. Paris21 also manages the International Household Survey Network (IHSN, see below) and has developed an *IHSN question bank*.

The *Rural and Agricultural Statistics* task team of PARIS21 advocates for greater visibility of Food, Agriculture, and Rural Statistics (FARS) within the overall system of national statistics. The team, convened by the Food and Agricultural Organisation (FAO), works on mobilizing resources; exchanging innovative experiences and practices; cost-effective methodologies; and promoting stakeholder co-ordination. In 2003 the team prepared an Interim Regional Project Proposal for "Strengthening Agricultural Statistics for Poverty Reduction and Food Security in Rural Africa," which was approved by the World Bank Trust Fund for Statistical Capacity Building. In collaboration with the International Fund for Agricultural Development and the FAO and with the financial support of the French Ministry of Foreign Affairs, the team has been carrying out a project supporting agricultural statistical development in Africa. For example, in Dec 2007 they held a workshop in Tunis in the run-up to the AFCAS meeting to discuss the integration of agricultural statistics into the NSDS.

Figure 1: The institutional and Program Landscape for the Development of Statistics in the Developing World.



Training for statisticians in Africa is provided by academic institutions and five sub-regional training centres, namely:

- Institute of Statistics and Applied Economics, Uganda
- Eastern Africa Statistical Training Centre Tanzania (EAST);
- Ecole Nationale Supérieure de Statistique et d'Economie Appliquée, Côte d'Ivoire (ENSEA);
- Institut Sous-Régional de Statistique et d'Economie Appliquée, Cameroon;
- Ecole Nationale d'Economie Appliquée, Senegal (ENEA).

Statisticians also train in developed countries universities, and in specialized institutions which are particularly strong and involved in France and the UK.

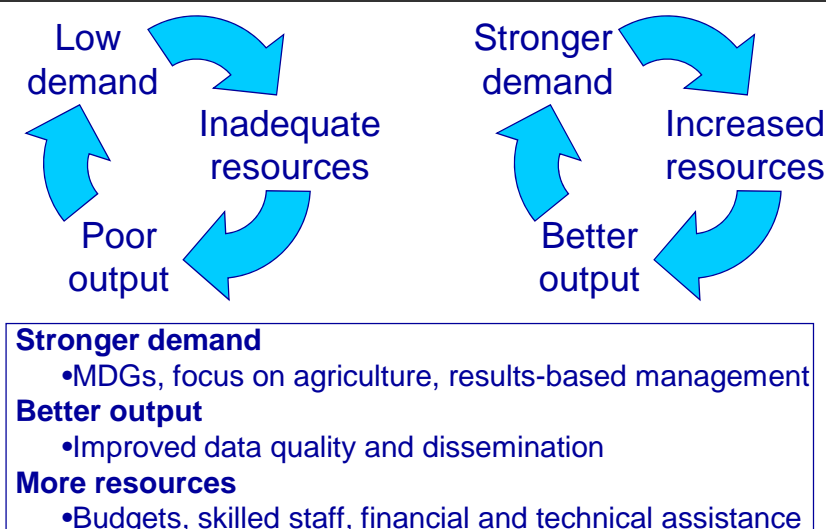
There are a number of sub-Regional initiatives in Africa, but none of it is focused on agricultural statistics. The *Economic and Statistical Observatory of Sub-Saharan Africa* (AFRISTAT) is an international organisation created by a Treaty that now has 19 member countries from West and Central Africa and has its headquarters in Burkina Faso. AFRISTAT has statutory power in the area of harmonization of concepts, international standards and statistical methods. It is acting for regional and economic integration, which means consistency and better comparability of statistical data. This is done according to the working program decided by Member states, towards support to NSO for data collection, manipulation and dissemination, as well as for the economic analysis and interpretation of data. Other sub-Regional Organisations (SRO)s are receiving financial support for statistical development especially from the AfDB and the EU. The IMF has created three *African Technical Assistance Centers* (AFRITACs) for West, Central and Eastern Africa respectively that, among other areas, are involved in statistical Capacity Development.

Finally, the International Household Survey Network (IHSN) is a partnership of international organisations seeking to improve the availability, quality and use of survey data in developing countries. This informal network was established as a recommendation of the Marrakech Action Plan for Statistics. It provides national and international agencies with opportunities to better coordinate and manage socioeconomic data collection and analysis, and to mobilize support for more efficient and effective approaches to conducting surveys in developing countries. The Secretariat is coordinated by Olivier Dupriez (World Bank, Development Data Group). The IHSN Secretariat is working in close collaboration with the *PARIS21 Consortium Secretariat*, who manages a World Bank financial contribution to the IHSN as a Satellite Program.

National Statistical Development Strategies (NSDS)

The Marrakesh Action Plan for Statistics (2004) proposed the development of National Statistical Development Strategies (NSDS) for all low-income countries. Since then PARIS 21 has developed guidelines and tools for the NSDS and 16 African countries have received by 2006. The vision behind the NSDS is to move from a vicious cycle of poor output, low demand, and inadequate resources to a progressive realization of a virtuous cycle where better output leads to stronger demand, increased resources and even better output (Figure 2 from Belkindas and Eele, 2008). A program to achieve this must be country led; based on a realistic assessment of strengths and weaknesses of the whole statistical system; set priorities in the light of constraints so that it becomes feasible; take a long-term view and focus on results.

Figure 2: From a vicious to a virtuous cycle



Source: Belkindas and Eele, 2008

Countries need to have an overall vision of the development of their national statistical system which will include the national, regional, and international needs; be part of the country development and poverty reduction policy; serve as a framework for international and bilateral assistance; include all parts of the data production units and address the issues related to the analysis and use of data; follow the international standards including quality; and build on all past and existing activities and experiences. The Reference Regional Strategic Framework provides directions and mechanisms for statistical capacity building in Africa. It is jointly coordinated by the AfDB and UNECA. The NSDS is the main tool for RRSF implementation.

The NSDS design process that involves the sectors in its planning and implementation. It starts by assessing the sector-specific statistical systems and helps prepare their strategies. In the process it develops shared goals and cross-cutting strategies for their integration into the NSDS. The *framework for a coordinated NSS* seeks to make more efficient use of resources and use common institutional procedures for coordination, collaboration and cooperation. It harmonizes the legal and institutional framework that takes into account the requirements of all stakeholders in the NSS. It then develops an NSS-wide financing strategy and a comprehensive human resource strategy with uniform training, recruitment and promotion procedures. It seeks to rationalize the use of physical infrastructure and ICT and improve the productivity of data management within a coherent management information system and a common data warehouse. The measures to increase the availability of quality data include a common metadata dictionary, common standards for data quality, harmonized data production schedule, and a comprehensive dissemination policy. The advocacy measures include the raising of the public profile for statistics within a coherent advocacy strategy across the NSS. Budgets are estimated, financing is sought, and implementation starts. Implementation is then monitor and evaluated by the NSS. It is the donors listed in Figure 1 who provide the financing for the development and implementation of NSDS.

The obstacles to the design and successful implementation of NSDS include poor channels of communication between NSO and sectors; lack of incentives for coordination/mainstreaming; the fear of loss of autonomy of the sector-specific statistical systems, and the fear of loss of funding.

Resources for Statistical Capacity Building in SSA

In 2004, the Marrakesh Plan of Action estimated that, in addition to streamlining coordinating and economizing on already committed technical assistance resources, an additional increase in financing for statistical capacity development of the order of 24-28 million dollars/year would be needed. Taking account of inflation, this amount would probably be between 30 and 34 million US dollars. These amounts do not include capacity development support to FARS.

Paris21 has developed a light monitoring system that collects and analysed the resources made available in support of statistical capacity building in SSA. Clearly, the Foundation will have to become part of that monitoring system. Annual capacity building commitments for 2004-05 were roughly US\$ 70 million. Very little of these resources is dedicated to FARS. The biggest contributors are the UK, the World Bank, the European Union, Norway, and the African Development Bank. Funds are increasingly channelled through sub-regional organisations, especially in the case of AFDB, EU and the IMF. A number of partners are also shifting to budget and sector programs. As a consequence statistical support needs to be identified early in the project cycle to get funding.

Funding for Statistics Education: Over the past decade, funding for statistical training centres and for student scholarships has been decreasing. ENSEA, ENEA and EASTC received funding for US\$ 2.2 million for the two academic years spanning 2003-05, and reported about 390 students. Undoubtedly over the past two decades it has also become more difficult to get funding for advanced statistical training in the developed World. There may well be a role for the Foundation in terms of funding not only for statistical capacity development, either directly to specific institutions, or via a scholarship fund.

Some measures of Progress

Beyond the development of approaches, norms, plans and data management, the flurry of activities in statistical capacity development over the past decade have achieved some notable successes in SSA:

- 40 SSA countries participate in the General Data Dissemination System (DDS) of the IMF;

- All countries (except for Somalia) benefit from the International Comparison Program (ICP-Africa);

- SSA countries are participating in the Accelerated Data Program;

- UNDG's DevInfo software, managed by UNICEF, has been introduced in 18 Sub-Saharan African countries (but is not being used by FAOSTAT and CountrySTAT).

- Burkina Faso and Nigeria are implementing STATCAPs financed by the World Bank;

- 16 countries have received TFSCB grants for the design of an NSDS;

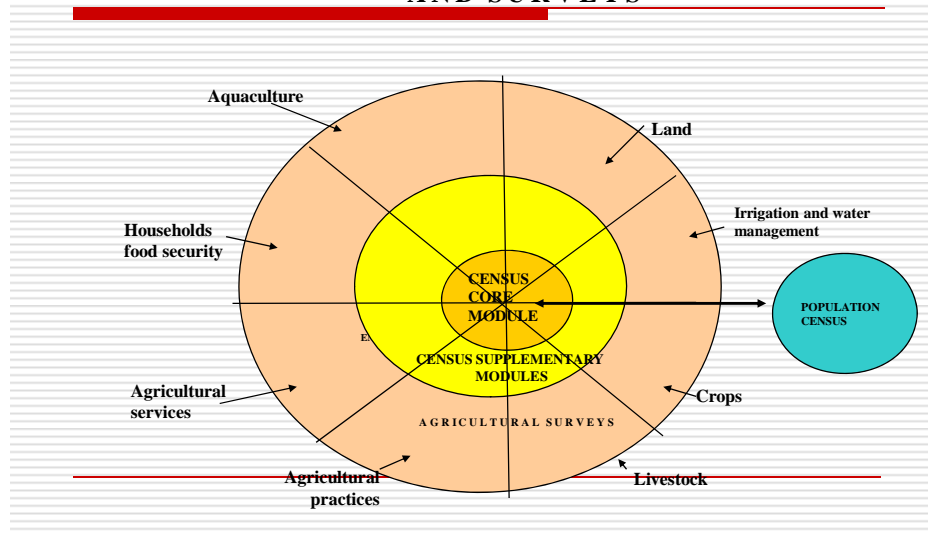
Food, Agriculture and Rural Statistical Systems

As discussed in the introduction, the FARS are often in a particularly sad state.

Bring in the data into the final version

Yet the ideas on how to manage improvements are well developed: Integrate them better into the NSS via the NSDS planning, financing and implementation; and link the various NARS data collection efforts squarely into the census data system as also discussed in the introduction and illustrated in figure 2 (Naman 2008).

Figure 3
**THE AGRICULTURAL CENSUS IN THE
 FRAMEWORK OF THE SYSTEM OF
 INTEGRATED AGRICULTURAL CENSUSES
 AND SURVEYS**



Source: Keita, 2008

Data collection would be organized within a ten year cycle starting with the decennial population census into which a modest agricultural module would be integrated. In order to do that, the population census needs to include a small sample of agricultural core data that could be used to identify and characterize rural household for subsequent selection into samples. Agricultural censuses would then be increasingly done via sample surveys whose household samples would derive from the Population Census and for which a relatively simple core set of data would be collected, with supplementary modules as needed. Other required data, including for production data and crop forecasting would then be derived from subsamples of the agricultural census. FARS would increasingly make use of and contribute to broader household data, including panels. As far as possible, within a single large scale household data set, modules would include crops, livestock, agricultural practices, agricultural services, household food consumption and food security, aquaculture, land rights and land management, and irrigation and water management. Of course in some cases the core module of the household surveys would not be the best way to document the current situation and track the changes: For example, aquaculture might be practiced by too few households and a special survey would be required; nomadic livestock production might require special approaches; and data on large commercial farms not owned would also have to be collected outside a household sample framework. Nevertheless, within the household survey, small farmers and agricultural workers could be viewed in their entire context of complex rural livelihood strategies, and output, input and labour market linkages, as well as data on education, health and other social aspects of life.

These data collection efforts would be designed so that they could generate data for monitoring and evaluating major agricultural and rural investment programmes and for carrying out impact assessments of development programs and of external shocks. To achieve this, the household data would be associated with sufficient community data. The planned focus of the Foundations policy work on shock and fluctuations means that continuous household data collection would also be needed that covers every year and crop season, so that risks can be measured and the impact of shocks on household incomes and behaviour can directly be observed. Such data collection would be carried out within village studies modelled on the ICRISAT village studies in India, rather than on national household surveys. They could either be nested as sub-samples of national surveys or linked to similar earlier surveys such as the Ethiopia village surveys of IFPRI.

FAO and AMCOST have tried hard to generalize this approach and it has been adopted in a number of countries as part of a broader International Initiative to Strengthen Agricultural Data that was developed as part of its collaboration with PARIS 21. But only an interim phase financed by the TFSCB and in kind support from France. Its expansion phase remains under-funded.

There are several specific efforts that so far have not been discussed and into which the Foundation is already involved: FAOSTAT and CountrySTAT organize, integrate and disseminate data on food and agriculture coming from different sources, globally and by country. The data *Data Quality Framework* for these two systems includes:

- The FAOSTAT Data Quality Stamp (a list of criteria has to be fulfilled)

- The FAOSTAT Data Release Schedule

- FAOSTAT Concepts and Definitions

- FAOSTAT Methodology

Agricultural Bulletin Board on Data Collection (ABCDQ) for information exchange and guidance

Periodic assessment of national agricultural data systems via a set of metadata and quality indicators

The focus of FAOSTAT and CountrySTAT is from the Agricultural Census to aggregate production, input, price data, and to AG-GDP, and on the food availability data that are derived from it and that result in the estimates of the number of undernourished people around the world and the famous FAO hunger maps. Unfortunately these systems do not directly integrate data on hunger, forestry, fisheries, soils and biodiversity. Instead such data are contained in more than 40 data bases in FAO which are produced in separate administrative silos. FAO now is trying to harmonized and coordinate these data sets. In particular it will appoint a director for statistics who will oversee all statistical activities of FAO. Of course the harmonization process will involve much more than such administrative reforms. And ultimately it will require the development of a unified data warehouse in the institution for all its data sets. *The question is whether the Foundation would want to support this data harmonization effort, perhaps via support to the hardware and software of the data warehouse.*

Other noteworthy initiatives have included the development of the International Handbook on Rural Household, Livelihood and Well-being; Statistics on Rural Development and Agriculture Household Income; the disseminated new approaches to collection of livestock statistics, and nomadic livestock statistics based on Mali and Niger experiences; and the development and dissemination of approaches to the collection of gender-specific data in the area of FARS. In the natural resource area the availability of *satellite imagery* has made possible the recent *Land Degradation Assessment in Dry Lands* that is managed from FAO and that is supported by GEF and UNEP. Its global assessment is based on 25 years of satellite data on biomass coverage that are available in 8km x 8km grid. Apparently it has observed more greening than loss of vegetation, even in the Sahel. Red spots with loss of vegetation stem primarily from urbanization (India, China), but can also be found in other pockets, such as the former homelands of South Africa. A report on these findings is still awaited. The global satellite surveys are complemented by more detailed national follow up studies in South Africa, Tunisia, Senegal Argentina, and China. These national studies will also include work at the local level via local field verification, both in green spots and in red spots. Undoubtedly this study will overturn a lot of conventional wisdom on land degradation.

The urgency of improving FARS has not escaped notice of other players. In the margins of the February meetings of the UN Statistical Commission, an initiative led by EUROSTAT emerged to produce a *Consensus Paper on AG Statistics* that would map the way forward to deal with these weaknesses. It would be prepared by expert group convened by Agricultural Statistical Committee of ISI, led by Mary Bohman and Fred Vogel. A draft would then be presented at already planned UNCS and ISI meetings in 2009 and at the next International Conference on Agricultural statistics in 2010 in Uganda. The entire process should support the currently ongoing FAOs review of its role in Agricultural Statistics. It would address the integration of agricultural and food data with household data, natural resource data, and other new approaches. It would

lead to an international standard of Agricultural statistics. Clearly both the HISN and the Foundation should be an active part of the preparation of this consensus paper.

AFCAS has not only been instrumental in developing and disseminating the growing consensus, but it has also repeatedly articulated clear support priorities that should influence how the Foundation would support FARS in the future:

- Enhanced overall support for National Agricultural Statistics from FAO
- Via strategy development (link to PARIS 21 and NSDS),
- Via support to CountrySTAT
- Via more workshops for info exchange and training
- Via combining data collection with capacity building
- Implementation of sex-disaggregated data
- In line with Afr. Gender & Devlpt. Index
- Via concepts of sub-holder and sub-holding,
- Collection of fisheries data (but they have said little about soils, water and forestry data)
- Support with GIS and remote sensing
- Including plot measurement and crop forecasting
- Support to analysis of agricultural data
- Especially sector modelling (via FAO-IFPRI link)
- Research, literature review and technical guidance in the areas of
- In intercropping, root crops, other continuously harvested crops
- In nomadic household systems
- Of farm household income, home consumption, and nonfarm income

The Ongoing Program of the Bill and Melinda Gates Foundation in Support of FARS in Africa:

The Foundation has already started to respond to the poor agricultural data situation and to selected requests for support. Ongoing support includes:

To the FAO CountrySTAT initiative in 17 SSA countries, with a total grant to FAO of 5.6 mio US\$.

To the rescue effort of publications, outputs and perhaps raw data of past agricultural censuses, consumption and cost of cultivation surveys. Ten priority countries were selected from the 17 CountrySTAT countries. The support is via a grant to Harvest Choice, located at IFPRI. It collaborates with FAO, the University of Pretoria and with the University of Minnesota.

To the World Food Program household data collection on food security indicators in 16 SSA countries that are also CountrySTAT countries.

A core component of the future support that is already in an advanced state of planning is a large program of *household panel data collection that would include strong nutrition, agriculture and rural (NAR) modules*. It would be managed by the by the World Bank LSMS team. A proposal from the LSMS team was reviewed in a

workshop in Washington DC on May 19 and 20. The final program will include 5 to six countries. The program would not only impact on the five or six countries covered, but would help create improved approaches and systems for such FARS focused household studies that could be used in other countries willing to undertake such efforts with support from other donors and groups of analysts, such as the planned household surveys in Ghana supported by the Economic Growth Center of Yale University. The tools developed would also be spread via the National Household Survey Network.

The strategic framework and the options for future support

The additional initiatives proposed here for GATES support are based on the following strategic premises: The effort to improve general data in SSA has gathered a lot of momentum in the past few years, and has generated a comprehensive, perhaps excessive set of institutions and initiatives. The support is organized under a coherent NSDS vision in support of National Statistical Systems that will increasingly generate quality analysis and demand for data and willingness to financially support the data systems from the national policy makers. Many, if not most of the tools for managing the transition to modern statistical systems in Africa are therefore in place.

On the FARS side, FAO, AFCAS and the NSS provide a well developed institutional framework for agricultural statistics. A coherent vision of how to develop the FARS system has also gained widespread support. The tools to integrate FARS properly into NSS also exist, but are still hampered by various obstacles. Similarly, much of the technical experience and guidance on how to develop the data that belong into the FARS are also available, but not always well disseminated and implemented. However, much of these advances are implemented only spottily and the systems remain riddled with deficiencies. These stem partly from a lack of sufficient financial support to capacity development of FARS, and of the critical support needs that were identified repeatedly by AFCAS.

As a consequence it is fortunate that the Foundation has identified the neglected area of FARS for support rather than dealing with the broader statistical capacity building effort. Given that a coherent vision, institutions, and technical guidance already exists, it is proposed that ***GATES adopt a gap filling approach where it funds the areas that so far have not received adequate support.*** Indeed its current support and the planned household data collection have in fact already identified important gaps that needed to be filled.

However, the Foundation will undoubtedly want to generate co-finance from other partners for its FARS overall FARS program or for components thereof. And it may want to move to a bigger push in this area than a gap filling approach implies. In this case ***it could also take a leadership position in a trust fund for FARS capacity development.*** Such a Trust fund could, for example, become a dedicated window in the TFSCP managed by the World Bank.

Based on the analysis of the paper the following additional areas have been identified for consideration by the Foundation:

A dedicated team for technical assistance to the integration of AG Stat into NSDS and the subsequent implementation. This team would enable a response to the number one support request that AFCAS members have repeatedly addressed to FAO, and contribute to priorities 2, 3, 4, and 6. The proposal for such a team has long been made as part of the Initiative for Agricultural Statistics (FAO 2002). At that time its total costs were estimated at close to 12 million US dollar over a period of that has remained underfunded (FAO 2002, attached to this paper). Therefore both the TOR for such a team, its composition, and the location of the team and its members could would not have to be invented from scratch, but could start by revisiting the already existing proposal that is listed in the reference.

The implementation experience of the financing provided to FAO from the TFSCB has shown that operating within the administrative system of FAO is cumbersome and does not favour the agile operation of a large scale capacity building effort such as the proposed team. The governance arrangements for such a task team

could involve the PARIS 21 Task Team for Agricultural Statistics that is headed by FAO. The merits of this arrangement are that it brings together the stakeholders involved in NSDS development and support, African stakeholders and additional potential funders. Options for institutional hosting of the funds for such a team include the PARIS 21 secretariat, or UNECA's African Center for Statistics.

Support to ***general and FARS specific statistical training in Africa***. The main rationale for this component is that financial support for such training, either in the African specialized institutions and in its Universities, or in developed country institutions, has declined, while demand for trained statisticians has increased significantly. Therefore there is an acute shortage of the required professionals. As discussed in the text this could perhaps be done via a grant to fund for scholarships that would be open to students studying in a broad range of African and non-African institutions. Or it could be done via specific support to one or several of the five statistical training institutions in Africa. Or it could be done via a combination of the two.

Support to Village level studies modelled on the ICRISAT village studies also supported by the Foundation, could generate much needed annual and seasonal data capturing the important fluctuations in climatic conditions, the price environments and therefore agricultural production and the associated farm and nonfarm incomes. These smaller studies would be carried out by specialized research institutions, preferably with links to research partners in the developed World. They could either be nested into the broader household samples, or build on similar previous data efforts to capitalize on already existing past data.

Support ***to the analysis and capacity building of the emerging micro and/or sector-wide data sets***. This would respond partially to priority 5 of the AFCAS list. This specific request focused on sector analysis with the help of IFPRI. In addition, however, analysis of the new household data will generate many additional capacity challenges that will have to be bridged. A program of capacity building could be executed via the planned economic and policy analysis program of the Foundation. It should learn from the other successful analytical capacity building effort, the African Economic Research Consortium (AERC). Its execution could possibly be managed by AGRA.

Support to ***FAO's internal harmonization of FARS*** across its diverse organisational units and sectors. While managing, implementing and financing of this core function. However the Foundation could consider a one time grant for *assisting with the software and hardware of a new data warehouse*.

Next Steps

It is recommended that the Foundation start out by considering whether this gap filling approach to FARS is a sufficient strategy to remedy the problems with these systems, and therefore appropriate for the Foundation. If it finds that is not the case, it might consider leading a broader initiative to fund a dedicated FARS capacity development Trust fund.

The Foundation would also need to examine whether this paper properly analyses the current institutional and program situation and the needs of the countries and the analysts, and whether the gaps have been properly identified. It would also want to have the paper reviewed by African Stakeholders and other stakeholders active in the FARS area. This could be done by asking Naman Keita from FAO to circulate the paper for comments to the AFCAS members and the members of the Task Team for Agricultural Statistics of PARIS 21. The views of Mary Bohman and Fred Vogel who are heading the ISI task force on the Consensus Paper for Agricultural Statistics should also be sought. This would also facilitate the future interaction of the Foundation with this task force. At the end of the consultation the paper would be revised and finalized.

Once a final version is available, the Foundation would select among the five identified proposals those that best fit the Foundations priorities and that can be fitted within its budget constraints. After that the task of development of the actual support programs would commence, including the most important issue of

identifying the appropriate institutional capacities and setups to carry them out. Undoubtedly program development would also involve mobilization of co-financing resources. Program development would involve a choice of countries in which the various initiatives would be operating. Undoubtedly the new initiatives will also give some preference to countries in which the National Household Surveys will be supported.

The interaction with the African stakeholders would then be deepened at the next AFCAS meeting in the fall of 2009 when all the data initiatives of the Foundation in Africa could be presented, discussed and further improved with this most important group of stakeholders.

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Annex 6: Excerpts from AMCOST paper on African Agricultural Research

Materials already covered in the main text and AMCOST-specific issues have been removed

Concept Paper for the African Ministerial Council on Science and Technology (AMCOST)⁵

November 9, 2007

Introduction

In their 2003 paper “The CGIAR in Africa: Past, Present, and Future” Carl K. Eicher and Mandivamba Rukuni evaluated the Consultative Group on International Agricultural Research (CGIAR) performance in Africa in the context of the entire agricultural science and education systems in Africa, and this approach will be followed in this concept paper. Among their many important conclusions are the following:

- Despite difficult start-up problems, the CGIAR centres have made significant contributions to African agriculture
- Funding constraints and donor preferences have forced the centres to become more development-oriented, and as a consequence their scientific efforts are under-funded.
- The National Agricultural Research Systems (NARS) and their supporting scientific and agricultural education systems are large, weak and under-funded.
- The CGIAR will not achieve its full potential until the NARS become productive and financially sustainable.
- There is an urgent need to build a strong agricultural science base in five to ten countries.
- The current strategies focusing on technology generation and transfer are unsustainable because inadequate attention is given to human capital replenishment and universities.
- The NARS, SROs, the CGIAR, and donors are improving priority setting, partnerships, coordination, accountability and financing of the technology generation and transfer.

This concept paper updates this previous assessment and traces the efforts to improve on the weaknesses diagnosed in the Eicher and Rukuni paper. Significant progress has been made, but the under funding of the NARS and human capital development have not been resolved.

The Changing Nature and Context of Innovation in Agriculture

(covered in main body of the paper)

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The African Agricultural Context

(covered in main text)

The Growing Divide in Agricultural Research Systems and Spending

(covered in main text)

Agricultural science and technology as public goods

Agricultural science and technologies can be used by one farmer without reducing its availability to another farmer, a property called non-rivalry. It is hard for innovators to restrict the use of innovations to those who pay for their use that means that most innovations are non-excludable: Scientific results are usually published; genetic improvements are incorporated in seeds that, except in the case of hybrid seed, can be multiplied by farmers; and machines can be copied. Without protection of innovators rights via patents and other mechanisms to protect intellectual property private individuals therefore would have little economic incentive to invest in scientific discovery and the generation of agricultural technology. *A market failure results.*

Public funding of scientific and agricultural research has traditionally been the primary way that the market failure has been overcome for agricultural sciences and for biological technologies. Excludability has also been created by the use of trade secrets, in which the innovator sells a product into which a technology is embodied without divulging how it was produced. That of course does not protect seeds that can be multiplied without a loss of quality. In order to enhance private investment in science and technology legal intervention were therefore needed to create enforceable intellectual property rights (IPR), and thereby overcome non-rivalry and to create excludability: copyright, trademarks, patents, and plant breeder's rights.

For mechanical and chemical innovation the patent system has for a long time provided protection of innovators rights by giving the innovator an exclusive right, usually for about one to two decades, to market his or her innovation for a limited period of time. This exclusive right is granted by a nation in exchange for the publication of the blueprint or formula for the innovation that can only be copied after the patent has expired. The innovator needs to apply for the patent in all the countries in which he intends to sell his product. There are therefore significant costs for the innovator in creating and maintaining patent rights.

Plant breeder's rights are anchored in special legislation and international conventions that protect plant varieties, although the protection is typically weaker than the rights granted by the patent system. It is these rights that have encouraged the massive entry of the private sector into bio-technology research.

A unique mechanism of protection of intellectual property arises in the case of hybrid seed, which lose productivity after every generation. The farmer therefore has to go back to the plant breeder and buy seed every year. As a consequence, all over the world, varieties of hybrid seed are now primarily produced by the private sector. On the other hand the private sector is far less active in the production of other seeds, a powerful illustration of the impact of lack of economic incentives.

All IPR systems involve transactions costs to the innovator. They also involve an economic cost because they reduce the spread of the innovation to those willing and able to pay for the technology. Finally, intellectual property rights can be abused, as when protective patents are acquired over innovations that may be important to rivals but that are then not used by the right holder. While the positive incentives effects of the intellectual property rights are recognized, the economic costs and the potential for abuse lead some to oppose IPRs in general, and plant breeder's rights in particular (see, for example, Boldrin and Levine 2002).

Public agricultural research, contract research, or the promise of a prize for agricultural innovations, can overcome the economic costs of exclusion associated with IPR. A government can collect revenue and develop a contract system for research under which all research results are immediately made available to all for use. Or it can give a prize to the innovator who first provides it and then pass the innovation immediately into the public domain (Wright et al. 2007). The difficulty under both systems is to properly characterize the innovation that is being sought, and set the contract terms or the award at the appropriate level.

Economies of scale in science and research also pose a barrier to the creation of effective innovation systems, especially in small countries. If a small country can expect significant spillovers of research results and innovation from its larger neighbours, or from the developed world, it may choose not to invest in agricultural science and technology and free-ride on the international public goods created by others. Even if it decides to invest in its own capacity, it cannot hope to invest into a full range of research capacities covering all commodities it produces or all its farming systems. As a consequence, international cooperation is essential for bringing smaller countries into the agricultural scientific and research system. As we shall see in the next section, African countries are well on the way to create the required mechanisms for sub-regional and regional collaboration. *The challenge for African governments is now to find appropriate funding mechanisms that would enable them to properly finance these new institutions, as well as additional centres of agricultural scientific excellence.*

Finally it should be noted that the CGIAR itself is a unique global effort created over the past nearly 50 years to overcome the poor incentives of private individuals and firms to invest in agricultural science and technology for the developing world. As we shall see, its greatest contribution has been in the creation of many of the “international public goods” that have led to the Green Revolution in agriculture.

The Agricultural Research System in Africa and its Coordination

As we have seen, Africa contains over 400 institutions engaged in agricultural research, including government and non-government research institutions, Universities, and Private sector institutions. Within each country, are collectively described as the “National Agricultural Research Systems” (NARS) and usually have created a network or umbrella organisation that helps them in advocacy, coordination and other common functions. In the different sub-regions of Africa the NARS have created Sub-Regional Organisations (SROs) the strongest of which are CORAF/WE CARD for West and Central Africa and ASARECA for Eastern and Central Africa. The SRO for Southern Africa is the SADC Food Agriculture and Natural Resource Directorate (SADC/FANR), and a North Africa SRO initially comprising Morocco, Algeria, Tunisia and Libya is also under development. The SROs are legally independent entities that foster research collaboration in their sub-Regions, and ASARECA and CORAF/WE CARD have established research grant funding mechanisms of their own, with significant support from the European Union. (Source: FARA website and websites of the individual SROs).

In 1991 the three SROs for sub-Saharan Africa established the Forum for African Agricultural Research that has its secretariat at the regional FAO office in Ghana, which took over all functions of, and replaced the Special Program for African Agricultural Research located at the World Bank. FARA is not a research organisation but an umbrella body of all the stakeholders in African Agricultural Research, including the African research institutions, the CGIAR and its Centers, CIRAD and IRD of France, African universities, the private sector, NGOs and donors. Its recently approved strategic plan for 2007-2016 includes the following three strategic statements (Box 2):

Box 2: FARA Strategic Statements

FARA's Vision: Reduced poverty in Africa as a result of sustainable broad-based agricultural growth and improved livelihoods, particularly of smallholder and pastoral enterprises.

FARA's Mission: The creation of broad-based improvements in agricultural productivity, competitiveness and markets by supporting Africa's sub-regional organisations in strengthening capacity for agricultural innovation.

FARA's Value Proposition: To provide a strategic platform to foster continental and global networking that reinforces the capacities of Africa's national agricultural research systems and sub-regional organisations.

The Forum is governed by the FARA General Assembly, which approves its main governance and management instruments including the FARA Constitution, FARA's ten year Strategic Plan, five-year Medium Term Plan, and three-year rolling Operational Plan. The functioning of the Forum between General

Assemblies is entrusted to an elected Executive Committee, which oversees the program and the work of FARA's Secretariat, which manages FARA's Strategic Plan.

FARA operates under the principle of subsidiarity and therefore undertakes only functions that cannot possibly be executed by the SROs, the NARS, or the constituent research institutions. Indeed, since FARA is the creation of the SROs, it cannot usurp their functions, but instead has to support them as explained in the above strategic statements. FARA has been entrusted by the African Union and NEPAD to coordinate Pillar 4 of its Comprehensive African Agricultural Development Program (CAADP) which focuses on Agricultural Research and Technology Dissemination. Under this pillar, FARA has developed the Framework for African Agricultural Productivity (FAAP, 2006) that sets out guiding principles for how research is to be fostered, institutionalized and financed in Africa. Under FAAP, FARA, the SROs, and the NARS will collectively guide the evolution and reform of agricultural institutions and services, foster an increase in the scale of Africa's agricultural productivity investments, and help aligned and co-ordinate financial support (Figure 1, reproduced with FARA permission)

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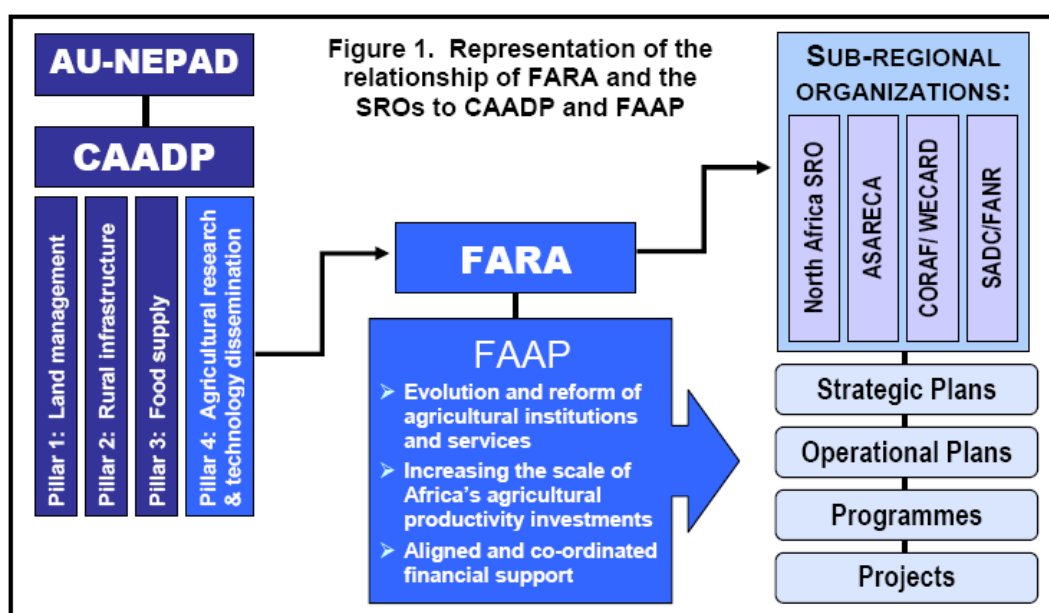


Figure 1: FARA and its Relationships

In February 2007 a joint external evaluation (JEE) by the five most important donors to African Agricultural research concluded as follows: "FARA is a young organisation.... it has developed a strong organisational framework in its first three years of full existence.... There is strong region-wide support for FARA, and there are sufficient checks and balances within the Forum to ensure accountability and stakeholder representation. The Secretariat has demonstrated that it is both efficient and effective in its operations....with increasingly significant tasks being assigned to the FARA Secretariat and the various FARA constituencies, these ... urgently need to increase their human resource capacity. A revised strategic plan will help FARA enunciate its alignment to FAAP and codify the results chain at a continental level. FARA's current portfolio of region-wide initiatives is a significant beginning to the strengthening of national systems for delivery of results under NEPAD's CAADP Pillar IV. ... JEE believes that the FAAP provides a framework for harmonizing donor support, and that committing to consolidated funding of the FARA Rolling Work Programme & Business Plan [RWPBP] is the best means of pooling resources." (JEE report 2007, p.11).

Current Characteristics of the CGIAR in Africa

In 2006, of total CGIAR expenditures of 458 million dollars, around 220 million dollars, or 48 per cent, went to Sub-Saharan Africa. Africa also benefited from the share of 9 per cent share of CGIAR expenditures that went to North Africa and Central and West Asia. All Centers currently have programs in SSA. Two Centers are located in West Africa (IITA and WARDA) while two are in Eastern Africa (ILRI and ICRAF). These four centres spent a total of 117.4 million dollars, a little over half the total CGIAR expenditures for sub-Saharan Africa in 2006. As table 1 at the end of the paper shows, the CGIAR centre programs cover a breathtaking range of topics; the timeline also shows that the range of topics has expanded significantly over the past decade. In addition the table provides the current resource allocation of the Centers to Africa. Table 1 Major Research Focus and Activities of the CGIAR Centres in Sub-Saharan Africa, 1970s-2004

In 2003 there were a total of 70 Center offices/sites in SSA distributed in 21 countries, although more effort is concentrated in East and Southern Africa than elsewhere. Thirteen Centers operated in Kenya alone. There were a total of 162 CGIAR Centers' programs/projects in SSA, of which 82 were conducted by the SSA-based Centers. The Centers reported 117 SSA programs/projects which they carried out in partnership with other institutions. To implement these programs/projects, the Centers engaged a total of 389 internationally recruited staff (IRS), 121 regionally recruited staff (RRS), and 2607 local staff (LS). However, as discussed previously, the CGIAR spends less than 10 per cent of its overall resources on biotechnology research, and little of that is likely to be spent in or for Africa. Since most of the NARS have little biotech capacity, and the private sector is so insignificant in African agricultural research, the biotechnology gap for Africa is an enormous issue.

A final note is that a number of important export commodities in which Africa has lost market share over the last forty years are missing from this list: cacao, coffee, oil palm, and tea. Also notably absent is cotton, in which West Africa has gained a major share of the World Market, thanks to support from France and poultry, goats and sheep, and pigs.

The CGIAR is not the only set of advanced research institutes (ARIs) operating in or for Africa. France's *Centre de Coopération Internationale en Recherche Agronomique pour le Développement* (CIRAD), and the *Institut de Recherche pour le Développement* (IRD) -formerly *Office de la Recherche Scientifique et Technique Outre-mer*, (ORSTOM) - also operate on the continent. In 2005 CIRAD was structured around seven research departments: annual crops; tree crops; fruit and horticultural crops; animal production and veterinary medicine; forestry; territories, environment and people; and advanced methods for innovation in science. It employed 1,820 people, including 1,050 senior staff members, and had an operating budget of 200 million euros. In 2005, IRD's activities were clustered into six programs: natural hazards, climate and non-renewable resources; sustainable management of Southern ecosystems; continental and coastal waters; food security in the South; public health and health policy; and globalization and development. It had a total budget of 195.2 euros and employed 2,256 staff, of which 43 per cent were located outside mainland France (Pardey et al, footnote 35). *The combined budgets of these two institutes are as large as the entire CGIAR budget.*

Biosciences Initiatives

The establishment of the Biosciences eastern and central Africa Network (BecANet) facility in 2004 was seen as a partial remedy to the low activity in biotechnology research. BecANet is one of the four regional biosciences networks initiatives established under the auspices of the New Partnership for African Development (NEPAD) and supported by a grant of US\$21 million from the government of Canada, which provided a US\$3.8 million grant for the facility's design and planning phase. BecANet builds on the intersection between the two NEPAD priorities of improving African capacity in science and technology and improving agricultural productivity. Its objective is to promote development and sharing of bioscience facilities, in partnership with the NEPAD Secretariat, which assembles African and international expertise, builds capacity for required research on biosciences, and addresses priority agriculture and agricultural-related

environment and health problems of Africa. The network covers 17 countries in eastern and central Africa regions. BecANet consists of a secretariat and Hub located on the campus of the International Livestock Research Institute (ILRI) in Nairobi, Kenya (that should provide a common biosciences research platform, research-related services, capacity building and training opportunities), regional nodes, and other laboratories distributed throughout eastern and central Africa for the conduct of research on priority issues affecting Africa's development. In addition NEPAD has initiated three other African Biosciences Initiative which are networks of leading centres and consist of hubs and nodes in Northern, Southern and Western African, i.e., Southern African Network for Biosciences (SANBio) with its hub at the Council for Scientific and Industrial Research (CSIR), Pretoria, South Africa; the West Africa Biosciences Network (WABNet) with the hub at Institut Sénégalais de Recherches Agricoles (ISRA) in Dakar, Senegal, and the Northern Africa Biosciences Network (NABNet) with the hub at National Research Centre (NRC) of Cairo, Egypt. These hubs possess the necessary physical infrastructure to develop and implement regional and continental biosciences projects.

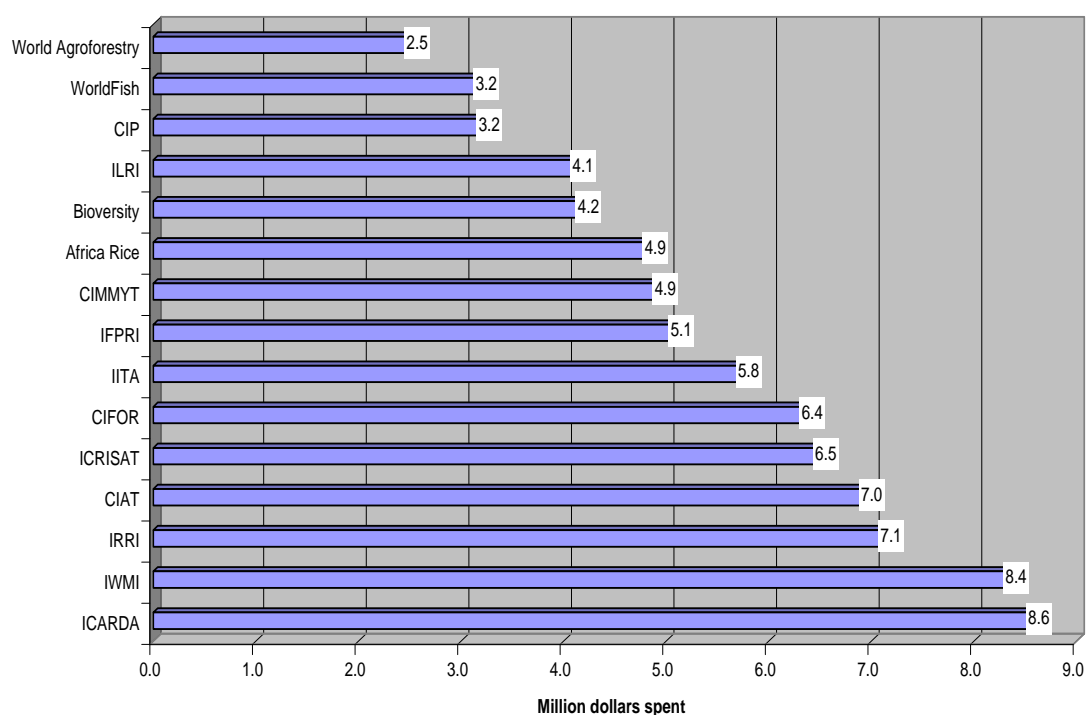
Publications by CGIAR Centres

A crude measure of scientific productivity is the number of publications in peer reviewed journals that are produced by research institutions and programs. The CGIAR now collects data on the number of publications that authors affiliated with each Centers have published, often in conjunction with other scientists. The journals included are those listed in Thompson Scientific/ISI. In 2005 and 2006 on average each centre published 160 peer reviewed articles. Since centres differ in size, to make comparisons across Regions and centres, we look at the number of publications per million dollars of expenditures.

The average number of publications by the CGIAR as a whole over the period 2005/2006 amounted to 5.5 publications per million dollars spent. Over the same period, on average, produced 4.4 publications per million dollars and the non-African ones accounted for 5.8. In other words, Non-African centres have a third higher publication productivity than African centres per million dollars spent. The good news is that African Centers are productive in terms of scientific output. But clearly they are lagging behind the non-African Centers, and there is significant room for improvement.

Among the Africa centres, none does better than the modal CGIAR center. Within Africa, the International Institute of Tropical Agriculture (IITA) ranked 7th out of 15 on the total CGIAR scale with 5.8 publications per million dollars spent, followed by WARDA, the African Rice Research institute which ranked 9th with 4.9; the International Livestock Research Institute (ILRI) was ranked 11th with 4.1 publications per million dollars spent while the World Forestry with 2.5 publications per million dollars ranked lowest in Africa as well as in the entire CGIAR system. These data are consistent with the finding of recent independent reviews of the centers.

Number of Peer-Reviewed Publications by CGIAR Centres-



Global and African Returns to Agricultural Research

CGIAR research has made significant contributions to SSA agriculture. Many previous studies highlight successes such as the high-yielding cassava varieties that include resistance to mites, mealy bugs, cassava bacterial blight, tolerance to drought, low cyanogens potential, and good cooking quality; the famous biological pest control especially in cassava but also in other crops; biological pest control in potato, including via pest resistant cultivars; improved hybrids and open-pollinated varieties of maize in eastern and southern Africa; higher-yielding wheat in eastern and southern Africa; hybrid sorghum in Sudan; semi-dwarf rice for irrigated regions in West Africa; early maturing cowpeas in West Africa; and disease-resistant potatoes in the eastern and central African highlands.

Some recent successes are the NERICA inter-specific hybrids of rice (Box 3); the introduction of wheat production south of Khartoum; drought tolerant maize varieties; maize resistant to maize streak virus and downy mildew; seed coating methods to control striga in maize; adoption of new barley varieties on 20 per cent of barley area in Morocco; introduction of a striga-tolerant short duration sorghum variety in Ghana; improved sorghum varieties; improved tilapia for integrated aquaculture-agriculture, applied especially in Malawi and Cameroon; vitamin A-rich orange-flesh sweet potato; cassava mosaic disease resistant varieties; wilt resistant extra short duration chickpea varieties for Eastern Africa; varieties of cowpeas resistant to striga, aphids, and bruchids; the use of botanical pesticides in cowpea fields and in storage; identification of wilt-resistant long-duration

pigeon pea varieties for Malawi, Tanzania, and Uganda; and high-yielding short-duration pigeon pea types for Kenya; improved varieties of soybean that fix more nitrogen from the atmosphere without rhizobium inoculation, are high yielding, store well, and are resistant to pod shattering; development of a wide range of new foods from soybeans and adoption of some of them; promotion fodder trees, and of agro-forestry techniques to restore soil fertility, and control of trypanosomiasis in cattle.

Data from 1990 show that adoption has been significant. In the late 1990s the adoption rate of improved varieties of all crops was 22 per cent of total area planted, and of this 11 per cent was planted to CGIAR related varieties, usually produced in collaboration with the NARS. Pardey et al. table 6). Data from between 2000 and 2005 shows overall adoption rates for wheat, slightly above 70 %, for maize around 45 %, rice at 26 %, cassava 19%, sorghum 15 %, and potatoes at 12%, In eastern, central and southern Africa 10 million farmers are reported to plant and consume improved varieties of beans. (other materials in this section covered in main body of paper)

Box 3: WARDA's Nerica

In 1992 the West Africa Rice Development Association (WARDA) initiated a research program aimed at developing high performance rainfed rice varieties suited to African agro-ecological conditions, by combining the ruggedness of African rice with the productivity of Asian species. WARDA used molecular biology to overcome sterility, the main problem in crossing species, and accelerate the breeding process. In 1996, the NERICA (New Rice for Africa) was born. NERICA combines the resistance of the African parent to pests, diseases and water stress with the yield potential of Asian parent; it reduces weeding requirements and displays drought and acid soil tolerance. In addition, it tastes good, say the farmers. Today there are around 200,000 ha of land under upland NERICA production. Côte d'Ivoire, Uganda and Guinea each have more than 10,000ha under production and 20 other countries are producing on smaller areas.

For the Nerica and other variety development activities the NARS and IARCs are increasingly adopting participatory varietal selection (PVS) in farmers field: The farmers select plant strains adapted to their growing conditions, their tastes, and their cooking habits. In addition to satisfying farmers' needs, this approach can reduce plant breeding cycles by several years.

Weaknesses of the CGIAR system

No sooner did the CGIAR enter its funding crisis after the massive expansion of mandates and Centers in the early 1990s that a number of reform efforts were initiated that are discussed in detail in the IEG report of 2003. These reforms tried to address the following weaknesses that were identified by a number of studies, and summarized most cogently in the IEG report:

A gradual drift away from the production of international public goods that could be used and adapted again and again by researchers in applied innovation systems. These public goods include the golden eggs of the system, the major scientific breakthroughs such as those underlying the green revolution, or the NERICA rices discussed above;

1. A shift from directly productivity enhancing research towards natural resource management and other topics;
2. A loss of power and relevance of the work of the Technical Advisory Committee, the precursor of the Science Council;
3. A lag in the application of bio-technology;
4. A shift in donor funding from core support to project funding, that is seen as largely responsible for the problems 1, 2, and 3 above;

5. Weak collaboration among Centers and between Centers, the private sector, advanced research institutes (ARIs), Universities and NARS (this despite the international networks for varietal testing run by many Centers);
6. Lack of responsiveness to client and farmer needs;
7. Enormous transactions costs in the governance, management, and fundraising efforts of the system and the individual Centers, with donors often insisting on their own supervision rather than relying on the many review processes of the system itself;
8. Despite the enormous transactions costs, weak quality control and coordination of the scientific efforts of the institutions;
9. Inability to terminate unproductive lines of work, programs, or even Centers.

For Sub-Saharan Africa additional identified weaknesses were as follows:

- The large number of Centers and Programs operating in the Region imposes a special burden on the NARS
- CGIAR research priorities were seen as not aligned with the priorities of NARS and SROs
- The Centers were often induced to work on applied research and development programs in order to compensate for the weaknesses of NARS.

In developing its reform program after 2000, the CGIAR rejected radical proposals to create a single institutional setup under a single Board and management. It also rejected the reduction of the number of Centers: Only the two African livestock institutes were merged, and the International Service for National Agricultural Research (ISNAR) in The Hague was merged with IFPRI. Instead, as is clear from the description of the system above, the system was put under a single Executive Committee (EXCO), with a virtual Systems Office, a Systems Director heading that Office, a Science Council. A number of existing committees were abolished or streamlined into new committees. The system gave itself a Charter which defines roles and responsibilities, governance and working rules for the system as a whole and its components.

The CGIAR also created a series of Challenge Programs: “A CGIAR Challenge Program (CP) is a time-bound, independently-governed program of high-impact research that targets the CGIAR goals in relation to complex issues of overwhelming global and/or regional significance, and requires partnerships among a wide range of institutions in order to deliver its products. The first CPs, namely, Water and Food [for growing more food with less water], HarvestPlus [to breed nutrient-dense staple foods], and Generation [to create a new generation of plants based on molecular biology and the existing stock of genetic resources], were launched on a pilot basis in 2003 following a CGIAR-approved process and guidelines for developing and implementing CPs. A fourth CP, the Sub-Saharan Africa Challenge Program (SSA CP), was approved by the CGIAR, conditional on successful implementation of an 18-month inception phase beginning in January 2005.” (<http://cgiar.org>). The African Challenge Program is headed by FARA, the only Challenge Program headed by an entity outside of the Centers. The Challenge programs have led to a modest increase in systems resources without crowding out financing of the regular systems activities. An initial evaluation of the programs by the Science Council provided indications that expectations of the challenge programs were being met as well as lessons for improving the programs.

Box 5: The Sub-Saharan Challenge Program

Under the Title “Securing the Future for Africa’s Children,” the program intends to build sustainable livelihoods through integrated agricultural research for development (IAR4D) in three pilot learning sites in Northern Nigeria and Niger, the Lake Kivu area, and adjacent areas in Malawi, Mozambique and Zimbabwe. (See Box 1 for a discussion of the IARfD concept). The work in the pilot project sites will go well beyond seeking specific scientific breakthroughs or new technologies but intends to bring innovations to the entire value chain from farm inputs, farm production to final markets. It intends to create innovation platforms that can tackle the interface among the four research components (productivity, NRM, markets and policies). The work will include support in the areas of capacity building, knowledge management and information sharing, monitoring, evaluation and impact assessment, and organisational and institutional change.

An inception phase of 18 months has now resulted in the endorsement by the CGIAR. Within the pilot learning sites the following nine research projects have been approved. During the approval process the Science Council and other independent reviews repeatedly expressed the concern that the innovations to be sought in each of the proposed projects and the program as a whole were not clearly defined, and that the science content was not properly spelled out. While the program is intended to generate location-specific systems innovations, including technologies, the global public good is expected to produce further development and validation of an integrated approach to innovation that can be replicated across Africa, and perhaps elsewhere. The Science Council insisted on the development of an elaborate monitoring and impact evaluation system for the program that can deliver a proof of concept from the initial three pilot areas. Given the complexity of the proposed IARfD projects such impact evaluation will present significant methodological challenges.

From the above description it is clear that the African Challenge Program did not start by an ex-ante articulation of specific constraints to expanded production and marketing, livelihoods, and nutrition, and instead to a much broader approach to innovation that brings it much closer to a development program than a scientific research program. Whether in the process it will be able to address the key known bottlenecks and stressors that hold African Agriculture back remains a wide open question.

In 2005 the Science Council issued a revised list of for the CGIAR research priorities that are listed in Box 6. These are broad priority areas and may be viewed more as areas of competence of the system, rather than fully developed priorities. The Science Council also developed guidelines for the preparation of medium term plans by the Centers. (www.sciencecouncil.cgiar.org/activities/spps/pubs). The priorities exercise attempts to move Centers away from activities which do not produce international public goods and, secondly, to

move the Centers away from development activities with no research content. The SC proposes that the Centers and the CGIAR members agree to allocate 80% of the total CGIAR budget for research and related capacity strengthening to the five Priority areas mentioned in Box 6. To contribute to a dynamic and flexible research environment, the SC suggests that the CGIAR spend up to 20% of its budget outside the System Priorities. It further encourages Centers to utilize at least half of that 20% for exploratory, innovative research work to develop new science and potential new future priorities. The other half of the 20% could be spent on free-standing capacity building or other research-related activities at the discretion of Centers.

Box 6: Science Council Priority Areas for 2005 to 2015

The intention of the new guidelines is to refocus research along the following lines:

- A re-emphasis of the CGIAR's role in research on major long-term issues
- Development of specific Systemwide contributions to the Millennium Development Goals
- Research for development—not development *per se*
- Explicit focus on income generation among the poor
- New collaborative approach to research on fruit and vegetables
- Research on trade, markets, and food safety
- Enhanced focus of research on drought, soil acidity, and temperature stress
- Application of modern molecular science
- Landscape-level approaches to the management of agricultural and natural resources

Application of these guidelines resulted in the **selection of five priority areas** for research, each of which has four sub-areas:

1. Sustaining biodiversity for current and future generations
2. Producing more and better food at lower cost through genetic improvements
3. Reducing rural poverty through agricultural diversification and emerging opportunities for high-value commodities and products
4. Promoting poverty alleviation and sustainable management of water, land, and forest resources

The CGIAR would like to devolve breeding programs to capable NARS (including their emerging private sector) where these exist. The intention is that: a) the CGIAR does not unnecessarily duplicate or inhibit the capacity of NARS and their partners, and, b) the CGIAR Centers can better utilize their existing expertise, acting on the comparative advantage of the System, to draw in new advances in genomics from Advanced Research Institutes and apply them to some of the major challenges for germplasm improvement.

Studies by the SC that show that Centers do work extensively with each other. The typical Center collaborates with seven other Centers; the most frequent international collaboration cited by Centers is “with other Centers”.

As far as Sub-Saharan Africa is concerned, the CGIAR Task Force on SSA of 2005 endorsed the proposal of the establishment of a single corporate entity to manage all the CGIAR centers and activities. Within this single entity the Task force considered that two types of structural alignment were needed in SSA: (1) adjusting the organisational arrangements in the CGIAR so as to achieve better synergy between CGIAR priorities and programs for SSA and those of the SROs and NARS; and, (2) adjusting the internal structure of the CGIAR System so as to improve its overall efficiency and effectiveness in SSA. In terms of consolidating the research activities and eliminating overlaps, the TF made two recommendations: that ... the CGIAR consolidate the Centers headquartered in SSA into two global entities: one in West and Central Africa (WCA), and the other in East and Southern Africa (ESA). And that the CGIAR plan and implement its research activities focused on SSA through two MTPs, one for WCA and the other for ESA.

As discussed before, the CGIAR did not consolidate its institutional setup into a single entity, and the recommendation of creating two Centers for SSA could therefore not be implemented. It is likely, however that both the issues of global consolidation as well as the issue of consolidation in Africa will again be considered by the ongoing CGIAR external systems review.

Instead the Science Council asked the Centers to prepare coordinated Medium Term Plans for collaborative work in each of these two sub-Regions. The preparation of these plans provided major opportunities for coordination, including with the SROs and NARS. Interestingly the research inventories conducted uncovered less overlap among Center programs and between Center Programs and SRO and NARS programs than expected, less conflicts of mandates, but a significant list of missed opportunities for coordination. The contribution of the Forum for Agricultural Research in Africa (FARA) to the exercise flagged the lack of congruence of priorities between CGIAR Centers, NARS, and the SROs. The FARA report has been well received within the CGIAR and the donor community. This may be a barometer of the growing countervailing power of the African scientific community.

It has taken four years to produce initial drafts, Science Council Review, and revised drafts of the plans. These plans do not cover the entire program of the CGIAR centers, but instead concentrate on areas in which collaboration among them is likely to be most fruitful. Therefore the plans are not strategic plans for CGIAR activities in the two African Regions, and are called plans for joint action of the CGIAR centers. The CGIAR Regional Plan for Collective Action in East and Western Africa prepared under the leadership of WARDA was positively reviewed by the Science Council and promises significant improvements in coordinated action. The second plan for East and Southern Africa under the leadership of ICRAF received a fairly negative review by the Science Council. Its second version still does not adequately address the concerns of its Science Council Review in terms of focusing more squarely on identifiable scientific contributions.

Within the past year the Science Council has caused all four African CGIAR centers to undergo external Program and Management Review that are available on the Science Council's website. The assessments of the quality of the Centers' work vary greatly across the four institutions, with ICRAF judged to have drifted too far into dispersed development activities that compete directly with other actors at one end of the spectrum, while ILRI is being commended for its successful merger, and tight and astute focus of its research and development activities on important topics of relevance to livestock producers, and for high scientific quality. Scientific quality is also judged adequate to high for IITA and WARDA, which given its two recent relocations is a major achievement for WARDA. WARDA is also commended for the high quality of its partnerships with the its SRO and NARS.

The World Bank is also thinking of changing once more the ways it is funding the CGIAR systems activities for Africa by providing some of the funding to African institutions such as the SROs or specific research institutions so that they can contract for the work of different CGIAR centers.

SRO and FARA Initiatives

The sub-regional organisations ASARECA and CORAF/WE CARD have also worked on Strategic and operational plans for their sub-regions. As a consequence the organisations have a good grasp of all ongoing and planned research in their sub-regions, as well as the institutions involved. For CORAF/WE CARD draft strategic plan in log-frame form became available in January 2007 and a provisional work plan has been elaborated both of which are available on the CORAF/WE CARD website. ASARECA's strategic plan (also available on its website) intends to fulfill the following functions:

SRO plans

1. Develop a shared vision and regional goals
2. Coordinate collective action at the regional level

3. Contribute to improving networking in the region
4. Contribute to the development of appropriate knowledge, methodologies, information and technologies
5. Facilitate the transfer of knowledge, information and technology
6. Mobilize and allocate resources for research through its various mechanisms
7. Strengthen capacity for agricultural research for development
8. Make the NARS operate as a true system at the national level
9. Facilitate sharing of research outputs and benefits among NARS
10. Enhance eastern and central Africa's reputation in regional and international fora as a desirable place to invest in research.

The World Bank has approved a 5-year funding of 45 million US dollars for CORAF, and is intending to fund a similar program for ASARECA and for Southern Africa in the coming year. It is also creating a small multi-donor trust fund to support these initiatives.

The Framework for African Productivity of FARA

Rather than describing the FAAP, key paragraphs of the FAAP are reproduced here:

"The consultation process through which FAAP was developed concluded that the priorities of CAADP Pillar IV for agricultural research, technology dissemination and adoption require radical improvements in (i) strengthening Africa's capacity to build capacity (ii) empowering farmers, and (iii) strengthening agricultural support services. By addressing these factors and undertaking the necessary reform of public sector institutions, Africa will establish the capacity, as indicated in CAADP Pillar IV: *of making a paradigm shift away from a principally technological package approach to a truly integrated agricultural research approach and to ensure that researchers (national and international) work together with smallholders, pastoralists, extension agencies, the private sector and NGOs to have impact on the ground.*

"Fragmentation in external financial support for Africa's agricultural productivity programs and institutions will be reduced [by] (i) Moving from "project" support to programmatic support for the entire budget of recipient programs and institutions (including recurrent costs); (ii) adoption of common planning horizons and common processes for strategic dialogue and for planning the activities to be supported by development partners; (iii) acceptance of common financial management procedures, monitoring and evaluation, reporting formats and procedures, and processes of program review....Some development partners are already prepared to go beyond these minimal areas of harmonization to adopt more complete degrees of harmonization including the establishment of multi-donor trust funds or pooling of funds in the accounts of recipient institutions.

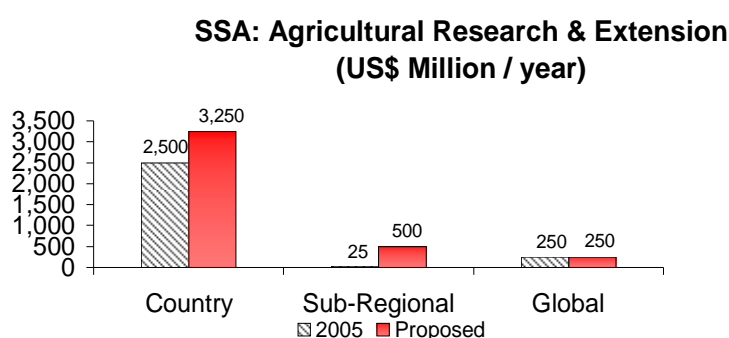
"At the country level, working in this way would be predicated on the country's commitment to FAAP and its principles. This would be reflected in country strategy, policy statements, institutional evolution, and programs and, as such, would be discussed and reviewed at NEPAD Country Roundtable meetings.

"It is estimated that, in aggregate (including public and private expenditures at all levels – local, national, sub-regional, and global) roughly US\$2.5 Billion is spent annually on Africa's agricultural productivity programs. Most of this spending is concentrated in the national programs (see the chart below). A very small proportion of the total (roughly US\$ 25 Million annually) is administered at the sub-regional level by the SROs.

A substantial increase in investment in Africa's agricultural productivity programs is recommended – raising annual aggregate spending on these programs to US\$4 Billion by 2010. This increase should include an increase in the scale of spending at the national level - on the order of US\$3.25 Billion annually for Sub-Saharan Africa as a whole. This would represent an increase by one third over current levels of investment in these programs. At the sub-regional and continental level, current investment levels of roughly US\$25 Million

annually should be increased to US\$500 Million annually. Global investments should be maintained at roughly \$250 million.

“In order to attain and sustain these levels of investment, African countries would have to increase their own contributions to these programs while the G8 group of developed countries and the associated development agencies will need to honour their commitment to substantially increase their support to these programs.” (FARA, 2006)



FARA Strategic and operational plans

These plans can be found on the FARA website. They have been approved by the recent FARA General Assembly. FARA will manage the following programs: The CGIAR Subsaharan Challenge Program, Strengthening Capacity for Agricultural Research and Development in SSA, a Regional Agricultural Information and Learning System, Dissemination of New Agricultural Technologies in Africa, including such innovations as the NERICA rice, and the African Biotechnology and Bio-Safety Initiative. All these programs were judged by stakeholders to be highly relevant to advance African Agricultural Growth. The World Bank is developing a multi-donor Trust Fund to support FARA programs that is expected to provide between 15 million to 25 million annual for the implementation of these programs. However significant funding gaps for the approved FARA programs remain open.

Conclusions

The institutional map for African agricultural research is complex, and contains a large number of national research institutions and universities that tend to be small and poorly funded. It contains four CGIAR centers and all other CGIAR centers are active in the Region, as well as the important French institutions CIRAD and IRD. The system also contains sub-regional and a regional organisation, FARA, that bring all these institutions and stakeholders together, and that are well connected to the African Union and NEPAD. Together these institutions, since 1991, have made a major effort to develop coherent strategies and programs, and coordinate their research programs with each other. They cover most major agricultural commodities, natural resource management, policy, and some environmental issues. The major identified gaps in the institutional landscape are research institutions devoted to export commodities in which Africa has lost market share: Cacao, Coffee, Oil palm and Tea. It is also not clear who is taking the lead in research on cotton, poultry and pork.

From the section dealing with returns to research the following conclusions emerge: While there has been significant technology adoption in Africa, it has resulted in yield gains that are more modest than in other Regions of the World. Rates of return to research are high in Africa, indicating a persistent under-investment in research. There is insufficient evaluation of the returns to CGIAR investment, in particular in the area of natural resources management. Nevertheless it is clear that the already measured returns can cover the entire

costs of the investment in the system. However, the bulk of the proven returns come from biological pest control, with more modest returns from crop genetic improvement, and insignificant returns from natural resource management research. The lower returns to crop genetic improvement result from a combination of factors, including relatively low adoption rates, limited irrigation, extremely low fertiliser application, and poor supportive institutions and policies.

From the sections dealing with CGIAR reform, it is clear that the CGIAR has shied away from the comprehensive institutional reform proposals to create a single organisation to manage all of the CGIAR centers and activities, and the associated proposals to create two integrated management structures for CGIAR activities and Centers in Western and Central Africa and in East and Southern Africa respectively. Instead the CGIAR has put in place a reform program that intends to address the specific major criticisms levelled against it in a number of global and Africa-specific reviews. The Science Council in particular has applied strong pressures on the system to revamp its research priorities to give them greater science and global public good contents. Initiatives have in particular been put in place to strengthen the application of molecular sciences in the system and bring the germplasm of the system into the global treaty framework. The CGIAR centers have also become more responsive to the voices of its African stakeholders, have included them in their own strategic planning, have participated actively in the strategic planning at the SRO and FARA levels, in the preparation for the various FARA programs, and in particular in the preparation of the African Challenge program.

The African NARS, SRO, and FARA have developed a strong consensus statement, the FAAP that sets out the principles for African agricultural research, development and dissemination, in short the agricultural innovation system. They have done so in a participatory mode involving all stakeholders, including universities, the private sector, civil society and the donors. They also have advanced in their own strategic planning, and contributed to the strategic planning of the CGIAR. They have in the process strengthened their institutions and advanced the institutional reform agenda. As a consequence they have obtained a strong mandate from the African Union and NEPAD to lead in the area of agricultural technology and innovation.

There is no question that a lot of goodwill and important information bases have been generated; visions, objectives, reform needs and improved funding mechanisms have been clarified; and programs are becoming more focused and coordinated. Of course it will take time to see whether all these efforts will bear fruit for African agriculture.

During the work on this concept paper, the author *could not find evidence that either national governments or the donors had developed concrete plans and funding mechanisms to the strengthening of African institutions of agricultural science, research and education.* We have not found concrete steps towards the development of African Centers of Excellence in Agricultural Sciences and Technology. Similarly absent are proposals for massive training of a new generation of African agricultural scientists and technicians. It is hard to see how Africa can do without such strong centers. Where will its agricultural scientists and technicians come from?

The serious institution building, reform and coordination efforts involving SROs, FARA and the CGIAR have now gone on for nearly 7 years. While some additional funding has become available, for example for the pilot phase of the African Challenge program, it is clear that *this enormous and costly reform and coordination efforts so far has not had the desired impact on funding of research, institution building and manpower development.* The efforts towards harmonization of donor procedures or setting up a joint donor Trust Fund are only at their beginning and the current plans are not likely to make the amount of resources available needed to bring the African agricultural science capacities up to international standards. A quote from a knowledgeable observer puts it aptly: "There appears to be a disconnect between what the donors promised and what they are prepared to deliver. This disconnect is being hidden under a cloud of administrative requirements such as the need for FARA to meet face-to-face with the donors before they can decide on what is in reality a relatively small amount of funding compared to the amount of aid that has been promised. If all the money has to be agreed and disbursed in such a tortuous way the funding pipeline will never be fully open."

Is anybody listening and willing to pay?

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Table 1: The CGIAR in Africa

#	Centre	Year joined CGIAR	Current name/status	Major focus/activity of the Centre ^a	Major Involvement in SSA				Resources devoted to SSA as a per centage of total budget (2000-2004)
					1970s	1980s	1990s	2000s	
1	CIAT	1971	Same	beans, cassava, tropical forages, rice, forest margins, savannas, fragile African and Asian environments	x	X	x	x	29%
2	CIMMYT	1971	Same	wheat, maize, triticale	x	X	x	x	37%
3	IITA ^b	1971	Same	soybean, maize, cassava, cowpea, banana, plantain, yams, sustainable production systems for the humid lowland tropics	x	X	x	x	99%
4	IRRI	1971	Same	rice and rice-based eco-systems					4%
5	ICRISAT	1972	Same	sorghum, pearl millet, finger millet, chickpea, pigeon pea, groundnut, sustainable production systems for the semi-arid tropics	x	X	x	x	50%
6	CIP	1973	Same	potato, sweet potato	x	X	x	x	30%
7	ILRAD ^b	1973	ILRI (formed in 1995) ^b	animal diseases	x	X	x	x	66% ^c
8	IBPGR	1974	IPGRI (re-named Bioversity in 2007)	plant genetic resources of crops and forages, collection and gene pool conservation	x	X	x	x	30%
9	IFPRI	1974	Same	socio-economic research related to agricultural development	x	X	x	x	49%
10	ILCA ^b	1974	ILRI (formed in 1995) ^b	Livestock feed and production systems	x	X	x	x	66% ^c
11	ICARDA	1975	Same	wheat, barley, chickpea, lentil, faba beans, pasture, forage legumes, small ruminants			x	x	15%
12	WARDA ^b	1975	Africa Rice Center	rice production in West Africa	x	X	x	x	100%
13	ISNAR	1980	Dissolved and became a Division of IFPRI (2004)	strengthening national agricultural research systems		X	x	x	44%
14	ICRAF ^b	1991	World Agroforestry Centre	agroforestry, multi-purpose trees			x	x	80%

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15	IIMI	1991	IWMI	irrigation and water resources management	x	x	18%	
16	ICLARM	1992	World Fish Centre	sustainable aquatic resource management	x	x	30%	
17	INIBAP	1993	INIBAP became a programme of IPGRI (1994)	bananas, plantains	x	x	--	
18	CIFOR	1993	Same	sustainable forestry management	x	x	30%	
Resources expended to SSA in a given time period (U.S. \$ million/year):				24	86	132	168	174
As a % of total CGIAR expenditures:				44%	41%	40%	44%	45%

^a Activities targeted for SSA region are bolded.

^b Centres headquartered in the SSA region. ^c Per centage share represents ILRI's budget in 2000-2004

Annex 7: A Burkina Faso Proposal for Scaling Up Social Protection

Communities and individual families are already part of an informal, if inadequate, social protection system. But they do need additional resources and support to expand these informal mechanisms into a more systematic effort, and to finance support to education, health care or home based care, etc. These resources should be provided as matching grants to the communities, with the latter providing the matching resources in cash or in kind, for example food needed for the most vulnerable.

While communities all over Africa are able to identify vulnerable families, and classify them by degree of need, they are not able to carry out proper needs assessment for these families, a task which normally is done by a social worker. In Sanmatenga there are nearly 300 villages and urban neighborhoods, but only three trained social workers, and there is no way the Ministry of Social Welfare can hire enough social workers to assist communities to do this job. Just as in the areas of agricultural extension, health, or veterinary medicine it would therefore be necessary to develop a system of community-based social workers. Communities should select one or several members to be trained in basic family needs assessment and supervision skills, and they could then be remunerated via daily allowances for their work out of the community grants. The ministry or Social Development would need to develop a curriculum, training program, and supervision program for them.

Assisting the chronically ill, orphans and the families which take care of them will require significant additional training of enough community members to manage the tasks. These community members cannot work as volunteers for a long period of time, and need to be provided with modest remunerations, such as per diems for every day they work or home visit they make.

The community members will encounter situations which they and the community as a whole cannot handle, such as medical emergencies, or child abuse. To deal with these cases requires the putting in place of proper referral systems so that difficult cases can be handled by health professionals, social workers or educators with the required skills. These same specialists need to be involved in designing and delivering the training and be available for facilitation and training on demand.

The same committee structures that were used for prevention at the provincial, district, and community level, the same training teams, and the same financing mechanisms can be reinforced and used to coordinate, manage and monitor the social protection program. In particular the committees can coordinate and provide financial resources to the NGOs and local offices of the respective government services so that they can become the facilitators, trainers and referral system.

Source: Hans Binswanger, personal observations