



Consultative Group on International Agricultural Research (CGIAR)

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STAKEHOLDER MEETING
October 30 – 31, 2002

**Agenda Item 6. CGIAR and Sustainable Development: 2002 Summits
and the Way Ahead**

NEPAD Program on Sustainable Agricultural Technology
Generation and Adoption Systems

Background/Process:

One of the pillars of the New Partnership for African Development (NEPAD) framework is the systematic application of agricultural S&T to enhance African agricultural productivity and competitiveness. A comprehensive program to achieve this goal was developed by the Forum for Agricultural Research in Africa (FARA) and endorsed by NEPAD. As a contribution towards the implementation of the FARA program, the World Bank has formulated a Multi-Country Agricultural Productivity Program (MAPP) for Africa. FARA and the World Bank (AFRVP) will lead a discussion of the elements of the MAPP. The proposal has important implications for CGIAR, which is foreseen to contribute further to the enhancement of technology generation and transfer in Africa. All stakeholder representatives are invited to share their views and suggestions on the draft proposal.

Document: A Multi-Country Agricultural Productivity Program (MAPP) for Africa

Comments:

**A MULTI-COUNTRY
AGRICULTURAL PRODUCTIVITY PROGRAM (MAPP)
FOR AFRICA**

DRAFT ISSUES PAPER



I Program Development Objective and Overall Design

A. Program Purpose

1. **The Challenge.** Despite gains in the second half of the 1990s, Sub-Saharan Africa enters the 21st century facing enormous challenges. The region's average per capita income is the lowest in the world – just US\$315 – a level that has changed little, and in some countries has actually declined, from the 1960s. Income disparities are also very high, and Africa's poor are the poorest of the poor. Almost half of the continent's 600 million people currently live not with less than one dollar but with less than US\$0.65 a day (Africa's share of the world absolute poor to jump from 25 to 30 percent during the 1990s).

2. The reasons of Africa's poor performance are many: wide-spread violent conflicts on the continent; the deterioration of terms of trade for non-oil primary commodities; faulty economic policies and poor governance which created a hostile environment for investments and growth and resulted in a dramatic decline in both the amount and efficiency of public and private investments; lack of investment in people and in basic infrastructure; economic vulnerability because of a failure to diversify into more dynamic product lines; and the AIDS crisis. However, one of the critical reasons of Africa's disappointing development performance is clearly the stagnation of its agriculture. Over the last 30 years, agricultural productivity has stagnated and agricultural growth has only averaged 2 percent per annum, not even keeping pace with population increase. This has resulted in falling per capita incomes in agriculture and more globally in rural areas, and in an increasing food insecurity at both the national and the household levels.

3. With African population expected to grow at 2.8% per annum, simply preventing an increase in the number of Africa's absolute poor will require a sustained annual growth of at least 5%, almost twice the level achieved since 1973. And Africa's GDP growth would have to average 8% per annum over the period to meet the “*International Millennium Development Goal*” of halving severe poverty by 2015, which is the objective that African Heads of State have adopted under *Africa's “New Partnership for African development (NEPAD, Box 1)”*. Achieving this ambitious objective is possible. Indeed, Africa has enormous unexploited potential in resource-based sectors and in related processing and manufacturing, and it has barely tapped the potential of its people. Globalization and the new technologies, especially the information technology, offer a great opportunity for Africa, historically a sparsely populated and isolated continent. Many African countries have started to undertake necessary economic reforms, improving macroeconomic management, liberalizing markets and trade and creating a policy and institutional environment more friendly to the private sector and to agriculture. Where these reforms have been sustained, economic growth has increased and poverty fallen. Countries with political stability, good macroeconomic management and improved policy environment saw output per-capita grow at close to 3% a year in the second half of the 1990s.

4. **Commitment of African Leaders.** To achieve their “*Millenium Development Objective*”, African Heads of States have outlined a broad strategy based on: (i) improving governance and preventing conflict; (ii) massively investing in people and in infrastructure; (iii) and increasing the

Box 1: The New Partnership For Africa's Development (NEPAD)

NEPAD is the consolidation of two proposals: The Millennium Partnership for the African Recovery Program (MAP) of Presidents Mbeki of South Africa, Bouteflika of Algeria, Mubarak of Egypt and Obasanjo of Nigeria; and the OMEGA plan of President Wade of Senegal.

NEPAD has five core principles -- good governance; entrenchment of democracy, peace and security; sound economic policy-making and execution; productive strategic partnerships; and domestic ownership and leadership – all seen as preconditions for Africa's renewal.

NEPAD is predicated on building a new relationship with international partners, based on mutual obligations, commitments and benefits. Emphasis is based on aid effectiveness, with African ownership of development programs and a monitoring and peer review process for mutual accountability of recipient countries and donors alike.

NEPAD has selected Agricultural Growth the cornerstone of its poverty reduction program, and asked FARA to be the technical agent for the implementation of the Agricultural Productivity Program.

competitiveness and diversification of the African economies. They have also made of growth in agriculture the cornerstone of poverty reduction and set a 6 % annual agricultural growth through 2015 as one of NEPAD's central objectives. Indeed, more than 70 % of African people live in rural areas and depend on agriculture and related non-farm employment for their livelihood. Agriculture accounts on average for 35% of GDP and one-half of total exports. Therefore, increasing agricultural productivity and incomes is the key to improving the well-being of rural households and supporting the investments in agricultural and non-agricultural rural activities which are critical to sustained economic growth and poverty reduction.

5. Such a high rate of agricultural growth would represent a drastic reversal of past trends. Indeed, over the past decades, technological change in African agriculture has by no means been widespread or deep enough to support sustained increases in agricultural productivity. Although there have been some significant successes -- hybrid maize in Southern Africa, rubber in Cote d'Ivoire, tea in Kenya and recently the development of the NERICA rice variety in West Africa -- technological progress has largely by-passed many of the crops (the "orphan crops") and livestock breeds which play a critical role in African smallholders' production systems. Public spending for agricultural research in Africa stagnated in the 1980s and actually declined in the 1990s, because of the need for African governments to restore macroeconomic balances and finance priority development programs in infrastructure and the education and health sectors. But this decline has also been due to a complacency borne from the very success achieved worldwide over the last four decades in increasing global agricultural productivity and production (today's farmers are feeding almost twice as many people from virtually the same crop land), and a mistaken belief that private research, in particular through biotechnology, would be able to shoulder a growing share of the research agenda. In addition, the efficiency of African agricultural research and extension systems, dominated by public agencies, has generally been poor. Low and unreliable funding, lack of strategic planning, poor linkages with end-users rarely involved in the governance of the systems, limited human resources, poor staff incentives and poor internal management have considerably limited the relevance and efficiency of their activities. As a result, the immense majority of African farmers, with limited access to markets, no equipment other than hand tools and very limited use of inputs, have been on the sideline of the world-wide agricultural revolution and trapped into low productivity farming systems.

6. For agriculture to become the main engine of economic growth and poverty reduction in Sub-Saharan Africa, the following measures will be required:

- Policy and institutional reforms to (i) reduce trade barriers, to open up expanding regional and international markets, (ii) strengthen property rights and the rule of law, and improve access to financial services, to foster private initiative; (iii) make input and output markets more competitive; and improve the efficiency of public institutions and public expenditure programs.
- Massive investments in rural transport infrastructure and communications, to link producers to markets; and
- Sustained investments in science and technology to support the much faster generation, diffusion and adoption of technologies well suited to the problems of African farmers, in particular those of smallholders and other vulnerable rural groups.

7. Achieving broad-based increases in agricultural productivity will be key. This in turn will require not only a much higher of funding than in the past but also major improvements in the efficiency of the agricultural technology generation and dissemination system. Since the early-1990s, **under the impulsion of the Special Program for African Agricultural Research (SPAAR)**, many national agricultural research system (NARS) started to rethink their institutional model and move away from the prevailing top-down, supply driven publicly-financed model toward more open and client-driven systems. SPAAR provided a consultative and partnership framework helped to build a clear consensus on the needed reforms which

include: (i) increasing the input of stakeholders in strategic and operational research planning, and in the monitoring of results; (ii) ensuring a reliable funding mechanism to improve financial sustainability; (iii) improving internal efficiency through increased transparency and accountability; (iv) strengthening the linkages between research, extension and end-users; and (v) increasing regional and international collaboration. Where these reforms have already been applied, they have started to bear fruit and should be pursued and deepened.

The consultative and partnership framework also led to the establishment and/or realignment of the mandate of sub-regional agricultural research organizations operating in Eastern Africa (ASARECA), Western and Central Africa (CORAF/WECARD) and Southern Africa (SACCAR) to coordinate research programs of common interest to the countries of their respective sub-regions, organize systematic knowledge sharing and human resource development and strengthen NARSs' partnerships with CGIAR centers and other advanced research institutions. It culminated with the establishment in 2002 of the Forum for Agricultural Research in Africa (FARA) as the apex organization of the three sub-regional organizations and a node and gateway to the global agricultural research network. Donor coordination was a trademark to the success of the transformation process.

8. African countries have outlined a vision and strategy which put agricultural and rural development at the center of their poverty reduction strategies and programs. This vision and strategy defined by the Forum for Agricultural Research in Africa (FARA) and endorsed by NEPAD is encapsulated in its *“Durban Statement”* (Box 2) dated May 2001. It focuses on the much faster generation, diffusion and adoption of technologies suited to the problems of African farmers and to market opportunities through: (i) continuing and deepening the reforms already initiated by many African countries for improving the efficiency of their national agricultural technology generation and dissemination systems; (ii) improving synergies between re-vitalized national systems and CGIAR's International Agricultural Research Centers and other centers of excellence; and (iii) forging a broad alliance between the public and the private sectors in support of agricultural technology generation and application. ***It also calls for a doubling by 2013 of the current level of public funding for Africa's agricultural technology generation and dissemination system.*** These funding projections are born out solid baseline analysis and the piloting of institutional innovations carried out through the ‘Sustainable Funding Initiative’ spearheaded within the framework SPAAR by USAID, the EU, the World Bank, AfDB and many other donors. (**Box on experiences in Competitive Funding**) The shared concerns for institutional viability and sustainable financing have led to the conceptualization of a new funding system for the entire African research system.

9. It is in this new conceptual framework and in complement to initiatives to strengthen the sub-regional organizations and FARA, and to provide them with funding, that the proposed *Multi-Country Agricultural Productivity Program (MAPP)* would be the main instrument for building a broad alliance between African governments and stakeholders, the national, regional and international scientific and donor communities, to enhance the capacity of national technology systems to trigger and support the sustained agricultural productivity increases which are at the heart of broad-based poverty reduction in Africa.

Box 2: . FARA' S DURBAN STATEMENT

The Way Forward for Agricultural Research and Development in Sub-Saharan Africa

1. Agriculture is the engine for improved rural livelihood and economic development in Sub-Saharan Africa (SSA). Recognizing this, the African political leaders have positioned agriculture at the center of their new vision for the future of the continent. In full support of this vision, the SSA agricultural research and development community has called for regional agricultural production to grow at an annual rate of 6% through 2020. [...] The target level of agricultural growth can not be achieved without a focused and market-driven technology development and transfer system, an enabling policy environment, and effective institutions.

2. The considerable efforts and financial investments that have been made by national and international institutions over the past 30 years have had limited pay-offs. At the present time, SSA is still dealing with first order challenges of increasing agricultural productivity, lagging behind most of the rest of the world. Additionally, new challenges that threaten the potential of agriculture to contribute to sustainable economic development in SSA have emerged. These include increasing urbanization, globalization and market competitiveness, environmental and natural resource issues (land degradation and desertification, water scarcity and competing demands for water, deforestation, loss of biological diversity, climate change, etc.), and the devastating impact of HIV/AIDS.

3. To address these challenges, we, the members of the SSA agricultural research and development community, recognize that effective and broadened partnerships are essential. The national agricultural research systems (NARSs) must play a central role in these partnerships. The African countries have made considerable efforts, over the past decades, to develop a solid base-line research infrastructure. In order to harness these resources, the NARSs have taken the initiative towards reforming themselves for greater accountability, fiscal stability and impact. They have also strengthened regional collaboration through the formation and development of sub-regional organizations (SROs), and more recently through the creation of the Forum for Agricultural Research in Africa (FARA). The light structures coordinate many decentralized networks, based on subsidiarity principles and increasingly on competition. Other partners, including the CGIAR Centers, have similarly responded to the challenge through more intensive consultation with NARSs and greater collaboration among themselves.

4. The way forward is to build on the gains already made. We, the members of the SSA agricultural research and development community hereby agree to commit ourselves to pursue the stated Vision through the following lines of action: (i) develop and disseminate technologies for increased agricultural productivity and sound natural resource management; and (ii) utilize the benefits offered by the emerging technologies, including information and communication technology, and safe use of biotechnology. Action will be guided by the principles of :

- inclusive partnerships which reach out to producers, agribusiness, and consumer organizations, as well as other development-oriented non governmental organizations (NGOs)
- substantive agenda based on programmatic priorities
- operational efficiency based on competition and decentralization
- mutual respect and shared credit
- and using the following instruments:
- high quality human capital
- increased and sustained financing, and
- effective institutions.

5. On the occasion of the CGIAR Mid-term Meeting held in Durban, South Africa, we call upon:

- The SSA governments to translate their political commitment to agricultural development into concrete actions by providing the necessary resources and creating an enabling policy and institutional environment;
- The SSA governments to ensure that issues of sustainable agriculture receive their due place on the agenda of the Johannesburg Earth Summit
- FARA, with the support of the Global Forum on Agricultural Research (GFAR), to play an advocacy role to place agricultural research at the center of the SSA agricultural development agenda;
- The international investor community to coordinate its efforts, and significantly increase and sustain financial support for African agricultural research;
- The international agricultural research system, including the CGIAR Centers and advanced research institutions, to forge more effective and efficient partnerships with African NARSs and achieve greater programmatic integration; and
- The CGIAR System to ensure that the proposed changes in program, governance structure, and funding mechanisms are consistent and reinforce our efforts to achieve the African Vision.

* *Forum for Agricultural Research in Africa (FARA); Special Program for African Agricultural Research (SPAAR); Association for Agricultural Research in East and Central Africa (ASARECA); Conférence des Responsables de la Recherche Agronomique en Afrique de l'Ouest et du Centre (CORAF/WE CARD); Southern African Center for Agricultural Research (SACCAR); CGIAR -Supported Future Harvest Centers*

Durban, South Africa, May 22, 2001

B. Program Development Objectives, Design and Implementation Arrangements

10. **Development Objective and Design.** The central goal of the proposed Multi-Country Agricultural Productivity Program (MAPP) would be achieving sustained rural poverty reduction through a broad-based growth in agricultural productivity and incomes, with a focus on small-holders and vulnerable groups. Its specific objectives would be, within FARA's and SROs' strategic frameworks, to strengthen the capacities of the African agricultural technology to effectively and on a sustainable basis generate, adopt, transfer and apply knowledge and technologies suitable to the agricultural context and challenges.

11. Improving the efficiency and sustainability of the agricultural technology generation and delivery system in Africa is a long-term challenge. Accordingly, the MAPP would be phased over a thirteen years period and financed through *a series of multi-country, pre-approved lines of credit/grant* structured both as: (i) an "horizontal" APL, supporting a series of country-specific agricultural technology generation and transfer operations to countries meeting specific eligibility criteria (para.14); and (ii) a "vertical" APL providing long-term support to each eligible individual countries through a long-term, sequenced program with clear sequencing and triggers.

12. The first phase of the MAPP (*"the Program"*) would support a series (10 to 12) of individual country-specific operations. The Board would approve the overall Program and multi-country line of credit/grant, as well as the first two country-specific operations. The subsequent country-specific operations would be circulated to the Executive Directors for information, after clearance by Regional Management. Any individual operation could be scheduled for Board discussion if at least three Executive Directors so requested.

13. **Phasing and Phase Triggers.** Country-specific operations under the Program would be approved over a three year period. Each country-specific program would be supported through an APL composed of three phases, each phase being of a three year duration (the Program's line of credit/grant would therefore be disbursed over a five-to-six year period). Phase II of the MAPP would be presented to Board's approval in 2006, when the first line of credit/grant is fully committed by Board approval. It would support (i) the first phase of new country-specific programs; and (ii) the second phase of the country-specific programs initiated under the proposed Program. Country-specific operations approved under Phase II would be implemented over the 2006-2010 period. It would be submitted to Board's approval upon the detailed review of Phase I achievements. MAPP's third phase would be presented to the Board by 2011. Monitorable final and intermediate milestones for the overall MAPP would be developed during the detailed preparation of the proposed Program, to track progress in long-term institutional reforms/development (poverty focus, governance and responsiveness, efficiency, financial sustainability) and be used as triggers for MAPP's Phase II and Phase III. Specific performance indicators would also be developed for each country-specific operation to be financed under the MAPP, tailored to the specific country circumstances.

14. **Country Eligibility Criteria.** MAPP's assistance to each eligible country would support a long-term development program through an APL with country-specific objectives, sequencing and phase triggers. The design of each country-specific program would depend on the country's prevailing policy and institutional environment, and include components selected from a menu of relevant activities as outlined in the "Program Description Summary" below. Countries would qualify for support under the MAPP on the basis of clear "eligibility-at-entry" criteria: (i) a satisfactory agricultural development and rural poverty alleviation strategy and program; (ii) a satisfactory operational agricultural technology generation and transfer strategy; (iii) Government commitment to provide adequate core financial support to implement the operational strategy, and (iv) Government commitment to apply satisfactory social and environmental safeguards.

15. **Estimated Cost and Financing Mechanism.** The total cost of the Program (MAPP's Phase I) is estimated at US\$ 1.71 billion over a 5 years period (2003-2007), of which: (i) US\$342 million would be funded by governments and beneficiaries (20% of total costs); (ii) US\$912 million would be funded by IDA credits and grants (55%); and (iii) US\$456 million would be funded by other external financing (25%). One of the central objectives of each country-specific program and APL would be to move away from project funding and provide coordinated financial support to a coherent program in support of the national agricultural technology generation and dissemination system. To do so

(i) a commitment would be sought from participating governments and participating donors to the principle of adopting common implementation procedures based on transparent and efficient public expenditures management -- budgeting, financial management and auditing, asset management, procurement, monitoring and reporting; and

(ii) external financial support would gradually be channeled through a common "basket-funding" mechanism from which funds would enter government budget accounts and be administrated according to procedures acceptable to IDA.

16. While not all external financing would immediately flow through the "basket-funding" mechanism, donors would be expected to fully channel their financial support in this way by the end of the first phase of the country-specific APL. This would permit government's to establish full ownership and control over the entire program from the start. It would also give governments the time necessary to gradually improve the efficiency and transparency of the budgetary process and of public finance management and to move toward (sectoral) budget support lending when the necessary pre-conditions are met. One of the objectives of the first phase of each country-specific operation/APL would be to assist the government in undertaking the necessary fiduciary reforms for becoming eligible to budget support lending.

17. **Implementation Arrangements.** The Program would be implemented under the overall umbrella of NEPAD and the leadership and guidance of a Steering Committee composed of selected Ministerial level representatives of African governments. FARA would become NEPAD's operational arm for agricultural productivity issues, and be the Technical Secretariat of the Program. It would be responsible for coordinating: (i) the preparation/appraisal of the overall MAPP and of individual country-specific operations to be financed under the Program; (ii) the preparation of these operations' annual work programs and budgets; and (iii) the assessment of implementation progress, including progress toward institutional objectives, milestones and triggers. FARA would also be responsible, jointly with IDA and other donors, for undertaking the mid-term review of the Program and for the preparation of its completion report, as well as for the preparation of MAPP's Phase II. A National Steering Committee and Secretariat would also be set up in each participating country, chaired by the responsible ministry, to coordinate the preparation of the country-specific operation by national stakeholders, oversee its implementation, prepare implementation progress reports and monitor its output/impact. Actual implementation responsibilities and detailed arrangements would depend on each country's specific circumstances. Although it is expected that there would be a need for a light national coordination mechanism, each participating institution would be fully responsible for implementing the Program activities according to its mandate.

18. **Monitoring and Evaluation.** The management and reporting capacities of implementing institutions would be assessed during the detailed preparation and appraisal of the Program. Implementation support would be provided jointly by FARA and concerned donors. The MAPP/Program would invest substantially on strengthening and harmonizing M&E capacities at country, sub-regional and regional levels. During MAPP's first phase (the Program), performance indicators would mostly focus on input, processes and outputs rather than outcomes and impacts which are longer-term. The latter would start to be at the center of MAPP's M&E system during its second and third phases.

II. Context, Main Issues and Strategic Agenda

A. *Strategic Context and Main Issues.*

19. **The Problem.** The second half of the 20th century has seen an unprecedented increase in global standards of living, in developed and developing countries alike. However, progress has been uneven and Africa has shared least in the global economic growth and welfare gains. Between 1950 and 1996, real GDP per capita in Africa rose from US\$830 to US\$1,309 (in real 1990 prices), or 58 %, while it doubled in Latin America (from US\$ 2,487 to US\$ 5,155) and was multiplied by six in East Asia (from US\$ 765 to US\$ 5,587). Africa's average per capita income is now the lowest in the world. Income disparities are also very high, and Africa's poor are the poorest of the poor: almost half of the continent's 600 million people live not with less than one dollar but with less than US\$0.65 a day. Economic growth in Africa actually fell from 4.9% p.a. in the 1960s to 1.9% p.a. in the 1990s, causing the continent's share of the world absolute poor to jump from 25 to 30 percent during the 1990s.

20. The reasons of Africa's poor performance are many: wide-spread violent conflicts; faulty economic policies and poor governance which resulted in a dramatic decline in the amount and efficiency of public and private investments; lack of investment in people and in basic infrastructure; and, more recently, the AIDS crisis. However, central to Africa's slow economic and social development has been the poor performance of its agriculture. In most African countries, agriculture accounts for up to 70% of employment and one third of total GDP. It also generates important second round effects on income and employment within the non-farm rural economy, and within the economy at large. Over the last 30 years, agricultural productivity has stagnated and agricultural growth averaged only 2 percent per annum, not keeping pace with population increase. This has resulted in falling per capita incomes in agriculture and in rural areas, and in an increasing level of food insecurity at both the national and the household levels.

21. **The Central Role of Agriculture in Rural and Overall Poverty Reduction.** Growth in agricultural productivity boosts agricultural production and income, either directly through increased own-farm production or through greater agricultural employment and income opportunities for landless laborers. But agricultural growth also generates important second round multiplier effects. African farmers are overwhelmingly small-holders who spend a large share on their incremental income on labor intensive local non-tradable goods and services. This leads to growth and employment creation in the non-agricultural rural economy and to a reduction in overall rural poverty. The engine of this rural economic growth is the production of tradables, i.e. the goods that are marketed outside the producing region itself, in particular tradable agricultural products. The demand for these tradable agricultural commodities lies mostly outside the producing regions and their production is constrained essentially by supply-side constraints.

Overcoming the latter allows for the increase in agricultural production and incomes. Increased agricultural incomes then generate second round effects by propelling demand-led growth in rural non-farm activity.

Box 3: Empirical Evidence of the Relationship Between Agricultural Growth and Poverty Reduction

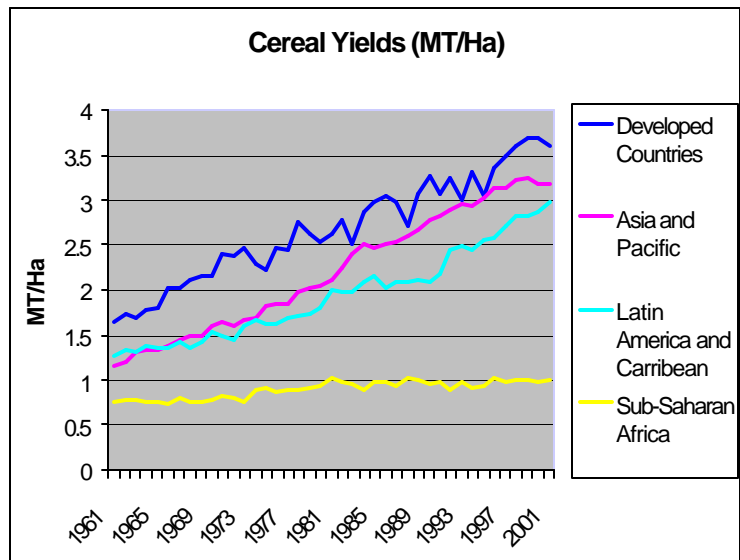
- A one percent increase in agricultural GDP per capita led to a 1.6% gain in the per capita incomes of the lowest income fifth of the population in 35 countries analyzed (Timmer, 1997)
- A 10% increase in crop yields leads to a reduction between 6% and 10% of people living on less than \$1 a day, according to a recent study (Irz, et al., 2001). For African countries, a 10% increase in yields leads to a 9 % decrease in the percentage of those living on less than \$1 a day
- Wheat prices would have risen 34%, and rice prices 41%, more between 1970 and 1995 in the absence of international agricultural research efforts (Evenson, 2001)
- The average real income of small farmers in southern India rose by 90% and that of landless laborers by 125% between 1973 and 1994, as a result of the 'green revolution' (World Bank, 2001)

Source: World Bank (2002)

22. Numerous studies have shown that the multiplier effects of agricultural growth on rural poverty can be as large as the direct impact of agricultural growth itself, each 1 percent in incremental agricultural incomes generating a 1 percent increase in non-farm incomes. It is estimated that the rural non-farm economy accounts on average for at least 20% of full-time rural employment in Africa, and non-farm income for about 40% of total rural incomes. Non-farm employment and incomes are particularly important for rural landless or near landless, and for women. They also provide an important source of financing for agricultural inputs and investments, and play an essential tool for stabilizing the income of the poor. Finally, there is growing evidence that in developing countries, increases in agricultural productivity and rural incomes contribute substantially to urban as well as rural poverty reduction. Indeed, consumers, especially poor urban consumers who spend a large proportion of their income on food, benefit directly from cheaper food prices. Cheaper food, the major wage good in developing economies, has a positive impact on the competitiveness and growth of the other sectors of the economy.

23. **Poor Past Performance of African Agriculture.** Africa's agricultural performance over the last 30 years has been the worst in the developing world. Agricultural productivity has stagnated and

agricultural growth has averaged 2 percent per annum, not keeping pace with population increase. While agricultural productivity soared world-wide during the second half of the 20th century through improvements in the biological potential of crops and improved crop management techniques (wheat yields quadrupled in Mexico, and rice production tripled over a 20 year period in South Asia), productivity increases were minimal in Africa and yields fell dramatically behind those in other developing regions (cereal yields in SSA fell from 65% of developing countries' average in 1967 to only 43% by 1997).



24. Per-capita cereal production actually declined from 128 kg to 124 kg during the period and calorie intake in Africa is currently the lowest in the world. Malnutrition has actually increased over the last thirty years and Africa is the only region where the number of malnourished children was higher in 1997 than it was in the mid-sixties (33 million against 22 million). While about one in ten malnourished children in developing countries resided in Africa in 1970, one in five did in the mid-1990s. Continuation of past trends would lead to a human disaster of unprecedented proportion. A study undertaken in the context of the preparation of the Bank's Rural Development Strategy (*Reaching the Rural Poor*) projects that, while all other developing countries would achieve a decline of more than 30% in the absolute number of malnourished children, the per-capita calorie availability in SSA would hardly increase between 1997 and 2020 and the region's number of malnourished children would continue to increase (from 33 to 39 million).

25. **Increased Degradation of Natural resources.** The natural resource base on which most of Africa's rural poor depend has been steadily deteriorating. Only about 20 percent of Africa's land is arable and it is estimated that about 65 percent of total arable land is degraded (the highest percentage in the world) as a result of increasing population pressure in both high potential and marginal areas. Traditional methods for restoring *soil fertility* and vegetative cover are undermined by growing land scarcity, while modern alternatives are unavailable to the majority of people. Environmentally sustainable activities such as pastoralism in arid regions and drought-resistant native species and varieties are being squeezed out by non-sustainable agricultural practices. *Fresh water*, one of Africa's scarcest

commodities, is rapidly being depleted through inefficient use and polluted by industrial and domestic effluents, and by degradation of watersheds in major river basins. The great challenge is to manage scarce water resources effectively for agriculture, industry and human consumption, yet still leave enough to maintain healthy ecosystems.

Forests, wetlands and rangelands are all being lost or degraded at a rapid rate across much of Africa, with major consequences for the poor. The primary cause is conversion of the land to agricultural use, with exploitation for fuelwood and timber as an additional factor in some areas. Negative impacts of the loss of forest ecosystems include deterioration of watersheds resulting in droughts and flooding (of the region's 11 major multi-national watersheds, eight have lost over 90 percent of their original forest cover) and a deepening fuelwood shortage. The loss and degradation of natural habitats is accompanied by loss of biodiversity, which has both short and long-term implications for the region's poor. In the short term people suffer from loss of access to economically important natural products such as medicinal plants, foods (including famine reserves), and building materials. Longer term impacts can include ecological instability and pest and disease outbreaks.

Box 4: The rural poor depend heavily on natural resources: Empirical evidence from Zimbabwe

There is plenty of evidence that rural households in Africa often depend heavily on environmental resources. Recent work carried out over several years in Shindi Ward in southern Zimbabwe, showed that:

- environmental resources? broadly defined to include wild foods, wood and wood products, grass, reeds, canes and leaves, and other woodland-based resources? in aggregate contribute roughly 35 percent of average total household income.
- Although in absolute terms better off households use more environmental resources overall, the poor depend more on natural resources than the rich.

The research also showed the factors determining resource use are complex: different households use different resources for different reasons at different times. Still, the conclusions are inescapable: the rural poor depend heavily on resources derived from woodlands, and deforestation poses a significant threat to rural livelihoods.

26. **The Reasons of Poor Past Performance.** Until the 1980s, most African governments pursued macroeconomic, trade and sectoral policies that favored urban development over rural development. They taxed agriculture heavily to generate resources to invest in industry and urban infrastructure. They adopted overvalued exchange rates to reduce costs of imports for industry, which encouraged food imports and undermined the competitiveness of agricultural exports. Moreover, many African governments were highly centralized. Public sector institutions dominated agricultural and marketing and input supply systems. This choked opportunities for individual entrepreneurs, private companies, farmer organizations, nongovernmental organizations and communities to participate in agricultural and rural development. In recent years, many African governments have reformed their macroeconomic, trade and agricultural policies, increasing the competitiveness of agriculture and rural products. Inflation and budget deficits are down. The exchange rate overvaluations of the 1970s and 1980s have been largely corrected, and trade policies no longer discriminate against exports. Institutional measures that controlled prices and supplies of food and export crops, such as marketing boards, price stabilization funds and regulations prohibiting small farmers from growing specific cash crops, have been or are being removed. And many state owned farms and agribusinesses have been privatized. Where these reforms have been sustained, economic growth has increased and poverty fallen. Countries with political stability, good macroeconomic management and improved policy environment saw output per-capita grow at close to 3% a year in the second half of the 1990s. However, the impact of these reforms hasn't yet been sufficient to overcome years of economic decline – including low national savings rates (at 13% of GDP the lowest in the world), inadequate infrastructure, the loss of human capital, eroded by AIDS and the poor performance of health and education services as well as by the sustained drain of the educated work force (it is estimated that some 23,000 trained professionals emigrated every year), and weakened institutions. African economies are deeply decapitalized (capital per worker is half that in South Asia and run-down infrastructure is a critical barrier to growth).

27. **The Driving Force of Agricultural Growth: Linking Farmers to Markets.** Two mutually reinforcing constraints to sustained agricultural development need to be immediately addressed: (i) producers' restricted access to domestic, regional and international markets; and (ii) a stagnating productivity which has eroded the competitiveness and profitability of an African agriculture largely excluded from the worldwide agricultural technology revolution which has spearheaded a sustained decline in real agricultural prices on international markets.

➤ **Restricted access to expanding international markets.** Trade is a vital engine for development, growth and poverty reduction. In 2001, close to 40% of Sub-Saharan Africa (SSA) total GDP came from exports of goods and services. Developing countries that have intensified their integration in the global economy have grown more rapidly over a sustained period. Unfortunately, many African countries, have not shared in the benefits of expanded international trade, partly because of domestic infrastructure, policies and institutions which are not conducive to the integration process, but also because of the tariff and non-tariff barriers imposed by developed countries where the most lucrative markets lie. This is particularly the case for agricultural trade for which African countries often have a comparative advantage. Growth in global agricultural trade has been lower than that of non-agricultural trade (the share of food and agricultural products fell from 17% to 10% of total merchandise trade between 1980 and 1998). Continuing high protection in developed countries -- through a combination of domestic support, market protection and export subsidies -- has both displaced African countries' agricultural production and exports and had a detrimental effect on international commodity prices, thereby imposing heavy income and welfare losses. A recent study (World Bank, 2001) estimates that the total potential welfare gains of developing countries from agricultural trade liberalization may amount to US\$142 billion annually (1993 US dollars). Most of these gains would come from trade policy reforms within developing countries themselves (US\$114 billion), reflecting the prevailing high level of distortions in developing countries -- and therefore the urgency of reducing them -- and the importance of agriculture in the economy. About US\$32 billion would come from the elimination of the trade barriers of OECD countries. This is equivalent to 50% of total development assistance to developing countries in 2001, and reducing barriers to international trade in agricultural products is high on African countries' agenda for the next round of international trade negotiations (Box.5).

Box 5: Agricultural Support in OECD Countries and the DOHA Commitment

In 2001, total agricultural support in OECD countries amounted to US\$311 billion, which is equivalent to the combined GDP of all African countries. On average, OECD farmers receive prices 31% above prices on international markets, and almost one-third of their total revenues originates from government support programs.

Addressing the negative impact on developing countries of OECD countries agricultural policies is fundamental to economic development and poverty eradication in the developing world. This is recognized in the Doha Ministerial Declaration which reconfirmed the long-term objective of the WTO Agreement to establish a fair and market oriented trade system. In Doha, member governments committed themselves to comprehensive negotiations, to end by January 1, 2005, aimed at:

- Improving market access for developing countries agricultural products;
- Substantial cuts in export subsidies on agricultural products;
- Substantial cuts in domestic agricultural support mechanisms.

➤ **Taking Advantage of Agricultural Trade Liberalization.** Securing the benefits from increased trade will not be not automatic. It will require a massive effort to improve the competitiveness of their economy and pro-poor policies and institutional development that allow poor producers to take advantage of the opportunities offered by global markets. A recent report by the Food and Agriculture Organization (FAO) has highlighted few examples of increased revenues and income from increased exports. Some developing countries, such as Colombia and Thailand, have clearly benefited from lower restrictions on their exports. Farmers in these countries were able to access the necessary market information, raise credit and investments, organize efficient marketing chains and meet the

demanding standards of developed countries consumer markets. Most developing countries however have found it difficult to compete with more efficient agricultural producers in an environment of freer trade which tends to align international prices with that of the lowest producers. They also have had difficulties in complying with the food safety and quality standards of OECD countries which is a major constraint to developing countries exports. In these countries, farmers have been unable to improve productivity and diversify away from traditional crops into higher added-value products and have seen their incomes and standards of living decline. For farmers in developing countries to benefit from their increasing integration in the global economy will require investments in transport infrastructure and marketing institutions (including access to information), improved access technologies and credit, investments in human capital and the development of institutions such as farmers organizations and of partnerships with processors and agro-industry, to meet the quality and safety requirements of demanding export markets.

Box 6: Coping with Safety Standards

Recent studies have estimated that the new EU standards for aflatoxin in food imports (as against the less stringent international standard), which reduce health risks by about 1.4 death per billion per year, would reduce African food exports to EU by 64% or US\$ 670 million per year. In 1998, 3/5 of developing countries responded that they had exports rejected within the past two years due to a failure to comply with importing country's SPS. Thailand for instance had been involved in 21 disputes with her trading partners since 1995.

28. **The Strategic Agenda.** It is possible to achieve the sustained 6% annual agricultural growth rate set by African Leaders under NEPAD. Africa has enormous unexploited potential, in resource-based sectors -- and in related processing, manufacturing and service -- that it has barely tapped. Globalization and new communication technology, especially information technology, offer a great opportunity for Africa, historically a sparsely populated and isolated continent. It will however require that on-going policy and institutional reforms be sustained and broadened. While macroeconomic stability has generally improved in many countries, it remains fragile. Tariff and non-tariff barriers to trade in raw and processed agricultural products and agricultural inputs remain high. In many countries, the institutional and regulatory framework remain inconsistent and nontransparent, discouraging private sector investments and limiting competition by preventing new entrants from competing against well-connected firms in input and output markets. In many countries, access to land and other natural resources, the main productive asset of the rural poor, is still not equitable, discriminating in particular against women, and the efficient functioning land markets is still constrained by the lack of clear and enforceable tenure rights. Rural financial markets remain underdeveloped, making it difficult for farmers and firms to expand or even maintain their operations. Also, much more needs to be done to reform government. Many countries must move more quickly with decentralization and the promotion of genuine participation of civil society in decision-making. These reforms are necessary. They are however not sufficient. A strong agricultural supply response will also require massive public investments in social services, to build the human and social capital of the poor, and in rural infrastructure to improve access to markets and services. Finally, massive investments in agricultural technology generation and dissemination will be required to bring the benefits of the world-wide

Box 7: Underlying Factors of Success in Agricultural Development

- Policies must not discriminate against agriculture, nor give it special privileges and agriculture should be taxed lightly, using the same progressivity and instruments as for other sectors;
- The economy should be open, employment sensitive, and oriented towards smallholders;
- The importance of external, including specialty and niche markets, should be fully recognized and exploited;
- FDI should be recognized as an integral part of the agricultural development process;
- Land reform is essential where land is very unequally distributed;
- Rapid technological progress is needed, for which both the private and public sectors have important roles in research, extension, and financing;
- Rural areas need substantial investment in education, health, and infrastructure; and
- The needs of women, who constitute an important component of farmers and farm laborers, must be built into programs.

agricultural revolution to African farmers, to improve their productivity and ability to compete on domestic and international markets.

29. Therefore, the strategic agenda for supporting sustained agricultural growth and wide-spread rural poverty reduction includes:

(i) Improving rural poor's access to assets (natural, physical and financial) and essential social and economic services, to build their human and social capital, raise the returns on the assets they hold, empower them to influence policy and exercise more effective control over the service they need;

(ii) Continuing policy and institutional reforms to eliminate distortions in incentives, reduce trade barriers impeding access to international and regional markets, and remove restrictive regulations and other administrative measures that discourage competition and impede the satisfactory operations of input and output markets;

(iii) Investing in rural transport, marketing and communication infrastructure, to link producers to markets;

(iv) Strengthening property rights and the rule of law, to foster private initiative;

(v) Improving rural financial markets to support investments in agriculture and rural economy;

(vi) Improving governance and the efficiency and accountability of public institutions, to make them more responsive to the needs of the poor and vulnerable groups; and

30. These reforms are at the core of African countries' poverty reduction strategy (PRSPs) which focus on: making government and institutions work better for the poor; fostering an enabling environment for broad-based and sustainable rural growth; reducing risk and vulnerability of the rural poor; promoting the sustainable management of natural resources. The proposed MAPP would be a critical component of this agriculture-led poverty reduction strategy. It would support the institutional reforms and investments required for the much faster generation, diffusion and adoption of technologies necessary for ensuring a strong and sustained increase in the productivity, competitiveness and incomes of African farmers.

B. Issues to be Specifically Addressed under the Proposed MAPP

1. Africa Has not Participated in the Agricultural Revolution.

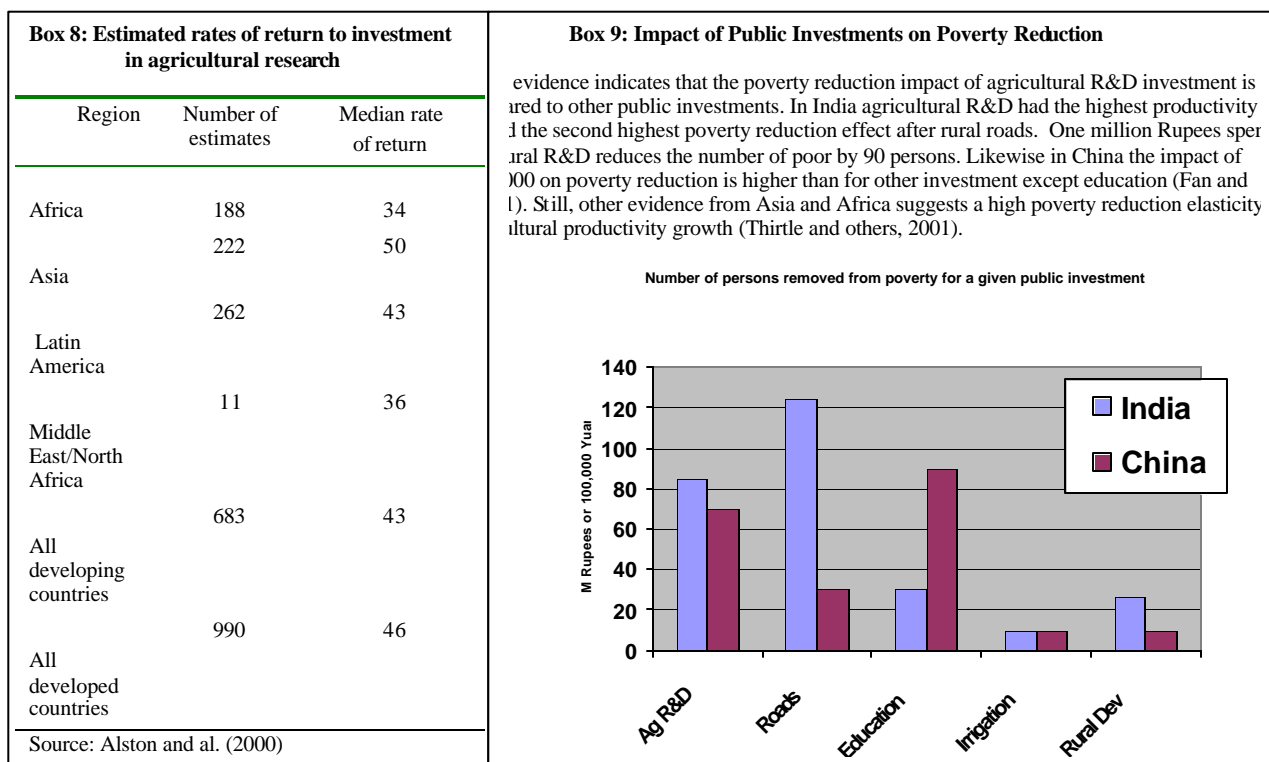
31. Many studies have demonstrated the very high economic returns on investments in agricultural research and dissemination, with returns typically above 40 percent (Boxes 8 and 9), which are thus a crucial driver of agricultural growth.

Although there hasn't been a comprehensive review of the impact of past investments in agricultural research on African agriculture, there are clear examples of significant successes: cotton in West Africa, hybrid maize in Southern Africa, rubber and oil palm in Cote d'Ivoire, tea in Kenya and, recently, the development of the Nerica rice variety by the West Africa Rice Development Association (WARDA,

Box 10: WARDA's Nerica

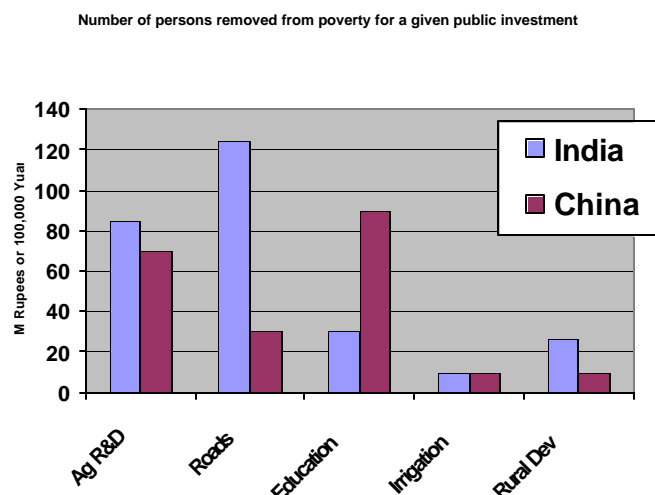
In 1992 the West Africa Rice Development Association (WARDA) initiated a research program aimed at developing high performance rainfed rice varieties well suited to African agro-ecological conditions, by combining the ruggedness of African rice with the productivity of Asian species. WARDA used molecular biology to overcome sterility, the main problem in crossing species, and accelerate the breeding process. Trials were carried out in farmers' fields in Guinea, through an approach called participatory varietal selection (PVS). 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 both drought and acid soil tolerance. In addition, it tastes good, say the farmers. The challenge now is to disseminate Nerica quickly throughout West Africa.

Box 10). However, the overall poor performance of the sector indicates that technological change has by no means been deep enough to support sustained and wide-spread agricultural growth. Africa has been on the sideline of the world-wide agricultural revolution and this has gravely eroded the competitiveness and profitability of its agriculture.



Box 9: Impact of Public Investments on Poverty Reduction

evidence indicates that the poverty reduction impact of agricultural R&D investment is equal to other public investments. In India agricultural R&D had the highest productivity and the second highest poverty reduction effect after rural roads. One million Rupees per year of agricultural R&D reduces the number of poor by 90 persons. Likewise in China the impact of 100 million Rupees on poverty reduction is higher than for other investment except education (Fan and al. 2001). Still, other evidence from Asia and Africa suggests a high poverty reduction elasticity of agricultural productivity growth (Thirtle and others, 2001).

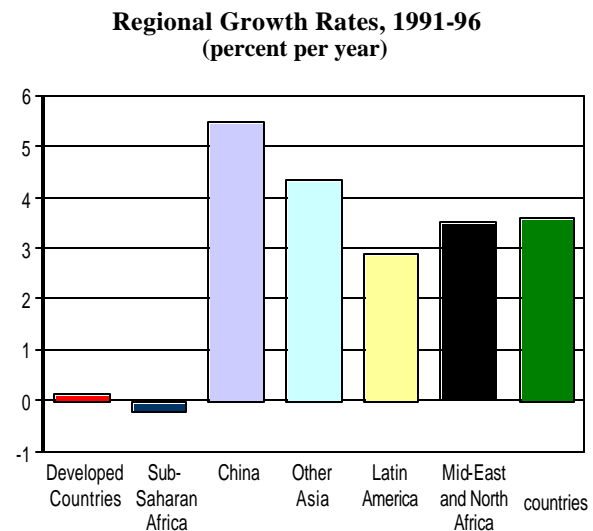
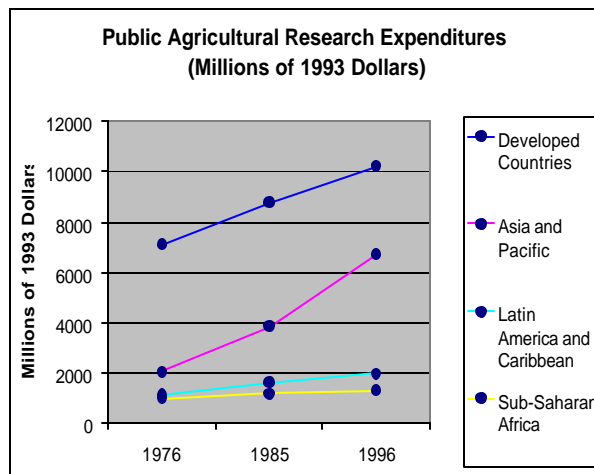


32. The agricultural revolution has induced sustained increases in productivity and triggered a sharp and wide-spread decline in real agricultural prices. The fall in agricultural prices have affected not only crops produced in developed countries but also tropical crops (bananas, pineapple) or commodities competing with tropical crops (beet against sugar cane, soybean against groundnut and other tropical oil crops) or against synthetic substitutes (rubber, cotton). The decline in international prices has had a major negative impact on the competitiveness of African agriculture and on the incomes of African farmers. Indeed, the agricultural revolution -- largely based on mechanization, improved crop varieties and animal breeds, fertilizers, concentrated feeds and plant and animal products -- has benefited only the small minority of the world's farmers: those able to acquire the new technologies either because they benefited from a high comparative advantage in terms of natural resource endowment or because, like the farmers in developed countries, they benefited from subsidies which artificially reduced their de facto production costs. This hasn't been the case for the immense majority of African farmers who, with limited access to markets, no equipment other than hand tools and very limited use of inputs, have been trapped into a low productivity and profitability farming systems and unable to invest in new technologies, even when these were available. In addition, technological progress has by-passed many of the crops and livestock varieties -- the "orphan crops" -- which play a critical role in African smallholders production systems.

2. Insufficient Investments in Agricultural Technology Generation.

33. **Public Funding.** Although there has been significant public investments in national agricultural research in Africa over the last three decades, African investment levels have been much lower than in Asian and Latin American countries. In contrast to the situation of the 1960s and 1970s when public

spending more than doubled, spending for agricultural research in Africa stagnated in the 1980s and declined in the 1990s, increasing Africa's technology lag behind other developing countries.



- Africa public agricultural research spending in 1996 amounted to US\$ 1,270 million against US\$930 million in 1976 (in 1993 US\$), i.e. an average growth rate of 1.5% per year over the period against 4.5% for the developing countries as a whole; worse yet, most of the growth was concentrated in the first ten years of the period, with growth actually turning negative at -0.2% p.a. during 1991-96;
- As a result, the share of Africa in developing countries' global expenditures on public agricultural research fell from 21% in 1976 to 11.1% in 1996, underscoring the grave danger for Africa to fall further behind in terms of agricultural productivity and competitiveness;
- International donor support to agricultural research, after decades of strong support, began to decline around the mid-1980s and Africa, where agricultural research relies heavily on donor support, was particularly hard hit.
- The budget of CGIAR centers, which play a key role in African agricultural research, also started to decline in real terms from the beginning of the 1990s (in 1995 it represented only 1.5% of the nearly US\$22 billion spent on public-sector agricultural research worldwide, down from 3.8% a decade earlier).

34. The reasons for this decline in funding of African public agricultural research are many: from the need for African governments to reduce spending generally for restoring macroeconomic balances, to growing pressures for meeting other urgent development needs in the education, health and infrastructure sectors. But also a complacency borne from the very success achieved globally over the last four decades in increasing global agricultural productivity (today's farmers are feeding almost twice as many people from virtually the same crop land), and a mistaken belief that private research, in particular through biotechnology, will be able to shoulder a fast growing share of the research agenda. None of these views are correct.

35. **Private Funding.** The private sector has always played a key role in technology generation and adoption. It is estimated that by the mid 1990s, about one-third of the US\$33 billion total investment in agricultural research worldwide was private. But little of this research took place in developing countries

(5.5%) and, although it is difficult to ascertain, it is doubtful that much of the private research was directly relevant to developing countries' needs. Private research is concentrated on food processing and post harvest technologies (in 1995, only 12% dealt with farm-focused technologies) and the farm technology needs of commercial agriculture (seeds, vaccines, agrochemicals and farm equipment) where profits can be captured.

Estimated Private Agricultural R&D Investments (1995)

	Expenditures			Shares		
	Public	Private	Total	Public	Private	Total
	(1993 US\$ million)			(percent)		
Developing countries	11,469	672	12,141	94.5	5.5	100.0
Developed countries	10,215	10,829	21,044	48.5	51.5	100.0
Total	21,692	11,511	33,204	65.3	34.7	100.0

Private agricultural research relevance to African agriculture will develop in the long run, as profitable markets develop. In the meantime, African agricultural research will continue to rely overwhelmingly on public support, through international centers or NARSs. This is especially true for addressing the needs of poor farmers. The decline in public funding of African agricultural research should be immediately reversed if the agricultural growth target of 6% p.a. necessary for significant poverty reduction in Africa is to be achieved. Given the lag between investing in technology generation and its impact on widespread adoption and productivity increases –measured in years and sometime in decades-- the necessary major increase in public funding of agricultural research cannot be delayed.

3. Low Efficiency of Agricultural Technology Generation, Transfer and Adoption System

(i) *Agricultural Technology Generation System.*

36. Most of the research in Africa is still done by public agricultural research institutions(NARSs). The contribution of universities and of the private sector to the NARSs are marginal. The International Agricultural Research Centers (IARCs) of the CGIAR system have also been very active in Africa, and have developed the basic material for many of the new varieties which are spreading through the continent. Africa now receives the largest share of CGIAR expenditures.

37. **National Agricultural Research Systems.** Most NARSs are dominated by public research institutions. Their past performance has often been poor. Low and unreliable funding, lack of strategic planning, poor linkages with end-users who are rarely involved in the governance of the systems, limited human resources, poor staff incentives and poor internal management have considerably limited the relevance and efficiency of their activities. African NARSs have to face both the complexity of the research agenda -- most African countries have a mosaic of agro-ecological conditions and cropping systems -- and the low capacity of governments in providing adequate and reliable funding for agricultural research. NARSs have had great difficulties in applying the stringent selectivity necessary to match national research priorities with the limited available funding and research system capacities. In spite of agroecological and farming system similarities among African countries, cooperation among NARSs for implementing regional programs of common interest has been limited.

38. In the early-1990s, with the support of the SPAAR, four *Regional Frameworks of Action* were designed for the Sahel, Humid Tropic, Southern Africa and Eastern Africa sub-regions, to improve NARSs efficiency and strengthen their collaboration. Implementation of these Frameworks for Action led to the identification of six principles for building strong NARSs: (i) increasing the input of stakeholders in strategic and operational research planning, and in the monitoring of results; (ii) ensuring a reliable funding mechanism to improve financial sustainability; (iii) improving internal efficiency through increased transparency and accountability; (iv) strengthening the linkages between research, extension and end-users; and (v) increasing regional and international collaboration. Many NARSs have

started to implement reforms along these lines, restructuring their managerial and governance systems to become more responsive to end-users and improving their financial and accounting systems. A growing number of semiautonomous or autonomous research institutions (Kenya Agriculture Research Institute, National Agricultural Research Organization of Uganda, Senegal Institute for Agricultural Research, National Center for Agricultural Research of Cote d'Ivoire) have end-users on their governance bodies and are formulating agricultural research programs in close collaboration with farmer organizations. The move away from the top-down, supply driven publicly-financed model in favor of more open and client-driven systems has also allowed some NARSs to improve financial sustainability through cost recovery. Competitive research mechanisms and contractual research with partial cost recovery from users have also be introduced in many NARSs. In many countries, R&D outreach programs empowering farmers and their organizations in technology generation and delivery, are being piloted. In Kenya, Uganda, South Africa, Zimbabwe, Malawi and Tanzania, among others, private firms are conducting or funding research on commercial crops.

39. **International Agricultural Research Institutions.** The bulk of international agricultural research effort is carried out by the CGIAR's network of independent International Agricultural Research Centers (IARCs). Africa alone absorbs half of CGIAR's total annual budget. Four Centers are located in Africa, of which three have built major research infrastructures. All Centers have a sizable activities ranging from upstream biological research to training. Funds to support the operations of the CGIAR system come from members' contributions. Members include industrial and developing countries, foundations, and international and regional organizations including the World Bank. Industrial countries, specifically the members of the Development Assistance Committee of the Organization for Economic Cooperation and Development, contribute more than two-thirds of CGIAR financing. The World Bank assumes the role of donor of last recourse. Although the ICs have produced impressive results, the overall efficiency and impact of the system have been less than optimal: (i) the system is only now developing a comprehensive and focused African strategy – each center having pursued its own specific strategy; and (ii) ICs coordination between themselves and with NARSs and their support to strengthening national research capacities have only recently started to improve. The CGIAR system is currently going through a restructuring process aiming at strengthening its relevance, efficiency and sustainability through a much greater collaboration with the NARSs and the newly established Sub-regional research organizations. In addition to the CGIAR system, there are a number of independent agricultural research and academic institutions (with international mandate) which operate in Africa, often outside any national or sub-regional collaborative framework. The Global Forum for Agricultural Research (GFAR) was recently established to expand the boundaries of the coalition for international agricultural research beyond the CGIAR , and also capture the research potential of the private sector.

40. **The Sub-regional Research Organizations** . Three sub-regional agricultural research networks (SROs) have been established over the last two decades (ASARECA in Eastern Africa, CORAF/WECARD in Western and Central Africa and SACCAR in Southern Africa). Their mandate is to (i) coordinate the research programs of common interest to the NARSs in their sub-region; (ii) organize systematic knowledge sharing and human resource development; and (iii) strengthen partnerships with CGIAR centers and other advanced research institutions. The funding of the SROs come from grants of bilateral and multilateral donors, in particular the European Union and the United States which have taken the lead in coordinating donor support to these organizations. The African member states bear some of the SROs' operating costs and provide as well substantial in-kind contribution in facilities and human resources.

41. **The Forum for Agricultural Research in Africa (FARA)** was recently created as the apex organization of the three sub-regional networks and to take over the global donor coordination responsibilities of SPAAR. FARA represents the African agricultural research systems in the Global Forum for Agricultural Research (GFAR) and in the CGIAR system.

(ii) Technology Transfer and Adoption System

42. African governments have invested heavily in technology transfer (extension) systems. It is estimated that about 80% of the world's extension services are publicly funded and delivered by civil servants, with universities, parastatals and NGOs delivering about 15% of services and the private sector an other 5 percent. Although no estimates is available, this proportion is probably even higher for Africa. Traditional extension approaches focused on delivering to farmers "technical packages" generated by agricultural research. One such system, supported by the World Bank, was the Training and Visit (T&V) system -- which tried to introduce sound management practices in governments' public extension systems and strengthen its linkages with research – which at one time employed an estimated 100,000 civil servants who worked directly with up to 10% of African farmers. Although it is difficult to assess the efficiency of prevailing public extension systems, their low perceived impact, lack of accountability and resulting low internal efficiency, and unsustainable demands on governments' budgets have led to a growing disenchantment with these largely supply-driven extension systems. Since the mid-1990s, countries have increasingly developed extension systems better suited to answering the complex nature of African farming systems and the diversity of African farmers' technical and economic constraints. These systems attempt to (i) shift away from the traditional approach of transferring prescriptive information to that of enhancing farmers' technical skills and understanding of issues and technologies; and (ii) promote pluralistic, demand-driven agricultural advisory systems where farmers' have greater control over the choice of the service supplier and the quality of the service.

C. Improving the Efficiency of the Technology Generation and Dissemination Systems

43. Improving the productivity and competitiveness of African agriculture requires immediate action in three areas: (i) the refocusing of agricultural research on the generation of technologies which address the specificities of Africa's complex farming systems and target the needs of small-holders; (ii) the deepening of on-going institutional reforms aimed at improving the accountability, efficiency and sustainability of the technology generation and dissemination systems; and (ii) a substantial increase in the funding of these systems at the national and regional levels

1. Research Agenda for African Agriculture.

44. ***The Technology Challenge.*** The defining characteristic of African agriculture is its diversity. Across the continent, within countries or even within individual farms, a wide range of crops is usually grown, often inter-cropped. These complex cropping systems exploit a diversity of climates and soils to buffer production from pest and climatic risks. Addressing the needs of African farmers therefore requires a deep understanding of local farming systems and the development of a menu of possible techniques and technologies adapted to local conditions, agroecological as well as economic: research priorities will need to be adjusted to the key characteristics of different types of regions (high/low potential, linked to/isolated from markets).

- ***Land frontier.*** Area expansion has been the traditional source of agricultural production in Africa. Population growth is however rapidly closing the land frontier in many African countries. Area expansion now comes at an increased cost, in terms of the high labor cost but mostly in terms of environmental degradation through the conversion to agricultural use of the rapidly declining forest resources, wetlands and marginal land (in low rainfall environment or of steep slopes). In the future, agricultural research should not promote area expansion, but attempt to mitigate its effect by focusing on the more sustainable management of soil and water resources. Particular attention should be given to the development of appropriate technologies for the large number of farmers living in low potential areas (for agroclimatic reasons or because they are constrained by poor infrastructure and market access), which will need to focus on low use of external inputs and the conservation of the resource base.
- ***Improved Soil and Water Management.*** Improving moisture and nutrient availability will present a major challenge. Irrigated agriculture, in particular wetlands and bottomlands should receive

increased attention. However, the most critical issue to address is water management in rainfed farming, to capture and better use rain where it falls through better agronomic practices. Soil degradation and nutrient depletion should be one of research major focus. High rates of nutrient depletion are found in most of Africa and poses the gravest threat to agricultural productivity. Better agronomic practices are needed to provide low costs responses affordable by poor farmers. But they will not be sufficient by themselves to maintain the long-term productivity of the soil resources. External inputs will also be necessary and this in turn requires both (i) that the cost of these inputs to farmers be reduced by investments in transport infrastructure and policy/trade reforms; and (ii) intensified research in nutrient management to improve the efficiency in their use. Many crop management problems are location-specific and will require strong national research capacities as well as close collaboration with extension services and end-users. Particular attention will be needed to the

- *Increasing Productivity.* Increasing productivity and protecting crop, livestock and fisheries productivity, based on improving the plant growth-environment is at the heart of future agricultural income growth. This will require a combination of genetic improvement and the development of yield-protecting technologies that help to attain a greater potential of the yield potential in the field and include both genetic improvement and improved crop management practices. New discoveries in molecular biology have opened new frontiers and prospects for the application of biotechnology to genetic improvements and for protecting crops and livestock against biotic and non-biotic stresses (water deficit/logging, toxic elements...). Given the complexity of this research, this will primarily be the responsibility of International Centers and, increasingly of the private sector.
- *Shifts in crop mix and high value crops.* Diversification to high-value export commodities offers farmers opportunities to increase incomes without increasing farm area. Also, high value crops are often labor intensive and have strong multiplier effects through linkages with input and downstream marketing and processing activities, offering further employment opportunities for landless workers. One of the most dynamic aspects of African Agriculture has been the shifts in crop mix (it is estimated that more than 50% of the agricultural GDP in Kenya over the 1968-87 period was due to a shift toward high-value crops (coffee, horticulture). This is true for a shift in favor of export crops but also, with the growing urbanization of the population, for crops produced for the expanding domestic urban markets. For agricultural research, this makes crop priorities somewhat of a moving target and requires that strong ties be established between research and producers for defining a fast-changing market-driven agenda. In addition, as previously mentioned, the issue of food safety concerns and quality standards need to be addressed through a combination of vertical coordination with private processors and agroindustry and a very proactive public sector involvement if smallholders are to take full advantage of opportunities open up by trade liberalization.
- *Reducing Risk.* African rural people are exceptionally vulnerable to adverse shocks, in particular those affecting agricultural production and incomes such as droughts, pests or diseases. They have developed sophisticated strategies for mitigating and coping with risk. They diversify their sources of income by planting different crops and plots, working for other farmers, non-farm employment and develop social networks. When shocks occur, rural people draw down their savings, take out loans, sell their meager assets or migrate to unaffected areas. But, these strategies provide only limited protection against fluctuations in income and consumption. Governments' first priority to reduce risk and vulnerability are prudent macroeconomic management, basic public health programs, cost-effective nutrition interventions, education policies that guarantee access to poor children, investments in infrastructure, the development of rural financial services and actions to stop conflict and ensure security. Because of the critical role played by agriculture in rural livelihoods, agricultural technologies have also a critical role to play to mitigate risks and reduce the vulnerability of poor rural households. In Africa, over 95 percent of cultivated land depends on rainfall. Many of these lands are in arid or semiarid areas where rainfall is unreliable, and crop failures are common. Increasing yields on rainfed lands by just 10 percent would have far greater impact on total agricultural output than doubling area under irrigation, even though productivity on irrigated lands is

two to four times that on rainfed lands. Moreover, such improvements would benefit mainly poor farmers living on marginal lands. This suggests that increasing availability of water in rainfed areas could make a big contribution to reducing poverty and increasing security of Africa's rural poor. Developing low-cost measures -- drought and disease resistant crop varieties, improved soil and water management techniques (such as minimum tillage) and affordable integrated pest management approaches-- that reduce risks of crop failures in rainfed agricultural areas is a priority for agricultural research in Africa. The development of early warning systems can also assist farmers to mitigate drought and other natural risks.

45. **Targeting the Poor.** First of all, to have a significant impact on agricultural growth and poverty reduction, agricultural research will need to address the specific needs of the poor, through the application of technologies that take maximum advantage of their particular endowments for increasing productivity and sustainability, and reduce vulnerability. It will have to be spread across the wide range of crops produced by smallholders and address their specific constraints: restricted access to land and other productive resources, labor constraints, low financial resources or access to credit, high vulnerability to climatic, market, biotic or social risks. Particularly important will be addressing the needs of women, and of HIV/AIDS affected labor-constrained households. Women provide 70 percent of total agricultural labor in many countries of Africa. Many poor agricultural households are female-headed and even in households containing both adult men and women, women often have primary responsibility for

producing food. Yet, often women do not have access to the resources that would enable them to increase output. One major constraint is time. Along with cultivating fields and tending animals, they must look after children, the sick and the elderly, collect firewood and water, prepare food, transport goods, and buy and sell goods in the market. Women also lack access to information of more advanced agricultural technologies or household labor-savings methods, because most agricultural extension agents are men and aim their services at men. Women have difficulty obtaining capital for investment in their farms because they lack decision-making authority and access to credit or other means of acquiring new technology or agricultural inputs.

Box 11: How to increase the Africa's food production by 15%

Rural women face considerable gender-based obstacles which make it difficult for them to achieve their potential, and given their importance to the rural economy, results in considerable loss in the sector's productivity. This has been well documented. For example, a survey of 750 rural households in Kenya found that men's gross value of output per hectare is 8 percent higher than women's. However, if women had the same human capital endowments and used the same volume and quality of factors and inputs as men, the value of their output would increase by 22 percent. Capturing this potential productivity gain would substantially increase food production in Africa, thereby significantly reducing the region's food insecurity. If these results from Kenya were to hold true for the region as a whole, simply raising the productivity to the same level as men could increase total production by 10–15 percent. Similar results were found in an analysis in Zambia, showing that if women enjoyed the same degree of capital investment in agricultural inputs, including land, as men, output in Zambia could increase by up to 15 percent (Saito et al, 1994, cited in Blackden and Chitra, 1999).

A study in Burkina Faso showed that these disadvantages take a toll; women cultivate their plots less intensively than men and yields are 18 percent lower than on identical plots controlled by men. This suggests that unless the needs of women are specifically addressed in agricultural and rural development programs, agricultural and overall national economic growth will continue to lag. Addressing the needs of the poor will require a re-orientation of the research activities, at the national and international levels. This in turn will require that the poor be given a much greater voice in priority setting and the development/implementation of technology generation programs.

46. **Bridging the Scientific Divide.** Research will need to continue investing in conventional technologies. Many high-yielding varieties have already been successfully developed and introduced and promising new ones are in the pipelines. Improved crop management techniques and more judicious use of inputs will also improve productivity, bridging the gap between potential yields and those achieved in the field. Biotechnology also offer developing countries hope to successfully addressing critical production and nutrition constraints: (i) crops' resistance to non-biotic stresses (acid, or alkaline soils,

salinity tolerance...) and to pest; (ii) production of disease-free planting material (banana, plantain, cassava...); (iii) input replacement (reduced need for fertilizers and pesticides); (iv) improved livestock productivity through disease resistant stocks and cheaper vaccines; (v) improved nutritional quality of food crops. So far, biotechnology activities have been concentrated in developed countries (less than 20% of the trials have been conducted in developing countries), where they have been used for the improvement of crop and livestock and the diagnosis of diseases and the production of vaccines. The cultivated areas under genetically modified (GM) crops have grown from 2 million ha in 1996 to more than 44 million ha in 2000.

47. In developing countries, Argentina, China, Mexico and in Africa South Africa have significant commercial planting of GM crops. Commercial application of biotechnology has also started in Kenya and Zimbabwe, but in this area too the continent is lagging behind other countries in the world. Africa cannot be excluded from the biotechnology revolution. The challenge will be to articulate an African biotechnology agenda and strategy that in particular focus on the need of poor farmers, build the capacity of African institutions to participate in BT research and develop the necessary regulatory framework for protecting against potential risks to human health and to the environment. Public research will play a fundamental role in the development of biotechnology in Africa. As most African countries don't have the resources, human and financial to take advantage of the benefits of biotechnology, the international community, and in particular the CGIAR system, will have a critical role in identifying opportunities and potential risks; leading research programs while supporting national capacity-building; and facilitating information access/sharing.

Box 12: Biotechnology in Africa

In Africa, only South Africa, Zimbabwe, Kenya have significant activities in the field of biotechnology. However, there is a growing awareness of the potential productivity impact of biotechnology and other countries have expressed strong interest, such as Nigeria and Cote d'Ivoire. Several success stories are coming out of the continent where biotechnological approaches have increased crops resistance to biotic and non-biotic stresses, reduced the cost of pest controls and created new employment opportunities.

- The wide adoption of disease-free banana plantlets in Kenya;
- The use of pest-resistant cotton varieties in South Africa;
- The use of new vaccines in Kenya and Zimbabwe

2. Improving the Relevance and Efficiency of the Technology Generation and Transfer Systems

48. Mobilizing the resources necessary for meeting the formidable agricultural productivity challenge confronting Africa countries will require the commitment and support of a broad and powerful coalition of stakeholders -- governments, end-users and external partners. To mobilizing this broad support, agricultural research will have to demonstrate its relevance, effectiveness and efficiency in contributing to poverty reduction objectives. This in turn will require:

- Increased stakeholders participation in the governance of the systems and in the definition of research priorities to ensure that research programs and results are relevant to the stakeholders' main concerns – including social and environmental objectives ;
- Promotion of cost sharing arrangements with end-users according to their capacity to pay, to increase their stake in the efficiency of services provision and improve the financial sustainability of the system;
- Promotion of pluralistic, competitive systems by opening the systems to other service providers (universities, NGOs, private sector) and the introduction of competitive contractual schemes for service delivery; and
- Increased efficiency, transparency and accountability of technology generation and dissemination institutions, through improved governance structure, internal MIS and systematic M&E systems.

49. **The Role of the Public and Private Sectors in Technology Generation and Adoption.**

Meeting the agricultural productivity challenge will also require forging new partnerships between the public and the private sectors. Public intervention in support for technology generation, dissemination and adoption is justified by (i) the public good nature of much of the technology necessary to overcome the main constraints to the sustainable development of African agriculture, but also (ii) by the limited capacity to pay of African smallholders and the imperfections prevailing in output, input and credit markets which, if not remedied, would lead to serious under-investment into agricultural technology relative to profit maximizing investment levels, and therefore into a shortfall in agricultural growth. Public intervention in support of new technology generation is justified by the fact that, once discovered and developed, scientific and technological knowledge is freely available to all, and can be embodied into capital goods and/or inputs by firms which did not contribute to the discovery and development costs. The patent system is designed to overcome this market imperfection, and has recently been extended to include genetic information and the derived seed varieties and animals. As a consequence, in OECD countries most applied research leading to new seed varieties, livestock strains, chemical inputs, and machines is now performed by the private sector. The private seed and chemical sector has also flourished in some large developing countries such as Brazil and India, but remains very poorly developed in the very small markets of Africa. This is partly a legacy of the excessive reliance on public sector marketing of inputs and outputs, but also because the investment climate for the private sector remains poor in many countries, excessive regulatory interventions and intra-African trade restrictions on agricultural inputs continue to fragment the markets for new seeds and chemical inputs. Reforms in these areas are necessary. However, because of the public good nature of much agricultural research, public funding will remain the main driving force of technology generation both for the strategic and basic science research which, even in developed countries, is financed by the public sector, and for the development of the large array of agricultural techniques which cannot be patented such as agronomic research and research into soil and water management. Substantial institutional reforms will be required to make publicly funded research and extension institutions more efficient and accountable, and innovative institutional arrangements – such as Competitive research grants open to all relevant public and private institutions -- will be needed to mobilize private initiative in support of publicly funded programs.

Box 13: “Public vs. Private: Who finance, Who delivers?”

Who should finance? Government should focus their limited resources on core functions that the private sector cannot provide:

- Ensuring that the market works: establishing the general policy and institutional that allow the market to operate efficiently;
- Correcting market failures through the provision of public goods, when goods and services are provided at prices above their minimum costs and/or levels of production/consumption are below the social optimum;
- Compensating through targeted interventions for outcomes of unconstrained market forces that are considered socially unacceptable.

Who should deliver? It should be based on criteria of cost-effectiveness and efficiency. Two reasons generally given to favor private delivery:

- Greater managerial autonomy and responsiveness to change in demand;
- Effective competition between service providers which encourages lower prices and better quality of service.

David Hoole, Oxford Policy management (2002)

50. **Reforming the Agricultural Technology Generation System** Considerable improvement in the way available human and financial resources are used, can be achieved by the restructuring of the existing technology generation and transfer systems. This involves: (i) defining clear lines of responsibilities and collaboration between NARSs, the sub-regional research organizations and the international agricultural research system; and (ii) aligning, for the system as a whole and each of its three components, processes and resources with their central objective and operational strategies.

- **Division of Responsibilities Among Research Institutions.** Because of the complexity of the agricultural research agenda and the severe constraints on the availability of resources, there is an urgent need to define a rational division of labor for between NARSs, sub-regional research institutions and ICs, and between private and public actors at each level, to ensure that their

respective research activities are well integrated and coordinated. This division of responsibility should take into account the comparative advantage of each of the partners (i.e. NARSs are better suited to undertake location-specific research), and existing capacities. One of the driving considerations will be the limited capacities of NARSs. Indeed, many African countries have small research systems (only six national systems have more than 200 researchers) and the basic tension of these small NARSs is to ensure that they move toward an affordable and sustainable portfolio in line with both national priorities and existing capacities. More specifically:

- International Centers of Excellence, including CGIAR, should concentrate efforts on strategic and basic research (germplasm improvement); germplasm safekeeping; bio-safety and IPR issues; assessment of global scientific advances; collation and dissemination of scientific information; ecoregional problems associated with maintaining and sustaining natural resources; method development and capacity-building of NARSs;
 - NARSs should concentrate on more location-specific adaptive research, crop/livestock husbandry and resource management research;
 - Sub-regional Research Organizations should concentrate on coordinating and facilitating collaboration among NARSs within the sub-region and between NARSs and the international centers.
 - Private sector capacities should be mobilized to undertake some type of research, on public or private funding, for which it has both an interest and a comparative advantage.
- ***Improving NARSs Capacities and Efficiency.*** Major efforts are still required in most NARSs to improve the planning and relevance of research programs; improve the internal management of research institutions; and develop human resources. This will involve the following reforms:
- Developing NARSs capacity for priority-setting and linking resource allocation to priority research programs;
 - Upgrading of NARSs technical skills and human resource management through sustained training programs, severing NARSs from civil service policies and procedures and introducing a performance-based human resource incentive and management system;
 - Developing information technology to link NARS to external scientific information networks;
 - Establishing efficient Internal Management Information Systems in agricultural research institutions; and
 - Introducing systematic scientific external reviews and evaluation, and strengthening Monitoring and Evaluation Systems to track internal efficiency, outputs and impact.

51. **Reforming Agricultural Technology Transfer/Adoption Systems.** Agricultural and rural development extension programs will be critical to achieving the rural development objectives. Delivering scientific and technical advances in most developing countries requires effective extension systems. New approaches in extension services will be important in bringing together the rest of the ingredients for successful productivity gains in agriculture — new technologies, modern inputs, credit, and efficiently functioning product markets. Some approaches need to recognize the specific requirements of small and poor farmers, while other approaches which are designed to serve large and commercial farmers should encourage the participation of the private sector in delivering extension services and be based on joined financing and monitoring among stakeholders in order to improve efficiency and increase cost recovery. But extension must be more than just a delivery vehicle for

Box 14 : Agricultural Advisory Services in Uganda

Through the Bank-financed National Agricultural Advisory Project, the government of Uganda is fundamentally altering the way it delivers agricultural extension from a supply -driven approach with government as the sole provider of advice, to a much more flexible and pluralistic demand-driven system. Key changes include:

- **Increasing independence and flexibility of extension services** by creating a small and semiautonomous unit within the Ministry of Agriculture, Animal Industry and Fisheries. This will allow the program to escape from old bureaucratic structures and some of the civil service restrictions which limit the flexibility and effectiveness of many public sector institutions in Uganda.
 - **Decentralizing responsibility and funding for agricultural advisory services** from district governments to farmers organizations and their local governments. Central government will provide matching grants to district governments. District governments will channel the funds to farmers' organizations and local governments to use to hire experts on specific technology, market development and other areas important to farmers. Farmers can also use the resources to finance activities such as participatory planning and group mobilization.
- **Increasing outsourcing of services** by providing incentives to districts to reduce the number of extension agents they employ as civil servants and to use contracted services instead. To ensure that service providers are qualified and perform as expected, the government will set and enforce standards for qualifications and performance. It will establish a registration system of agricultural service providers as professionals. It will also provide training to civil servants made redundant through the reforms to ease their transition to employment in the private sector.
- **Boosting cost-sharing** by gradually and deliberately raising fees to local governments and farmers for extension services.
- **Improving donor coordination** by requesting donors to make a joint commitment to the program and use a common mechanism to finance it. A memorandum of understanding will be signed by participating donors (including IDA) and government, containing procedures for annual approval of budgets and work plans, quarterly cash flow forecasts, commitments, timing of flow of funds, triggers, procurement, reporting, review and evaluation, external audits and the like.

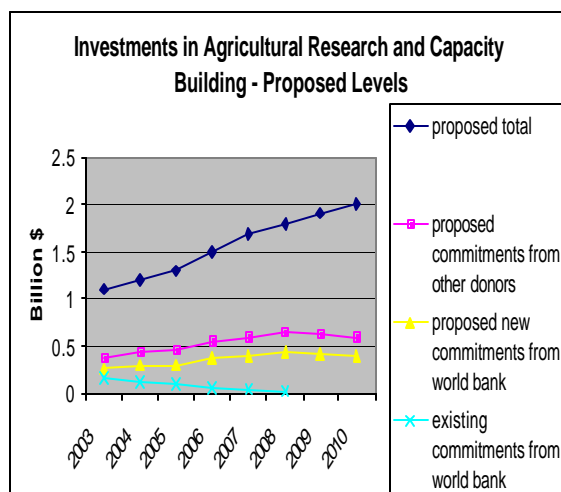
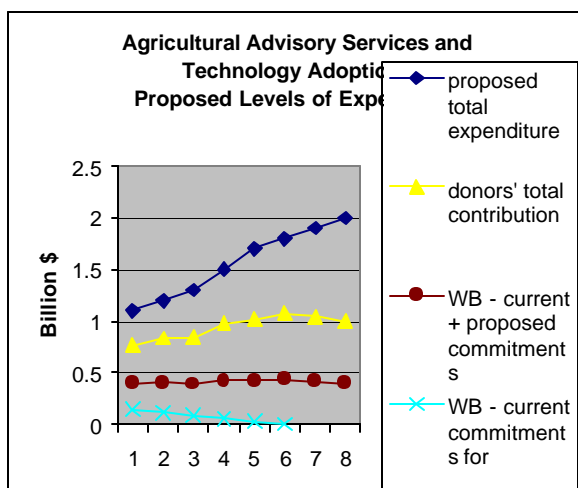
agricultural technologies. Extension can play an important role in delivering other critical information such as information on markets, health/nutrition and other areas. As in the case of national agricultural research systems, the reforms of national technology transfer systems should be continued and deepened, aiming at:

- Establishing and financing pluralistic farmers advisory systems (FAS) involving public and private suppliers largely demand-driven and based on performance-based contracts;
- Empowering farmers/farmers associations for the selection and contracting of service providers of their choice;
- Promoting a gradual transition to a system of largely publicly-funded but privately-subcontracted agricultural extension services, with affordable cost recovery from farmers for advisory services to ensure ownership and cost-effectiveness;
- Broadening the scope of advisory services beyond on-farm technologies to marketing, processing and non-farm rural activities and to business management aspects; and
- Increasing the use of modern information technology to increase rural producers access to global and local technical and market information.

3. Ensuring Adequate Funding of the Technology Generation and Transfer System

52. **Funding Requirements.** African political leaders have singled out agricultural productivity increase as one of the critical drivers of economic growth and poverty reduction. They have affirmed their commitment to the improvement of agricultural technology generation and dissemination systems, as a key priority in the New Partnership for Africa Development (NEPAD). *The goal is to double the current annual spending on agricultural technology generation and dissemination in Africa within 10 years from about US\$2.3 billion currently to about US\$4.5 billion in 2010 (an average increase of 7.0 percent a year during the next decade:*

- *from US\$1.3 to approximately 2.3 billion for agricultural research; and*
- *from about US\$ 1.1 billion to about US\$ 2.0 billion for advisory services.*



53. **Sources of Funds.** The funds necessary to finance this much increased support to African technology generation and transfer systems will have to come from many sources, including government, producers, agribusiness firms and donors. Initially, government and donor funds will need to provide the largest proportion of funds.

- **Governments.** In the past, governments' commitment to supporting national research and extension systems has been lukewarm at best. Public expenditures for these services as a proportion of agricultural GDP (the "research intensity") has typically be low (less than 0.5% against 2.4% in developed countries). In the future, although external support will continue to be necessary for the development of efficient agricultural technology systems, the main responsibility for the provision of adequate funding will rest with the governments themselves and their full commitment is an absolute pre-requisite if NEPAD objective for agricultural growth is to be achieved.
- **Donors** will continue to play a central role in the funding of African agricultural technology generation system (over the past three decades, donor funding provided on average 35 to 40% of expenditures of NARS in Sub-Saharan Africa, and for one-third of the countries, up to 65%). In the short-to-medium term, donor funding will continue to be critical for supporting not only the International Centers and the newly established Sub-regional research networks, but also the NARSs and national extension systems as African government will continue to face severe fiscal constraints

in funding priority sectors. In the longer-term, as end-users ability and willingness to pay increase, along the improved efficiency of the national technology generation and transfer systems, the need for donor funding is expected to decline.

- **The efficiency of donor funding** will need to be improved. In particular, past donor support has been less than optimal, as donor priorities have often driven the research agenda, imposed a large administrative cost of NARSs limited capacities and not always been supportive of NARSs' institutional strengthening. Future donor funding will therefore need to address two central issues in the development of sustainable and efficient NARS:
 - Ensuring a stable and sustainable funding base through a long-term commitment matching the long-term nature of the research and institutional development process;
 - Providing funding through a common, consolidated research funding mechanism ensuring the autonomy of NARSs' governance bodies and management in setting the research agenda and deploying the resources accordingly.
- **Producers and other technology users** will not be able, at this stage of the continent development, to cover more than a small share of costs of technology development and dissemination until their incomes rise significantly. It is however critical that they contribute to its funding from the start, to ensure that they have a clear stake in the governance and efficiency of the system and that a strategy be developed for increasing end-users' funding according to their capacity to pay. Also, the involvement of private sector in technology generation and dissemination should be promoted through joint ventures, contract research or other institutional arrangements, or by tapping the growing capacity of private non-profit institutions.

54. **New Funding Mechanism for Agricultural Generation Transfer and Adoption Systems.** FARA and NEPAD have over the past two years developed proposals for the reform of the funding mechanisms for African Agricultural Technology Generation and Adoption Systems. The central objective of the proposed financing framework is to foster the development of African technology generation and diffusion systems that is (i) responsive to its users/clients; (ii) flexible, competitive and supportive of innovation while benefiting from the necessary long-term stability for its core funding needs; and (iii) closely integrated and coordinated around well defined regional, sub-regional and national priorities. The new financing mechanism would have five interrelated components:

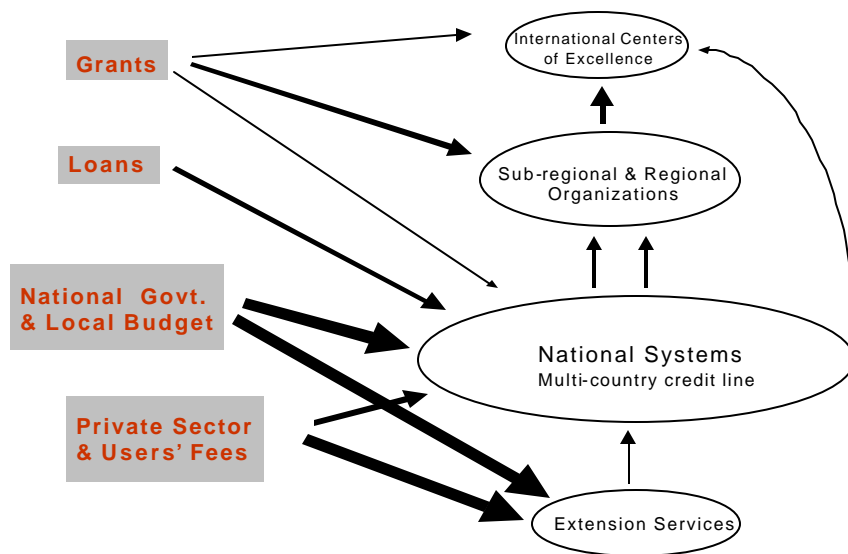
- **Funding support to end-users.** This component will provide (i) support for the development of end-users capacities to be full partners in the development of national agricultural technology generation and dissemination systems and (ii) funding, on a matching grant basis, to producer associations and other rural entrepreneurs for assisting them in accessing (short-term/adaptative) research activities and advisory services, on a demand basis and through contractual arrangements.
- **Funding of national Advisory Services.** This component will provide support for (i) developing efficient, responsive and sustainable agricultural advisory services, largely driven by the demand of its clients; (ii) undertaking the inventory and piloting and/or scaling-up of "best-bet" technologies; (iii) supporting activities for developing markets, farmers access to markets (for inputs and outputs), and the capacity of the private sector to undertake processing and marketing activities;
- **Funding of NARSs.** This component will provide (partial) funding of the part of the core operating and investment expenditures of national agricultural research systems. NARSs funding will come from (a) cost recovery from clients under contractual research (see above); (b) allocations from national budgets; and (b) donors' grants and loans ;
- **Funding of Sub-regional Research Institutions.** The component will provide funding for the core and program activities of the three sub-regional regional institutions, and their apex body (FARA).

Funding of FARA will be through donors' grants. Funding for the sub-regional research institutions will come from: (i) donors' grants to fund the core functions of sub-regional organizations; (ii) donors' grant and participating NARSs' contribution, on a matching grant basis (50/50), for the marginal cost of regional research programs of common interest and capacity-building activities (training, internships...for NARSs researchers), undertaken under contract at NARSs' request; and (iii) donors' grants to fund research programs of a regional interest to be awarded through a competitive basis to NARSs (individually or jointly), ICs and other international centers of excellence.

- **Funding of ICs and other Centers of Excellence.** The component will provide grants to fund core activities of the CGIAR, including system-wide initiatives and challenge programs (funding of the CGIAR system would be maintained at least at its current levels). In addition funds would be provided to FARA, the sub-regional organizations, and the NARS to commission research and capacity building from the ICs and other centers of excellence around the World.

55. The central principle of the new funding system depicted in the figure below is the rigorous application of the *Subsidiarity Principle*: technology generation and dissemination will be funded and executed at the lowest possible level which is able to efficiently carry out the relevant activities, taking due account of economies of scale and externalities. Therefore, the funds, rather than trickling down through the system, need to be provided to the lowest level consistent with the Subsidiarity Principle, for empowering these levels to (i) undertake the required research and/or extension programs, and (ii) commission and fully or partially finance the technical and managerial support they require from higher levels. In addition, the principle of Plurality (of providers in the systems) implies that the lower level organizations will be able to contract with any provider of services among national, sub-regional, or international institutions.

New Funding Flows for Technology Generation and Adoption



7

III. Program Description

A. *Program Objective*

56. The objective of the proposed **Multi-Country Agricultural Productivity Program (MAPP)** would be to promote rural poverty reduction through the promotion of broad-based growth in agricultural

production, productivity and incomes, with a focus on small-holders and vulnerable groups. It would be at the heart of the *overall African Agricultural Technology Generation and Transfer Initiative* which has been identified by African Heads of State as one of the priority programs under the New Economic Partnership for African Development (NEPAD) and which includes three main components:

- (i) Support to the International Centers of Excellence, including the CGIAR institutes, to be financed by public and private sources in the international community;
- (ii) Support to the Sub-Regional Research Institutions, to be financed by interested donors led by the EU and USAID; and
- (iii) Support to National Agricultural Technology Generation and Transfer Systems (NATGTSs), which would be the central focus of the proposed *Multi-Country Agricultural Productivity Program (MAPP)*.

57. Improving the efficiency and sustainability of the agricultural technology generation and delivery system in Africa is a long-term challenge. Accordingly, the MAPP be phased over a thirteen years period and financed through a *series of multi-country, pre-approved lines of credit and grant* structured both as:

- (i) an “horizontal” APL, supporting a series of country-specific agricultural technology generation and transfer operations open to countries meeting the eligibility criteria set out below (para. 59); and
- (ii) a “vertical” APL providing long-term support to each eligible individual countries through a long-term, sequenced program with clear sequencing and triggers.

58. The first phase of the MAPP (“*the Program*”) would support a series (10 to 12) of individual country-specific operations through the proposed overall line of credit/grant approved by the Board. The Board would approve the overall MAPP and multi-country line of credit, as well as the first two country-specific operations. The subsequent country-specific operations would be circulated to the Executive Directors for information, after clearance by Regional Management. Formal approval would become effective 10 working days thereafter. Any individual operation could be scheduled for Board discussion if at least three Executive Directors so requested.

B. Country Eligibility Criteria

59. Countries would qualify for support under the MAPP on the basis of the following “eligibility-at-entry” criteria:

- *Satisfactory agricultural development and rural poverty alleviation strategies and programs*, embodied in a Poverty Reduction Strategy (PRSP) and a Letter of Agricultural Development Policy;
- *A clear commitment by government to implement its rural poverty reduction and agricultural development strategies through*(i) a satisfactory public expenditure program and (ii) an official request for inclusion of the proposed Agricultural Productivity Program in IDA’s Country Assistance Strategy; and
- *A satisfactory operational agricultural technology generation and transfer strategy*, fully incorporated in the country’s poverty rural strategy, which:
 - Is pro-poor;

- Is demand-driven, based on performance contracts and includes cost sharing by end-users;
- Is based on the subsidiarity principle and open to a plurality of public and private service providers;
- Promotes good governance, efficiency and financial sustainability, including through the promotion of the financial and managerial autonomy of public agricultural technology generation and transfer institutions;
- Adopts a program funding approach through a common funding mechanism; and
- Promotes collaboration with sub-regional and international centers of excellence.

➤ *Government commitment to apply satisfactory social and environmental safeguards.*

60. Bank assistance to each eligible country would support a long-term development program through an APL with country-specific objectives, sequencing and phase triggers. The design of each country-specific program would depend on the country's prevailing policy and institutional environment, and include components selected from the menu of relevant activities outlined in the "Program Description Summary" below. The main objectives underlying country programs would be as follows:

- (i) empowerment and strengthening of rural producer organizations and other end-users;
- (ii) improved efficiency, accountability and sustainability of the National Technology Generation System;
- (iii) improved efficiency, accountability and sustainability of the National Rural Technology Advisory System;
- (iv) development of private input supply, marketing and agro-processing operators; and
- (v) strengthening of Government's capacities to deliver its core functions (policy-making, defining and enforcing the sector regulatory framework and monitoring evaluation of main indicators of agricultural productivity and incomes, environmental impacts and rural poverty reduction).

C. "Program" Description Summary

61. Each country program under the MAPP would be specifically adapted to the policy and institutional preconditions prevailing in the country and the development strategy and program designed to achieve the objectives of the MAPP. Country programs in the different phases of the APL would be selected from the following menu of components and sub-components.

Component 1: Empowering Farmers .

62. The component would support: (i) the development of an effective information system, for better linking farmers and traders to markets; and (ii) the promotion of farmers organizations.

- **Linking Rural Communities to Markets through better Information Services.** The project would support the development of an efficient Agricultural Information System (AIS), by coordinating the information systems which already exist in public and private institutions and integrating them into a demand-driven system based on a partnership between the public and private sectors, and (partial) cost recovery.
- **Strengthening Farmers Organizations.** The component would support the development of viable farmer organizations able to (i) represent farmers' interests in public policy-making; (ii)

open new market opportunities for their members; and (iii) efficiently provide their members with the services and inputs their needs. The component's possible activities may include:

- The review of the current legal and regulatory framework for creating a supportive institutional environment;
- The sensitization and mobilization of farmers for the creation of groups/associations around economic activities (input access, credit access, marketing, agro-processing);
- The strengthening of the capacity of existing farmers associations and national organizations for providing efficient services to their members;
- Assisting the FOs to participate in policy making, priority setting and governance of their NARS and advisory service systems;
- Support for the development and implementation by FOs of promising pilot activities.

Component 2: Strengthening Agricultural Technology Generation

63. The objective of this component would be to establish a national agricultural research system that (i) is responsive to national priorities and the demands of farmers; (ii) relies on a multi-source system based on strong partnership with the international research system and the domestic private sector; and (iii) is sustainable in terms of human and financial resources. The component may include:

- Updating the national agricultural research strategy and master plan to align them with national priorities;
- Strengthening the financial and management autonomy of public research institutions (with a governance body including all stakeholders, responsible for undertaking research programs on the basis of stakeholders requests, and financed through a sustainable funding mechanism including adequate funding of core functions, research contracts, competitive grant systems, and cost recovery for some of the services);
- Funding of (i) capacity-building activities to be contracted from national, regional and international centers of excellence and (ii) NARS participation in regional research programs;
- Building the human resource base of the research institutions, through relevant training programs, including on-the-job training with international agricultural research centers.
- Piloting and subsequent development of a competitive grant mechanism, open to all qualified research institutions;
- Provision of matching grants to producer organizations for the contracting of relevant technology development services to qualified institutions through performance-based contracts; and
- Piloting and subsequent development of a Rural Technology Enterprise Facility (RTEF) to (i) identify and access appropriate existing technologies (world-wide); (ii) co-finance with interested private partners the adaptive research necessary to adapt the technologies to local conditions, as well as the manufacturing and the marketing of these technologies;

Component 3: Strengthening Rural/Agricultural Advisory Services.

64. The objective of this component would be to establish/strengthen a pluralistic farmers advisory system (FAS) involving public and private suppliers, largely demand-driven and based on performance-based contracts. The component may include the following activities:

- Strengthening of farmers/farmers associations for selecting and contracting the service providers of their choice;
- Strengthening the capacities of advisory service providers, including private operators and NGOs; and
- Provision of matching grants to producer organizations/local governments for contracting relevant advisory services through performance-based contracts to ensure accountability.

The component would also support the *up-scaling of successful technologies*: While the emphasis of the program would be on demand-driven approaches, some of the pressing technical issues will however need to be addressed through a push strategy. This is in particular the case for activities with significant externalities and that would improve/maintain productivity in the longer-term, such as soil and water conservation measures or other technologies already identified as “best-bets” -- such as the NERICA rice varieties in West Africa or the PROSCAP soil fertility program in Malawi -- for rapid scaling-up. An inventory should be made of these promising technologies.

Component 4: Promotion of Agricultural Diversification and Input and Output Market Development

65. The objective of this component would be to support the development of markets and of private sector initiative for the marketing and agro-processing of agricultural produce. The program may include:

- The piloting of a Rural Technology Enterprise Facility (para... above).
- The preparation of detailed strategies/programs for promising crops, including market and trade facilitation/value chains studies, to identify specific markets and markets’ requirements, constraints to be removed to improve competitiveness.
- Pilot activities for the development of a rural trader network and producers-private sector partnerships for marketing and agro-processing activities.

Component 5: Strengthening of Core Public Services

66. The program would support the strengthening of Government’s capacity to deliver core public goods: policy analysis, defining and enforcing clear regulations and safety standards, sector impact assessment, and agricultural statistics. This component would involve (i) capacity-building through selective recruiting and targeted training programs; (ii) the preparation of detailed operational strategies in each of the target areas; and (iii) the undertaking of specific priority reviews and studies. The program may include:

- The preparation and implementation, on the basis of the core functional analysis of the relevant services, of a detailed capacity-building program (including recruitment/deployment policies, training programs);
- The preparation of a Public Expenditure Review (PER) and a Medium-term Expenditure Framework (MTEF) for the agricultural sector, to align public expenditures with priorities and fiscal resources;

- The strengthening of ministries' capacity in critical areas such as (i) policy-making; (ii) trade issues and regional market integration; (iii) definition and enforcement of regulations, guidelines and standards, in particular in the areas of inputs/seeds, food safety and pest management; and (iv) agricultural statistics..
- The development of an efficient agricultural information and impact monitoring system, to provide a solid basis to policy-making and the design of development program integrating information on social and economic parameters from various sources, public and private, at sub-regional, national and local levels;
- The preparation of detailed studies and action plans on selected strategic issues such as: (i) a national food security policy; or (ii) a detailed pest management program.

D. Program Cost and Financing Mechanism

67. **Estimated Total Cost.** The table below presents:

(i) the annual cost of Africa's *global agricultural technology generation and transfer system* (including the regional, sub-regional and national levels), which is to increase from US\$ 2.4 billion in 2003 to US\$ 2.9 billion in 2007 and US\$4.6 billion in 2012, in line with NEPAD targets; and

(ii) the projected *annual cost of the national systems, to be financed under the proposed MAPP*, which is projected to increase from US\$2.1 billion in 2003 to US\$2.55 in 2007 and US\$2.9 in 2012.

Estimated Total Incremental Costs: 2003-2007/2003-2012 (US\$ million)

1. Research	2003 (base)	2007	2012	Incremental 2003-07				Incremental 2003-12		
				Total	MAPP	IDA	Other	Total	IDA	Other
Total annual cost	1,200	1,450	2,400	200				1,200		
ICs of Excellence	300	350	600	50	0			300	0	
FARA/SROs	0	50	100	50	0			100	0	
NARSs Total	900	1,100	1,700	200	160	110	50	800	270	130
Investment	150	200	300	50	40	30	10	150	50	25
Op. Costs	750	900	1,400	150	120	80	40	650	220	105
Non-Salary	150	200	600	50	40	30	10	450	150	75
Salary	600	700	800	100	80	50	30	200	70	30
2. Advisory Services	2003 (base)	2007	2012	Incremental 2003-07				Incremental 2003-12		
				Total	MAPP	IDA	Other	Total	IDA	Other
Total annual cost	1,200	1,450	2,200	250	200	130	70	1,000	330	170
Investment	200	250	500	50	40	30	10	300	100	50
Op. Costs	1,000	1,200	1,700	200	160	100	60	700	230	120
Non-Salary	200	300	700	100	80	50	30	500	160	90
Salary	800	900	1,000	100	80	50	30	200	70	30
3. TOTAL NARSs/Adv.Serv.	2,100	2,550	2,900	450	360	240	120	1,800	600	300

68. **Total Financing Requirements and IDA's Line of Credit/Grant.** The proposed "Program" and associated IDA line of credit would finance 10 to 12 country-specific operations (i) to be approved by

the Board during the 2003-2005 period (2 in calendar 2003, 4 in 2004 and 6 in 2005); and (ii) implemented over the 2003-2007 five years period since each country-specific operation would be of a three year duration (the first phase of the country-specific “vertical APL”). As indicated in the table below, the total estimated financing requirements under the “Program” are estimated at US\$ 1.71 billion over the 5 year (2003-2007) period, of which:

- (i) US\$342 million would be funded by governments and cost recovery from beneficiaries (20% of total costs);
- (ii) US\$912 million would be funded by IDA credits and grants (55%); and
- (iii) US\$456 million would be funded by other external financing (25%).

Table: “Program” Cost and Financing: 2003-2007 (US\$ million)

	2003	2004	2005	2006	2007	Total	Total %
Total	90	270	450	450	450	1,710	100
Gov/end users	18	54	90	90	90	342	20
IDA	48	144	240	240	240	912	55
Other External	24	72	120	120	120	456	25

69. **Financing Mechanism: from Project to Budget Support Lending.** One of the central objectives of each country-specific program would be to move away from “project financing” and provide coordinated funding to a coherent public expenditure program in support of the national agricultural technology generation and dissemination system. From the start of each country-specific program, donor funding would be based on :

- (i) a set of agreed upon “*basic Principles*” in priority areas -- market-oriented policies, end-users empowerment, good governance arrangements, social and environmental sustainability -- which would be translated into operational milestones (including the country APL’s second phase triggers) for tracking progress toward development objectives; and
- (ii) detailed annual national public expenditures programs to be supported by all interested donors.

70. A commitment would be sought from participating governments and participating donors to the principle of adopting common implementation procedures based on transparent and efficient public expenditures management -- budgeting, financial management and auditing, asset management, procurement, monitoring and reporting. External financial support would gradually be channeled through a common “basket-funding” mechanism administrated according to financial/budgetary procedures satisfactory to IDA, from which funds would enter government budget accounts. While not all external financing would flow through the common mechanism from the start of the “Program” (most of the on-going support would in many cases have already been committed according to traditional “project” arrangements),

Box 15: Mozambique PROAGRI

PROAGRI is a sector program in Mozambique under which over twenty donors provide financial (and technical) support to the budget of the Ministry of Agriculture and Rural Development (MADER). Prior to PROAGRI, most external support to MADER (over 90%) entered through projects and, as such, were “off-budget.” Financial management followed donor procedures. Under PROAGRI, donors have committed themselves to the principle of channeling their financial support through the budget. In practice, their funds are “pooled” in a basket account with the Central Bank of Mozambique. From this account, funds flow directly into Mozambique’s general budget account. Plans are reflected in the budget, funds are managed according to the official procedures of the Mozambican Government. Three-fourths of donor support to MADER now flows in this way, and the proportion will continue to arise. The implementation of this arrangement has helped the Government to improve its own management capacity while gaining vastly greater ownership

it would be expected that donors would over time increasingly channel their support through the common financing mechanism with the objective of channeling all their support that way by the start of the Phase II of the country-specific APL. Such funding mechanism and donor commitment would permit government's to establish full ownership and control over the entire program from the start. It would also give government time to gradually improve the coherence, efficiency and transparency of its budgetary process and of public finance management and to move toward full (sectoral) budget support lending. This approach is being tested successfully under the first Phase of the Mozambique Agricultural Sector Public Expenditure Program (PROAGRI, Box 15) and lessons from this program would be incorporated in the design of the proposed MAPP. One of the objectives of the first phase, coordinated with other IDA-financed operations in the country, would therefore be to assist the country in undertaking the necessary fiduciary reforms for becoming eligible to budget support lending.

71. There may be a few countries that already meet the eligibility criteria for "budget support lending". This would be confirmed during appraisal. In this case, their program would be financed from the start through budget support lending. It is however expected that most countries wouldn't meet the necessary pre-requisite and their program would be supported:

(i) At first (first and if necessary second phases of country-specific APLs) through the common "basket-funding" approach, after establishing during preparation and appraisal that the minimum conditions exist for the efficient and transparent use of the pooled funds. Pending the establishment of efficient and transparent public finance management policies and procedures, program implementation would be done in accordance with procedures satisfactory to IDA and disbursements of the pooled funds would be done against quarterly disbursement requests based on satisfactory justification;

(ii) then, for countries meeting the necessary pre-requisites in terms of efficient public expenditure management (as determined by IDA through public expenditure reviews and fiduciary assessments), through a "budget support approach" along the lines of that of PRSCs. In this case, annual programs would be funded through tranches (two per year), the first tranche covering IDA's share of the cost of the first six months of the agreed upon annual program to provide the necessary pre-financing. Tranches would be released upon satisfactory implementation of the program, based on a detailed review by government, national stakeholders, IDA staff, other external partners.

E. Implementation Arrangements and Key policy and Reforms supported by the Program

72. **Overall Framework.** Each country-specific operation would be clearly imbedded in the country's poverty reduction strategy.

- The Country's PRSP would provide the cross-cutting assessment of the country's social, structural and sectoral development policies and government's strategy and the policy and institutional reforms priorities for sustainable growth and poverty reduction, in particular in rural areas.
- A *Letter of Development Policy (LDP)* and a multi-year matrix of policy and institutional reforms (with result-based performance indicators) would provide a detailed description of (i) Government's strategy and operational program to improve the efficiency and sustainability of the country's agricultural technology service delivery system, and (ii) the program's underlying "Basic Principles"(para..) and critical milestones and triggers for program implementation.
- The operation would be undertaken only after Government's and stakeholders' commitment to the objectives, reforms, design, funding mechanism, implementation and monitoring arrangements of program has been confirmed.

73. **Implementation Arrangements.** Implementation arrangements would be designed to support the following four main objectives: (i) strengthening end-users capacity to define their constraints and access the services they need, on a demand basis; (ii) promoting the “subsidiarity principle” in the supply of the services required; (iii) increasing the transparency and efficiency in service delivery; and (iv) supporting the increasing financial sustainability of service institutions, in particular by the increased cost recovery from end-users. The table below summarizes the activities undertaken by each of the institutions of global agricultural technology generation and dissemination system, and the institutions’ corresponding sources and use of funds.

Institution	Use of funds	Source of funds
<i>International Centers of Excellence</i>	<ul style="list-style-type: none"> • Own activities • Research programs contracted by FARA/SROs; • Training and capacity building programs in favor of NARSs 	<ul style="list-style-type: none"> • International community • FARA/SROs • NARSs
<i>FARA</i>	<ul style="list-style-type: none"> • Own management • Funding of contracted Africa-wide CGIARs programs; • Funding of SROs management • Funding of SROs agreed upon annual research and capacity-building work programs 	<ul style="list-style-type: none"> • International community • Governments’ contributions
<i>SROs</i>	<ul style="list-style-type: none"> • Own activities/management • Funding of sub-regional programs contracted to ICs • Funding of sub-regional research programs through competitive mechanism • Co-funding of agreed upon capacity-building programs for NARSs 	<ul style="list-style-type: none"> • International community and/or FARA • NARSs contributions
<i>National Research Institutions</i>	<ul style="list-style-type: none"> • Own activities • Contribution to SROs • Co-funding of regional research programs • Co-funding of own capacity-building programs 	<ul style="list-style-type: none"> • Governments/Donors • End-users
<i>National Advisory Services</i>	<ul style="list-style-type: none"> • Own activities • Co-funding of FOs and private sector capacity-building and pilot activities 	<ul style="list-style-type: none"> • Governments/donors • End-users
<i>Farmers Organizations</i>	<ul style="list-style-type: none"> • Own activities • Contribution to NARSs and advisory agencies 	<ul style="list-style-type: none"> • Members contribution • Matching grants from Government/public advisory agencies
<i>Private Sector Operators</i>	<ul style="list-style-type: none"> • Own management and activities; • Contribution to professional associations 	<ul style="list-style-type: none"> • Own funds • Matching grants from Government/public advisory agencies

74. The overall program would be implemented under the overall umbrella and leadership of NEPAD. MAPP’s Steering Committee would be composed of selected Ministerial level representatives of African governments. FARA, NEPAD’s operational arm for agricultural productivity issues, would be responsible for the Technical Secretariat of the Program and for coordinating:

- the preparation/appraisal of individual country-specific operations;

- the preparation of these operations' annual work programs, within the framework of the agreed upon "Basic Principles"; and
- the assessment of the programs' implementation progress, including progress toward institutional objectives, milestones and triggers.

It would also be responsible, jointly with IDA and other donors, for undertaking a mid-term review of MAPP's first phase and for the preparation of its completion report, as well as for the preparation of MAPP's second phase. In addition, a National Steering Committee and Secretariat would be set up in each participating country, chaired by the responsible ministry, to prepare the country-specific operation, oversee its implementation by national institutions, monitor output/impact and prepare progress reports. Actual implementation responsibilities and detailed arrangements would depend on each country's circumstances (there may be several ministries –Agriculture/Livestock, Higher Education and Scientific Research—responsible for agricultural technology issues). Although it is expected that there would be a need for a light national coordination mechanism, each participating institution would be responsible for the activities for which it is normally responsible. The management and reporting capacities of implementing institutions would be assessed during program preparation and appraisal. Implementation support would be provided jointly by FARA and concerned donors.

75. **Monitoring and Evaluation.** Improving focus and efficiency in the generation and dissemination of agricultural technologies is a long-term undertaking which will require careful monitoring of a broad range on measures and the assessment on impact on productivity and incomes. In most countries, M&E systems are weak and don't permit to collect and analyze the necessary information. The MAPP would invest substantially on strengthening and harmonizing M&E capacities at country, sub-regional and regional levels, to track progress and impact and reformulate objectives and design as necessary. This would be done during the first phase of the MAPP, both globally and at country level. During this first phase, performance indicators would mostly focus on input, processes and outputs rather than outcomes and impacts which are longer-term. The latter would start to be at the center of the program's M&E system during its second and third phases.

76. **First Phase's Mid-term and Completion Reviews.** A mid-term review of the overall MAPP would be organized at the beginning of the third year of the program, to assess progress and fine-tune program design and implementation arrangements. A completion mission would be organized during the last year of the program, to assess progress in meeting first phase's central objectives and efficiency in implementation, and to draw lessons for the detailed preparation of the program's second phase. In the same way, each country-specific operation funded under the MAPP would carry out a mid-term review and a completion review for assessing progress and guiding the preparation of its second phase.

F. Project Rationale.

77. **Project Alternatives.** The following alternatives were considered and rejected: (i) business as usual, i.e. standard individual country operations; (ii) a MAPP focusing on Technology generation only; and (iii) an Horizontal APL, multi-country, but each country operation with a limited time span.

- *Business as Usual.* Raising the productivity and competitiveness of African agriculture is an emergency. Poverty reduction will not be achieved if the past complacency of governments and the international community continues and if investments in agricultural technology generation and transfer systems continue to take the back seat in public expenditure programs. The proposed regional approach will raise consciousness about the urgency of addressing agricultural technology issues, permit to address it in an holistic fashion, at regional, sub-regional and national levels, and mobilize the necessary political and financial support of governments and the international community.

- *Focus limited to technology generation.* Technology generation, transfer and adoption is not a process that can be divided into discreet and independent blocks. It is an integrated continuum whose efficiency critically depends on the tight cooperation between users/adopters, advisory service providers and research institutions, and on the capacity of each to understand issues at each level of the continuum. Although it would have simplified the design and implementation of the program, an approach focusing only on technology generation will not have permitted to address the complex and integrated scientific, economic, institutional and social issues involved.
- *An ‘‘Horizontal’’ MAPP.* The improvement of the agricultural technology generation, transfer and adoption systems is a complex, long-term capacity and institution building process. that require a careful, gradual and sequenced design tailored to countries specific circumstances. An approach based on a support limited in time would have favored quick, narrowly focused design and/or encouraged over-ambitious objectives and overoptimistic expectations. It would not have supported the long-term horizon and gradual approach which are necessary.

78. **Value Added of Bank Support.** The World Bank is a global, multi-sectoral institution with a long-term perspective. Rural development has always been at the heart of Bank’s assistance to member countries. Bank support to agriculture equals roughly one-third of total official development assistance (ODA) to agriculture specifically, and about 20% of all assistance to agriculture-related activities. The Bank’s strong partnerships with most of the major bilateral and multi-lateral development agencies, and key UN Agencies such as the FAO and IFAD in supporting rural development, gives it a depth of knowledge and experience in assisting the world’s rural poor. Specifically, the Bank has comparative advantages in the following areas:

- *Power to Convene.* The Bank is the only global institution capable of bringing together all stakeholders and donors, including the private sector, to discuss important issues and set objectives for assistance strategies. This convening power allows the Bank to play a catalytic role in bringing forth new directions and agendas in rural development programs globally, regionally, and for individual countries, and lever the efforts of donors and other international institutions.
- *Ability to Approach Rural Development Holistically.* As a multi-sectoral institution, the Bank is able to provide a cross-cutting and holistic perspective to the truly multi-dimensional nature of rural development and integrate these into a broader, comprehensive development framework and PRSPs.
- *Ability to Provide Both Finance and Policy Advice Based on World-Wide Best Practices in Rural Development.* The diversity of instruments available to the Bank enables it to provide policy-oriented technical assistance and also to support the implementation of Bank-endorsed policies through a variety of investment programs. The world-wide scope of Bank operations, as opposed to regional, or national development efforts, allows for the diffusion of knowledge and experiences on a global basis. This also allows for the development of partnerships and communities of interest and practice that cut across countries and regions.
- *Impartial Long-Term Development Agenda.* The Bank is a collectively owned international institution that is not driven by narrow profit maximizing objectives. This reality allows the Bank to provide its clients with impartial, multi-year support to rural development, even when political or economic conditions, or conflicts in a given country do not provide immediate business opportunities attractive to private financial institutions.

79. **Governments and Stakeholders Commitment and Ownership.** African commitment and ownership for the proposed MAPP is very high. The overall African Agricultural Productivity Initiative is one of the main priorities of African governments under NEPAD. The proposed MAPP would be a critical instrument for implementing this initiative. The main principles and the broad design of the MAPP were identified by FARA in May 2001 (the Durban Declaration, see Box). They have been

further discussed and refined with FARA, International Agricultural Research Centers (CGIAR) and the main interested donors (EU, USAID, AfDB) at the First Annual Meeting of FARA in Maputo in March 2002, and during the recent annual meetings of the Consultative Group for International Agricultural Research in Manila (October 2002). The result of these discussions are reflected in this Concept Paper. The detailed preparation of the overall program and of the individual country-specific operations would be undertaken jointly with FARA, country governments and stakeholders, and interested donors. It would be presented to NEPAD for review and endorsement before its appraisal by IDA and interested donors.

G. Issues Requiring Special Attention

80. During the preparation and implementation of the overall MAPP and of each of the country-specific operations, the greatest emphasis would be given to the various aspects of the efficiency and sustainability of agricultural technology generation and dissemination systems: (i) economic/financial in terms of impact on agricultural productivity and incomes; (ii) social, in terms of the focus on poor and vulnerable target groups; (iii) institutional, in terms of good governance and internal management efficiency; (iv) fiscal; and (v) environmental.

81. **Financial/Fiscal sustainability.** The financial sustainability of the country-specific and regional agricultural technology generation and transfer system will be the central objective of the program. It will critically depend on the commitment of the various stakeholders to provide the necessary funding. The latter in turn will depend on the relevance and efficiency of the systems in meeting stakeholders' expectations in terms of the relevance of the technologies to specific needs of farmers, and of the society at large.

- *Relevance:* the systems will have to generate and disseminate technologies which both (i) have a quick impact on farmers and other rural entrepreneurs' productivity and income; and (ii) provide answers to government's more long-term social and environmental concerns.
- *Efficiency:* the systems will need to meet its objectives through an efficient use of available resources. This will require that (i) objectives be clearly prioritized and (ii) work programs be implemented with efficiency and transparency.

Improving relevance and efficiency, and thus sustain stakeholders' commitment to provide the required level of funding, the program will therefore support institutional reforms to :

- (i) empower end-users to participate in the governance of the system and institutions and define priorities and work programs of the research/advisory institutions, and to monitor results, through ensuring that they are adequately represented on the institutions' governance bodies;
- (ii) ensure the autonomy of the research/advisory institutions and the transparency and accountability of their management, in particular by improving their internal procedures and MIS.

82. **Social Sustainability.** The focus of the research and transfer programs should be on fostering wide-spread economic growth, and therefore should have for priority to address the productivity constraints of the smallholders and other small-scale rural entrepreneurs, which are the back bone of the rural economy, and also of disadvantaged/vulnerable groups (women, HIV-stricken households). In particular, research programs will to address issues critical to smallholders and poor rural households survival -- such as droughts -- and develop technical packages aimed at mitigating these risks. Social targeting of research and advisory institutions' activities would be clearly defined from the start on the basis of a poverty/social assessment during the preparation of the country-specific operations. IDA's relevant guidelines on social issues would be strictly implemented.

83. **Environmental Sustainability.** Among the main challenges to sustained agricultural growth in Africa are (i) the conservation of the resource base, and (ii) the environmentally sound use of agricultural

inputs to support productivity increases while protecting natural habitats and human health. These topics would be at the center of the research agenda. A major effort would be made to promote IPM approaches and particular care would be exercised in supporting the development of biotechnologies. Bank's relevant guidelines would be strictly enforced. A review of country-specific environmental issues would be carried out during preparation, to support the development of the research agenda and the improvement of national regulatory framework. As in the case of social issues, environment-targeted output and performance indicators would be defined and closely monitored.

84. **Institutional Reforms.** Institutional reforms, aimed at improving coherence, governance and efficiency, will be at the heart of the sustainability of the overall agricultural technology generation and dissemination system, at the regional, sub-regional and national levels. These reforms would require: ensuring stakeholders' empowerment, ensuring the accountability of institutions and improving their internal efficiency. High priority will be given to the careful design and sequencing of reforms to ensure that they are tailored to countries' specific circumstances and implementation capacity. Institutional reforms performance indicators and triggers would be at the center of the MAPP's , "Program's " and country-specific operations' monitoring and evaluation mechanism.

H. Next Steps (to be completed after internal discussions)