Agricultural research from the perspective of a Multilateral Development Bank: the case of the African Development Bank

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Agricultural research from the perspective of a Multilateral Development Bank: the case of the African Development Bank

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I – Agriculture in Africa

Agriculture provides an important route towards the achievement of the critical development goals of enhancing food security, reducing poverty and creating jobs in Africa. The agricultural economy employs 65–70 percent of Africa's labor force, typically accounts for 30-40 percent of GDP and more than 70 percent of the continent's poor live in rural areas, and agriculture is their most important economic activity (World Bank, 2013). However, Agriculture in Africa suffers many challenges including, poor infrastructure, weak sector institutions, underdeveloped markets, public and private underinvestment, inadequate availability and uptake of adapted technologies, limited access to credit, lack of effective management of natural, lack of agricultural commodities market integration, climate change, and gender inequality.

The year 2000 also marked the year that African countries joined the rest of the world in declaring war on poverty and the deterioration of the environment. The adoption of the Millennium Development Goals (MDGs) was followed by the adoption by African Heads of State and Government of the New Partnership for Africa's Development (NEPAD)-inspired Comprehensive Africa Agricultural Development Program (CAADP). CAADP has become the key agenda for food and agricultural development in Africa. The driving motive for CAADP was two-fold: i) eliminate the pervasive hunger and malnutrition in Africa and, ii) improve Africa's food independence by substantially reducing the amounts spent by African countries on food imports. The basis for CAADP was that agriculture-led development is fundamental to cutting hunger, reducing poverty, generating economic growth, reducing the burden of food imports and opening the way to the expansion of exports.

Agricultural growth and productivity will require a wide range of actions to address the challenges indicated above. Priority interventions can be summarized as the "four Is": improving the **I**nvestment climate; better **I**nfrastructure and regional integration; supporting **I**nnovation; and strengthening **I**nstitutional capacity. However, the African context in all dimensions is complex and highly diverse, and solutions need to be tailored to fit local conditions.

II – Agriculture research in Africa

Every major review of agricultural research and development has highlighted the importance of increasing the capacity of African agricultural scientists. Staatz and Dembele (2008) noted that of 48 countries in Sub-Saharan Africa (SSA) for which data was available, half of them had fewer than 100 scientists (full time equivalents) while 40% of the scientists were working in just five countries. A study commissioned by Forum for Agricultural Research in Africa (FARA) (FARA, 2007) found that a major cause of Africa's slow progress in agricultural growth is a poor capacity for innovation. African governments continue to give little support to capacity building for agricultural research for

development. This weakness in the capacity of the NARES reduces the ability of the national scientists to form meaningful and productive partnerships with scientists from either the Consultative Group on International Agricultural Research (CGIAR) or advanced research institutions. What seems to be missing in most cases is a consistent strategy by national governments, their development partners to direct investments into building and retaining agricultural scientists.

Failure to make the investments that would develop and nurture the capacity for technology dissemination and adoption has plagued the development of agriculture in Africa. Agriculture-led growth envisaged by CAADP calls for market-driven agricultural development. An innovation system approach involving an "Impact Pathway" which argues that acquisition of knowledge by farmers is insufficient without the availability of credit and market infrastructure is very valid.

Another gap in the system is the lack of coordination between research (the knowledge and technology generation part) and extension (the uptake of knowledge and information by the end users part). In many African countries, research institutions and extension organizations do not belong to the same ministries. More often than not, staffs of the research institutes receive higher remuneration and better career management than those of the extension services. This situation leads to minimum interaction between the two important components of the NARES. Furthermore, the R&D arena witnesses a diversity of actors from within and outside the continent, with limited coordination among these actors and the initiatives they are implementing.

Bearing in mind that priorities for research are best developed at the national level, Mokwunye (2010)_stated in his Regional Review on Africa's Agricultural Research and Development that research programs must cater for:

- The huge size and agro-ecological diversity of Africa result in a wide range of farming systems and different staples;
- The prevalence in Africa of very old soils that are susceptible to erosion and that contain very limited plant nutrient reserves;
- Africa's overwhelming dependence (95%) on rainfed agriculture;
- The predominance of countries with populations under 10 million and the low average population density in SSA which exacerbate the problems of establishing viable markets;
- The fact that nearly 40% of the African population lives in land-locked countries;
- The fact that African agriculture is predominantly based on smallholder with tremendous variation in terms of their access to resources such as land and market;
- The fact that in 48 countries in SSA, 40% of the agricultural scientific manpower resides in just five countries.

As a response to the critical mass issue in human capacity, the regional economic integration in Africa should embody the building and accumulation of capacities to harness and govern research. Regional economic integration bodies must play a key role of mobilizing, sharing and using existing scientific and technological capacities, including human and financial resources as well as physical infrastructure for R&D and innovation. International partnerships in basic and applied research are critical to the realization of Africa's research strategies and should be concomitantly pursued.

III – Support to agriculture by the African Development Bank

The African Development Bank's Agriculture Sector Strategy (AgSS) 2010-2014 seeks to increase agricultural productivity, enhance incomes, and improve food security on a sustainable basis. It does this through two mutually reinforcing pillars: (i) improving rural infrastructure (water resources management and storage, agro-processing and trade-related capacities for accessing local and

regional markets); and (ii) improving the management of renewable natural resources (forestry, sustainable land management, and climate change mitigation and adaptation). A cross cutting theme in the strategy is the capacity building in the Regional Member Countries. This strategy is in line with the priorities set out in the African Union's CAADP.

The Cumulative number of Bank Group Loans and Grants (1967-2012) is 3,796 totaling Euro 73.209 billion. Approvals by Sector, during this period show that agriculture sector had 13% share, compared to 14% for the energy sector, and 19% for the transport sector (see Fig. 1).

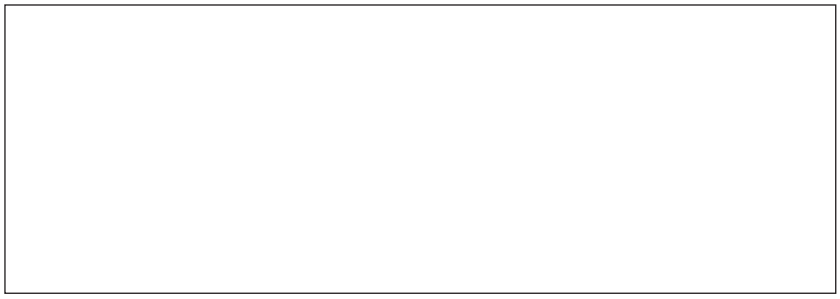

Fig. 1. Cumulative Bank Group loan and grant approvals by sector, 1967-2012 (%) (Source: ADB Annual Report, 2012).

In 2012, the Bank Group Loan and Grant approvals amounted to Euro 4.25 billion, accounted for as follows: Infrastructure (Euro 2.02 billion or 48.9%); Social sector (Euro 604.1 million or 14.6%); Multi-sector (Euro 581.2 million or 14.0%); Finance (Euro 463.2 million or 11.2%); Agriculture and Rural Development (Euro 354.3 million or 8.6%); and Industry, Mining and Quarrying (Euro 112.3 million or 2.7%) (see Fig. 2). However, one should keep in mind that the Bank mobilized funds from outside sources and through joint financing by other development partners for agriculture and natural resources management.

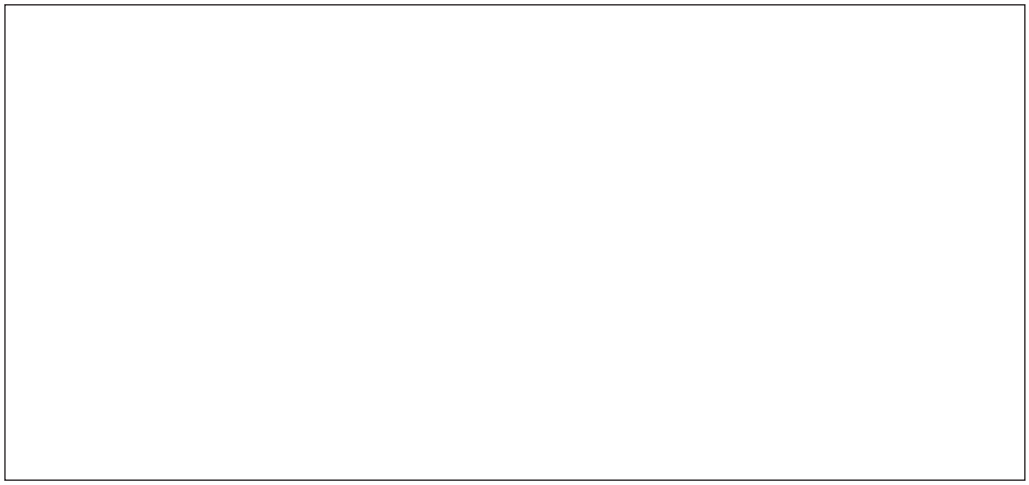

Fig. 2. Bank Group loan and grant approvals by sector, 2012 (Source: ADB Annual Report, 2012).

In 2012, the Bank approved 20 operations in Agriculture covering 16 countries and amounting to Euro 446.3 million including loans, grants, and special funds. The projects included the rehabilitation of agricultural infrastructure, construction of access and feeder roads, market infrastructure and storage facilities, strengthening capacity for the delivery of agricultural services, and support to climate change adaptation measures. The approved operations included one multinational programme supporting agricultural research and development in four CGIAR centers to work on four strategic commodities with an amount of Euro 45.5 million representing 10.2% of 2012 approvals in agriculture.

As of 31st December 2012, Agriculture and Agro-industry Department (OSAN) active portfolio consisted of 112 operations valued at Euro 2.171 billion. This portfolio is dominated by the agriculture and rural development sub-sector (63%), comprising large part of agriculture infrastructure projects like irrigation projects. The sub-sectorial distribution shows that these investments are mainly in agriculture infrastructures and natural resources management projects which represent 86% of the commitments and this is in line with the AgSS (2010-2014).

In 2013, Agriculture and Agro-industry Department strategic direction will be driven by recommendations contained in the Mid-term Review of the AgSS (2010-2014) and will put more effort in the following areas; (1) fine-tuning the current twin pillars for rural infrastructure and natural resources to better capture the need for inclusive growth by broadening interventions in agricultural infrastructure to include more value chain and agro-industrial developments that create employment in rural areas, (2) modify the current pillar on natural resources management to include activities relevant to the 'transition to green growth', and (3) revise AgSS (2010-2014) to capture other some long term priority areas in the continent like regional integration, governance and skills development relevant to agriculture.

IV – Bank's support to Agricultural Research and Development

1. Rationale

An independent evaluation from the seventh (1996) to ninth (2004) cycles of the African Development Fund (ADF) pointed out the relative weakness of research in the Bank in comparison to its sister institutions. Accordingly, one of its major recommendations is the need for the Bank Group to enhance its research and dissemination capacity and assume a more prominent role in providing intellectual leadership on development issues in Africa.

Cutting across sectors, the Bank Knowledge Management and Development Strategy – KMDS (2008-12) recognizes that knowledge management is an integral part of Bank's mission and mandate as Africa's Premier Development Bank and hence the need to generate, mobilize, share and apply knowledge. This gives a unique position of combining knowledge and financial resources to the Bank as it pushes through its agenda of developing innovative solutions to complex development challenges across all sectors in Africa.

In 2009, the Bank and the International Fund for Agricultural Development (IFAD) embarked on a joint evaluation of their Agricultural Policies and Operations in Africa, so called AfDB/IFAD Joint Evaluation. The ensuing report recommended the need for the Bank to be more focused, selective, and innovative as it remains engaged in the agricultural sector. The report also recommended the need for the Bank to build partnerships based on comparative advantages that support its strategic goals. These recommendations were adopted by the Bank as it developed its current Agriculture Sector Strategy AgSS: 2010-2014). As a result, although the focus of the AgSS is on agricultural infrastructure development and renewable natural resources management, it emphasizes purposeful and strategic partnerships (e.g., with international centres of excellence, regional, multilateral and bilateral organizations, etc.) in order to meet other agricultural development needs such as those in the area of science and technology.

The Bank's Human Capital Development Strategy 2012-16 (awaiting approval by the Bank Board of Directors), namely in its focus area titled 'Improve Competitiveness and Employment Opportunities', intends to facilitate the strengthening of Science and Technology including scientific research and innovation work being carried out by regional African Networks of Excellence. Areas of concentration will include: a) biotechnology; b) engineering; and c) Information and Communication Technology.

The Bank's investments in research and technology generation and dissemination in the agricultural sector contribute to the achievements of the Millennium Development Goals (MDGs), namely MDG 1 (Eradicate extreme poverty and hunger), and MDG 7 (Ensure environmental sustainability). Investments in knowledge production, sharing and uptake are in line with Bank's 10-year Strategy (2013-22) aiming at inclusive and green growth.

2. Past and ongoing Bank's support to research and capacity building institutions

The first financial support provided to research and capacity building institutions was approved in 1987, sourced from the Bank's net income, on an annual basis until 1991. Following the decline in net income in subsequent years, the Bank provided, on two occasions in 1993 and 1998, a financial support to research institutions from its ADF/Technical Assistance Fund resources. Between 1987 and 2009 the Bank has provided a total of Euro 106.3 million to research and capacity building institutions. This financial support covered a number of important sectors including: agriculture, health, finance, education, gender, environment, and macro-economic development research. Agricultural research, received on the average over 70% of Bank support during this period, followed by the health sector research (12.2%) and macro-economic research (9.5%). Sixty five percent of the Bank's support to agricultural research was to International Agriculture Research Centers. Examples of the Centers include (WARDA the newly called Africa Rice, ICARDA, IWMI,…). In 2012, a sizeable funding of Euro 45.5 million was granted to support research and development on four strategic commodities in Africa, namely rice, maize, cassava and wheat; a program which is being implemented by four Centers of the Consultative Group on International Agricultural Research (CGIAR), namely, the International Institute of Tropical Agriculture (IITA), the Africa Rice Center (AfricaRice), the International Center for Agricultural Research in Dry Areas (ICARDA), and the International Food Policy Research Institute (IFPRI) for five years (2012-2016).

The Bank Group has also provided support to non-CGIAR research institutions such as: the International Center for Insect Physiology and Ecology (ICIPE), the Desert Locust Control Organization (DLCO), the International Trypano-tolerance Center (ITC), and the Semi-Arid Food Grain Research and Development (SAFGRAD) whose scientific research have contributed to: pest and plant diseases control, fight against upsurges of Desert Locusts, armyworm and Quelea birds, and to the identification of key factors in the control of trypanosomiasis in cattle and small ruminants, and facilitating the release of early and extra early maturing food grain cultivars in the dry regions of Africa.

In the area of institutional support and capacity building, the Bank grants have been instrumental to the successful implementation of the Frameworks for Action (FFAs) and the subsequent establishment of three effective Sub-Regional Agricultural research coordinating organizations, the Association for Strengthening Agricultural Research in East and Central Africa (ASARECA), West and Central African Council for Agricultural Research and Development (WECARD), South African Development Community (SADC-FANR) in Sub-Saharan Africa, all of which culminated to the establishment of a continent-wide Forum for Agricultural Research in Africa (FARA). Last but not the least, the Bank provided support to National Agricultural Research and Extension System (NARES) in the area of research and extension and institutional support with allocated grants amounting to Euro 20.2 million between 1989 and 1998. Annex 1 gives a list of completed (Euros 59.04 million) and on-going (Euros 92.8 million) grants provided by the Bank to support research and capacity building institutions.

In 1987, there were only eight beneficiary institutions and, except for 1990, the number has been on a consistent increase until 1998 (24 institutions) then dropped to 7 currently. While the provision of support to a large number of institutions can be justifiable in order to increase outreach, the total amount of resources available has not increased in a commensurate manner. As a result, the average size of Bank assistance to the beneficiary institutions has declined, thereby limiting the impact in terms of volume of research activities. It should also be noted that, as the number of beneficiary institutions increased, the Bank's internal ability to closely and effectively supervise, monitor and evaluate the results of the research programs, financed through its grant, has not grown commensurately.

In 2000, the Board of Directors of the African Development Fund, considered another proposal for financial support to research institutions and capacity building initiatives. The purpose of the proposal was to address two major issues: (a) urgent requests received from certain institutions; and (b) the exercise underway for the re-allocation of ADF and TAF resources. The Board approved the earmarking of an amount of Euro 13.8 million from ADF-VIII (1999-2001) Technical Assistance Fund to continue support for the activities of research and capacity building initiatives in Africa. The Board, in approving this proposal, requested management, to take the following actions: (a) Submission of a status report on the utilization of the ADF-VII (1996-98) grant allocations; (b) Preparation of a general set of criteria, applicable for the selection of eligible institutions; (c) Ensuring an optimal balance between the size of grants and the number of beneficiary institutions so that the grant allocations will not be too thinly spread over a large number of beneficiaries; (d) Accord priority to selected themes or areas of strategic focus, where the Bank Group has attached high priority in its Vision and Mission; (e) Allocate grants, where feasible, to finance research activities which are easily monitorable, or whose long-term impacts are identifiable; (f) ensure that priority is given to research programs supported by the donor community, so as to promote the Bank's catalytic role.

In 2002, a Proposal for Financial Support to Research and Capacity Building Institutions (irrespective of the sector) which proposes specific modalities and general eligibility criteria, for the allocation of resources to research institutions and capacity building initiatives for the period 2002-2004 was prepared. This proposal was also an occasion to present to the Board of Directors of the ADF: a) a comprehensive assessment of the achievements of the main institutions, which benefited from previous ADF/TAF grants (key achievements and lessons learned are highlighted below); b) provide a summary of the main activities of the research institutions financed through the 1998 ADF-VII/TAF grant; and c) Indicate to the Board planned medium-term research activities and work program with the main potential beneficiary institutions. This renewal of the Bank's support to research institutions, after an interruption of five years, has sparked new expectations, among the international development community and was a signal from the Bank to reassure the international donor community, of its continued commitment in contributing to the global effort to transform Africa's socio-economic progress.

3. General assessment of past Bank support to agricultural research and capacity building institutions

The grants funds, including those from TAF, were used to support important programs such as studies and surveys, human and physical resources capacity building and networking, and research activities and policy analysis. About 50% of the institutions have undertaken relevant training activities, in conjunction with their research programs. Financial reports on the different projects generally indicate appropriate use of project funds.

Overall, the objectives, strategies and research results of the research institutions have contributed to Africa's economic and social development at large. Concrete results have been documented (see Annex 2). There are clear positive impacts realized mainly from the training and direct

research programs undertaken by the different institutions. Research networking and collaborative work, among the various national, sub-regional and regional research organizations, have been advanced, adding noticeable contributions to the overall effort of accelerating regional integration.

4. Lessons learnt from past Bank support to agricultural research and capacity building

Bank support to research institutions has contributed to increasing the Bank's visibility especially in its emerging role as a center of knowledge production and management, beyond its traditional mandate of financially supporting development projects. However, it is recognized that this support needs to be selective in its choice of research institutions and should tailor such assistance to specific research programs that are in line with its vision and development objectives. Consequently, and in order to maximize impact and enhance effectiveness of its support, the Bank should reduce the number of institutions, which benefit from each round of grant allocation to an optimal size and also emphasize support that support thematic selectivity.

In providing financial support to research institutions, the Bank Group experience showed that technological development is a long-term investment including, in addition to knowledge generation effort, substantial borrowing and adaptation of technologies from within and outside the continent. It also calls for a full collaboration, both at regional and international levels.

It appears from past interventions that there is a need to strengthen national agricultural extension and research systems through better dissemination of good practices to small producers, notably women, so as to significantly improve productivity and the food security which remains fragile in several Bank Regional Member Countries. In this regard, there is a need for sustained public support measures at the end of an R&D intervention by the Bank, in order to preserve and consolidate the gains and impact derived particularly if such project has achieved encouraging results and stimulated genuine interest among farmers.

The need for the Bank to establish strategic and purposeful partnerships around agricultural R&D based on: a) comparative advantages; b) complementarity and c) area of specialization in order to add value to its interventions in the Regional Member Countries in a cost effective way. It is essential in the future that a clear and objective delineation of division of labor among the many partners in the African R&D landscape (NARES, CGIAR, non CG IARCs, Regional and Sub-regional organizations, Private sector) must be done.

The existence of a concerted research agenda and the necessary resources are prerequisites to relevant and successful partnerships and must therefore be given a high priority. Furthermore, capacity building of NARES should be a continuous goal in the mid- to long-term of the envisioned partnerships. The ultimate goal of this approach is to link knowledge and technology generation and its uptake through backstopping from international centers of excellence and in collaboration with regional and sub-regional organizations in order to deliver on RMCs development priorities. Under this arrangement, regional and sub-regional research organizations (FARA and its SROs) and farmers organizations, can play several important roles: 1. advocacy and lobbying for national and international support for R&D; 2. eye opener on new researchable issues of widespread relevance; 3. promotion of functional linkages between research and extension; 4. capacity building in collaboration with the technology generating block (CG and NARES). The proposed collaboration arrangement could prove cost effective as "bureaucracy and funding intermediation" will be avoided".

Project results constitute an asset only when conducted with long-term perspective and after forging real ownership in the member countries concerned. Hence, in providing financial support, the Bank must apply a strong disengagement policy in order to avoid perpetual dependency and promote sustainability of research programs in the longer term while ensuring that the project design includes a built-in smooth exit strategy.

The multi-year funding approach must also be the adopted in allocating research grants to institutions. This will enable the Bank to: a) make up-front decisions on grant allocations, following the approval of each ADF replenishment; b) identify research programs, which tackle long-term development challenges with strong partnership commitments; c) provide an important sense of assurance of Bank support to both the beneficiary institutions and to the funding partners; d) align its strategy with those of the donor community and development partners by encouraging and promoting the implementation of a regional approach to research; e) allocate resources to institutions whose overall research agenda and work program have been reviewed and approved by the donor community at large.

Although the Bank support has contributed to strengthen the capacity of these institutions to undertake and manage research programmes, it has become clear that lack of specific strategy focusing on key areas led to limited impact of previous research support interventions. A major lesson therefore is the need for the Bank to target key areas such as: (a) boosting agricultural production (crop, livestock and fisheries) in a sustainable way through applied simple technologies; (b) developing knowledge and technologies that enhance value addition and reduces post-harvest losses of crop and animal products to improve food security and income; (c) develop approaches, tools for sustainable management of natural resources (water, soil and biodiversity); (d) address cross-cutting issues such as climate change, socio-economic, institutional and policy research pertaining to agricultural and natural resources management; and (e) capacity building of research institutions.

Setting up and implementing a monitoring and evaluation system is essential to measure the outcomes in terms of the technologies, innovations and knowledge generated by research investments. Impact can be approached through food production and availability, production costs and income beyond pilot farmers. This concern must be streamlined in every R&D intervention.

V – Funding instruments

The inability of the Bank to address the entire research agenda of relevance to Africa's economic and social development is recognized. Rather it should be possible for the Bank, in a co-operative fashion, to support African research institutions to implement part of the research agenda. Any attempt to intensify in-house research would take the Institution far away from its main function of directly financially supporting development projects.

Initially, Bank's Net Income (via the Technical Assistance Fund) has been the major source of funding of collaborative research with research entities. With decreasing resources in Net Income due to high demand pressure (Emergency and Special Relief Funds, Debt management, MIC – Technical Assistance Fund, Other support on emerging needs basis,…) and the slow graduation of countries to the mix (ADF-ADB) and ADB status (these two categories, particularly the second one as major generators of Bank income), this window may not be expected to play an important role in future funding of research.

With the advent of bi-lateral and Multilateral Trust Funds at the Bank in 2005, other opportunities opened up for strengthening the Bank's knowledge base. This funding avenue, with grants in the range of several hundred thousands of Euros finances the cost of studies, analytical work including economic and sector work which contribute directly to institutional strengthening of the Bank and enhance the Bank's effectiveness. Trust Funds also enabled the Bank to finance pre-feasibility studies for bankable projects and help mobilize co-financing with other development partners. Capacity building support for its member countries, Technical Assistance for the Bank and the organization of conferences and workshops are also important areas of intervention of Trust funds. Although the agriculture sector benefited little from these resources (1% in 2010), the share of this sector may increase in the future as other funding alternatives may become scarce.

Trust funds are currently under policy and processing reforms to improve their management and impact. Both middle and low income countries are eligible to these resources.

The Technical Assistance Fund for the Middle Income Countries (TAF-MICs) is used. Indeed, the Bank identified the need for grant resources critical for enhancing capacity building and country analytical work for effective policy dialogue in MICs. This funding source was set up in 2002 to finance non-lending activities in MICs. The fund resources are derived from the Bank's Net Income and is designed to host additional bi-lateral resources. Activities covered under this fund are geared towards increasing the volume of Bank operations in the countries, as well as enhancing the quality of operations design and implementation (provision of short-term technical assistance experts to assist in project preparation, and the training of Government officials responsible for monitoring Bank projects in the countries). The guidelines for the management of this fund were revised in 2005 to increase the funding ceiling and to broaden the scope of activities such as the initiation of partnerships among performing MICs and undertaking of Economic and Sector Analytical Work.

Another important funding source for research is through the Regional Operation Windows, which provide grants targeting research operations that generate Regional Public Goods[1]. Mindful about the importance of regional integration in the economic development; and particularly in the area of research and knowledge generation and sharing on the continent, the Bank is promoting this approach. Under this funding avenue, the Bank has set aside 20% of ADF XII (2011-13) resources to be dedicated to regional operations, out of which a maximum of 15% dedicated to Operations generating Regional Public Goods (RPGs). In order to access this competitive funding source, a set of eligibility criteria was established to screen funding requests. This window was used in to obtain from the Bank a funding of Euro 45.5 million in 2012 for the Support to Agricultural Research for Development of Strategic Crops in Africa (SARD-SC)". This option offers a good funding framework as it proved adapted to the African context. Being of regional dimension, it targets several countries on the continent and contributes to: a) alleviating the challenge associated with the lack of critical mass in individual NARES; b) tackling trans-boundary and relevant research topics in a cost effective way; c) developing regional research and development networks with synergies and complementarities while avoiding duplication; necessary conditions for a good coordination. The challenge with using this window stems from the fact that only ADF (Low income) countries are eligible to its resources as grants while ADB (middle income) countries are not. Hence the latter are reluctant to contract loans to participate in regional programs with ADF countries. Unfortunately, in the area of research very positive interaction can happen between the two groups benefiting most likely to the low income one. This situation calls upon the Bank to come up with innovative funding instruments in order to incentivize ADB countries to participate in regional operations that generate regional public goods such as the ones supporting research.

Due to the expected increase of requests from Regional Member Countries to finance Regional Operations in general and Regional Public Goods in particular, it is very important that ADF contributors consider the increase of the resources dedicated to Regional Public Goods in general and the Research and Development themes in particular.

An additional indirect way of financing R&D exists through investments operation in agriculture. Indeed in several projects, applied and adaptive research along with institutional capacity building of R&D entities in the member countries are integral parts. These targeted activities are usually outsourced to national, regional or international institutions via short term contracts.

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[1] Considered as regional public goods are those characterized by: **a) *Non-rivalry:*** Public goods are those whose benefits can be enjoyed by one party without (or hardly) reducing the availability of these benefits to others; **b) *Non-excludability:*** It is difficult or prohibitively expensive to exclude others countries / communities/ regions) from enjoying/ consuming the generated benefits; **c) *Of Public Interest:*** The good is of broad public interest and benefit. Typically, a public/ governmental entity in each participating country is typically responsible for the regulatory/policy context for the good to be produced and takes part in its production.

VI – Why has the Bank chosen to support CGIAR?

With four of the CGIAR's 15 Centers (Fig. 3) and one Challenge Program headquartered in Africa, and almost all fifteen Centers having a representation in Africa, CGIAR is committed to development in Africa through partnerships with National Agricultural Research Systems (NARS), NGOs, the private sector and other development partners.

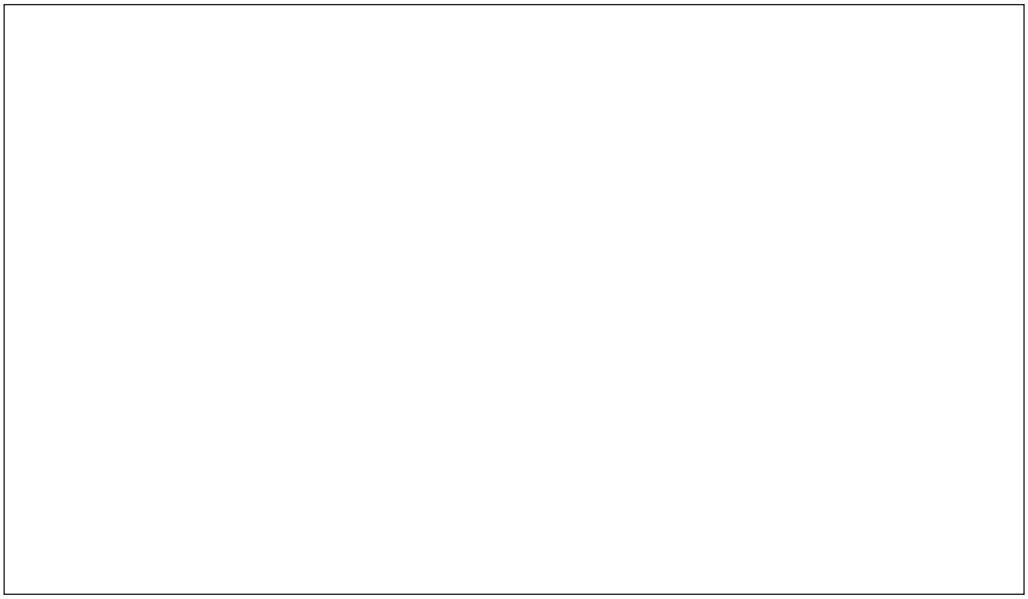

Fig. 3. Geographical locations and representations of the CGIAR Centers on in Africa.

Work in the 15 CGIAR centers is conducted by over 8000 researchers in a three dimensional manner: agro-ecosystems, commodities and cross-cutting themes. Along with the skill mix and expertise in CGIAR's centers of excellence and the consultation process on research priority setting, CGIAR with its centers network is a good partner and a resourceful institution to AfDB's operations at the design and the implementation phases.

Several technologies are produced by research conducted by CGIAR in collaboration with African NARES and from elsewhere from which African institutions can borrow to tackle continental problems. These readily available technologies could be scaled up in Bank's funded operations in RMCs. A list of these relevant technologies is given in Annex 2.

CGIAR organized a series of reviews, extensive consultations and workshops to change the way the consortium is doing business as an International Public Goods provider. Overall, the donors including AfDB welcomed the changes in the CGIAR system renewed vision, research programming approach and processes and the governance structure. AfDB participated to the first GCARD conference in 2010 in Montpelier and contributed to the discussion on the research priorities on the continent, the windows proposed to channel funding and the associated operational modalities. At the end of this process Bank management felt that the reform was timely and relevant and noted as follows: a) the reformed structure, management and processes will make the system more, transparent, results oriented, accountable and cost-effective; b) the construction of the research agenda for Africa and its prioritization resulted from an extensive and highly partic-

ipatory processes and was satisfactory; c) the third funding window (i.e. providing support directly to the CG Centers) is adequate for the Bank (proximity and close oversight, cutting down on bureaucracy and improved accountability); d) partnering with the CGIAR for strategic research issues for the continent targeting preferably the CG centers present in Africa while considering the expertise and the comparative advantages of the different centers and allowing for expertise and knowledge to be drawn from the global CG centers network; e) earmarking funds for specific topics (i.e. four strategic staple cops in Africa: rice, maize, cassava and wheat); f) while implementation will be spearheaded by the CGIAR centers, links are put in place with the local NARES and the private sector to ensure that integration is effectively done along the technology creation and uptake pathway; g) regional and sub-regional organization, professional organization, private sector are part of the projects steering committee and are involved in terms of oversight, advocacy and provision of feedback from the field; h) building capacity of NARES of the regional member countries.

VII – The way forward

Governments are required to demonstrate to the donors' community and development agencies their commitment towards financing agricultural research to ensure full ownership of results and impacts. It is essential that the design of any intervention investments made by donors and development agencies entails smooth exit strategy built into the project to ensure sustainability through public and private sector involvement.

In this regard, there is a need for advocating for political and financial support to agriculture in general and agriculture research in particular by the Regional Member Countries and other Regional and pan African bodies (RECs, NEPAD - CAADP, AU, etc.). This advocacy must be evidence-based. Unfortunately, in Africa, history has always shown a disconnect between the political pronouncements and the actual support by politicians and planners to agriculture and agricultural R&D. The significant lack of action on the "Maputo Declaration on Agriculture and Food Security in Africa" by the Heads of States and Governments in 2003 made a commitment to allocate 10 percent of national budgetary resources to agriculture and rural development stands as a reminder of such disconnect.

Several analyses indicated that with the public resources at hand and their efficient mobilization such targets can be met while foreign assistance should be regarded as a supplementary source. A strong and steady political commitment to support agriculture is a necessary signal to the international community to accompany such engagement.

Guided by its analytical work and in response to the feedback from its stakeholders during multiple rounds of consultations, the Bank will support the twin objectives of inclusive and green growth in its recently approved 10 year strategy (2013-22). In the African context the engagement along these two dimensions will require specific data and technologies to be able to operate evidence based policy making and also propose technical solutions for the different economic sector such as agriculture. In the case of agriculture, it can be argued that the marginalization (opposite of inclusiveness) of certain sub-sectors and ecosystems can stem from a deficit in basic knowledge and/or adapted technologies to those sub-sectors, agro-ecosystems and socio-economic groups. The closing of this knowledge gap will require the mobilization of domestic and foreign support for Research for Development targeting those areas.

In its quest to expand support to development initiatives, the Bank has been providing financial support to ongoing activities of several research institutions on the continent. However, with the important increase of such requests, and building on lessons drawn from its past experience, the Bank will have to maximize the impact of its support to such institutions by being more focused and pro-

viding financial assistance within the context of a strategy guided by the following principles: (i) being more selective in its support favoring research and capacity building institutions whose programs are more directly linked to the strategic objectives of the Bank's Vision; (ii) focusing support on specific well defined activities; (iii) combining research and capacity building activities; (iv) attaching greater emphasis to regional and sub-regional initiatives to promote effective collaboration, networking and regional economic integration; and (v) contributing to donor support effectiveness through the Bank's complementary participation in programs supported by other donors.

Regional Member Countries should engage in an effort to convince Bank management, Board of Directors and Governors of the strategic role of investing in agriculture and agricultural research and advocate for more ADF resources dedicated for the Regional Public Goods window with more support for research. On the ADB side, a larger share of the net income resources should be made available for funding highly competitive research proposals that are of relevance to African agriculture in both LIC and MIC countries.

VIII – Conclusion

The need to improve agricultural production in Africa, while ensuring that environmental footprints are not left, is now more pressing than ever before. This provides compelling reasons for the Bank Group to not only sustain its commitment but to reinvigorate it in order to support the efforts of research institutions in Africa with a strong involvement of RMCs governments.

Performance monitoring of the ongoing operations supporting research and the lessons drawn from the past operations indicates that the Bank's support to a multiple partnership that involves CGIAR Centers on Africa, African NARES and Regional and sub-regional agricultural research organization each one playing a specific role is probably the 'best bet' model of implementing agricultural R&D interventions. The culture of performance monitoring and results based approaches must be well anchored. The strengthening of NARES capacity must be an important legacy of all interventions.

Bank's support must be selective in terms of partnerships and themes and should aim at strategic researchable issues with relevance to food security, poverty alleviation and environmental sustainability.

In order to harness more support to agricultural research for development, the Bank should explore innovative funding instruments blending ADF, ADB and Trust Funds resources to serve all RMCs in an inclusive manner using regional approaches. In this way the capacity and expertise of strong research programs and institutions on the continent and beyond can benefit to less developed ones.

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Annex 1: Summary of Bank's Support to Research and Capacity Building (Grants)

Annex 2: Selected CGIAR research outcomes of relevance to African Agriculture

- Successful biological control of the cassava mealybug and green mite, both devastating pests of a root crop that is vital for food security in sub-Saharan Africa. The economic benefits of this work alone, estimated at more than $4 billion, are sufficient to cover almost the entire costs of CGIAR research conducted so far for Africa.
- New Rices for Africa, or NERICAs, which combine the high yields of Asian rice with African rice's resistance to local pests and diseases. Currently sown on 200,000 hectares in upland areas, NERICAs are helping reduce national rice import bills and generating higher incomes in rural communities.
- More than 50 varieties of recently developed drought-tolerant maize varieties being grown on a total of about one million hectares across eastern and southern Africa.
- A flood-tolerant version of a rice variety grown on six million hectares in Bangladesh. The new variety enables farmers to obtain yields two to three times those of the non-tolerant version under prolonged submergence of rice crops, a situation that will become more common as a result of climate change.
- Widespread adoption of resource-conserving "zero-till" technology in the vital rice-wheat systems of South Asia. Employed by close to a half million farmers on more than 3.2 million hectares, this technology has generated benefits estimated at US$147 million through higher crop yields, lower production costs and savings in water and energy.
- An agroforestry system called "fertilizer tree fallows," which renews soil fertility in Southern Africa, using on-farm resources. More than 66,000 farmers have adopted this technology in Zambia, where it has strengthened food security and reduced environmental damage, and the system is spreading in four neighboring countries.
- Information and tools used by conservationists to monitor some 37 million hectares of forest, resulting in better management of this diminishing resource and contributing to more sustainable livelihoods for forest dwellers.
- A new method for detecting aflatoxin, a deadly poison that infects crops, making them unfit for local consumption or export benefiting farmers throughout sub-Saharan Africa. This technology, together with a novel biological control method that has proved able to reduce aflatoxin by nearly 100 percent, is helping to curb this major threat to human health, especially in children, and to save millions of dollars in lost sales of food for export.
- A simple methodology for integrating agriculture with aquaculture to bolster income and food supplies in areas of southern Africa where the agricultural labor force has been devastated by HIV/AIDS. Under large-scale testing in Malawi, the method doubled the income of 1,200 households and dramatically increased fish consumption.
- A new approach to predicting the likely impact of climate change on major crops' wild relatives, which are a key source of genes needed to enhance climate resilience, as well as valuable findings on the likely consequences of biofuels development in China and India for increasingly scarce water supplies.
- Increasing smallholder dairy production in Kenya improving childhood nutrition while generating jobs. This award-winning project with smallholder dairies has contributed up to 80 percent of the milk products sold in the country and strengthened local capacity to market milk products.