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PROJECT PERFORMANCE ASSESSMENT REPORT

REPUBLIC OF KENYA

**NATIONAL AGRICULTURAL RESEARCH PROJECT-PHASE II
(CREDIT NO 2935-KE)**

January 16, 2008

*Sector Thematic and Global Evaluation Division
Independent Evaluation Group*

Currency Unit = Kenyan Shilling

Currency Equivalents (annual averages)

| | |
|------|----------------------|
| 1997 | US\$1.00 =KSh.58.00 |
| 1998 | US\$1.00 =KSh.61.80 |
| 1999 | US\$1.00 =KSh.70.40 |
| 2000 | US\$1.00 =KSh.76.30 |
| 2001 | US\$1.00 =KSh.78.60 |
| 2002 | US\$1.00 =KSh. 78.60 |
| 2003 | US\$1.00 =KSh. 78.90 |

Abbreviations and Acronyms

| | |
|---------|---|
| ARF | Agricultural Research Fund |
| ASAL | Arid and Semi-Arid Lands |
| ASARECA | Association for Strengthening Agricultural Research in Eastern and Central Africa |
| ATIRI | Agricultural Technology and Information Response System |
| CIMMYT | International Maize and Wheat Improvement Center |
| CBOs | Community Based Organizations |
| CGIAR | Consultative Group for International Agricultural Research |
| CRAC | Center Research Advisory Committee |
| ERS | Economic Recovery Strategy for Wealth and Employment Creation |
| EPR | External Programme Review |
| FAO | Food and Agriculture Organization |
| GOK | Government of Kenya |
| ICRAF | International Centre for Research in Agroforestry |
| ICRISAT | International Crop Research for the Semiarid Tropics |
| IDA | International Development Association |
| ILRI | International Livestock Research Institute |
| ISNAR | International Service for National Agricultural Research |
| KAPP | Kenya Agricultural Productivity Project |
| KARI | Kenya Agricultural Research Institute |
| KSU | KARI Seed Unit |
| KPIs | Key Performance Indicators |
| MALD | Ministry of Agriculture and Livestock Development |
| MDG | Millennium Development Goals |
| NRC | National Research Center |
| NGO | Non-Government Organization |
| OPVs | Open Pollinated Varieties |
| PRSP | Poverty Reduction Strategy Paper |
| PRGF | Poverty Reduction and Growth Facility |
| RCC | Research Coordination Committee |
| RRC | Regional Research Center |
| SRA | Strategy for Revitalizing Agriculture |
| T&V | Training and Visit System |

Fiscal Year

Government January-December

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IEGWB Mission: Enhancing development effectiveness through excellence and independence in evaluation.

About this Report

The Independent Evaluation Group assesses the programs and activities of the World Bank for two purposes: first, to ensure the integrity of the Bank's self-evaluation process and to verify that the Bank's work is producing the expected results, and second, to help develop improved directions, policies, and procedures through the dissemination of lessons drawn from experience. As part of this work, IEGWB annually assesses about 25 percent of the Bank's lending operations through field work. In selecting operations for assessment, preference is given to those that are innovative, large, or complex; those that are relevant to upcoming studies or country evaluations; those for which Executive Directors or Bank management have requested assessments; and those that are likely to generate important lessons.

To prepare a Project Performance Assessment Report (PPAR), IEGWB staff examine project files and other documents, interview operational staff, visit the borrowing country to discuss the operation with the government, and other in-country stakeholders, and interview Bank staff and other donor agency staff both at headquarters and in local offices as appropriate.

Each PPAR is subject to internal IEGWB peer review, Panel review, and management approval. Once cleared internally, the PPAR is commented on by the responsible Bank department. IEGWB incorporates the comments as relevant. The completed PPAR is then sent to the borrower for review; the borrowers' comments are attached to the document that is sent to the Bank's Board of Executive Directors. After an assessment report has been sent to the Board, it is disclosed to the public.

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IEGWB's use of multiple evaluation methods offers both rigor and a necessary level of flexibility to adapt to lending instrument, project design, or sectoral approach. IEGWB evaluators all apply the same basic method to arrive at their project ratings. Following is the definition and rating scale used for each evaluation criterion (additional information is available on the IEGWB website: <http://worldbank.org/ieg>).

Outcome: The extent to which the operation's major relevant objectives were achieved, or are expected to be achieved, efficiently. The rating has three dimensions: relevance, efficacy, and efficiency. *Relevance* includes relevance of objectives and relevance of design. Relevance of objectives is the extent to which the project's objectives are consistent with the country's current development priorities and with current Bank country and sectoral assistance strategies and corporate goals (expressed in Poverty Reduction Strategy Papers, Country Assistance Strategies, Sector Strategy Papers, Operational Policies). Relevance of design is the extent to which the project's design is consistent with the stated objectives. *Efficacy* is the extent to which the project's objectives were achieved, or are expected to be achieved, taking into account their relative importance. *Efficiency* is the extent to which the project achieved, or is expected to achieve, a return higher than the opportunity cost of capital and benefits at least cost compared to alternatives. The efficiency dimension generally is not applied to adjustment operations. *Possible ratings for Outcome:* Highly Satisfactory, Satisfactory, Moderately Satisfactory, Moderately Unsatisfactory, Unsatisfactory, Highly Unsatisfactory.

Risk to Development Outcome: The risk, at the time of evaluation, that development outcomes (or expected outcomes) will not be maintained (or realized). *Possible ratings for Risk to Development Outcome:* High Significant, Moderate, Negligible to Low, Not Evaluable.

Bank Performance: The extent to which services provided by the Bank ensured quality at entry of the operation and supported effective implementation through appropriate supervision (including ensuring adequate transition arrangements for regular operation of supported activities after loan/credit closing, toward the achievement of development outcomes. The rating has two dimensions: quality at entry and quality of supervision. *Possible ratings for Bank Performance:* Highly Satisfactory, Satisfactory, Moderately Satisfactory, Moderately Unsatisfactory, Unsatisfactory, Highly Unsatisfactory.

Borrower Performance: The extent to which the borrower (including the government and implementing agency or agencies) ensured quality of preparation and implementation, and complied with covenants and agreements, toward the achievement of development outcomes. The rating has two dimensions: government performance and implementing agency(ies) performance. *Possible ratings for Borrower Performance:* Highly Satisfactory, Satisfactory, Moderately Satisfactory, Moderately Unsatisfactory, Unsatisfactory, Highly Unsatisfactory.

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Principal Ratings

| | <i>ICR*</i> | <i>ICR Review*</i> | <i>PPAR</i> |
|------------------------------------|----------------|-------------------------|---------------------------|
| Outcome | Satisfactory | Moderately Satisfactory | Moderately Satisfactory |
| Institutional Development Impact** | Substantial | Substantial | NR |
| Risk to Development Outcome | ——— | ——— | Moderate |
| Sustainability*** | Likely | Likely | NR |
| Bank Performance | Unsatisfactory | Unsatisfactory | Moderately Unsatisfactory |
| Borrower Performance | Satisfactory | Satisfactory | Moderately Satisfactory |

* The Implementation Completion Report (ICR) is a self-evaluation by the responsible Bank department. The ICR Review is an intermediate IEGWB product that seeks to independently verify the findings of the ICR.

**As of July 1, 2006, Institutional Development Impact is assessed as part of the Outcome rating.

***As of July 1, 2006, Sustainability has been replaced by Risk to Development Outcome. As the scales are different, the ratings are not directly comparable.

Key Staff Responsible

| <i>Project</i> | <i>Task Manager/Leader</i> | <i>Division Chief/ Sector Director</i> | <i>Country Director</i> |
|-----------------------|-----------------------------------|---|--------------------------------|
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| Supervision | Edgardo Quisumbing | Karen Brooks | Makhtar Diop |
| Completion | Moctar Toure | Karen Brooks | Makhtar Diop |

Preface

This is a Project Performance Assessment Report (PPAR) for the National Agricultural Research Project –Phase II (Cr. 2935-KE) which was approved on January 28, 1997, and became effective on June 6, 1997. A credit of SDR 27.4 million (US\$39.7 million equivalent) was approved to support the development of Kenya’s agricultural research capacity. The Credit was closed on December 31, 2003 after an 18–month extension with a cumulative disbursement of US\$36.5 million and a total project cost of US\$138.7 million.

The PPAR findings are based on an IEG mission that visited Kenya in April/May 2007. Additional information came from an in-depth review of Kenya’s economy–wide and agriculture sector strategies and performance; project files, including the Implementation Completion Report (ICR); review of sector studies, including IEG’s Country Assistance Evaluation. Interviews were also held with officials of the Government of Kenya including the Implementing Agency—the Kenya Agricultural Research Institute (KARI)—and other relevant agencies; Kenya’s Development Partners including, multilateral, bilateral and NGOs and private sector service providers; and the Bank’s Regional Staff. The PPAR mission visited three of KARI’s National and Regional Research Centers and met with staff, farmer organizations and local agricultural officers.

In accordance with standard IEG procedures, a copy of the draft PPAR was sent to the Borrower for their review and comments. The Borrower did not have any comments.

Summary

Kenya gained its independence in 1963 with an estimated population of about 8.3 million and today, it has reached 34.3 million. About 46 per cent of Kenyans live below the poverty threshold and 70 per cent live on 12 per cent of the total land area. Over 85 per cent of the land is arid and semi-arid. Land degradation is shrinking Kenya's agricultural land. With a total arable land of 43.6 million ha., Kenya's agricultural land and water resources are meager and variable in quality. Changing weather patterns and recurrent droughts have caused food shortages and affected the livelihoods in the dry areas in general and in pastoral areas in particular.

At independence, Kenya inherited an agricultural production system comprising a small and highly mechanized estate farming sector and a large subsistence traditional agriculture. Today agriculture accounts for 27 per cent of GDP and generates 60 per cent of total export earnings. Eighty per cent of the population is rural and agriculture is the principal source of livelihood. The overall performance of the agriculture sector in the past two decades has been weak but is recently showing signs of recovery. In the mid-nineties, low commodity prices, recurrent droughts, weak governance with minimal accountability coupled with weak economic and agricultural sector policies resulted in low economic growth in general and the agricultural sector in particular.

The stated objectives of the National Agricultural Research Project (NARP) Phase II, approved in 1997, were to contribute to food security, poverty alleviation and environmental protection. The project would achieve these objectives by raising agricultural productivity and incomes on a sustained basis through technology generation and dissemination in close cooperation with farmers and extension agents. The Project would also develop technologies promoting indigenous knowledge and appropriate for small holders and women. However, given the lack of specificity of these objectives, this assessment has inferred two overarching objectives from the key performance indicators in the SAR: i) implementation of priority research programs and effective dissemination; and ii) enhanced institutional capacity.

The project's overall Project *Outcome* is rated moderately satisfactory. The rating reflects the substantial rating for relevance and modest rating for efficacy in achieving the project development objectives. The project's development objectives were relevant to Government of Kenya's (GOK) poverty and development strategies. A common element in all these strategy documents is the call for improving Kenya's agricultural productivity as a principal instrument for reducing rural poverty and promoting food security. Towards this end, the Kenya Agricultural Research Institute (KARI) has made substantial progress in focusing its research agenda on quick impact-producing technologies. Farmers' agricultural productivity constraints and national development priorities are driving agricultural research priorities. The Project's institutional development objective and design were also appropriate and relevant to the GOK's attempt, and the Bank's strategy, to enhance public sector efficiency. The project's relevance is equally valid today in supporting the Government's renewed drive to improve technology dissemination by engaging public, private and other service providers.

KARI's agricultural research network, including its growing collaboration with international and regional research institutes and the Government's firm commitment to increasing agricultural productivity, are likely to ensure the further realization of the project's development outcomes. Thanks to the long-term investment in institutional capacity strengthening, KARI is a success story. The ongoing IDA-assisted Kenya Agricultural Productivity Project (Phase I of the Kenya Agricultural Productivity Program) continues to deepen the reform in "generation, dissemination and adoption of agricultural technology." Successful implementation of the Program will promote farm level adoption of available KARI technologies. The overall **Risk to Development Outcomes is thus rated moderate.**

The Bank's overall performance in assisting the Government in the design of the project and implementation supervision is rated moderately satisfactory. In the rating, substantial weight is given to the Bank's role in the design of the institutional enhancement and in prioritizing the agricultural research agenda in this second project, which offset a mixed supervision performance.

The Borrower's overall performance is rated moderately satisfactory. The rating reflects the Government's mixed performance, particularly in terms of delayed counterpart funding and slow implementation of policy reforms, while KARI's performance as the implementing agency is rated Satisfactory.

Lessons emerging from the implementation of NARP-Phase II reflect the cumulative impact of NARP Phase I. The two-phase capacity building of KARI is an exemplary long-term engagement for the Bank and GOK's Development partners. The following are the key lessons for both the GOK and the Bank:

- When the outcome of an operation is contingent upon a parallel program on which the project has minimal influence, the risk mitigating measures should be identified at appraisal.
- Long term engagement and appropriate sequencing of external (Bank and other aid agencies) assistance are critical to successful institutional capacity building.
- Establishing partnerships with research organizations and allowing independent external evaluation of research institutions' operations, management and performance enhance institutional maturity.
- Adopting a pluralistic approach for the delivery of agricultural services requires the parallel placement of complementary input and service delivery institutions.

Vinod Thomas
Director-General
Evaluation

1. Background and Context

Overview

1.1 Kenya gained its independence in 1963 with an estimated population of about 8.3 million and today, it has reached 34.3 million. About 46 per cent of Kenyans live below the poverty threshold and 70 per cent live on 12 per cent of the total land area equivalent to 305 persons per sq. km. Over 85 per cent of the land is arid and semi-arid. Land degradation is shrinking Kenya's agricultural land. With a total arable land of 43.6 million ha., Kenya's agricultural land and water resources are meager and variable in quality. Changing weather patterns and recurrent droughts have caused food shortages and affected the livelihoods in the dry areas in general and in pastoral areas in particular.

1.2 Kenya enjoyed a decade (1968-1978)¹ of high growth rate following its independence. From end 1970s to the end of 1980s, the performance of the economy started a downward trend and in 1991 program aid was suspended. To reboot the economy, in 1993 Kenya embarked on a series of policy reforms including eliminating price controls, lifting foreign exchange control and import licensing, and privatization of public sector enterprises. The results were immediate but short-lived. During 1994-96, the average GDP growth rate was 4 per cent. From 1997 to 2002, Kenya backtracked on the reform agenda and faced two suspensions of IMF programs and Bank assistance due to noncompliance with agreed commitments on the management of the economy coupled with the unchecked corrupt Government practices. With the inauguration of the Kibaki Government, in 2003, the Economic Recovery Strategy for Wealth and Employment Creation (ERS) was launched and established the basis for Kenya's current sustained growth. To assist the GOK's bold economic, social and governance agenda, the IMF approved a \$250 million Poverty Reduction and Growth Facility (PRGF) and the aid community pledged US\$4.2 billion. In 2004, Kenya, Tanzania and Uganda signed the East African Customs Union Agreement which will further boost growth in all the member states. Today Kenya enjoys an annual growth rate of over 6 per cent and exports earnings have surpassed the US\$ 2 billion mark. Despite the impressive achievements, Kenya has an unfinished agenda in policy reforms, addressing inequalities and further deepening of good governance all of which will be critical for continued growth and poverty reduction.

The Agriculture Sector

1.3 At independence, Kenya inherited an agricultural production system comprising a small and highly mechanized estate farming sector and a large subsistence traditional agriculture. Today agriculture accounts for 27 per cent of GDP and generates 60 per cent of total export earnings. Eighty per cent of the population is rural and agriculture is the principal

1. 1978 was a watershed for Kenya marking the end of Kenyatta Presidency and the accession of President Daniel Arap Moi who ruled Kenya for 24 years. Although multiparty elections were held in 1992 and 1997, the 2003 election, when President Mwai Kibaki won, is considered as the first free and fair multi-party election in Kenya.

source of livelihood. The main staple crops—maize, wheat, sorghum, millet and cassava currently occupy 30 per cent of the total arable land. Maize accounts for 80 per cent of total cereal land or 38 per cent of total cropped area. It is also the principal food security staple in the diet of Kenyans. Maize also absorbs nearly a third of total Nitrogenous fertilizer consumption in Kenya. Despite the availability of several hybrid and drought tolerant seed varieties, average maize yields remain significantly below potential yields. Neighboring Uganda is a highly competitive maize producer. However, GOK’s continued market intervention including domestic price support discourages import from Uganda. A success story in Kenya is the dairy subsector. GOK’s proactive support including improved breeding, access to animal health services and coupled with market availability, milk production has grown significantly during the past ten years.

1.4 Irrigated agriculture is also limited to about 90,000 ha compared to 540,000 ha. of potential irrigable land. The arid and semi-arid lands (ASAL) which constitute 85 per cent of the total land area of Kenya is home for poor farmers and pastoralists facing recurrent weather related risks. The most lucrative agricultural products are horticulture, tea, coffee and pyrethrum and account for 90 per cent of export earnings. Horticulture is second to tourism in foreign exchange earnings. Kenya accounts for 31 per cent of EU’s floral imports. Kenya’s horticultural products are known for good quality and are widely marketed in Europe especially during the off seasons.

1.5 The overall performance of the agriculture sector in the past two decades has been weak but is recently showing signs of recovery. In the mid-nineties, low commodity prices, recurrent droughts, weak governance with minimal accountability coupled with misguided economic and agricultural sector policies resulted in low economic growth in general and the agricultural sector in particular.² The share of agriculture in GOK’s total budget has reached 5.7 per cent, still significantly lower than the target 10 per cent for 2008 agreed at the African Heads of State Summit in Abuja, Nigeria. Table 1 presents selected sectoral indicators.

Table 1. Selected Indicators (%)

| | 1997 | 2003 | 2004 | 2005 |
|--------------------------------------|------|------|------|------|
| GDP Growth | 2.1 | 1 | 4.3 | 6 |
| Agricultural GDP Growth | 1.7 | 2.6 | 1.6 | 6.7 |
| Share of Ag. GDP | 27.5 | 30 | 27 | 27 |
| Share of Agriculture in Total Budget | 4.0 | 4.5 | 5.6 | 5.7 |
| Poverty Incidence | 52 | 57 | NA | 46 |
| Population (million) | 28.6 | | | 34.3 |

Source: World Bank data base, 2000, 2007.

2. Swamy Gurushi, Development Economics Department, World Bank, “Structural Adjustment in the 1980’s: Kenya Volume 1. 1994

Agricultural Development Strategy

1.6 GOK has issued several macro, sectoral and sub-sectoral development strategies. To mark a new beginning for Kenya, the 2003 ERS charted a far reaching agenda for economic recovery and assigned an important role for the agriculture sector to promote food security and poverty reduction. In 2004, the GOK approved the Strategy to Revitalize Agriculture (SRA) (2004-2014) anchored on the objectives and principles of the ERS, the Kenya Poverty Reduction Strategy Paper (PRSP) and the Millennium Development Goals (MDGs). The SRA calls for a new direction for agriculture by reorienting agriculture as a diversified productive business enterprise. To support the new direction, macro and sectoral policies would be realigned and pluralistic service provision that would tap public and private sectors, NGOs and farmer organizations would be encouraged. Toward this end, GOK has embarked on a long term agenda to improve agricultural productivity and the necessary agricultural technology generation and dissemination services. KARI is also implementing its ten-year (2005-2015) Strategic Plan (SP). The SP is a sequel to NARP-Phase II and incorporates the policy directions of ERS and SRA.

1.7 The World Bank portfolio in Kenya has a long and checkered history. Since 1997, OED had rated 14 projects, and of these only one (7 per cent) was rated as having satisfactory outcome compared to an average satisfactory rating of 71 per cent for the Africa Region.³ Only one operation (Arid Lands Resource Management Project 2005) was rated satisfactory outcome out of eight operations assessed since 2000. NARP Phase II is the second in a series of Bank assistance to Kenya's agricultural research capacity building and supporting research directions to meet the challenges of agricultural productivity and growth. In June 2004, the Bank approved the Kenya Agricultural Productivity Project to support the GOK's three-phase agricultural productivity program. IDA is providing an Adaptable Program Credit of US\$27 million and grant of US\$13 million for phase one of the program.

2. The Project

Project Objectives and Design

2.1 The stated objectives of the project were to contribute to food security, poverty alleviation and environmental protection. The project would achieve these objectives by raising agricultural productivity and incomes on a sustained basis through technology generation and dissemination in close cooperation with farmers and extension agents. The Project would also develop technologies promoting indigenous knowledge and appropriate for small holders and women.

2.2 The formulation of the project objectives in the Staff Appraisal Report (SAR) combines broad goals and specific instruments to achieve intermediate objectives. However, the project objectives and the Key Performance Indicators (KPIs) presented in Annex 6 of the

3. Operations Evaluation Department, World Bank, 2004, "The Republic of Kenya Country Assistance Evaluation".

SAR are largely related to monitoring the implementation of the project components, i.e. the outputs. The one exception is the “increase in productivity of major crops/livestock/agro forestry productions systems” as an outcome indicator without specific targets. This disconnect raises the question of which set of “project objectives” should be assessed? It also points to the lack of rigor in project processing reviews since the mis-specification of project development objectives is often flagged at the time of ICRs and PPARs. In this case, the Task Team, at Mid-Term Review raised the issue and proposed revising the Project’s Development Objectives with a view to targeting the intermediate outputs rather than claiming to achieve “food security, poverty reduction and environmental protection”. The Task Team’s proposal was appropriate. However, Management was concerned about the long and arduous process of revising Development Objectives, which requires Board approval. Instead it concluded that the scope of the Development Objectives as described in the SAR is broad enough to include the intermediate outcomes and did not warrant a formal revision.⁴ This Assessment’s inferred project objectives are: i) implementation of priority research programs and effective dissemination; and ii) enhanced institutional capacity. These encapsulate the output/outcome indicators in Annex 6 of the SAR. KARI has also undertaken periodic external evaluations and impact assessments which shed some light on project outputs and intermediate outcomes.

Project Components

2.3 The project was designed as a follow-up to the long term agenda established under the National Agricultural Research Project which was closed in 1995. NARP-Phase II focused on three key priority elements.

2.4 ***Institution Building (US\$84.1 million or 46.7 percent of total project cost).*** This component was designed to: rationalize KARI’s network of National and Regional Research Centers; strengthen its administrative, management and accounting systems; and improve its procedures for setting research priorities, budgeting, implementation and dissemination of results and impact assessment. A critical aspect of the Institution Building component was the appropriate sizing and skill mix of staff including upgrading of human resources. To better inform its clients, KARI was also expected to improve its monitoring and evaluation system (M&E), and establish an integrated management information system (MIS).

2.5 ***Research Program Implementation (US\$88.0 million or 48.9 percent of total project cost).*** To support high priority basic and adaptive research programs the project included research on: i) crop and livestock, ii) natural resource management, iii) socioeconomics, and iv) biotechnology. The Project was also designed to finance competitive research grants in collaboration with research institutions and private sector through the ongoing Agricultural Research Fund (ARF).

4. The Africa Region notes that there was a general consensus to design projects with higher and long term objectives while recognizing that the projects at hand would only account for intermediate objectives. The project objectives of the Tanzania Second Agricultural Research Project approved a year after NARP-Phase II indicates that the Project Objectives were appropriately formulated :” to support the generation of technology to increase efficiency and productivity of crop and livestock production systems...”

2.6 **Seeds Program (US\$7.8 million, or 4.4 percent of total project cost).** The project would develop a pilot national seed system for basic, breeder and foundation seeds. The Project would establish a Foundation Seed Unit and provide access to formal and informal private sector seed multiplication enterprises and breeders. It was also expected that the project would continue to promote the liberalization of the seed sub-sector.

3. Implementation

3.1 As a follow-on operation, KARI had in place an established institutional arrangement to implement the project. The launching of NARP-Phase II was widely viewed as an attempt to further deepen KARI's institutional development, enhancement of skills, improving financial management and focusing on the contribution of research to Kenya's agricultural development and food security. However, the political climate and Kenya's economic performance did not render a favorable environment for development activities in general. The project was appraised in February 1995, approved in January 1997 and declared effective in June 1997 and was completed in December 2003 after an 18-month extension. Overall project implementation was satisfactory despite a significant (60 per cent) reduction in co-financing of research programs. The ICR presents a comprehensive review of the implementation of the project by component and is largely consistent with the findings of the Assessment Mission. The PPAR highlights the principal features of the three components which are critical to the review of project implementation. Table 2 presents the Project's selected implementation of project components.

Table 2. Quantitative Project Targets and Actual

| <i>Institution Building</i> | <i>Target</i> | <i>Actual</i> | <i>Actual (%)</i> |
|---|---------------|---------------|-------------------|
| Staff Retrenchment | 1400 | 975 | 70 |
| No of Regional Research Centers | 15 | 17 | 130 |
| Increase in Post Grad. Research Scientists-Ph.D (%) | 10 | 20 | 200 |
| No. of RRCs providing Technology Transfer | 10 | 15 | 150 |
| Soil Labs for Fertilizer recommendation Established | 2 | 2 | 100 |
| Research Programs | | | |
| Increased improved technologies disseminated (%) | 25 | >30 | 120 |
| Seeds Program | | | |
| No. of Operating KARI Seed Units | 5 | 5 | 100 |
| No. of Commercial Seed Producers Established | 5 | 5 | 100 |

Sources: EDRP Technical Annex, ICR and KARI.

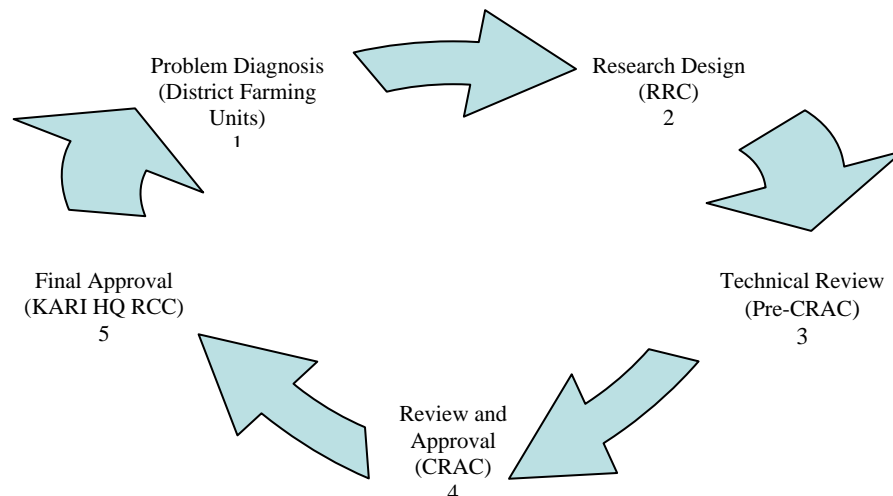
Institution Building

3.2 The **Institutional Building** component was designed to build upon the achievements made under the 1986 IDA-assisted NARP. In 1997, the KARI network was endowed with substantial physical infrastructure, equipment, and a cadre of core research scientists and a large support staff. To transform "KARI into a leaner and more efficient organization", the

project's multi-pronged approach was on adopting a mechanism for planning and prioritizing research programs, rationalizing the network of research centers and resulting in an appropriate mix and balance between research and support staff. These measures, coupled with improved financial, information management, and monitoring and evaluation systems constituted KARI's institution building agenda. Overall, with few exceptions, KARI has successfully implemented the various core elements critical for institution building.

3.3 KARI has established a chain of functional scientific committees/fora to: i) set the national strategic research agenda (the Annual Research Forum); ii) approve research proposals at the KARI Research Coordination Committees (RCCs); and iii) screen at the National/Regional Research Centers the research proposals (Center Research Advisory Committees) (CRACs). The KARI Biennial Science Conference is a major event for KARI where Kenya's agricultural policy makers, research scientific community, and the private sector operating in the agriculture sector actively participate. This Conference provides an opportunity for KARI to receive feedback on its ongoing research activities and to identify emerging issues for research. A typical Research project Cycle for KARI is presented in Figure 1.

Figure 1. Research Project Cycle



3.4 Based on KARI's overall strategic research agenda, the NRCs and RRCs, consistent with their mandates, identify research topics in consultation with various stakeholders in their designated Districts. The constituents include, the District Agricultural Officers, farmer groups, and scientists in Universities conducting related research. Technical review meetings are held in the Centers and culminate with recommendations for approval to the KARI HQ. Research Coordination Committee (RCC). The weakest link in the Research Project Cycle is the absence of an in-house-based monitoring and evaluation system. Project progress and financial reports are regularly submitted to KARI HQ. However such reports are not used for purposes of evaluation. KARI HQ. recognizes this lacuna and is currently formulating an M&E System under the IDA-assisted KAPP.

3.5 Another major undertaking was the rationalization of KARI Research Centers (NRCs and RRCs) and staff size and skill mix. The number of Research Centers remained

unchanged during the life of the Project due to the transfer and merger of Centers. The decision to maintain the Research Centers was based on the need to assign one NRC or RRC per mandate area. The RRCs conduct mainly adaptive research programs to address the agricultural technology constraints of homogeneous “agro-ecological zones and socio-economic systems” covering several Districts. They are also involved in transfer of technology and knowledge. NRCs are responsible for basic research and development programs (RDP) serving as national “specialized and referral programs” for priority agricultural commodities and topics. During the life of the project two centers were transferred out of KARI while two other Centers were merged into the KARI network. To secure ownership of land assigned to KARI, titled lands have increased from six per cent of total lands under KARI in 1999/2000 to 32 per cent in 2005/2006.

3.6 KARI has also undertaken several steps to further enhance its financial management and control systems. RRCs and NRCs submit their financial statements monthly to KARI Hqs. which generates regular financial management reports on budget allocations and expenditures. Recent reviews have however, identified major weakness in financial management systems that need to be addressed. On-line links between KARI Hq. and the RRCs and NRCs and the integration of financial input and research output into functional management information system are still pending.

Research Program Implementation

3.7 To address the key challenges of increasing agricultural productivity, the focus of NARP Phase II was high impact adaptive research programs within the framework of farming systems approach. Toward this end, KARI has generated wide ranging agricultural productivity enhancing technologies. New seed varieties suitable for varying climatic zones, animal health research, technologies aimed at managing the fragile natural resources and promoting soil fertilities, and research in biotechnology for crops and livestock were also developed. The ARF which was established in 1991 to promote competitive research grants was also financed under the project. A cross cutting instrument—socio-economic research—to test the viability of research programs and assess the impact of adopted technologies was also an integral part of NARP-Phase II albeit with minimal follow-up. KARI’s technology dissemination strategy was dependent on the then prevailing Training and Visit System (T&V) supported under an IDA-assisted Agricultural Extension Project. In 1998, the T&V System collapsed in Kenya and the project ended prematurely with unsatisfactory outcomes.⁵ To overcome the absence of an extension service provider, KARI, in 2000, had to introduce a new approach known as the Agricultural Technology and Information Response System (ATIRI).

3.8 In 2005, KARI prepared an inventory of all its completed basic and adaptive research programs including their adoption status.⁶ KARI and its predecessor Institutes, dating back to the 1960s have developed over 750 technologies. Over 80 percent of the technologies were released since the early 1990s covering the period of NARP Phase I and NARP Phase

5. For a detailed review, see Madhur Gautam’s “Agricultural Extension The Kenya Experience: An Impact Evaluation”, OED, World Bank, 2000.

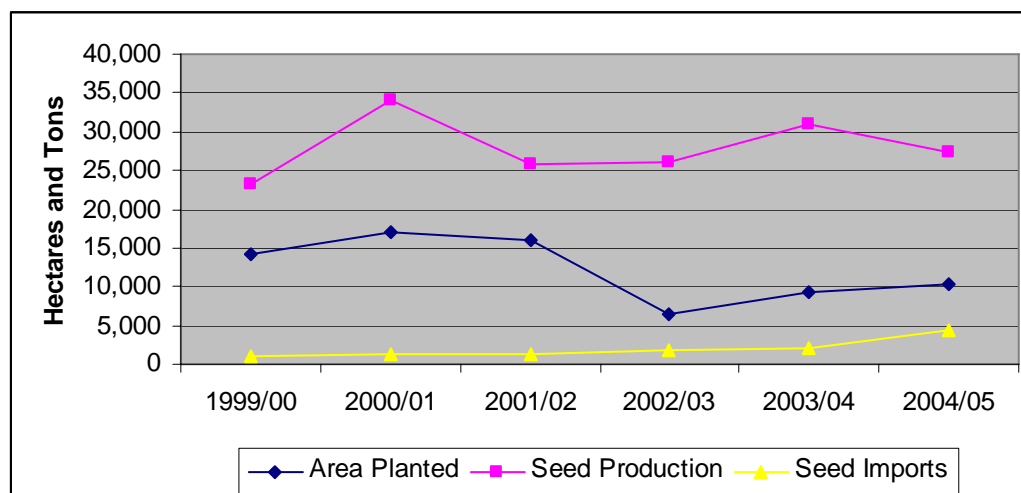
6. Kenya Agricultural Research Institute, 2005, “Inventory of Technologies Developed by KARI up to 2005”.

II. During the period of NARP Phase II, several RRCs have tested high yielding maize seed varieties on farmers' fields under varying climatic environments.

3.9 An important element in the research capacity building of KARI was the continued financing of the ARF. During NARP Phase II, the governance of ARF was made more independent of KARI to ensure impartiality in the selection process of research grants. An estimated US\$2.6 million was disbursed for about 100 research projects during the period 1998-2003 to external research scientists, Research Institutes and to KARI Scientists in collaboration with researchers in Universities. Two bilateral aid agencies, USAID and DFID financed the ARF until 1997 after which the IDA Credit remained the sole source. With the collapse of the extension service in Kenya in 1998/99, KARI in 2000 introduced ATIRI, the initiative aimed at: i) promoting the participation of farmers in the identification of research needs; and ii) dissemination of technologies. This program was successfully implemented in all the RRCs. Funding for ATIRI was earmarked from the project following the Mid-Term Review in 2000. ATIRI was launched as a 3-year pilot program and by 2003, the RRCs had collaborated with 325 Community Based Organizations (CBOs) composed of 15,000 farmers. By 2003, beneficiaries from the ATIRI outreach program reached 38,500 farmers.

Seeds Program

3.10 Shortage of good quality seeds has been and still is a key factor in explaining low crop yields in Kenya. The Project financed the establishment of KARI Seed Units (KSU) originally known as the Foundation Seed Unit. The pilot seed program was intended to produce breeder and foundation seeds for multiplication in collaboration with selected farmers. The KSUs are housed in five RRCs and produce maize, wheat, sorghum, cowpeas and other seed varieties on contract with neighboring farmers. In 2005, the KSUs reached a peak production of 680 tons. To meet the growing demand for affordable maize seed varieties, the KSUs produce open pollinated varieties (OPVs). These varieties, unlike the hybrid seed varieties can be re-sown following a crop harvest. The project also promoted the development of the Kenya seed industry. Policy reforms to liberalize the seed industry have encouraged the entry of both international seed companies and local entrepreneurs into Kenya's domestic seed market. Today there are over 50 seed companies operating in Kenya. Five seed industry development units (SIDU) were also established during the project implementation period and are linked with about 256 seed multiplication farmers. Figure 2 presents the trend in total domestic seed production and imports. Over 80 per cent of total seed traded is maize and the Kenya Seed Company, a government parastatal, accounts for 75 per cent of the seed market in Kenya. Despite progress in the production and import of improved maize seeds, there is a significant unmet demand and, as shown in Figure 2, overall seed production has risen only marginally.

Figure 2. Domestic Seed Production and Import

Source: Kenya Seed Traders Association extracted from the Annual Reports of the KEPHIS

Project Cost and Financing

3.11 The total Project Cost was estimated at US\$179.9 million comprising contributions from GOK, bilateral aid agencies, IDA and private sector. Actual Project Cost after an 18-month extension of the Closing Date of the IDA Credit was US\$138.7 million or 77 per cent of the appraisal estimate. The estimated and actual Project Costs and Financing Sources are presented in Table 3.

Table 3. Project Cost and Financing by Component (US\$ mill)

| Project Components | IDA | | GO K | | Co-financing | | Total Project Cost | Total Project Cost |
|----------------------|-------------|-------------|-------------|-------------|--------------|-------------|--------------------|--------------------|
| | App. | Act | App | Act | App | Act | Appraisal | Actual |
| Institution Building | 14.9 | 19.4 | 64.7 | 73.6 | 4.6 | 6.5 | 84.2 | 99.5 |
| Research Program | 20.6 | 14.8 | 5.0 | 2.5 | 62.3 | 16.6 | 87.9 | 33.9 |
| Seeds Program | 4.2 | 2.5 | 0.7 | 1.2 | 2.9 | 1.6 | 7.8 | 5.3 |
| Total | 39.7 | 36.7 | 70.4 | 77.3 | 69.8 | 24.7 | 179.9 | 138.7 |

Source: KARI, 2007 and AFTS2, Africa Region, ICR, 2004

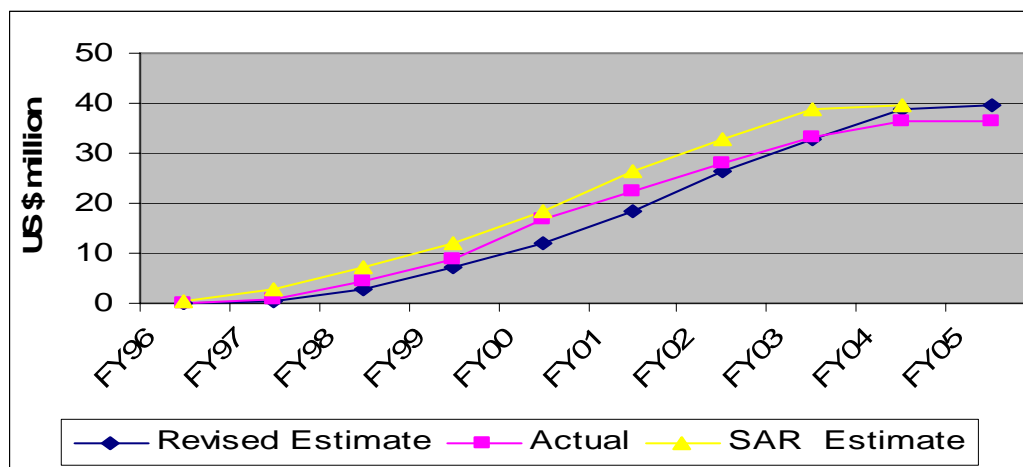
Note: Co-financing includes US\$6.9 million of Private Sector participation.

3.12 The reduced project cost has curtailed the size of the project. It is probable that the project cost was overestimated especially for the Research Program Implementation. Except for a few sub-components, the core elements of the project—Institution Building and Research Program Implementation—did not specify pre-defined quantitative targets. As a

result, the project was flexible depending on the financing envelope. Two factors explain the actual reduced project cost. First, the project cost was estimated on indicative financing plan particularly for the bilateral aid agencies. Unlike IDA's contribution, the amount expected from the bilateral sources was not based on a firm project document. Second, disbursement from such sources was not strictly to co-finance specific subprojects but a financing pledge to the overall agreed national agricultural research agenda. As a result the actual co-financing disbursement was only 35 per cent of the original commitment.⁷

3.13 Despite the slow release of GOK counterpart funds during the initial years of the project, the credit disbursement rate exceeded the revised schedule until FY2004. However only 70 per cent of the IDA credit was disbursed by June 2002, the original Credit Closing date (Figure 3) and required an 18-month extension. The Credit was closed in December 2003 and about US\$3.2 million was cancelled. The agreed disbursement arrangement did not facilitate quick turn around time in the flow of funds. Since KARI did not operate a Special Account the withdrawal application required several reviews and approvals between the MOA and MOF. This arrangement slowed down the start-up of projects in the Research centers.

Figure 3. Cumulative Disbursements



Monitoring and Evaluation

3.14 In 1995 and again in 2000, KARI had indicated that it would establish a Unit in Headquarters responsible for M&E. No formal action was taken to establish such a Unit and instead, KARI instituted a system of quarterly and annual reports as an integral part of individual research proposals. Under this arrangement, the Assistant Directors from Headquarters visit the RRCs and NRCs quarterly and submit summary reports to the office of the Deputy Director.⁸ The quality of these reports is variable and the focus is more on monitoring quantitative targets and budget expenditures than on evaluation. These monitoring reports however are very useful for management to track emerging

7. To be sure, attempts were made to get explanations for the substantial decline of bilateral contributions. Due to several staff turnovers in both the aid agencies, the reasons are not fully known.

8. External Programme Review of KARI, April 2003.

implementation issues and contributed to improved financial management and control. Recognizing this lacuna, KARI has subjected itself to independent External Programme Reviews (EPR) in 2003 and 2007 with a mandate to evaluate KARI's institutions and the entire research cycle from design to dissemination. The 2007 EPR was in progress at the time of the Assessment Mission. There are also specific subject and project-related reviews such as the evaluations of the ARF (2001 and 2002) and ATIRI (2006), the Bank's Mid-Term Review (2000) and other aid agency sponsored reviews. While these reviews and evaluations generate valuable findings and lessons, the absence of an institution-based M&E System remains a significant gap in the institutional development of KARI. A key weakness is the absence of baseline data to monitor the impact of technologies and crop yields. To address this concern, the FY2004 IDA-assisted KAPP inter alia has a provision for the establishment of an M&E System. KARI management fully recognizes the need for formulating a credible M&E System and providing the trained staff to implement the system. Toward this end, KAPP's assistance is one more opportunity for KARI to design, implement and utilize an M&E System.

4. Performance Ratings

4.1 The Staff Appraisal Report in Annex 6 has a series of qualitative and quantitative Key Performance Indicators labeled as "output, outcome and impact" indicators. However a scrutiny of the indicators reveals that they are mainly output indicators. To monitor and evaluate the outcome and impact of agricultural research projects, targets for crop yields or farm income attributed to the adoption of technologies generated under the project should have been specifically established. These targets were not specified in the Key Performance Indicators nor monitored during implementation. In the absence of such indicators, the Assessment is based on development objectives with intermediate outcomes. Available internal and external evaluations and the Mission's findings are the bases for assessing the achievement of the Project's development objectives.

Project Outcome

4.2 The project's overall Project *Outcome* is rated moderately satisfactory. The rating reflects the substantial rating for relevance and modest rating for efficacy of the project development objectives. Since objective (i) is closer to an outcome than objective (ii), after two national research projects, substantial weight is given to objective (i), including the dissemination aspect. The ICR had qualified its satisfactory outcome rating by noting in the text that considering the failure of dissemination the overall outcome is marginally satisfactory, a rating scale that was not available at the time. Table 4 Summarizes the Outcome ratings.

Table 4. Summary of Outcome Ratings

| Development Objectives | Relevance | Efficacy | Efficiency |
|---|------------------|-----------------|-------------------|
| i) Technologies to raise agricultural productivity developed and disseminated | Substantial | Modest | NA |
| ii) Enhance Institutional Capacity | Substantial | Substantial | NA |
| Overall Project Outcome: Moderately Satisfactory | | | |

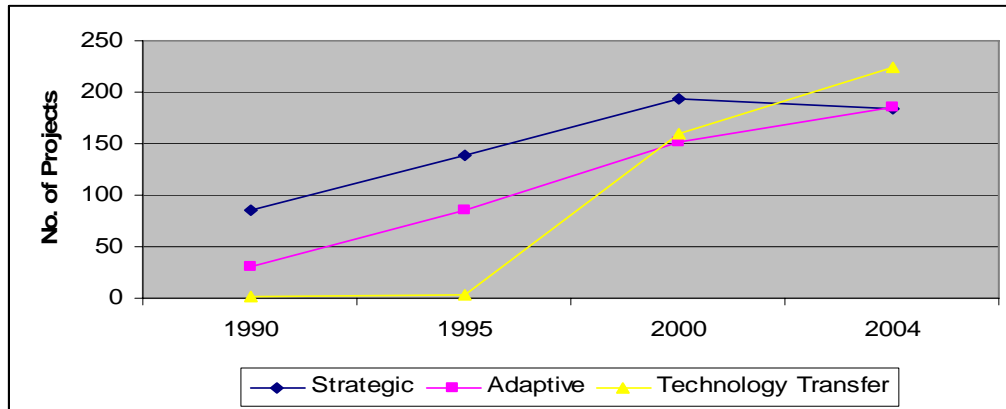
Relevance of the Project Objectives and Design

4.3 The project's development objectives are relevant to GOK's Poverty Reduction Strategy (2000), the Strategy for Revitalizing Agriculture (2004), and the Economic Recovery Strategy for Wealth and Employment (2003), and the Bank's Country Assistance Strategy (2004). A common element in all these strategy documents is the call for improving Kenya's agricultural productivity as a principal instrument for reducing rural poverty and promoting food security. Similarly, the design of the project was appropriate and relevant to meet the project development objectives. NARP-Phase II was designed to shift the agricultural research agenda toward adaptive research with a view to responding to national development priorities and farmers' production constraints. Towards this end, KARI has made substantial progress in focusing its research agenda on quick impact-producing technologies. Farmers' agricultural productivity constraints and national development priorities are driving agricultural research priorities. The Project's institutional development objective and design were also appropriate and relevant to the GOK's attempt and the Bank's strategy to enhance public sector efficiency. The overall relevance of project objectives and design is rated **Substantial**.

Efficacy

4.4 **Efficacy of Project Development Objectives is rated Modest.** The two-pronged development objectives are interlinked. To develop technologies aimed at addressing the farmers' productivity constraints and to facilitate their dissemination requires an institutional capacity equipped with skilled staff, an appropriate organizational setup, systems and procedures. Toward this end, the Project has made substantial contributions to the development of agricultural technologies but failed in showing its impact on productivity increases. The latter is attributed solely to the failure of the assumed institutional arrangement for agricultural extension and lack of complementary inputs.

KARI has responded successfully to demands for new technologies suitable to Kenya's agro-ecological zones but the project's dissemination and increased productivity objectives were not achieved and is rated Modest: KARI conducted three types of agricultural research—Strategic, Adaptive and Technology Transfer. Both adaptive and technology transfer research projects increased significantly since 1995. Figure 4 presents the trend in the type of research projects.

Figure 4. KARI Research by Type

4.5 In response to most farmers' productivity constraints, 76 per cent of KARI's research agenda focused on crops and animal production. In the 2005 "Inventory of Technologies", KARI documented 754 research outputs dating back to 1960. The distribution of KARI Innovations by Category is summarized in Table 5. During 1996-2003, the implementation period of NARP-Phase II, KARI issued 136 technologies covering crops, livestock, biotechnology, and soil and water resource management.

Table 5. KARI Innovations by Research Category

| Research Category | Number in Category | Percent of Total |
|------------------------------------|--------------------|------------------|
| Energy on the farm | 2 | 0.3 |
| Environment management | 3 | 0.4 |
| Institutional | 7 | 0.9 |
| Biotechnology | 16 | 2.1 |
| Post harvest | 22 | 2.9 |
| Livestock health | 41 | 5.4 |
| Soil and water resource management | 54 | 7.2 |
| Animal production | 94 | 12.5 |
| Commodity | 479 | 63.5 |
| Total | 754 | 100 |

Source: KARI, "Inventory of Technologies Developed by KARI up to 2005".

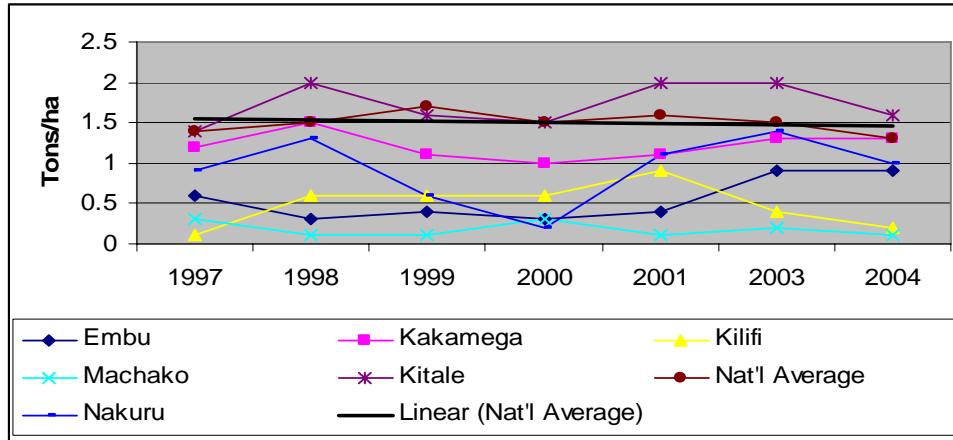
4.6 As the ICR correctly pointed out, the numerous research projects conducted in the NRCs and RRCs are commodity specific—maize, cassava, wheat, sorghum, livestock, potato—paying limited attention to farming as a system to take into account the interaction of other activities with the selected commodity-specific research topic. A notable example is the link between crop and livestock production and the overarching issue of natural resource management. Such a research strategy could result in optimum farm management practices. However, two common issues are often cited as to why research project proposals are often singular rather than multi-dimensional. First, due to the shortage of research scientists, the fact-finding team developing a research proposal based on feedback from farmers is not

multi-disciplinary but a specialist in crop, animal production or soils. As a result, the research is narrowed to address a single production constraint. Second, the paucity of research resources acts as a disincentive for a comprehensive multi-faceted research proposal. KARI recognizes the sub-optimality of such a research approach and efforts are being made in the CRACs to address such design shortcomings.

4.7 With respect to the dissemination of new technologies, the collapse of the T&V System was a major setback for KARI. The project design correctly linked the delivery of extension services to the then ongoing sector-wide T&V system. Troubles in the T&V system were deepening during the early years of NARP Phase II. However, the decision to seek an alternative delivery mechanism was made in 2000 during the Project's Mid-Term Review. KARI conceived the concept, which was launched as a pilot operation to serve not only as an extension service but also to promote farmers' participation in the identification and formulation of adaptive research topics. ATIRI soon became a success story especially in tapping CBOs as a channel for community participation in all phases of the adaptive research work. A notable feature of ATIRI is the active participation of women as leaders of the CBOs.

4.8 In 2003, KARI issued the "Beneficiary Assessment Study Report" prepared by a group of consultants, on the performance and impact of 13 technologies released under NARP-Phase II and ATIRI. The Report's main conclusions are that, "...there has been some successful adoption of the technologies, although coverage beyond centers is somewhat limited, ATIRI is showing promising results". KARI Kitale has released hybrid Maize seed -H614 for the high potential areas of Western Kenya and North Rift Valley. The Study found out that the awareness rate is about 57 per cent, and 47 per cent have adopted the variety. However, the adoption rate is higher in areas closer to the Kitale RRC compared to areas further away from the Center. This is partly due to KARI's proactive dissemination effort using its on farm trials and the Farmers' Field Schools. For all the surveyed districts, the awareness rates of newly released technologies vary from 15-60 percent and the adoption rates also fall in the range of 32-56 per cent.⁹ Despite KARI's commendable effort to disseminate the technologies developed, maize yields remain low relative to their potential. Figure 4 presents maize yields for selected districts representing high potential and dry areas and the national average. Maize yields in the high potential Districts of Kakamega and Kitale are nearly double those of the predominantly dry areas of Kenya—Machakos and Embu. However, average maize yields (and current cereal yields more broadly) have remained stagnant since about 1997.

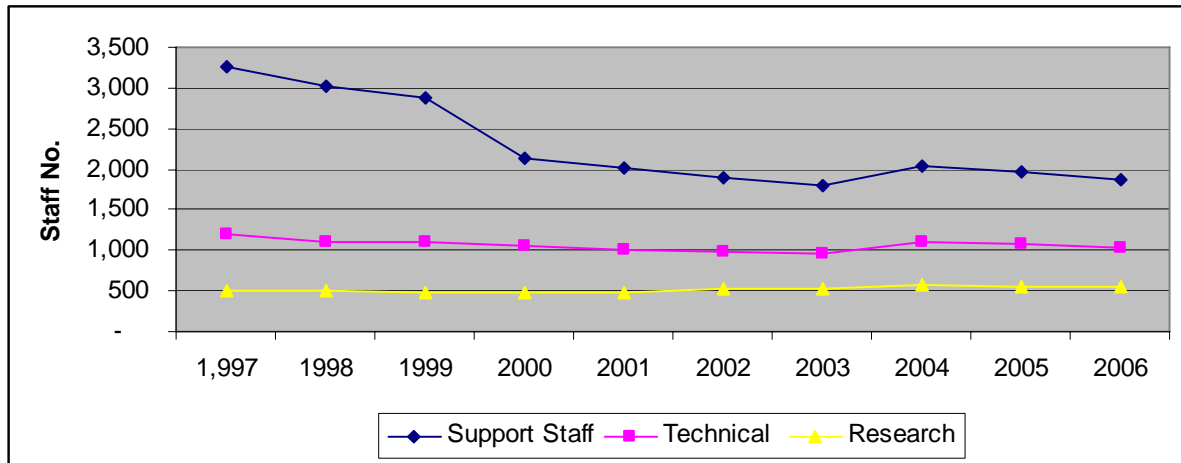
9. KARI, 2003, "Beneficiary Assessment Study Report".

Figure 5. Maize Yields for Selected Districts and National Average

4.9 Research projects financed under the ARF have also produced good results on farmers' fields. Productivity gains attributed to ARF released technologies range from 30 per cent for cow's milk production to 74 per cent for sweet potatoes.¹⁰

4.10 *KARI is the leading technology generation institution for Kenyan agriculture.* The investment in KARI since NARP-I which continued under NARP Phase II along with substantial support from various aid agencies and international research organizations, has resulted in a significant boost to the overall capacity of KARI. KARI is a highly respected and recognized agricultural research institution in Africa. Its in-house scientific strength, the relevance of its research which is aligned to national development priorities and sector strategies, and the various initiatives to link its research with dissemination testify to its overall success. KARI prides itself having 113-strong PhDs, doubling the target increase under the project. It has also reduced its support staff significantly from about 3,250 in 1997 to 1,870 in 2006. The current ratio of research (including technical support) staff to administrative staff is about 1:1.2 which compares favorably with similar research organizations. One reason for the increase in the number of Research Centers is that in 2004/2005, KARI inherited two Centers—TRC and the Kenya Veterinary Vaccine Production Center. The evolution of KARI staffing is presented in Figure 5.

10. Odhiambo, M. and Martimi, H., "Appraisal of the ARF as a Funding Mechanism and Impact Assessment of ARF Projects." September 2002.

Figure 6. KARI Staff Composition

4.11 KARI has also enhanced its collaboration with regional and global research organizations. CGIAR Regional Offices (CIMMYT, ILRI, ICRAF, ICRISAT, ICIPE), and the Association for Strengthening Agricultural Research in Eastern and Central Africa (ASARECA), a Regional Organization comprising nine Agricultural Research Institutes in nine countries in neighboring regions, are KARI's leading partners as well as national research organizations in Tanzania and Uganda. KARI Katumani has developed "low inputs drought tolerant maize crop varieties" suitable for semi-arid areas. With funding from ASARECA, KARI Katumani in collaboration with ICRISAT and other national and regional organizations has also launched research on adapting to climate change based on providing access to climate information to farmers and monitoring their farming decisions.¹¹ The Mtwapa RRC located on the coast has an ongoing collaboration with the Tanga Research Center in Tanzania, located across the Kenyan border. They exchange research findings on crops—maize, cassava and vegetables-- that grow on both sides of the border. KARI has also increased its outsourcing of research projects e.g. barley breeding, cashew nuts, chemical testing, soil analytical surveys, etc. The total value of outsourced research has increased from KSh 0.6 million in 1996/97 to KSh 10.4 million in 2005-06.

4.12 KARI Headquarters, NRCs and RRCs have expanded their Library services with scientific books, journals and research publications. These facilities have become the research and reference centers for agricultural research scientists as well as academics.

4.13 KARI has also made substantial progress in streamlining its financial management and control system. It has developed a strong capacity in project management, and financial management, control and reporting. In recognition of KARI's in-house capacity, KARI is responsible for the financial management of the ongoing IDA-assisted Kenya Agricultural Productivity Project and overall project implementation responsibility for the GEF-assisted Western Kenya Integrated Ecosystem Management Project.

4.14 KARI has adopted various measures to improve the efficiency of conducting agricultural research. The Research Project Cycle ensures the selection of high priority and

11. KARI Katumani, 2006, "Annual Report 2006".

results-oriented research proposals. Partnering with local and external research organizations and the use of competitive grants are contributing to KARI's resource utilization efficiency. KARI has responded successfully to agricultural productivity constraints through the development of new technologies, seed varieties, animal husbandry practices, and soil management techniques. However, the return from the adoption of these recommendations is contingent on factors beyond the control of a research institute. A recent study¹² on the determinants of adoption of new maize varieties in Kenya has shown that the leading explanatory variables are: access to credit, quantity of fertilizer applied at planting and contacts with extension. With the introduction of ATIRI, KARI has closed the dissemination gap, albeit limited in scale. Improving access to credit which also determines fertilizer application is a sectoral issue on which KARI has little influence. Nevertheless, the adoption rate of new seed varieties has surpassed the expected rates in the Bank's Staff Appraisal Report while the incremental yields attained are significantly lower than projected¹³.

4.15 While there are areas for improvement, the Project has successfully strengthened the scientific and management capacities of KARI. **The efficacy of the project's overall institutional objective is rated high.**

Efficiency

The efficiency of the project's development objectives have not been rated due to lack of data. The various evaluations conducted by external evaluators point to the overall satisfactory performance in trial farms of the technologies generated by KARI and the improvements in overall research management and efficiency. However, between 1996-1998 and 2004-2006, the average national maize yield increased by a mere 12 per cent. With such modest yield increases coupled with limited adoption of improved farm practices, the return to investments in maize research would be marginal. However, the successful implementation of the ongoing agricultural productivity program could be expected to boost the future adoption of the available agricultural technologies from KARI that would improve crop yields.

Risk to Development Outcomes

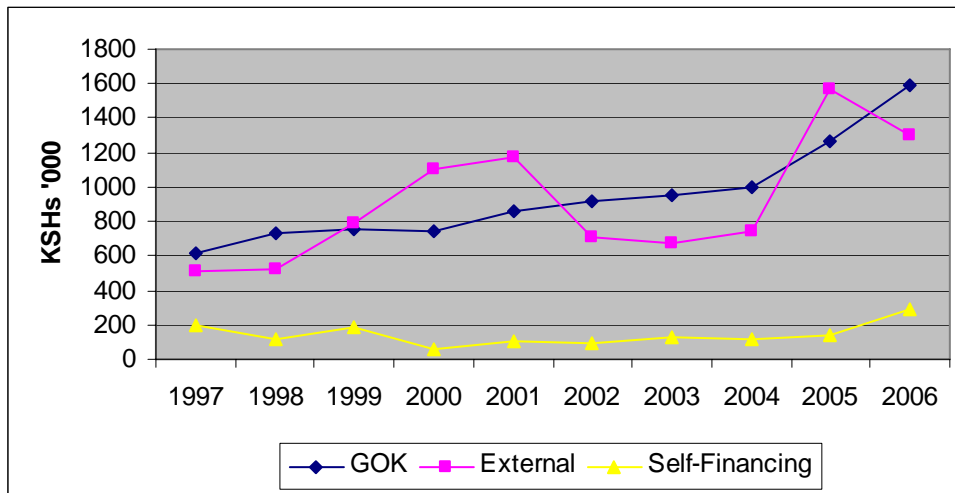
4.16 KARI's agricultural research network, including its growing collaboration with international and regional research institutes and the Government's firm commitment to increasing agricultural productivity, would ensure the growing realization of all the project's development outcomes. KARI's greatest challenge is to broaden its resource base to ease its heavy reliance on external assistance. The average share of GOK in the total budget of KARI is about 48 per cent compared to 42 per cent projected at the end of NARP-Phase II.

12. Determinants of Improved Maize Seed and Fertilizer use In Kenya: Policy Implications", James O Ouma, Hugo De Groote, George Owuor, *Kenya Agricultural Research Institute, Embu International maize and Wheat improvement Centre (CIMMYT), Nairobi, Kenya Egerton University, Njoro, Kenya*

13. World Bank Staff Appraisal Report "National Agricultural Research Project-Phase II, 1996.

Notwithstanding the increasing trend in GOK budget allocation, KARI is urging MOA and MOF to accelerate the timing and actual release of approved budgets. Budgets are generally released toward mid to end of the budget Quarter and the average actual release is about 85 per cent of the approved budget. Actual budgets which are often lower than approved budgets and are released late affect the planning and implementation of KARI's annual work program. Figure 6 presents KARI's Budget Sources.

Figure 7. KARI Budget Sources



4.17 KARI has launched various initiatives including cost recovery for its services, co-financing with other research institutes, and improving its financial management and control to improve cost effectiveness. To boost these initiatives, KARI needs to develop policies and action plan that will generate revenues. The ongoing IDA-assisted Kenya Agricultural Productivity Project (Phase I of the Kenya Agricultural Productivity Program) continues to deepen the reform in “generation, dissemination and adoption of agricultural technology.” Specifically, the Project is supporting the establishment of a National Agricultural Research System (NARS) with a view to promoting a “pluralistic research system, with continued support for reform of KARI.” In recognition of KARI's central role in the Project and its competence in project implementation, the KAPP Secretariat is located in KARI Headquarters. Early indications point to satisfactory progress and assure the continued support to KARI. Such interventions minimize the risk to NARP-Phase II development outcomes.

4.18 In 2004, the GOK introduced annual Performance Contracts for all public sector institutions to monitor and evaluate their contracted deliveries. KARI signs its performance contracts with the MOA. In early 2007, the Performance Contract Steering Committee in the Office of the President selected MOA for “best performance and service delivery.” Among the constituents of MOA, KARI was recognized as one of the leading best performing organizations. Thanks to the long-term investment in institutional capacity strengthening, KARI is indeed a success story. Based on the risk assessments, the overall **Risk to Development Outcomes is rated moderate.**

Bank Performance

4.19 The Bank's Performance in assisting the Government in the design of the project is rated satisfactory. As a sequel to the first NARP, the focus of NARP-Phase II was on adaptive research and continued support for improving its institutional capacity. In particular, rationalizing the staff skill-mix, improving the planning and implementation of research programs, and improving the financial management and control system were the appropriate areas for Bank support. The Project also addressed issues in the seed sector which required reforms and a supply response to meet the growing demand for improved seeds, a key constraint to higher yields. In all these areas, the Bank Team assisted the GOK and used its convening power to mobilize the support of other aid agencies to collaborate in assisting the GOK in agricultural research. One area the Bank could have performed better was in the formulation of the Project's Development Objectives and the selection of related Performance Indicators. This issue was discussed above in Section 2 under Project Objectives and Design. Lack of clear articulation of development objectives is appearing as a generic issue which should be addressed at the time of Project Concept Note (PCN) and requires management's close scrutiny. A related issue is the Bank's silence in flagging the imminent collapse of the extension service as one of the project risks.

The Bank's supervision performance is rated moderately satisfactory. The Bank played a critical role in supervising a project and providing timely and effective assistance to the implementation of the project during a very challenging period in Kenya's economic management and performance. Bank Supervision consumed an average of US\$130,000 per annum during the life of the project. This level of spending on supervision is nearly double the current Bank-wide average allocation for supervision.¹⁴ Notwithstanding the high cost of supervision and the appropriate skill balance, the Bank's supervision performance is mixed. The mission findings and recommendations were largely process oriented rather than the technical review of the implementation progress. Even the rating of the Project Implementation Status did not always reflect performance rating of the key components. Shortly after the project was declared effective in June 1997, availability and timeliness of counterpart funding¹⁵, and monitoring and evaluation were rated as unsatisfactory. The unsatisfactory ratings continued until the MTR in November 2000. Despite the lack of counterpart funds and the inaction on M&E, the overall project implementation status was rated satisfactory for nearly two years. In 2000, it was clear that the Project was significantly behind schedule and the MTR correctly recommended project restructuring including the introduction of ATIRI. During 1999 and 2000, NARP-Phase II was the only ongoing Bank-assisted operation in the agriculture sector and the Bank Team argued for an extension of the Credit Closing Date both on project grounds and to continue engaged in the agricultural sector. The Bank could have been more proactive in advancing the MTR since there were clear signs that the project was facing serious issues especially in meeting its "dissemination

14. The total lending completion cost of NARP-Phase II is US\$1.5 million. For the period FY00-04, Bank-wide average lending completion costs were US\$0.6 million and US\$0.7 million for the Africa Region.

15. The Assessment Mission also notes that it is common practice for the Regional and National Research Centers to receive their Quarterly approved budgets late in the Quarters.

objective” after the collapse of the T&V system and closure of the IDA-assisted Second National Agricultural Extension Project in 1998. In rating the Bank’s overall performance substantial weight is given to the Bank’s role in the design of the institutional enhancement and in prioritizing the agricultural research agenda in this second project. **Overall, the Bank performance is rated moderately satisfactory.**

Borrower Performance

4.20 In February 1996, the Ministry of Finance (MOF) on behalf of the Borrower submitted to the Bank a far reaching Letter of Sectoral Policy (LSP). The LSP outlined the Government’s strategy to address “the sector’s main constraint” and the critical role of new technologies and dissemination to farmers. MOF further indicated that the LSP would be used to prepare both NARP-Phase II and the Agricultural Sector Investment Project (ASIP). The latter reached only the Negotiations stage and was later dropped. The GOK had anticipated the economy to grow at an average of 7 per cent annually between 1996 and 2000 based on 4.4 per cent per annum growth of agriculture during the same period. Neither the GDP nor the agricultural GDP projected growth rates were attained. Adoption of new technologies was expected to contribute significantly to the projected growth of agriculture. The LSP also committed the GOK to a series of policy reforms and specific measures to promote the efficient development of KARI. Overall, the Borrower’s performance in implementing the agenda described in the LSP is mixed. The institutional restructuring of the agriculture sector-related ministries remains a work in progress. There are still six Ministries dealing with the sector, 32 regulatory and commercial parastatals, and 101 pieces of legislations governing production and marketing of agriculture products.

4.21 GOK remains a key player in the maize market absorbing nearly 50 per cent of the marketable surplus at artificial prices significantly higher than import parity prices to protect the domestic maize market. GOK is also intervening marginally in fertilizer imports. With respect to the reforms in the Seed Industry, GOK has taken steps to promote private sector participation and a revised National Seed Policy which is currently with the Cabinet for approval. To alleviate KARI’s budgetary limitations, the GOK had also undertaken to increase the annual recurrent budget by 10 per cent, streamline the flow of resources with a view to improving the timelines of the quarterly budget releases. Actions on the budget front are also mixed. Lack of adequate counterpart funds was responsible for the slow start-up of the project which necessitated an 18-month extension of the Credit Closing Date. Notwithstanding the shortfalls cited above, GOK is committed to KARI as the country’s flagship agricultural research institution. **On balance, the Government’s performance is rated moderately satisfactory.**

4.22 KARI is the principal player in the assessment of Implementing Agency’s Performance. **KARI’s performance is rated Satisfactory.** The ATIRI concept is KARI’s own approach which ensured KARI’s commitment to disseminating new technologies to farmers. Without ATIRI, the link between research and farmers (for the formulation of adaptive research topics and extension) would have remained suspended after the collapse of the T&V system. KARI is also credited for opening its scientific work and institutional performance to external evaluators. This is a strong signal of maturity and self-confidence.

To be sure, KARI has selectively implemented the recommendations made by the external evaluators. Recognizing the enormous amount of time KARI management devotes to outside evaluations and scrutiny, the 2003 External Review Panel called on aid agencies to coordinate their review of KARI performance to avoid duplications.

4.23 The weakest areas of KARI were the monitoring and evaluation system and mainstreaming socio-economics in formulating research proposals. During implementation, attempts to establish a KARI-wide M&E System were not successful and instead a system for quarterly progress reporting was adopted and was functional. With respect to evaluation, KARI relied on external evaluations. The ongoing IDA-assisted Kenya Agricultural Productivity Project is supporting KARI to establish an M&E System. With respect to socio-economics, several actions were taken to assign trained economists to all the Research Centers to conduct impact assessment. However, an ex-ante economic analysis of adaptive research proposals is not widely practiced. Equally critical is the need to demonstrate with sensitivity analysis the implication of varying agronomic practices and input applications on expected crop yields. **The overall performance of the Borrower is moderately satisfactory.**

5. Lessons

5.1 Lessons emerging from the implementation of NARP-Phase II also reflect the cumulative impact of NARP Phase I. The two-phase capacity building of KARI is an exemplary long-term engagement for the Bank and GOK's Development partners. KARI has an ample stock of adaptable agricultural technologies—seed varieties, crop and animal husbandry practices, and soil and land management techniques. This build-up is a result of strong external support for adaptive research. The immediate challenge is to maximize the benefits from existing technologies. Competition for public sector resources are growing and continued reliance on external assistance is equally risky. In allocating scarce budgetary resources, GOK should critically examine the relative returns from continued adaptive research and promoting the adoption of existing technologies. This does not suggest a major shift of resources from research to extension. Efforts are currently underway in Kenya to diversify research and extension service providers. As a premier agricultural research and technology network, KARI has the potential new heights with the ongoing support of the agricultural productivity program which will address the unfinished agenda in research and reboot the delivery of extension services. The following are the key lessons for both the GOK and Bank:

- i) **When the outcome of an operation is contingent upon a parallel program on which the project has minimal influence, the risk mitigating measures should be identified at appraisal:** NARP Phase II was designed with the assumption that the national agricultural extension service would be the principal channel for disseminating the technologies generated by KARI. The T& V System was collapsing and KARI had no control on the organization, management and performance of the extension service. Under the circumstances, both the Borrower and the Bank should have allowed for a contingency plan as part of the design of the

project. This was absent and it was only at Mid-Term Review Stage that KARI had to establish a new mechanism to disseminate its technology.

- ii) **Long term engagement and appropriate sequencing of external (Bank and other aid agencies) assistance and are critical to successful institutional capacity building.** Although KARI has a long history of scientific research, the sequencing of external support starting with the establishment of key organizational and physical infrastructure (NARP Phase I) was appropriate. These measures were followed by substantial support for results-oriented organizational efficiency measures and streamlining structures; aligning research with national and sectoral strategies aimed at addressing farmers' productivity constraints; and attaining a balanced skill mix (NARP Phase II). This journey continues under the ongoing IDA-assisted KAPP.
- iii) **Establishing partnerships with research organizations and allowing independent external evaluation of research institutions' operations, management and performance enhance institutional maturity.** This is the hallmark of KARI. Other research organizations value KARI's scientific knowledge and reciprocally, KARI seeks partnership to fill in-house knowledge gaps. KARI has benefited immensely from independent external evaluations. This reflects an openness to new ideas that is important for institutional development.
- iv) **Adopting a pluralistic approach for the delivery of agricultural services requires the parallel placement of complementary input and service delivery institutions.** Care should be taken in assuming the readiness of new service providers. Lessons from the reforms of the 1980s teach us that due to incomplete policy reforms and market failures, 'the expected service and input providers' may equally fail to step-in or delay their full integration in the 'pluralistic market' and create delivery gaps. A case in point is the failure of the national parallel T&V system which was critical for the dissemination of KARI's new agricultural technologies. A good lesson is KARI's gradual withdrawal from a number of commercial commodity research areas which are handled by growers' associations whose members were strongly supporting the transfer of responsibility.

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Annex A. Basic Data Sheet

SECOND NATIONAL AGRICULTURAL RESEARCH PROJECT (CREDIT 2935-KE)

Key Project Data (amounts in US\$ million)

| | <i>Appraisal estimate</i> | <i>Actual or current estimate</i> | <i>Actual as % of appraisal estimate</i> |
|--------------------|---------------------------|-----------------------------------|--|
| IDA Loan | 39.7 | 36.70 | 92.4 |
| Cofinancing | 74.7 | 24.7 | 33.1 |
| Government | 70.4 | 77.3 | 109.8 |
| Total project cost | 184.8 | 138.7 | 75.0 |

Cumulative Estimated and Actual Disbursements (US\$ million)

| | FY97 | FY98 | FY99 | FY00 | FY01 | FY02 | FY03 | FY04 | FY05 |
|-------------------------|------|------|------|------|------|------|------|------|------|
| Appraisal estimate | 0.5 | 2.9 | 7.4 | 12.1 | 18.4 | 26.3 | 32.7 | 39.0 | 39.7 |
| Actual | 0.99 | 4.5 | 8.8 | 16.8 | 22.5 | 28.0 | 33.2 | 36.5 | 36.5 |
| Actual as % of estimate | 198 | 155 | 118 | 139 | 122 | 106 | 102 | 94 | 92 |

Project Dates

| | <i>Original</i> | <i>Actual</i> |
|-----------------|-----------------|---------------|
| Appraisal | | 02/03/1995 |
| Board approval | | 01/28/1997 |
| Effectiveness | 05/26/1997 | 06/06/1997 |
| Mid-Term Review | 03/01/1998 | 05/01/2000 |
| Closing date | 06/30/2002 | 12/31/2003 |

Staff Inputs (staff weeks)

| | <i>Actual/Latest Estimate</i> | |
|----------------------------|-------------------------------|-----------------------|
| | <i>N° Staff weeks</i> | <i>US\$US\$('000)</i> |
| Identification/Preparation | 100 | 383 |
| Appraisal/Negotiation | 82 | 257 |
| Supervision | 197 | 797 |
| Completion | 4 | 75 |
| Total | 383 | 1509 |

Mission Data

| | Date (month/year) | No. of persons | Specializations represented | Performance rating | |
|--------------------------------|----------------------|-------------------|--|--------------------------|---------------------------|
| | | | | Implementation status | Development objectives |
| Identification/ Preparation | 09/12/1994 | | | | |
| Appraisal / Negotiation | 02/03/1995 | | | | |
| Supervision 1 | 04/18/1998 | 8 | Team Leader, Disbursement; Agricultural Policy, Seeds, Procurement Specialist, Agriculturalist, Extension Specialist, Financial Management Economist | S | S |
| Supervision 2 | 07/24/1997 | 4 | Procurement Specialist, Agriculturalist, Research/Extension Linkage, Agricultural Economist | S | S |
| Supervision 3 | 02/26/1998 | 7 | Agriculturalist, Principal Agriculturalist, Sr. Extension Specialist, Sr. Financial Management Specialist, Disbursement Specialist, Procurement Specialist | S | S |
| Supervision 4 | 07/24/1998 | 7 | Sr. Agriculturalist, Principal Agriculturalist, Sr. Financial Management Specialist, Extension Specialist, Procurement Specialist, Financial Management Specialist, Disbursement Specialist | S | S |
| Supervision 5 | 04/16/1999 | 5 | Agriculturalist (2), Economist, Financial Management | U | S |
| Supervision 6 | 04/16/1999 | 3 | Sr. Agriculturalist, Sr. Operations Officer, Sr. Financial Management Specialist | S | S |
| Supervision 7 | 06/16/2001 | 9 | Agriculturalist, Irrigation Engineer, Irrigation Specialist, Economist, Financial Management (2), Disbursement Officer, Consultant (FAO), Consultant | S | S |
| ICR | 09/15/2003 | 3 | Ag. Economist, Financial Management Specialist, Research Agronomist | S | S |

Performance Rating: S: Satisfactory

Project Dates

| | Original | Actual |
|-----------------|------------|------------|
| Appraisal | | 02/03/1995 |
| Board approval | | 01/28/1997 |
| Effectiveness | 05/26/1997 | 06/06/1997 |
| Mid-Term Review | 03/01/1998 | 05/01/2000 |
| Closing date | 06/30/2002 | 12/31/2003 |

Staff Inputs (staff weeks)

| | <i>Actual/Latest Estimate</i> | |
|----------------------------|-------------------------------|-----------------------|
| | <i>N° Staff weeks</i> | <i>US\$US\$('000)</i> |
| Identification/Preparation | 100 | 383 |
| Appraisal/Negotiation | 82 | 257 |
| Supervision | 197 | 797 |
| Completion | 4 | 75 |
| Total | 383 | 1509 |

Mission Data

| | <i>Date</i> (month/year) | <i>No. of</i> <i>persons</i> | <i>Specializations represented</i> | <i>Performance rating</i> | |
|--------------------------------|-----------------------------|---------------------------------|--|---------------------------|---------------------------|
| | | | | Implementation status | Development objectives |
| Identification/ Preparation | 09/12/1994 | | | | |
| Appraisal / Negotiation | 02/03/1995 | | | | |
| Supervision 1 | 04/18/1998 | 8 | Team Leader, Disbursement; Agricultural Policy, Seeds, Procurement Specialist, Agriculturalist, Extension Specialist, Financial Management Economist | S | S |
| Supervision 2 | 07/24/1997 | 4 | Procurement Specialist, Agriculturalist, Research/Extension Linkage, Agricultural Economist | S | S |
| Supervision 3 | 02/26/1998 | 7 | Agriculturalist, Principal Agriculturalist, Sr. Extension Specialist, Sr. Financial Management Specialist, Disbursement Specialist, Procurement Specialist | S | S |
| Supervision 4 | 07/24/1998 | 7 | Sr. Agriculturalist, Principal Agriculturalist, Sr. Financial Management Specialist, Extension Specialist, Procurement Specialist, Financial Management Specialist, Disbursement Specialist | S | S |
| Supervision 5 | 04/16/1999 | 5 | Agriculturalist (2), Economist, Financial Management | U | S |
| Supervision 6 | 04/16/1999 | 3 | Sr. Agriculturalist, Sr. Operations Officer, Sr. Financial Management Specialist | S | S |
| Supervision7 | 06/16/2001 | 9 | Agriculturalist, Irrigation Engineer, Irrigation Specialist, Economist, Financial Management (2), Disbursement Officer, Consultant (FAO), Consultant | S | S |
| ICR | 09/15/2003 | 3 | Ag. Economist, Financial Management Specialist, Research Agronomist | S | S |

Performance Rating: S: Satisfactory

Annex B: People and Agencies met

1. Dr. Romano Kiome Principal Secretary, Ministry of Agriculture
2. Dr. Ephraim Mukisiri, Director, KARI
3. Dr. George Murithi , Assistant Director, KARI
4. Dr. C.W. Kariuki, Director, KARI Katumani Regional Research Center
5. Dr. Charles Waturu Nderito, Director, National Horticultural Research Center, Thika.
6. Ms. , Director, KARI Mtwapa Regional Research Center.
7. Mr. George M. Karanja, National Coordinator, ATIRI, KARI.
8. Ms. Mary Kamau, Deputy Director, Agricultural Extension, MOA
9. Mr. Obongo Nyachae, Director, Seed Traders Association of Kenya
10. Dr. Castro P. Camarada, FAO Representative
11. Dr. Abate, Agronomist, FAO
12. Mr. Benjamin Songomo, CEO, Horticultural Development Authority
13. Mr. Ratemo, USAID
14. Mr. Pharesh Ratego, Project Management Specialist, USAID
15. Ms. Beth Mwangi, Managing Director, IDEAL Business Link Ltd.
16. Mr. Kees Van Baar, Deputy Head of Mission, Netherlands Embassy
17. Mr. Kanywithia Mutunga, CEO, Kenya National Federation of Agricultural Producers
18. Mr. Colin Bruce, Country Director, Kenya Country Office WB
19. Ms. Christine Cornelius, Program Coordinator, Kenya Country Office, WB
20. Mr. Andrew Karanja, Agricultural Economist, Kenya Country Office, WB
21. Ms. Karen Brooks, Sector Manager, Sustainable Development, Africa Region,
22. Mr. Berhane Manna, Sr. Agriculturalist, Sustainable Development, Africa Region, WB
23. Mr. David Nielsen, Sr. Economist, Sustainable Development, Africa Region, WB
24. Mr. Moctar Toure, Former TTL of NARP Phase II.

