

IEG

ICR Review

Independent Evaluation Group

1. Project Data:		Date Posted : 03/22/2011	
PROJ ID : P059127		Appraisal	Actual
Project Name : Agric.Res & Trng. II	Project Costs (US\$M):	84.0	85.7
Country: Uganda	Loan/Credit (US\$M):	38.0	39.7
Sector Board : ARD	Cofinancing (US\$M):	26.0	26.0
Sector(s):	Central government administration (60%) Agricultural extension and research (40%)		
Theme(s):	Other rural development (29% - P) Technology diffusion (29% - P) Other environment and natural resources management (28% - P) Participation and civic engagement (14% - S)		
L/C Number: C3204			
	Board Approval Date :		05/06/1999
Partners involved :	Closing Date :	12/31/2005	06/30/2009
Evaluator:	Panel Reviewer :	Group Manager :	Group:
Hassan Wally	Ridley Nelson	IEG ICR Review 1	IEGPS1

2. Project Objectives and Components:

a. Objectives:

Original:

According to the Project Appraisal Document (PAD) the development objective of the project was to : "increase the efficiency and productivity of the dominant crop, livestock, fisheries and forestry farming systems of Uganda; increase farm household income and improve family welfare; and enhance the management of natural resources for the protection of the environment (PAD, p. 2)."

According to the Development Credit Agreement (DCA) the objective of the project was to : "(i) support agricultural research and technology development and the transfer of technology and its dissemination to farmers with a view to increasing (a) the efficiency and productivity of the crop, livestock, fisheries and forestry production systems, and farm household incomes, and (b) the efficacy of natural resources management and environmental protection; (ii) strengthen the farmer-research-extension linkages and support the agricultural outreach program; (iii) promote the development, transfer and dissemination of superior technologies and farming practices; (iv) support the institutional and human resource development of the national agricultural research system; and (v) initiate the process of decentralizing research infrastructure and management ."

There are differences between the objectives stated in the DCA and the Project Appraisal Document (PAD). IEG uses the PDO as stated in the DCA where it is expressed more precisely in regards to the expected outcomes and target groups which makes the PDO more evaluable .

Revised:

The Project Paper on the Additional Financing Credit states the PDOs as : (a) the generation of new knowledge, strategies and technologies in support of the Plan for the Modernization of Agriculture (PMA); (b) the design and implementation of improved procedures and capacities for scaling -up the application of new technologies; and, (c) capacity building of the reformed National Agricultural Research System (NARS). These changes were not incorporated into the Development Credit Agreement . Since these PDOs are in fact a subset of the original PDOs, this ICR review will evaluate against the original PDOs as stated in the DCA .

Summary of Outcome/impact indicators:

- 20% adoption rate of new technologies by farmers in specific locations by mid-term and 50% by end of project;
- 15% increase in household income and improved welfare in specific locations by mid -term and 30% by end of project;
- 20% increase in environment-friendly technologies developed and promoted by NARO and 40% adopted by farmers by mid-term to end of project

b. Were the project objectives/key associated outcome targets revised during implementation?

Yes

If yes, did the Board approve the revised objectives /key associated outcome targets?

Yes

Date of Board Approval: 08/02/2007

c. Components (or Key Conditions in the case of DPLs, as appropriate):

Component 1. Technology Development and Adaptation (Appraisal Cost US\$ 10.0 million, Actual Cost US\$ 9.3 million). To support: (i) ongoing, adaptive and applied research which address specific problems of dominant production systems; (ii) strategic and adaptive research to respond to newly emerging problems including threats to terrestrial and aquatic bio-diversity; and, (iii) establishment of an Agricultural Research Development Fund (ARDF) to support a competitive research grants scheme (CGSs).

Component 2. Outreach, Extension and Technology Dissemination (Appraisal Cost US\$ 10.6 million, Actual Cost US\$8.4 million). To prioritize support for: (i) the dissemination and adoption of developed (on-the-shelf) technologies and management practices through partnerships with extension /advisory services providers and other stakeholders; (ii) demonstration of technologies in farmers' fields and promoting their adoption; and, (iii) establishing partnerships at a decentralized level, through the establishment and operation of eight Agricultural Research and Development Centers (ARDCs), to ensure stakeholder participation in priority setting, design and implementation of research .

Component 3. Institutional Development (Appraisal Cost US\$ 17.4 million, Actual Cost US\$ 22.0 million). To support the: (i) transformation of National Agricultural Research Organization (NARO) Public Agricultural Research Institutes (PARIs) and non-PARIs into research institutions that promote the transfer and adoption of improved technologies in line with the National Agricultural Research System (NARS) principles; (ii) updating of the National Agricultural Research Strategy and Plan of 1991; (iii) updating the NARS Strategy and Plan for 2007-2015 and also provide insights into research needs for the proposed follow -on project; (iv) strengthening of NARS capacity for ensuring quality and "value for money" outputs, including through economic and impact analysis of research results; (v) negotiating of basket funding mechanisms involving combined releases of funding provided by GoU and the development partners ; (vi) strengthening of NARS information systems for improved sharing, dissemination and retention of the institutional/historical data; and, (vii) provision of technical assistance to determine how to establish an Agricultural Research Trust Fund to support Competitive Grant Schemes (CGSs).

d. Comments on Project Cost, Financing, Borrower Contribution, and Dates:

The total cost of the project was US\$85.7 million compared to an appraisal estimate of US\$84.0 million. The borrower provided US\$20.0 million of counterpart funds and the project also received US\$ 26.0 million from other donors. The ICR (p. 19) noted that US dollar amounts for IDA exceeded appraisal amounts on account of depreciation/appreciation of US dollar against the SDR during the project period .

The project was restructured twice, first on April 17, 2003 following the Mid Term Review where adjustments were made to support NARS reform process and consequently in 2005 US\$4.0 million were reallocated to support this process, second on August 2, 2007 where additional financing of US\$12.0 million was approved for scale up and expansion to implement NARS reforms . At the first restructuring US\$9.64 million of the Credit had been disbursed, representing 24% of the total disbursements at Credit closure of US\$ 39.7 million and at the second restructuring US\$26.66 million of the Credit had been disbursed, representing 67% of the total disbursements at Credit closure of US\$39.7 million. The project closed 42 months later than the appraisal closing date, of which 18 months were to allow a longer time frame for establishing sustainable client-responsive agricultural research services, 5 months to

allow GoU access to funds pending the approval of additional financing, and 19 months to carry out activities under the additional credit.

3. Relevance of Objectives & Design:

Relevance of Objectives . (Substantial) The original project objective to increase agricultural productivity and farmers' incomes was strategically appropriate . The FY97 CAS emphasized accelerated agricultural growth as a key component of rural development . The project directly supported the CAS objectives that relate to agricultural intensification through technology development, dissemination and adoption as the base for agricultural growth and increasing incomes. Also, the project called for supporting agricultural research and technology development, and at the same time strengthening research-extension-farmer interlinking to better respond to farmer needs, all of which are fundamental to a productivity enhancement strategy . The project revised objectives are also consistent with GoU Plan for the Modernization of Agriculture (PMA) and the 2005 NARS Reform Act. The ICR (p. 5) notes that the project was endorsed by the Sectoral Committee on agriculture of the Parliament indicating wide support for the project . The project objectives remain relevant today especially that the FY 10 CAS calls, among other things, for increasing production and commercialization of agriculture in order to promote inclusive and sustainable economic growth .

Relevance of Design . (Modest). The overall project design was appropriate as a second intervention for supporting Uganda's National Agriculture Research Organization (NARO). The project features support for capacity building and institutional strengthening of NARO, strengthening research-extension-farmer linkages, and decentralizing decision making and increasing stakeholder involvement, all of which are appropriate activities for achieving the stated objectives. The project also benefitted from the experience of ARTP I and incorporated several lessons in the design of ARTP II.

A notable shortcoming in the design was the attempt to coordinate activities between research and extension institutions in the absence of a formalized incentive structure . The design could have been more specific and should have included measures to institutionalize and strengthen inter-agency cooperation . Also, the project scale and multiple activities were somewhat ambitious .

4. Achievement of Objectives (Efficacy):

Support agricultural research and technology development and the transfer of technology and its dissemination to farmers with a view to increasing (a) the efficiency and productivity of the crop, livestock, fisheries and forestry production systems, and farm household incomes, and (b) the efficacy of natural resources management and environmental protection . (Modest). Over the lifetime of the project (from 2000 to 2009), NARO generated 85 new varieties, of which 29% were cereals, 26% were tubers and 20% were fruit trees. Also, NARO released improved goat and poultry breeds as well as several technologies to treat animal diseases . By project completion about 59% of NARO's research outputs (technologies, knowledge and strategies) were disseminated by technology pathways in specific locations compared to an appraisal target of 60% and an initial dissemination rate of 13% (ICR, p. vii). The project also supported adaptive research where 5 Zonal Agriculture Research and Development Institutes (ZARDIs) collectively produced 178 outputs, tested 473 technologies and successfully adapted 51% of the tested technologies (ICR, p. 20). Also, the project supported 48 ZARDI level projects which were implemented in collaboration with partner institutions, including 7 local and 4 international NGOs, United Nations, Consultative Group on International Agriculture Research (CGIAR), 3 local government entities, and 5 local universities (ICR, p. 22). The ICR (p. 22) reported that by 2008 each ZARDI delivered at least 15 research outputs to several uptake pathways . In addition, the project supported NARO's strategic and adaptive research to respond to emerging problems, for example, NARO collaborated with FAO to implement a program to control Banana bacterial wilt in western Uganda which led to significant reduction in the incidence of the disease and also collaborated with the International Institute for Tropical Agriculture (IITA) to develop NARO's mosaic resistant cassava varieties -such varieties averted a famine in northern and eastern Uganda (ICR, p. 21). Currently, NARO is collaborating with IITA to address the outbreak of cassava brown streak disease in Uganda . The ICR (p. 11) reported that yield differences between NARO's modern crop varieties and traditional ones was statistically significant . Also, according to the ICR (p. 10) by 2004/05 about 25% of rural households adopted improved crop varieties which resulted in significantly higher yields (when compared to similar households in the same agro-ecological zone that did not adopt these varieties), and this yield increase resulted in a 30% increase in crop incomes. The ICR (p. 8) stated that the project also supported research aimed at natural resource management by generating technologies that facilitated resource conservation and improved soil productivity (e.g. use of leguminous trees to promote soil and water conservation) . However, the ICR (p. 11) highlighted the absence of data to verify the current status of adoption rates as well as the areas of land cultivated with new varieties . Also, the ICR did not provide enough details -other than the borrower's comments, on the impact of the project activities on the productivity of livestock, fisheries and forestry production systems, and the efficacy of natural resources management and environmental protection . In addition, the ICR did not include recent figures that reflect the impact of the project on household incomes . In the absence of this information the efficacy of this PDO is rated Modest overall .

Strengthen the farmer -research-extension linkages and support the agricultural outreach program .(Modest).

According to the ICR (p. ix), 20 joint activities (100% of formally revised target) were implemented with Public Agricultural Research Institutes (PARI) and National Agricultural Advisory Services (NAADS). To support outreach, ZARDIs adopted different participatory approaches including Farmer Field Schools, institute open days, farmer competitions, partnerships, participatory market chain approaches and farming systems and livelihood analysis (ICR, p. 22). However, the ICR (p. 21) pointed out that in spite of several outreach mechanisms, NARO's strategy lacked an overarching theme and suffered from inadequate linkages and cooperation with the newly established NAADS . To improve outreach, Agriculture Research and Development Centers were upgraded to ZARDIs as part of NARS reforms (ICR, p. 22). In spite of such efforts, the proportion of farmers with significant uptake and adoption of research outputs was 25% for crops and 12% for livestock compared to PAD appraisal targets of 50 and 35% for crops and livestock, respectively (ICR, p. vii). The low adoption rates and weak linkages between NARO and NAADS reflect Modest efficacy of this PDO .

Promote the development, transfer and dissemination of superior technologies and farming practices . IEG

integrated the discussion of this PDO under the first PDO which calls among other things for supporting agricultural research and technology development and the transfer of technology and its dissemination to farmers .

Support the institutional and human resource development of the national agricultural research system .

(Substantial) . The project supported training and human capacity building activities . By project completion there were 7 Ph. D graduates compared to a target of 3, 4 M. Sc. graduates compared to a target of 3, and 17 short training sessions compared to a target of 7 . Also, research managers received training on corporate governance, financial management for non-financial managers, and fraud detection and prevention . The project provided US\$1.6 million for physical rehabilitation of various research facilities including office blocks, green houses, laboratories, library, guest house, conference halls and store facilities . The project also supported establishing 12 quality assurance guidelines as well as guidelines for participatory monitoring and evaluation (PME) and the NARS log frame was revised. The project supported training 76 PARI staff in M&E and 12 others in managing research for impact (ICR, p. 23). In addition, about 35 PARI and non-PARI staff were trained in impact assessment . BY 2009, NARO designed and implemented a successful plan for rationalizing the utilization of human and physical resources and a modern human resources development policy was established and approved by NARO council . Also, a 20% salary increase for all NARO staff members was approved by the government and implemented . NARO completed its revised ten year strategy and a five year implementation plan and based on these NARO developed the National Agriculture Research Project (NARP) which provide the basis for follow-on support programs (ICR, p. 25). By 2009, 100% of the key elements of (NARS) policy and legal reform was in place compared to 15% in 1999 (ICR, p. viii). With the project's support Uganda's National Research System (NARS) is now a member of the CGIAR and recently a full member of the African RICE center (WARDA) with NARO representing Uganda in both organizations .

Initiate the process of decentralizing research infrastructure and management . (Substantial)

. By project completion there were 8 zonal agricultural research and development institutes (100% of appraisal target) operational compared to only 2 in 1999. Decentralization was also strengthened by promoting Competitive Grant Schemes (CGSs) where by project completion 8 zones (appraisal target 7 zones) had operational CGSs compared to none at the beginning of the project . The ICR does not provide details on the technologies generated through CGSs . In addition, research institutes were rationalized according to zonal and national mandates where NARIs focused on strategic and basic research in crops, fisheries, forestry, livestock and semi -arid agricultural resources and the national laboratory service with a cross cutting mandate that covers soil, agricultural engineering, biosciences and information services; while ZARDIs focused on adaptive and applied research and reflect priorities in different agro-ecological zones (ICR, p. 24).

5. Efficiency (not applicable to DPLs):

There was no ERR estimated at appraisal and no aggregate ERR estimated in the ICR . The economic analysis in the ICR identified social benefits from research activities by examining the yield impact of using improved varieties of 3 major crops in Uganda: maize, cassava and beans in 9 agro-ecological zones. The analysis assumed a constant 10% annual rate of diffusion . For the baseline scenario, the ICR estimated a Net Present Value (NPV) of 128.2 Million (2000, US\$) and a Benefit/Cost Ratio of 6.2. The analysis also estimated impacts of improved varieties on net crop revenue and provided a sensitivity analysis with six different scenarios . The analysis showed that adoption of the new varieties for the 3 crops led to significant increments in yields and incomes suggesting potentially higher aggregate yields and economic impact-compared to the traditional local varieties, over time that the project has enabled. The analysis went further and shed light on the impact of various factors on technological adoption .

Despite these results, national yields would not increase much on average unless there is wider adoption of improved varieties. Also, the analysis did not capture other benefits from other project activities such as technology products, animal breeds, fruit varieties as well as activities under the CGSs .

Overall, the ICR's economic analysis -although partial, clearly demonstrated the substantial benefits of research, hence efficiency is rated **Substantial** .

a. If available, enter the Economic Rate of Return (ERR)/Financial Rate of Return (FRR) at appraisal and the re-estimated value at evaluation :

	Rate Available?	Point Value	Coverage/Scope*
Appraisal	No		
ICR estimate	No		

* Refers to percent of total project cost for which ERR/FRR was calculated.

6. Outcome:

Overall outcome is rated **Moderately Satisfactory** . There were moderate shortcomings in the area of efficacy and design. Relevance of objectives was substantial, but relevance of design was modest . Efficiency was substantial. On efficacy, although two PDOs were rated Modest, IEG views that the project provided a better base for further improvements in the Ugandan agricultural productivity through : (i) generation of various new technologies; (ii) strengthening human capacity and infrastructure; (iii) promoting decentralization of research activities which would potentially help increase the responsiveness of research to farmer needs; and (iv) the institutionalization of important processes such as the competitive grants schemes . Efficacy shortcomings included weakness in research -extension links, the unavailability of data to assess current adoption rates, current areas cultivated with new varieties, the extent to which the project improved natural resource management, the impact of the project activities on the productivity of livestock, fisheries and forestry production systems; and recent impact on farm income .

a. Outcome Rating : Moderately Satisfactory

7. Rationale for Risk to Development Outcome Rating:

Risk to Development Outcome is **significant** . NARO has generated a significant number of new varieties and technologies, however, unless there is wider adoption of such technologies by farmers, the longer -term impact on increasing national agricultural productivity will be modest . This requires further strengthening of the linkages between NARO and NAADS to facilitate dissemination and adoption of new technologies . Also, long term funding of NARO activities should be addressed beyond support from other Bank related or donor funded projects .

a. Risk to Development Outcome Rating : Significant

8. Assessment of Bank Performance:

Ensuring Quality at Entry . The ICR has no formal quality at entry rating . The project was designed by a preparation team that included senior officials demonstrating high level of ownership (ICR, p. 5). The project design attempted to incorporate lessons learnt from the earlier ARTP I and other research projects in Uganda and neighboring countries . For example, the design was geared towards creating an enabling environment with a transparent incentive system for researchers, and promoted the decentralization of research activities given the distinct agro-ecological zones in Uganda, However, the design should have included more measures to ensure strengthening linkages with extension institutions to enable wider adoption of technologies . Also, the design lacked specifics on how to coordinate M&E activities between NARO and the other research institutes (see section 10).

Quality of Supervision . Supervision missions had good technical and operational skill mix and were conducted regularly during the implementation period . The presence of two successive TTLs based in Kampala, Uganda also benefitted supervision . Supervision missions identified implementation bottlenecks and provided detailed action plans in aide memoires to address them, emphasized fiduciary issues and provided adequate guidance on remedial measures (ICR, pp. 15-16). The project TTL and team supported the government in the design and passage of the National Research Act in 2005. Also, the project team proposed an additional two years financing for the project to support the sector wide approach and lay the ground for an integrated research and extension project.

a. Ensuring Quality -at-Entry:Moderately Satisfactory

b. Quality of Supervision :Satisfactory

c. Overall Bank Performance :Moderately Satisfactory

9. Assessment of Borrower Performance:

Government Performance . The government was generally committed to the project, however, there were shortcomings that contributed to implementation delays in several cases . The NAR act took two years to get parliamentary approval, counterpart funds for NARO were below agreed amounts in a number of fiscal years, and additional project financing was delayed for one year seeking parliamentary approval . The delays and under-funding of NARO negatively impacted project activities .

Implementing Agency Performance . While NARO had overall responsibility for the project, fiduciary responsibility was delegated to the PARIs and ZARDIs after NARO reform . Implementation was delayed by factors beyond the control of NARO (as mentioned above). The ICR (p. 16) highlighted several areas where good progress was achieved including decentralization, NARS reforms, establishment of CGSs and improvement in human resource infrastructure capacity . However, there were also a number of shortcomings including weak linkages with NAADS at all levels and insufficient attention to M&E aspects (ICR, p. 17).

a. Government Performance :Moderately Satisfactory

b. Implementing Agency Performance :Moderately Satisfactory

c. Overall Borrower Performance :Moderately Satisfactory

10. M&E Design, Implementation, & Utilization:

Design. The PAD (annex 1) includes a set of relevant indicators that capture the outputs and outcomes of the project activities, most importantly, indicators that were geared to gauge adoption rates and productivity increments . However, the design lacked specifics on how to coordinate M&E activities between NARO and the other research institutes.

Implementation and Utilization . By MTR, planning, monitoring and evaluation systems were not developed in NARO and no linkages between outcomes and planning and budgeting processes were established at the overall NARO Secretariat (NAROSEC) level. Although NARO managed to develop a user friendly Management Information System, it proved to be deficient in addressing institutional requirements . Furthermore, with the dissolution of the Monitoring and Evaluation Planning Unit (MEPU) during NARS reform, M&E continued to be weak (ICR, p. 8). The ICR (p. 8) highlighted key weakness areas including : lack of appreciation of M&E among the project's top management, limited understanding of the role of M&E in research programs and lack of consensus data and reporting as well as limited infrastructure network to enable data sharing between headquarters and institutes . The lack of accurate data affected NARO's ability to reflect its achievements and instead such achievements were reflected in surveys conducted under NAADS.

a. M&E Quality Rating : Modest

11. Other Issues (Safeguards, Fiduciary, Unintended Positive and Negative Impacts):

Safeguards. The project was classified as environmental category "C" (PAD, p.16). According to the ICR (p. 8) the project did not raise any environmental safeguard concerns .

Fiduciary . Financial management and procurement were both satisfactory at NAROSEC level and at the research institutes level. The project benefited from capacity building that started with the first phase of the project (ARTP I) and continued with this phase . The introduction of a computerized accounting system and a quarterly system for financial management improved the flow of funds from NARO headquarters to the research institutes . At MTR disbursements stood at 38% of ARTP II credit, however, this slow down was resolved after completing NARS reforms and funds reallocation among various components .

12. Ratings :	ICR	IEG Review	Reason for Disagreement /Comments
Outcome:	Satisfactory	Moderately Satisfactory	Weakness in research-extension links and the unavailability of data to assess

			current adoption rates, current areas cultivated with new varieties, the extent to which the project improved natural resource management, the impact of the project activities on the productivity of livestock, fisheries and forestry production systems; and recent impact on farm income.
Risk to Development Outcome:	Moderate	Significant	Uncertainty about long term funding for NARO and concerns regarding adoption of new varieties.
Bank Performance :	Satisfactory	Moderately Satisfactory	Design shortcomings and weakness in M&E.
Borrower Performance :	Moderately Satisfactory	Moderately Satisfactory	
Quality of ICR :		Satisfactory	

NOTES:

- When insufficient information is provided by the Bank for IEG to arrive at a clear rating, IEG will downgrade the relevant ratings as warranted beginning July 1, 2006.
- The "Reason for Disagreement/Comments" column could cross-reference other sections of the ICR Review, as appropriate .

13. Lessons:

Based on the lessons in the ICR the following are emphasized :

- **Project design should include a formalized incentive structure to ensure effective coordination between complimentary institutions** . The experience of ARTP II demonstrated that despite best intentions, formal structures for inter-agency collaboration need to be strengthened at all levels and responsibilities need to be clear for key players to enhance efficiency and effectiveness of implementation .
- **Government funding is needed for the sustainability of research institutions** . It is important to explore different avenues to generate higher funding for research, for example through tax on commodities, as in the case of coffee, and at the same time reduce dependency on development partners . The government funding for NARO's salaries increased from 50 to 90% over the project time and is expected to reach 100% by FY10. However, it is not enough to only fully fund salaries as it is also necessary to fund other recurring research costs.
- **A sound M&E system requires a formal incentive structure to adequately monitor the project impact** . Although the project envisaged the establishment of a functional and sound M&E system that would adequately report against development objectives, the absence of an incentive system hindered M&E activities. The lack of accurate data limited NARO's ability to reflect on its achievements .

14. Assessment Recommended? Yes No

15. Comments on Quality of ICR:

This is a generally sound ICR. It provides good coverage of project achievements and a candid report on most shortcomings. The ICR could have provided more details on the technologies generated by NARO and their impact on agricultural productivity. Also, the economic analysis (annex 3) could have benefitted from further discussion on the different scenarios of the sensitivity analysis .

a. Quality of ICR Rating : Satisfactory

