Document of
The World Bank

Report No: ICR00001061

IMPLEMENTATION COMPLETION AND RESULTS REPORT
(IDA-33470 TF-23752)

ON A

CREDIT
IN THE AMOUNT OF SDR 5.5 MILLION
(US$ 7.6 MILLION EQUIVALENT)

AND A

GLOBAL ENVIRONMENTAL FACILITY GRANT
IN THE AMOUNT OF SDR 1.8 MILLION (US$ 2.5 MILLION EQUIVALENT)

TO

GEORGIA

FOR AN

AGRICULTURAL RESEARCH, EXTENSION AND TRAINING PROJECT

June 23, 2009

Sustainable Development Department
Europe and Central Asia Region

CURRENCY EQUIVALENTS

Exchange Rate Effective
June 22, 2009

Currency Unit = Lari
Lari 1.00 = US$ 0.60
US$ 1.00 = Lari 1.66

FISCAL YEAR
January 1 – December 31

ABBREVIATIONS AND ACRONYMS

ADP	Agricultural Development Project
ADPCC	Agricultural Development Project Coordination Center
AKS	Agricultural Knowledge System
ARET	Agriculture Research, Extension and Training
ARS	Agricultural Research System
BGD	Biogas Digesters
CAS	Country Assistance Strategy
CGB	Competitive Grant Board
CGS	Competitive Grant Scheme
DO	Development Objective
EPC	Environmental Pollution Control
GDP	Gross Domestic Product
GEF	Global Environment Facility
GEO	Global Environmental Objective
GOG	Government of Georgia
ICR	Implementation Completion Report
IDA	International Development Association
IMC	Inter-Ministerial Commission
IVHO	Institute for Viticulture, Horticulture and Oenology
M&E	Monitoring and Evaluation
MoA	Ministry of Agriculture
NGO	Non-Governmental Organization
PAD	Project Appraisal Document
PDO	Project Development Objective
PMU	Project Management Unit
TF	Trust Fund
WB	World Bank

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Sector Manager: Dina Umali-Deninger
Project Team Leader: Darejan Kapanadze
ICR Team Leader: Daniel Gerber

GEORGIA
Agricultural Research, Extension and Training Project

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A. Basic Information

Country:	Georgia	Project Name:	Agricultural Research, Extension & Training Project
Project ID:	P065715,P064091	L/C/TF Number(s):	IDA-33470,TF-23752
ICR Date:	06/23/2009	ICR Type:	Core ICR
Lending Instrument:	SIL,SIL	Borrower:	GOVERNMENT OF GEORGIA
Original Total Commitment:	XDR 5.5M,USD 2.5M	Disbursed Amount:	XDR 5.5M,USD 2.5M
Environmental Category: C,C		**Focal Area**: I	
Implementing Agencies: Ministry of Agriculture			
Cofinanciers and Other External Partners:			

B. Key Dates

Agricultural Research, Extension & Training Project - P065715

Process	Date	Process	Original Date	Revised / Actual Date(s)
Concept Review:	02/10/1999	Effectiveness:		02/05/2001
Appraisal:	09/26/1999	Restructuring(s):		
Approval:	05/11/2000	Mid-term Review:		04/25/2003
		Closing:	12/31/2005	06/30/2008

Agricultural Research, Extension and Training GEF Project - P064091

Process	Date	Process	Original Date	Revised / Actual Date(s)
Concept Review:	02/10/1999	Effectiveness:	02/19/2001	02/05/2001
Appraisal:	09/26/1999	Restructuring(s):		
Approval:	05/11/2000	Mid-term Review:		04/25/2003
		Closing:	12/31/2005	06/30/2008

C. Ratings Summary

C.1 Performance Rating by ICR

Outcomes	Moderately Satisfactory
GEO Outcomes	Moderately Satisfactory
Risk to Development Outcome	Moderate

Risk to GEO Outcome	Moderate
Bank Performance	Moderately Satisfactory
Borrower Performance	Moderately Satisfactory

C.2 Detailed Ratings of Bank and Borrower Performance (by ICR)			
Bank	**Ratings**	**Borrower**	**Ratings**
Quality at Entry	Moderately Satisfactory	Government:	Moderately Satisfactory
Quality of Supervision:	Satisfactory	Implementing Agency/Agencies:	Satisfactory
Overall Bank Performance	Moderately Satisfactory	Overall Borrower Performance	Moderately Satisfactory

C.3 Quality at Entry and Implementation Performance Indicators			
Agricultural Research, Extension & Training Project - P065715			
Implementation Performance	**Indicators**	**QAG Assessments (if any)**	**Rating:**
Potential Problem Project at any time (Yes/No):	No	Quality at Entry (QEA)	None
Problem Project at any time (Yes/No):	No	Quality of Supervision (QSA)	None
DO rating before Closing/Inactive status	Satisfactory		

Agricultural Research, Extension and Training GEF Project - P064091			
Implementation Performance	**Indicators**	**QAG Assessments (if any)**	**Rating:**
Potential Problem Project at any time (Yes/No):	No	Quality at Entry (QEA)	None
Problem Project at any time (Yes/No):	No	Quality of Supervision (QSA)	None
GEO rating before Closing/Inactive Status	Satisfactory		

D. Sector and Theme Codes

Agricultural Research, Extension & Training Project - P065715		
	Original	**Actual**
Sector Code (as % of total Bank financing)		
Agricultural extension and research	91	92
Central government administration	9	8

Theme Code (as % of total Bank financing)		
Participation and civic engagement	25	
Rural markets	25	9
Rural services and infrastructure	25	21
Technology diffusion	25	70

Agricultural Research, Extension and Training GEF Project - P064091		
	Original	**Actual**
Sector Code (as % of total Bank financing)		
Agricultural extension and research	37	52
Central government administration	9	
Micro- and SME finance	54	48

Theme Code (as % of total Bank financing)		
Infrastructure services for private sector development	25	
Pollution management and environmental health	25	35
Rural services and infrastructure	25	30
Technology diffusion	25	35

E. Bank Staff

Agricultural Research, Extension & Training Project - P065715		
Positions	**At ICR**	**At Approval**
Vice President:	Shigeo Katsu	Johannes F. Linn
Country Director:	Asad Alam	Judy M. O'Connor
Sector Manager:	Dina Umali-Deininger	John A. Hayward
Project Team Leader:	Daniel P. Gerber	Iain G. Shuker
ICR Team Leader:	Daniel P. Gerber	
ICR Primary Author:	Daniel P. Gerber	

Agricultural Research, Extension and Training GEF Project - P064091		
Positions	**At ICR**	**At Approval**
Vice President:	Shigeo Katsu	Johannes F. Linn
Country Director:	Asad Alam	Judy M. O'Connor
Sector Manager:	Dina Umali-Deininger	John A. Hayward
Project Team Leader:	Daniel P. Gerber	Jitendra P. Srivastava
ICR Team Leader:	Daniel P. Gerber	
ICR Primary Author:	Daniel P. Gerber	

F. Results Framework Analysis

Project Development Objectives (from Project Appraisal Document)
The Overall Development Objective of the Project is to assist the Government of Georgia develop an efficient and cost-effective agricultural knowledge system to demonstrate, disseminate and promote the adoption of appropriate technologies that increase sustainable agricultural production and reduce pollution of natural resources. In support of this objective, the Project would assist the Government of Georgia to: (i) put in place a Competitive Grant Scheme for agriculture; (ii) support Reform of the Agricultural Research System; and (iii) invest in Environmental Pollution Control (manure storage and handling facilities and biogas digesters, as well as soil and water quality monitoring programs) on a pilot basis to reduce agricultural nutrient pollution of the Black Sea.

Revised Project Development Objectives (as approved by original approving authority)
While indicators were modified, the PDO was not revised

Global Environment Objectives (from Project Appraisal Document)
The Project will initiate measures aimed at improving on-farm environmental practices, which, over the long-term, would reduce nutrients entering the Black Sea.

Revised Global Environment Objectives (as approved by original approving authority)
PDO was not revised

(a) PDO Indicator(s)

Indicator	Baseline Value	Original Target Values (from approval documents)	Formally Revised Target Values	Actual Value Achieved at Completion or Target Years
Indicator 1 :	Adoption of improved agricultural technologies (disseminated technologies being adhered to by beneficiaries after completion of grant financing and/or successfully replicated by non-beneficiaries)			
Value (quantitative or Qualitative)	0% - No improved technologies being extended to and adhered to by the project beneficiary farmers	20% of farmers in project areas adopt improved technologies	60% of beneficiary farmers continue using/benefiting from extended technologies	73.2% of beneficiary farmers continue using/benefiting from extended technologies
Date achieved	02/05/2001	02/05/2001	12/31/2005	06/30/2008
Comments (incl. % achievement)	122% of achievement of revised target value. Information on use of technology obtained through an independent evaluation of project outcomes performed by an NGO consortium.			
Indicator 2 :	Competitive Grant Scheme for technology dissemination operates successfully with representation of all major stakeholders, pe er review and monitoring			

	systems in place.			
Value (quantitative or Qualitative)	No Competitive Grant Scheme in place	Competitive Grant Scheme established with peer review and monitoring systems in place sufficient for self sustainbility	Competitive Grant Scheme sustained post-project with government and/or donor financing	Competititive grant scheme adopted at national leveloperating sucessfully with government funding
Date achieved	02/05/2001	02/05/2001	12/31/2005	06/30/2008
Comments (incl. % achievement)	100% achievement of revised target value. Competititive grant scheme for financing priority reasearch fields as operated by the National Science foundation under the Ministry of Education and Science.			
Indicator 3 :	Institute of Horticulture, Viticulture and Oenology achieves sustainability, allowing to lead a full-scale research work, cov er essential recurrent costs and maintain qualified staff.			
Value (quantitative or Qualitative)	Institutional reform plan for the Institute of Horticulture, Viticulture and Oenology under development	Implemenatiton of institutional reform and investment plans completed sucessfully	none	Institutional reform and rehabilitation of the Institute of Horticulture Viticulture and Oenology has been successfully imple mented
Date achieved	02/05/2001	02/05/2001	12/31/2005	06/30/2008
Comments (incl. % achievement)	100% achievement of target value. Beneficiary institute restructured, refurbished and operating. Main target outcomes of ref orm succesfully delivered			

(b) GEO Indicator(s)

Indicator	Baseline Value	Original Target Values (from approval documents)	Formally Revised Target Values	Actual Value Achieved at Completion or Target Years
Indicator 1 :	Adoption of sound manure management practices (disseminated technologies being adhered to by beneficiaries)			
Value (quantitative or Qualitative)	0% - No technologies disseminated	10% of farms in project areas adopting manure management plans and biogas units	80% of beneficiaries adhere to the extended manure management practices	98% of beneficiaries of biogas digesters and manure storage facilities operated and used as intended
Date achieved	02/05/2001	02/05/2001	12/31/2005	06/30/2008
Comments (incl. % achievement)	123% achievement of revised target outcome			

Indicator 2 :	Decrease of nutrient pollution (N and P containing pollutants) to the selected rivers of Environment Pollution Control Progra m target area			
Value (quantitative or Qualitative)	0%	n/a	5%	Minor River Choga = N - 43% and P-58%.Larger River Khobistsakali = N-46% and P-23.5%
Date achieved	12/31/2005	02/05/2001	06/30/2007	06/30/2008
Comments (incl. % achievement)	Measurements were taken in small rivers in project areas since establishment of system at watershed level was not possible. Figures have no base line data nor control sampling to compare project to non project areas			

(c) Intermediate Outcome Indicator(s)

Indicator	Baseline Value	Original Target Values (from approval documents)	Formally Revised Target Values	Actual Value Achieved at Completion or Target Years
Indicator 1 :	Reform of the overall agricultural research complex accelerated			
Value (quantitative or Qualitative)	No vision for reforming of agricultural research system in place	Successful completion of the reform and rehabilitation plan for the project beneficiary institute	none	A model for reorganizing agricultural research complex developed and stakeholder consensus reached on its outline
Date achieved	02/05/2001	02/05/2001	12/31/2005	06/30/2008
Comments (incl. % achievement)				
Indicator 2 :	Number of responsive, high quality proposals received and approved under the Competitive Grant Scheme			
Value (quantitative or Qualitative)	0	at least 40 grants	130 (target was increased to 180 upon MOA decision to run an additional CGS cycle and is now back to the original number as MOA decided to drop it)	155 approved and completed grants
Date achieved	02/05/2001	02/05/2001	06/30/2007	06/30/2008
Comments	119% achievement of revised target, and four times achievement of original			

(incl. % achievement)	target.			
Indicator 3 :	Number of the CGS grant recipient institutions (research institutes, universities, NGOs, businesses)			
Value (quantitative or Qualitative)	0	at least 40	220 (target was increased to 270 upon MOA decision to run an additional CGS cycle and is now back to the original number as MOA decided to drop it)	237 institutions
Date achieved	02/05/2001	02/05/2001	06/30/2007	06/30/2008
Comments (incl. % achievement)	108% of revised target value			
Indicator 4 :	Number of farmers directly and indirectly benefiting from the Competitive Grant-funded sub-projects			
Value (quantitative or Qualitative)	0	2400	650 direct and 19,500 indirect beneficiaries	903 direct and 20,090 indirect beneficiaries
Date achieved	02/05/2001	02/05/2001	06/30/2007	06/30/2008
Comments (incl. % achievement)	139% of revised target value			
Indicator 5 :	Number of the improved manure storage facilities constructed in the Environment Pollution Control Program target area			
Value (quantitative or Qualitative)	0	700	540	540
Date achieved	02/05/2001	02/05/2001	12/31/2007	12/31/2007
Comments (incl. % achievement)	100% achievement of revised target value			
Indicator 6 :	Number of biogas digesters installed in the Environment Pollution Control Program target area			
Value (quantitative or Qualitative)	0	196	290	292
Date achieved	02/05/2001	02/05/2001	12/31/2005	06/30/2008
Comments (incl. % achievement)	101% achievement of original target			

G. Ratings of Project Performance in ISRs

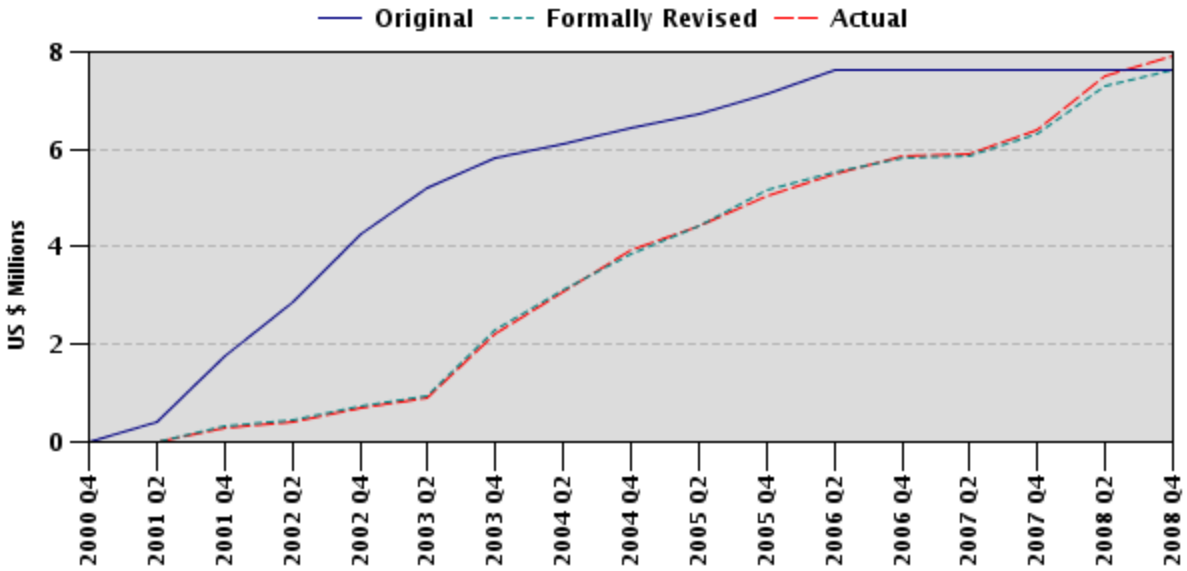
-						
No.	Date ISR Archived	DO	GEO	IP	Actual Disbursements (USD millions)	
					Project 1	Project 2
1	09/18/2000	S	S	S	0.00	0.00
2	12/06/2000	S	S	S	0.00	0.00
3	06/15/2001	S	S	S	0.30	0.13
4	12/27/2001	S	S	S	0.40	0.13
5	03/28/2002	S	S	S	0.47	0.13
6	10/17/2002	S	S	S	0.91	0.28
7	12/19/2002	S	S	S	0.91	0.28
8	06/13/2003	S	S	S	2.24	0.41
9	06/24/2003	S	S	S	2.24	0.41
10	11/13/2003	S	S	S	2.78	0.52
11	06/08/2004	S	S	S	3.82	1.06
12	12/20/2004	S	S	S	4.42	1.62
13	04/02/2005	S	S	S	4.69	1.71
14	03/21/2006	MS	S	MS	5.50	2.07
15	08/23/2006	MS	S	MS	5.86	2.18
16	02/06/2007	MS	S	MS	5.92	2.35
17	02/21/2007	MS	S	MS	5.92	2.35
18	07/25/2007	MS	S	MS	6.72	2.42
19	02/13/2008	S	S	S	7.52	2.46
20	09/20/2008	S	S	HS	7.91	2.48

H. Restructuring (if any)

Not Applicable

I. Disbursement Profile

P065715



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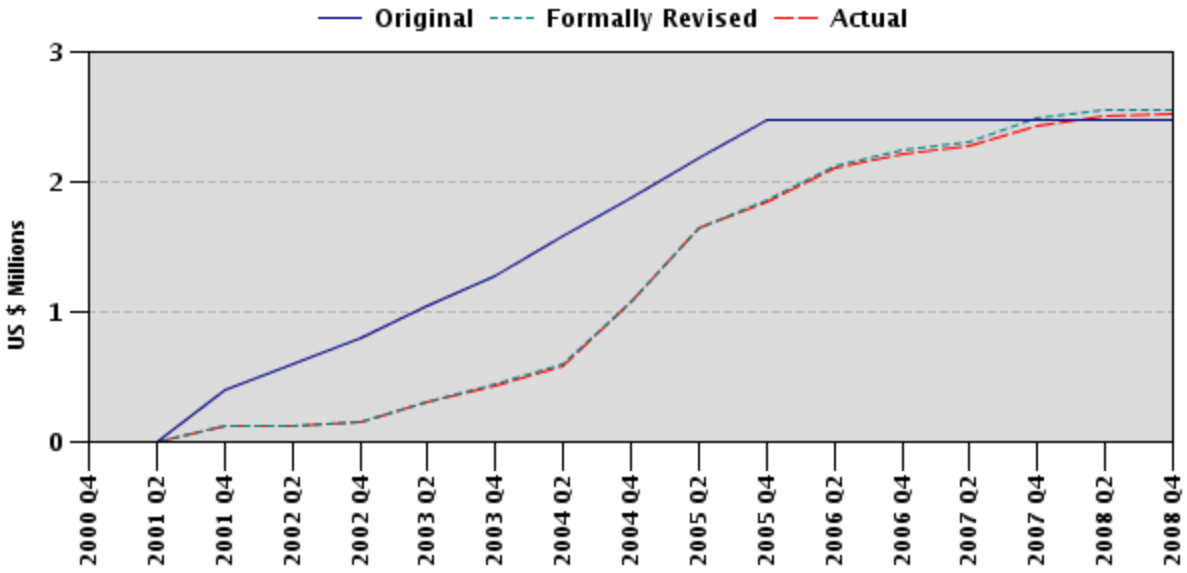


1. Project Context, Development and Global Environment Objectives Design

1.1 Context at Appraisal

Agricultural production in the Republic of Georgia was severely disrupted following the collapse of the Soviet Union, and the subsequent civil conflict. By the mid to late 1990s, agricultural production had picked up again, accounting for about 28 percent of Gross Domestic Product (GDP) and some 55 percent of employment.[1] However, the nature of agriculture had changed dramatically; with the collapse of markets and land privatization efforts, about one million small farmers with less than one hectare (ha) of land reverted to subsistence production, cultivating mainly wheat, maize and potatoes.[2] Productivity in the sector was low, underemployment and unemployment rates were high, and poverty and vulnerability was widespread.

The agriculture sector faced three significant constraints to its development. First, the shift from a command economy to a market-based economy required significant restructuring of former collectivized farms, privatization of land assets, development of markets, investments and access to credit. Second, the breakup of the Soviet Union meant the disintegration of large collective farms into private highly fragmented small farms. These new private farmers had little experience in farm management, especially in agricultural technologies available to expand production or to improve environmental sustainability. Finally, agriculture practices during the Soviet period relied heavily on mineral fertilizers and pesticides that resulted in the pollution of the Black Sea. While agro-chemical input use dropped significantly after the country's independence, the poor manure storage and handling practices and overall poor field management practices of the new private farmers prevented a significant reduction of nutrients flows from rivers to the Black Sea.

The basis for the Bank's agriculture sector investment strategy was first formulated in 1995, following the end of the civil war in Georgia. This strategy was based on a Bank sector report, "Georgia: Reform in the Food and Agriculture Sector." The investment strategy placed top priority on addressing short-term needs, such as provision of agricultural credit and consolidation of the ongoing land reform. As a second phase, the strategy proposed some longer-term investments in government services to the agricultural sector, such as irrigation, and agricultural research and extension. The first investment project, the Agricultural Development Project (ADP) (IDA CR 2941), aimed primarily to address these short-term priorities, but also provided seed funds to prepare studies related to some of the longer-term priorities. On the basis of these studies, preparation of the Georgia: Agriculture Development II Project (ADP II) was initiated, which included both irrigation rehabilitation and agricultural research and extension components. During the review of the Project Concept Document, however, a decision was taken to split the project into two separate operations: (i) the Georgia: Irrigation and Drainage Rehabilitation Project; and (ii) the Georgia: Agricultural Technology

[1] 1997 Figures

2 IFAD "Rural Poverty in Georgia"

Improvement Project. The name of the latter was changed to Georgia: Agricultural Research, Extension and Training Project, following consultations with the Georgian project preparation team.

The Government of Georgia has been an early adopter of agricultural sector reforms, and became a member of the World Trade Organization in late 1999. Georgia has over the years evolved into one of the least "interventionist" economies in the region. Recognizing its agro-industrial potential, the Government of Georgia has been pursuing a strategy to meet internal demands and to realize potentials to expand exports. Thus, the Government was interested in pursuing sector reforms, especially with regard to land reforms, and to increasing farm productivity. This was to be achieved by dissemination of improved technologies and inputs and stimulating research using mainly market driven instruments. In addition, the Government of Georgia recognized the threat to environmental sustainability in the Black Sea, caused by current farming practices.

Country Assistance Strategy and Government strategies supported by the Project

The project objectives were consistent with the Country Assistance Strategy (CAS, Report No. 1700 GE dated 10/21/97), which defined the Bank's objectives in Georgia as (i) deepening and diversifying the sources of growth; (ii) reducing poverty; and (iii) protecting the environment through sustainable natural resource management. New agricultural practices disseminated through the competitive grants scheme (Component 1) would assist direct beneficiaries of the project, rural farmers, to improve farming practices for more sustainable yields that would result in reduced poverty while the introduction of environmentally-friendly agricultural practices would result in improved soil and water quality and contribute to the reduction of pollutants to the Black Sea. Reforming select agricultural institutions (Component 2) would create the appropriate institutional setting for agricultural extension and research programs that would assist farmers and boost agricultural productivity. Finally, the installation of biogas digesters (Component 3) would directly improve the lives of rural households by providing a reliable and secure source of energy, and simultaneously reduce pollution.

1.2 Original Project Development Objectives (PDO) and Key Indicators (as approved)

The Overall Development Objective (DO) of the Project was to assist the Government of Georgia to develop an efficient and cost-effective agricultural knowledge system to demonstrate, disseminate and promote the adoption of appropriate technologies that increase sustainable agricultural production and reduce pollution of natural resources. In support of this objective, the Project would assist the Government of Georgia to: (i) put in place a Competitive Grant Scheme for agriculture; (ii) support Reform of the Agricultural Research System; and (iii) invest in Environmental Pollution Control (manure storage and handling facilities and biogas digesters, as well as a soil and water quality monitoring program) on a pilot basis to reduce agricultural nutrient pollution of the Black Sea.

Key performance indicators of the project development objectives at design (PDO) included:

1. 20% of farmers in project areas adopting improved farm production, marketing, management, and post-harvest technologies.
2. 10% of farms in project areas adopting production and resource conservation technologies (environmentally-friendly agriculture practices)
3. 10% of farmers in project areas adopting manure management plans, including the use of biogas units.
4. Successful completion of the reform and rehabilitation plan for the Institute of Viticulture, Horticulture and Oenology (IVHO).[3]

1.3 Original Global Environment Objectives (GEO) and Key Indicators (as approved)

The Project aimed to initiate measures that would improve on-farm environmental practices, which, over the long-term, would reduce nutrients entering the Black Sea.

The key performance indicator for the Global Environment Objective was the increased adoption of recommended environmentally sound farming practices in pilot areas (e.g., sound manure management practices), which would lead to a reduction of pollution in the Black Sea.

1.4 Revised PDO (as approved by original approving authority) and Key Indicators, and reasons/justification

The PDO was not formally revised.

1.5 Revised GEO (as approved by original approving authority) and Key Indicators, and reasons/justification

The GEO was not formally revised.

1.6 Main Beneficiaries.

The main beneficiaries, as identified in the PAD, were private farmers and agro-processors, who, through the introduction of technologies would experience agricultural diversification, higher productivity, and lower costs of production. The types of farms targeted for the project ranged from smallholders (with farm sizes up to one hectare) and part-time farmers with small crop or livestock surpluses, to larger leased farms with land ranging in size from five to one hundred hectares (ha). Improved productivity and management of these farms would increase returns to farmers from higher production and better product quality to meet market requirements, especially export markets. In addition, higher productivity in rural areas would mean improved living standards and greater profitability.

Secondary benefits from the project were expected to accrue to both the broader population in Georgia, through reforms to applied agricultural research facilities, and to the global community through reduced pollution in the Black Sea. Investments in applied agricultural research and effective technology transfer were expected to result in high

3 These indicators reflect those originally approved as per the Project Appraisal Document (PAD). The indicators were modified in the mid-term review (see section 2.3)

returns (given the relatively low technological base), and to engage farmers in practical and relevant technologies that could be applied for greater productivity. Second, the global community and the broader Georgian public were expected to benefit from reduced pollution in the Black Sea, and the maintenance of productive ecosystems and critical natural habitats in the freshwater, estuarine and near shore waters. This would be achieved through the introduction of improved manure management practices, manure pits and platforms and bio-digester technologies.

1.7 Original Components (as approved)

The project had four components that aimed to reform the Georgian agricultural knowledge system through appropriate technology acquisition, adaptation and dissemination that would better respond to the new realities and needs of the emerging private farmers, while at the same time promote environmentally friendly agricultural practices to protect Georgia's surface and ground water and reduce agricultural pollution to the Black Sea.

These components were as follows:

Component 1: Competitive Grant Scheme (US$5.6 million – IDA Credit + GEF Grant)

The Competitive Grant Scheme (CGS) supported the following activities: (i) Adaptive Research and Technology Dissemination (IDA funding); and (ii) Environment-friendly Agricultural Practices to reduce negative impacts on soil and water quality (GEF funding).

(a) *Adaptive Research and Technology Dissemination*. This combined a program of on-farm technology acquisition, adaptation and dissemination, as well as the provision of agricultural advisory services, to tackle immediate priorities for improving on-farm productivity, profitability and long-term sustainability on private farms, both small-holder and commercial. The project encouraged the participation of farmers, farmers' organizations, NGOs and other stakeholders in "needs assessments" of farmers' priorities and constraints, identification of priority activities and their implementation. These activities, funded under the Competitive Grant Scheme, aimed to build national capacity and increase the competitiveness of Georgia's agricultural sector. The terms and conditions for operating the CGS were set out in an Operational Manual, which was approved by the Inter-Ministerial Commission (IMC) and the Bank. The CGS was implemented by a Competitive Grant Board (CGB).

(b) Support for Agricultural Practices to Reduce Environmental Pollution. This subcomponent, funded by the Global Environment Facility (GEF), aimed to fund activities to improve Georgian surface and groundwater and reduce the nutrient load entering the Black Sea from point and non-point sources of pollution originating from agricultural practices in Georgia. The selected project area was located within the Khobi River watershed in Western Georgia, and comprised three districts – Khobi, Chkhorotsku and Tsalenjikha – bordering the Black Sea. These districts suffered from high levels of

pollutants in the soil that eventually washed into the Black Sea. This sub-component funded activities proposed to the CGS that aimed to specifically reduce pollutants in this area. These activities included (i) promotion of efficient manure management practices; and (ii) conducting on-farm trials and demonstrations of improved sustainable agricultural practices, including reduced tillage, better chemical management systems, introducing contour farming and buffer strips to improve water quality.

Component 2: Reform of the Agricultural Research System (US$3.52 million- IDA Credit)

A Conceptual Framework for a National Strategy for Reform of the Agricultural Research, Extension and Training System was approved on June 17, 1999, by the Inter-Ministerial Commission set up by the President to support reform of the Georgian Agricultural Knowledge System (AKS). The Government agreed with the Bank to pilot reforms in one priority research area, namely Horticulture and Viticulture. This component provided a combination of technical assistance, training and investments to reform the Institute for Viticulture, Horticulture and Oenology (IVHO). The reform of this institute would then serve as a model for the remaining Agricultural Research, Extension and Training System. This component included activities related to civil works and rehabilitation; procurement of laboratory and field equipment and goods; human resource streamlining; and training, and operational costs.

Component 3: Pilot Environmental Pollution Control Program (GEF funding – US$1.17 million)

The project supported a pilot program in the Khobi River watershed, in the same areas of Western Georgia, to cover the following activities: (i) the promotion of efficient manure management practices – installation of manure storage tanks/pits on a pilot basis; (ii) adaptive research, on-farm testing and demonstration of the use of biogas digesters in the villages to provide biogas for cooking and other domestic use to rural families and to reduce methane emissions into the atmosphere; and (iii) the establishment of a watershed scale water quality monitoring program to monitor agricultural pollution of major rivers draining into the Black Sea.

Component 4: Project Management Unit (US$0.71 million- IDA Credit)

The Project provided for a Project Management Unit (PMU) to coordinate project implementation and monitor and evaluate project activities. The PMU was headed by a Project Manager, who reported to the Minister of Agriculture and Food. The PMU was comprised of an Environmental Engineer (heading the Environmental Pollution Control component), a Reform Component Coordinator, an Administrative Officer and a Secretary/Interpreter.

1.8 Revised Components

There were no formal revisions to the project components.

1.9 Other significant changes

While there were no significant changes to the design of the project, some changes were made to the implementation arrangements under both Component 1 (Competitive Grant

Scheme) and Component 4 (Project Management Unit). In addition, some reallocation of resources between activities in Component 3 (Environmental Pollution Control) occurred to respond to increased demand for one technology over another. At closing, project costs had amounted to approximately 105 percent of the amount estimated at appraisal. Much of the increases were related to overall cost of construction that were greater than anticipated, as well as goods and services in a rapidly growing economy over the life of the project.

Component 1 – Competitive Grant Scheme: According to the original design of the CGS, the recipients of the competitive grants were required to submit receipts for all purchases to track the grant disbursements. This, however, resulted in blocked disbursements and impeded implementation of the component since there were few retailers that offered receipts at the time in Georgia, and those that did were generally larger supermarkets where the goods were more expensive to buy than with smaller retailers or in open air markets. Thus, the CGS was redesigned to omit this requirement and to follow international practice in small grants program that disbursed funding based on outputs. This adjustment led to improved implementation of this component and disbursements were able to resume in a timely fashion. The rapid implementation of the component with most grants already completed by early 2007 resulted in some 7 percent savings.

Component 2 – Reform of the Agricultural Research System: While the component suffered from delays in implementation resulting mainly from the frequent changes at the top level of government, the overall design of the component activities to be financed had largely remained as defined at appraisal. These delays along with an unplanned a move of the entire Institute for Viticulture, Horticulture and Oenology out of the main building to a new adjacent location on the site of the Ministry meant that significant resources were spent on the move to the new facilities and the component expenditures ended up some 8% overdrawn relative to estimates at appraisal.

Component 3 – Pilot Environmental Pollution Control Program: During implementation it became apparent that farmers were most likely to adopt technologies that provided some economic benefit over technologies with the objective of reducing pollution alone, especially when an additional work load was involved. Consequently, from the beginning the demand for manure pads/pits, and manure management practices remained weak. Bio-gas digesters, on the other hand, offered some immediate economic benefits in the form of energy for cooking. It was therefore decided to reallocate significant resources away from manure pits and improved practices to concentrate on the installation of biogas digesters (BGDs). Relative to the manure pits, however, BGDs were significantly more costly, and, in the end this component absorbed some 24 percent in additional resources relative to the original design.

Component 4 – Project Management: As part of an attempt to streamline implementation of projects in the agricultural sector, the Government of Georgia decided to merge the existing Project Implementation Units (PIUs) for all existing agriculture projects under one legal status in the form of an Agricultural Development Project

Coordination Center under the Ministry of Agriculture. While this was not a direct requirement of the World Bank, the result was that the Project Implementation Units benefitted from this centralization of activities, since PIUs worked in close collaboration, and could exchange information and share some administrative resources, especially as related to procurement and financial management. Nonetheless, these changes along with frequent policy reversals due to changing ministers led to significant delays in the implementation and the subsequent extensions resulted in increases in project management costs of some 47 percent relative to design.

Extension of closing date:
During project implementation, there were major political changes, arising from the Rose Revolution, the revolution in the Autonomous Republic of Achara, and frequent turnovers in the Ministry of Agriculture. These political changes resulted in shifting policy directions that, when combined with the regular staff turnovers meant that project implementation was frequently delayed. The project required four extensions of the Closing Date for both the IDA Credit and the GEF TF, moving it from the original closing date of December 31, 2005 to December 31, 2006, then to June 30, 2007, December 31, 2007, and finally June 30, 2008. However, by the project closing date, June 30, 2008, all project activities were substantially delivered and the project objectives as measured against the revised indicators were to a large extent met.

Monitoring and Evaluation: A revision was made to the project's intermediate outcome indicators at the mid-term review. This followed a portfolio review and the desire to make project indicators more reflective of outputs and outcomes. As a result, the target values of several indicators were revised to reflect more achievable goals, and several indicators were revised completely to become more output based. The revised monitoring indicators were fully met by project closing. However, several of these indicators measure outputs and outcomes that differ from the stated objectives and outcomes in the PAD. Section 2.3 outlines this issue in greater detail.

2. Key Factors Affecting Implementation and Outcomes

2.1 Project Preparation, Design and Quality at Entry

a. Lessons of earlier operations. An Agricultural Development Project funded by the World Bank approved in 1997 along with a sector study undertaken in early 2000 provided much of the foundation for this project. Lessons learned from this project highlighted the need to improve government services offered, such as research and extension, to the agricultural sector, which provided the logic for the ARET project. Global experience using competitive grant schemes provided a lesson for Component 1-CGS, which was anticipated to introduce greater competition and improvement in allocation of resources and more demand driven government services. The introduction of this model was the first of its kind in the FSU region and has been adopted more broadly now in several countries in the region. Component 2 remained modest in scope with the specific aim of piloting the reform for one of the institutions of the agricultural

research system for broader replication later with more Government commitment.[4] Finally, the introduction of BGDs (Component 3) drew on global experiences, from countries such as China and India, in introducing innovative technologies to reduce pollutants. Given that BGDs were to be introduced in a new setting, climate and culture, the project was designed to pilot the technology and went through several designs and adjustments before local companies were able to design and produce systems that performed acceptably at reasonable costs in Georgia's setting.

b. Risks: The risks to the project were adequately identified at project preparation. The main risks to outcome that were identified related to local technical capacity and commitment at the level of extension officers, researchers, and farmers. The project intended to address them with training and external technical assistance and capacity building as deemed necessary. On reforms of the research system, political willingness was considered a moderate risk. This risk was addressed with a design that involved an incremental approach dealing with one research institute that would then provide a model for wider reform in the Agricultural Knowledge System at a later point. In the end, frequent changeovers in the Ministry of Agriculture led to some delays in implementation of both Components 1 and 2, although the pilot nature and the simple scope of activities allowed for continued implementation. One further risk identified at entry was the possible failure by the implementing agency and the grant committee to keep the grant approval process transparent and apolitical. This was deemed a high risk, and a detailed grant manual was developed that outlined procedures for reviewing grants and application processes that ensured a relatively transparent award process. The procurement and financial reviews performed at the end of the project found no irregularities in the administration of the Component.

c. Adequacy of participatory process. The project made very good use of participatory mechanisms to solicit opinions and to disseminate new technologies and findings. At entry, there was a participatory process that involved several agencies and ministries in the Government to determine which research institute would be selected to be reformed on a pilot basis. This process led to the selection of the IVHO. Throughout the project, participatory stakeholder workshops were used to disseminate project results, and to introduce new technologies. There were two beneficiary meetings held in East and West Georgia to discuss the outcomes of the CGS that brought together the entire community of Georgia's agricultural science and technology sector, including heads of institutes, research centers, laboratories and farmers. For more details on the stakeholder workshops, see Annex 6.

d. Project Design (IDA). While the project's design accounted for lessons learned and made use of an extensive participatory process, the design of the project activities are difficult to link directly to the project objectives and outcomes. The PAD makes reference to technological improvements that will result in "agricultural diversification, higher productivity and lower costs of production and, in turn, increase profitability and

[4] The need for reforms had been identified by a report Restructuring Assistance and Policy Advice for the Ministry of Agriculture and Food of Georgia that was commissioned by USAID with input from the World Bank and the European Commission

improve living standards in rural areas. Higher productivity and better management will bring about improvements in product quality to meet specific market needs, including those of export markets" (PAD, page 12). The Project Development Objective aims to achieve sustainable agricultural production through the dissemination, promotion and resulting adoption in the project areas of technologies. However, project activities in Component 1 focus on the introduction and anticipated adoption of technologies that are to be introduced under the project, with little reference to any improved incomes, or productivity. In addition, the monitoring and evaluation (M&E) framework does not provide for measurement of changes in income or productivity. Thus, the project objectives, outcomes, activities and evaluation framework are only loosely connected. Based on the project activities, the objectives were more modest, and linked simply to strengthening the extension service link for farmers. This more modest objective would have been realistic given the fact that farming reverted to subsistence levels after the collapse of the Soviet Union, and the likelihood of increased productivity for export markets remains relatively poor.

e. Project Design (GEF). According to the stated GEF global objectives (GO) of the project, new technologies were expected to be adopted for eventual reductions in pollution. The environmental pollution control program (EPC) under Components 1 and 3 planned for the investment in agricultural practices to reduce runoff including manure platforms and BGDs, among others. The STAP review undertaken at appraisal noted a relatively weak link between BGD technologies and reduced water pollution. Given the fact that BGDs were eventually the method most in demand by farmers to reduce pollution and significantly more costly than the other alternatives, the impact of the program as piloting an effective way to reduce water pollution is in question. While the project called for extensive piloting to eventually fund a model that was appropriate for the Georgian climate, the relatively high investment costs of the BGDs means that without programs to subsidize installation, they remain beyond the reach of most of the rural households they were targeting.

2.2 Implementation

Implementation of project activities was continuously rated satisfactory. Implementation of project activities was accomplished despite a Government changeover in 2004, and frequent changeovers in the Ministry of Agriculture. At the mid-term review, the project was also assessed to be progressing in a satisfactory manner, and no issues were identified that put project implementation at risk. A request was made at the mid-term review to extend the project's closing date by one year because of a slow start and delayed effectiveness. One further outcome of the mid-term review was a restructuring of indicators that aimed to better measure progress toward output-based monitoring, and that provided a more realistic assessment of targets. Thus, several of the indicators for measuring progress of the project's global environment and development objectives were revised to provide more precision and practicality in measuring and assessing progress. By the project closing, all of the project's revised outcome indicators were met or surpassed.

The following outlines the component-specific factors that are believed to have impacted implementation:

Component 1 –Competitive Grant Scheme

Frequent changeover of Ministry of Agriculture staff delayed the implementation of the CGS. During the course of the project, the Minister of Agriculture changed over six times, causing frequent delays as the Ministry strove to inform themselves of the project details and the mechanisms for grant disbursements. The CGS introduced the first mechanisms for awarding grants in a competitive manner in the region, and this mechanism was a significant departure from Soviet and post-Soviet funding for agricultural extension activities. At several points throughout the project the team had to reconfirm the objectives of the grant scheme which was to fund activities with a public good that would result in the knowledge acquisition of beneficiary farmers and the eventual replication among other farmers. In addition, because of the frequent changeover of the Minster of Agriculture, the overall component objectives had to be clarified to the newly appointed Ministers, during which time implementation was often put on hold. For example, the Minister of Agriculture appointed prior to the last round of the CGS first requested an increase in the allocation towards the component, only to withdraw the request shortly afterwards, causing some delays in the implementation even of the final round. Despite this, 157 subprojects were funded, of which 155 closed with satisfactory ratings, and only two were suspended for noncompliance of reporting standards.

Component 2 – Institutional Reform

Deep changes in Georgia's political and economic systems meant that some delays ensued in reforming Agricultural Knowledge and Research facilities. At the project start, most members of the Agricultural Research System in Georgia agreed that significant efforts would need to be undertaken to align Georgia's facilities with the demands of a market economy. This fundamental transformation of the research system would create entirely new conditions for and expectations from the academic field. This component aimed to initiate this process by developing a comprehensive model for reforming the IVHO, which would serve as an example for the rest of the agricultural research system. The timely implementation of this component was hindered in part by the extensive staff optimization program that was needed. While the institutes had far too many staff at the time of the project's initiation, the Georgian law did not permit termination of staff until the issue of salary arrears had been addressed, which delayed the implementation of the project. In addition, implementation was delayed over discussion of how to determine the legal status of the research institute, which had implications for its ability to bring in revenue from different activities. Once these issues were resolved, however, the component continued to be implemented in a timely and satisfactory manner.

Components 3 – Environmental Pollution Control Program: *The component faced difficulties in finding farmers willing to implement manure management practices beyond BGDs. The high demand for BGDs pushed the project in investing in the development of a design that adequately functions under Georgia's cooler winter and required piloting of several models before arriving at an appropriate design.* This component funded the development of biogas digesters and the introduction (540) manure pits/pads for improved environmental pollution control. The manure pits were not considered as providing significant benefits, and so much of the funding was shifted to the development

of BGDs that enjoyed higher demand from the farmers. Significant resources and time were spent in the first two years of implementation to arrive at a technologically and cost appropriate BGD design for Georgia's small farms. The design finally adopted was a hybrid from Indian and Chinese systems mainly because of the small scale and perceived simplicity of these designs. Towards the end of the project, slightly larger units were constructed on a pilot basis to demonstrate a relatively higher efficiency that could be achieved with larger size. In this process extensive consultation took place between designers, manufacturers and the project team to ensure that the design represented an optimal consensus on size, price and efficiency. Ultimately, 292 biogas digesters were built, and several local manufacturers have begun producing locally manufactured models. The design developed under the project has been adopted as the most suitable design and some 100 additional units have been built since project closing with support from other donors and some local government funding.

Component 4 – Project Management Unit: *Restructuring of Project Management Units led to some initial delays*. A very difficult political environment, and the merging of the implementing agency into a single body at the Ministry of Agriculture, led to some initial delays in implementation. Once the consolidation happened, project management remained adequate and responsive to client needs. Overall the Project Management unit was always adequately staffed; and procurement and financial management procedures were rated satisfactory throughout the project. Technical staff remained dedicated throughout implementation, undertaking frequent field visits to demonstration and research sites, and providing guidance to scientists and farmers involved in the project.

2.3 Monitoring and Evaluation (M&E) Design, Implementation and Utilization

At the outset, the project monitoring and evaluation design did not adequately link outputs with outcomes to reach the overall project objective. The overall objective was too broad and ambitious in its definition making it difficult to clearly link activities with objectives. This difficulty is reflected in the design, implementation and utilization of the monitoring and evaluation framework. At project design, some indicators measured project inputs rather than outputs. Under Component 1, the overall objective was to increase adoption rates of technologies that were introduced under funding through the CGS. The original outcome indicator had estimated that a 20% adoption rate would be achieved among farmers in the area. This indicator was revised to measure beneficiaries maintaining or retaining the technologies that were introduced on their properties from CGS funding. In addition the establishment of the CGS moved from being an output originally, to become an outcome after MTR. Similarly, the number of grants administered, and the numbers of farmers receiving grants (inputs) were measured rather than the adoption rates that were anticipated to result from the grant program (outputs). Similarly, under Component 2, the objective of rehabilitating the IVHO was that the institute would become more sensitive to the needs of small farmers and would begin providing research and extension services for a domestic market. However, the indicators chosen to measure implementation progress focused on the adoption of a reform plan and the rehabilitation of the IVHO (inputs) rather than the services provided by a rehabilitated IVHO (outputs). Finally, the objective of Component 3 was to reduce pollution to the Black Sea. However, the indicators measured the number of farms with

biogas digesters or manure pits (inputs) rather than levels of pollution directly linked to the farms (outputs).

This issue was recognized at the mid-term review (MTR), and, as a result, the monitoring and evaluation indicators were revised to measure project outputs and outcomes as well as to provide a more realistic assessment of projected achievements under the project. However, these revisions led to the second issue with the monitoring and evaluation framework in that they tended to measure activity outputs rather than the stated outcomes of the project components as set out in the Project Development Objective. For example, under Component 1, the stated objective indicates that the technology demonstrated to targeted beneficiaries would, eventually, lead to the *adoption* of technologies on a wider scale. While the original indicator measures both the beneficiary and non-beneficiary[5] populations the revised indicator measures the percentage of *beneficiary* farmers that continue using/benefit from extended technologies. Yet the objective of the project as per the design was to create a mechanism for adoption rates among all farmers in the project area. While the project states it has achieved 122 percent of the target value, the proposed measurement does not capture the intended objectives of the project. Likewise, under Component 3, the indicator was revised to measure the percentage of *beneficiaries* that adhere to the manure management practices. However, the objective of the component as stated in the PAD was to develop a technology for the local conditions that would be demonstrated and *adopted*. While anecdotal evidence exists to suggest that the popularity of the biogas digesters, in particular, led to adoption of the technology even after the project closed, the indicator only measures the sustainability of the technology amongst beneficiaries, rather than amongst the non-beneficiary populations. The indicators for Component 2 were not revised, and thus, continue to measure inputs rather than outcomes or outputs.

Despite the issues in design and the later revisions, the monitoring and evaluation was consistent throughout project implementation. While the PIU did not face any insurmountable problems in collecting data for the M&E, the revisions in the MTR were done with the specific aim of revising the indicators to present a more realistic assessment of projected outcomes. These revisions also did not pose any issues in the data collection process, and the M&E implementation and utilization is rated satisfactory.

2.4 Safeguard and Fiduciary Compliance

As a category "C" project no environmental safeguards were considered applicable during appraisal. Project impacts were considered mainly positive for the environment.

[5] Beneficiaries are defined as farmers who have directly benefited from either a research or demonstration grant. Non-beneficiaries represent farmers who have not directly benefitted from grant resources beyond their purely demonstrative and research objectives.

Even though in the initial stages of the project there were difficulties in obtaining adequate counterpart funding, project financial management was found to be satisfactory throughout implementation. The centralization of PIUs for agriculture projects meant that financial management and procurement benefitted from staff that was knowledgeable in World Bank procedures. The last financial management review of operations managed by ADPCC was carried out as part of the last supervision mission in June 2008. The rating for financial management of the project as of this review remained Highly Satisfactory.

Procurement was satisfactory throughout the implementation of the project. A final procurement review was undertaken as part of the last supervision mission and was rated satisfactory. ADPCC has significant experience with project closings and grace period payments, and all payments were completed in a satisfactory manner.

2.5 Post-completion Operation/Next Phase

Overall, the sustainability of the activities funded under the project is considered to be high. The section below provides a component by component overview of the post-completion arrangements.

Component 1: Competitive Grant Scheme

In addition to funding numerous significant sub-grants under the project that were imperative to sustaining Georgia's agricultural extension system during very turbulent economic and political times, the CGS introduced a new and innovative mechanism for funding agricultural research. As such, a secondary benefit of this component was training researchers in how to review and assess proposals on a competitive basis. This capacity was instrumental in continuing the CGS model for funding research services, and the model has been mainstreamed into the Georgian National Science Foundation that was created in 2005 to award grants on a competitive basis.

Component 2: Reform of the Agricultural Research System

This component was intended to serve as a model for reforming the agricultural research system through the complete reform and restructuring of one such institute- the IVHO. The sustainability of the reforms to the IVHO is considered to be quite high, since the institute is currently able to cover all of its costs, partially through public funding, and partially through selling services and products. Thus, the reforms and rehabilitation of the IVHO is expected to be sustained in the future. Unfortunately, given the rapidly changing political and economic climate in Georgia, further institutional reform of the Agricultural Research System has been put on hold indefinitely as other policy concerns have taken priority. Thus, while the activities funded under the component have been largely successful and are expected to be sustained, the next phase of reform remains unclear.

Component 3: Environment Pollution Control Program

The sustainability of the biogas digesters (BGD) that were installed under the program is rated high, based on field visits and other documentation. The BGD that were installed are expected to be operated and maintained without problem, since all the farmers were

trained in operating the installations and the BGD are locally produced and local companies can provide maintenance services. Discussions with contractors and beneficiaries reveal few problems as long as operating procedures are followed. However, the sustainability of continued promotion and adoption of the BGD remains unclear. BGDs require an initial investment between US$ 2,000 to 2,500 per unit, which is beyond the abilities of most rural farmers today in spite of the potential estimated US$400 a year in savings on energy and fertilizers these systems represent depending on farming model. As such, the pilot has been successful in demonstrating the technical viability of these systems, however significantly more in-depth analysis of the economic benefits would need to be undertaken to be able to conclusively say that a subsidy for the building of small scale BGDs would present an optimal way to invest public resources to support small subsistence farmers in Georgia's context. Arrangements including links to potential carbon funding would need to be explored. It is notable however, that since the project closing, other donors have funded continued promotion and installation of some 100 additional units, but the continued adoption of BGDs among small subsistence farmers remains unlikely without some sort of government or donor support.[6]

The soil and water sampling component had been contracted to a private company for the duration of the project. While this arrangement proved adequate for the duration of the project at the conclusion of the contract these water sampling activities finished as well. However, the National Environmental Agency established under the Ministry of Environment in 2005 has been tasked with water monitoring and the data collected under the project has been transferred to the Agency. It has branches in Batumi, Kutaisi, Zestapani and Rustaui, where it samples water along the main rivers in the country. Georgia has also recently adopted regulation that favors the on farm implementation of Global GAP (Good Agricultural Practices) of which a key aim is environmentally sustainable agricultural production. However, these practices in the EU and EU pre-accession countries are supported by subsidy policies and rural development grants that incentivize farmers to adopt them. In Georgia, none of these mechanisms are in place and current agricultural support policy does not provide financial incentives in that direction.

3. Assessment of Outcomes

3.1 Relevance of Objectives, Design and Implementation

The overall PDO as approved in the PAD exhibits somewhat unclear linkages with the relevant project activities. In addition, as goals, they encompass a scope that was, perhaps, too broad and ambitious. While this remains a significant design issue of the project, the components as designed reflected more modest objectives in scope and in approach; all three components introduced activities on a pilot basis, either to be further

6 During the course of the project, some local governments offered to cover the 20 percent contribution of the beneficiaries towards the installation of BGDs. However, the GOG has not indicated that it intends to take over the 80 percent installation costs. Some donors are, at present, looking towards continued financing, but, as of yet, there are not concrete plans to continue the funding of BGDs on a wider scale.

revised and updated throughout the course of the project (Component 1 and 3) or to serve as a model for the sector (Component 2). As such the project activities continue to be relevant in the context of Georgia. Agriculture continues to occupy a large share of employment (over 50 percent) and GDP in Georgia, and provision of farm advice to small farmers remains as necessary as ever. The mechanisms introduced under this project have helped in delivering these services more effectively and with greater participation by farmers in formulating their needs for extension services. The GEO, as approved in the PAD, remains more modest in scope, and thus exhibits closer linkages with the project activities.

3.2 Achievement of Project Development Objectives and Global Environment Objectives

The PDO as approved in the PAD aims "to assist the Government of Georgia to develop an efficient and cost-effective agricultural knowledge system to demonstrate, disseminate and promote the adoption of appropriate technologies that increase sustainable agricultural production and reduce pollution of natural resources." This objective, as formulated here, was only partially achieved. The project components (specifically Components 1 and 3) focused on introducing new farming practices and technologies with the objective of wider adoption rates and reduced pollution. There was little in the project activities or the design of the components to address how sustainable agricultural production was to be achieved. However, in looking at the design of the components as described in the PAD, it is clear that the outcome of sustainable agricultural production was not related to the project activities, and a clear causal relationship is not established. Instead, the activities promoted the establishment of a CGS that would deliver technologies and know-how with the objective of wider adoption rates (Component 1), the reform of one research institute to serve as a model for wider replication at a later point (Component 2), and the piloting of improved manure handling and storage systems (Component 3). These activities would imply a more modest PDO than what was approved. While the PDO was never formally revised, based on the project activities and the objectives laid out in the PAD for each of the components, the project largely achieved its objectives.

The Global Environment Objective of initiating 'measures that would improve on-farm environmental practices, which, over the long-term, would reduce nutrients entering the Black Sea" was largely achieved. This was accomplished through research and demonstration grants in nine main categories representing key agricultural activities in the country (detail of grant activities is reflected in annex 2) A total of 55 grants dealt directly with land conservation and erosion control techniques as well as improved water run-off controls and fertilizer management techniques. However, little data is available on the adoption of these technologies outside of the direct beneficiaries. Pilot technologies that were introduced to reduce pollution in the small rivers adjoining project are linked with a reduction in organic particles in suspension and nitrate contamination by some 5 percent according to samples taken under the project. Biogas digesters, meanwhile, have dramatically improved the livelihood of individuals who have been direct beneficiaries of the demonstration program. However adoption of this technology by farmers without external resources remains unlikely, given the high upfront costs.

Such a program, based on a more in depth economic review, relative to other instruments to support small farmers, may be a possibility worth revisiting if financing of the construction and installation could be organized with carbon funding.

Component 1. Competitive Grant Scheme: **Moderately Satisfactory.** Based on the description in the PAD, the objective of this component was twofold. First, a competitive grant program was to be introduced with the key objective of re-establishing the link between the scientific community and farmers at grassroots levels. This objective was largely achieved, with the introduction and continued operation of a competitive grant scheme to fund on-farm extension and training services. During the course of the project 157 grants were funded, of which 155 were rated satisfactory. The CGS mechanism has been adopted by the Georgian National Science Foundation, created in 2005 to conduct applied field research nationwide. The second objective of the project was that the technology introduced under the CGS would be adopted by non-beneficiaries of the project. However, during the mid-term review revision of indicators, this objective seems to have been lost. While the end of project survey responses confirm the usefulness of the technology introduced under the CGS by the majority of farmers interviewed, there appears to be little is very little actual adoption by farmers who have not directly benefited from grant financing. The results of a beneficiary survey by an independent consultant show that 73.2 percent of CGS participant farmers continue using/benefiting from the extended technologies after completion of grant financing, and most of these farmers (69 percent) consider the introduced technologies effective. Some 38 percent of farmers characterize yield growth resulting from application of the new technologies as significant and 78.9 percent believe the quality of their produce increased. While the survey indicated adoption amongst non-beneficiaries as negligible, anecdotal evidence indicates some adoption did occur, particularly of new seed materials, improved seedling for wine, and new varieties of potato. Adoption of practices that involved more processes than direct materials or use of inputs, were less successful. Overall larger more progressive farmers have been more willing and able to adopt the demonstrated technologies The survey results indicate that while recognition for technology was significant, as illustrated by high satisfaction by direct grant beneficiaries, and awareness by indirect beneficiaries, effective diffusion is hampered by factors beyond the project, such as lack of access to credit necessary for investments in new technology, weak supply chains for produce to reach markets, and a very open trade regime that forces very low producer prices. Given the success of the CGS as a mechanism, but the low adoption rates to date of the technology introduced, the component is rated *moderately satisfactory*.

Component 2 – Reform of the Agricultural Research System: Satisfactory. The objective of the component, to introduce reforms through the restructuring and rehabilitation of one research institute, was largely achieved. The IVHO was chosen through extensive consultations with the Government and other stakeholders. At project design the expectation was that reform model introduced in IVHO, would be used as a template to replicate in the other agricultural research institutions. A sector-wide reform of the Agricultural Research System has been initiated by Government. However, a clear strategic plan remains to be agreed until the role and interface with universities, the Academy of Sciences, and line ministries, has been determined. Nonetheless, the reform

of and the investment into IVHO have actually gained results which go much beyond providing scientific support to the priority area of horticulture and viticulture. Laboratory equipment and other facilities now housed at IVHO will lay the ground work for further research especially as they relate to the selection of wine varieties, diseases and development of disease control methods, and control of foreign substances in wine production. Technical expertise and lessons learned from operating CGS under ARET Project are factored into the set-up of the National Science Foundation that now administers yearly grants programs according to agreed priorities. The objective of the component defined as piloting reform of a selected priority institute of the agricultural research system, and the formulation of a strategic vision for reform of the research system has been significantly achieved. In Georgia's turbulent political environment, this has to be considered a *satisfactory* achievement of component outcome.

Component 3. Pilot Environment Pollution Control (EPC) Program: <u>Satisfactory</u>. The primary aim of this component was to educate rural communities of the selected districts of Western Georgia on the basics on-farm management of organic waste and its implications for the quality of the environment. The pilot EPC program implementation revealed that farmers are unlikely to adopt those elements of manure management which do not carry direct and tangible economic benefits. BGDs carried benefits for the environment and served economic interests of cattle farmers. In response to the local demand, the pilot program disseminated BGDs in a larger number of administrative districts than planned originally, and significantly raised awareness of this technology, as revealed in a beneficiary survey conducted at the project's closing. Tracking contents of nitrogen (N) and phosphorous (P) in the minor river crossing the village with the highest proportion of farms with good manure management practices showed decrease of NO_3 and PO_4 decreased respectively by 4.6 percent and 23.5 percent. However, the impact of the BGDs on water pollution remains a tenuous link. With the demise of the Soviet Union, and the subsequent privatization of farms into small plots, most of the farmers reverted to subsistence farming and no longer used intensive mineral fertilizers which may have played a significant role in nutrient reduction. The lack of control sampling in non-project areas makes attribution of reduction of pollution to the project difficult.

A significant aim of the component was the effective piloting and testing of suitability of BGDs in Georgia. As previously described several designs were tested and in this process builders and manufacturers have gained significant expertise in this technology. While the technology introduced under this component largely remains beyond the reach of Georgia's small farmers targeted under the project, significant external benefits were gained from this work. However, the purchase and installation of the BGD technology is estimated at US$2,500 per unit, and remains unaffordable for the rural populations of Georgia, who are typically subsistence farmers with limited incomes. The case for BGDs vis-à-vis simpler and less costly technologies in terms of objectives to reduce pollution remains unclear. Manure pits introduced under the project, are an example of an effective lower cost method to reduce pollutants to the Black Sea. However, farmers preferred the BGD technology (particularly with significant GEF co-financing), since they brought tangible economic benefits in the form of cost savings in energy. Given these facts, the pilot EPC Program is rated as *satisfactory*.

3.3 Efficiency
At the time of appraisal, there was no analysis done on the economic rate of return (ERR).

Component 1 – Competitive Grant Scheme:
The economic assessment concentrated on a sample of projects with beneficiaries that have retained the new technology spread by the sub-projects. IRR calculations were based on 10 years of operating the investments made under the sub- projects.

The information for conducting the economic impact assessment is based on:

- sub-projects documentation, mainly final grant reports for assessing expenses incurred by the farmers in operating/maintaining the technology introduced under the investment;
- market prices of goods produced by farmers to derive gross revenues; and
- price indices provided by state statistics services for calculating other parameters and forecasting future cash flows from operating the investments.

The analysis shows that the average internal rate of return of grants amounted to 38 percent with a wide range of results between categories and individual grants. Due to the lack of adoption beyond direct project beneficiaries, the incremental impact of this component on the economy of the project areas remains very modest. However, measuring impact of the diffusion of knowledge and technology are processes that are affected by time and other factors beyond the scope of the project.

Component 2 – Reform of Agricultural Research System:
The IVHO as a result of its reorganization has been able to greatly increase its revenues and undertake research and provide advisory services that are beneficial for the farming community and for which to a significant extent commercial farmers and processors are willing to pay. While it largely has been able to retain its state budget allocations today these resources only represent about 30 percent of its operating budget. In addition to state funds the IVHO is now contracting some 30 percent of its operating resources in the form of research grants from the National Science Foundation and another 35 percent from the sale of services to farmers and agri-business. As such the component has significantly helped in improving the efficiency and sustainability of agricultural research and extension and rebuilding the link between the agro-scientific world and farmers. These are lasting effects that will continue to accrue past the project's conclusion.

Component 3 – Pilot Environnemental Pollution Control Program
Results from the survey show high levels of satisfaction of beneficiaries of the BGD technology. However economic benefits remain limited at around US$120.00 a year from energy against an investment cost of US$2,000-2,500. Benefits improve dramatically in case of intensive agriculture where the BGD's production of highly nitrogenated organic fertilizer is used for high value horticulture, green house production, or intensive orchards. In intensive farm operations the combined benefit of energy and fertilizer can be as high as US$480.00 per year according to reports produced under the project. However, given that most farmers under the project operate low intensity farm

operations, the actual benefits remain significantly lower (estimated around US$200.00). Assuming a 12 percent discount rate and 20 years of operation, the rate of return only amounts only to some 5 percent.

3.4 Justification of Overall Outcome and Global Environment Outcome Rating

Rating: <u>Moderately Satisfactory</u>

While the project remains relevant to global and country objectives, and it achieved its investments, the justification for a rating of *moderately satisfactory* stems from the fact that the specific activities funded under the project had only a weak link to the Project Development Objectives and the Global Environment Objectives. The PDO, as listed in the PAD, is to "develop an efficient and cost-effective agricultural knowledge system to demonstrate, disseminate and promote the adoption of appropriate technologies that increase sustainable agricultural production and reduce pollution of natural resources." The project initiated institutional reform within Component 2, the link between reforming the IVHO and the development of an "efficient and cost-effective agricultural knowledge system" is incomplete without adoption of reforms across the other research institutions. There was little scope for follow up within the Component to ensure the extrapolation of reform initiatives to the agricultural knowledge system as a whole. This is particularly salient given the lack of analysis done at project closing on the efficiency of the system. So while the reform of the IVHO was carried through and this institute is now arguably more cost-effective and efficient- which is, in and of itself an admirable achievement- the link between the reform of one institute and the reform on an agricultural knowledge *system* remains underdeveloped.

Second, the link between the PDO of the promotion of appropriate technologies that increase sustainable agricultural production and reduce pollution of natural resources remains unclear. Much of the focus of Component 1-CGS was focused on boosting production or improving incomes of rural farmers, and the indicators associated with this component aimed to measure the number of grants disseminated, or the number of high-quality proposals received. While this remains an admirable objective, there is little mention of the focus on *sustainable* agricultural production that is featured prominently in the PDO. Some of the grants awarded under the CGS invariably went to improving the sustainability of agricultural production, but the prominence of this objective in the PDO suggests that it should have been a key focus of activities implemented under this project.

Finally, the GEO has the objective of promoting appropriate technologies that reduce pollution of natural resources. The biogas digesters bring significant benefits to farm families in the form of cooking fuel, and reduce land erosion and silting of water streams. However, at $2,500 per unit, they remain beyond the means of the average farmer in Georgia. Replication of the technology therefore is uncertain due to the investment costs involved in building these facilities. Given the high input costs of this technology, the objective of introducing technologies to reduce pollution could have been achieved with more cost-effective measures, mainly involving changes in land management practices, manure platforms, etc.

Yet, the achievements of the project remain substantial. The introduction of new technologies to farmers who had recently taken over small private plots, the installation of BGD technologies for a consistent cooking gas source in poor rural areas, and the complete reform of the IVHO were important benefits. There is anecdotal evidence that technology for digester developed under this project offers a springboard to local manufacturers to sell BGDs in neighboring countries. Beneficiaries of the project indicated high levels of satisfaction, and the Georgian scientific community indicated that the project acted as a lifeline for the agricultural research system in a time when state funding had all but collapsed. The link, however, between the project and its development objectives, and the substantiation for achieving these objectives in an efficient and cost-effective manner remains a bit weak. A clearer link between the objectives of the project based on the specific implementation activities would have eliminated many of these issues.

3.5 Overarching Themes, Other Outcomes and Impacts

(a) Poverty Impacts, Gender Aspects, and Social Development

Poverty: The project had a clear link to reducing poverty by expressly providing services to farmers in rural areas that would assist them in improving yields, and thereby positively impacting food production and incomes. While all of the project beneficiaries surveyed as part of the project closing indicated their satisfaction with the project's activities, no assessment was done on the impact of poverty, agricultural yields, or production.

Gender: The project did not have a gender focus in its objectives. Recent evidence has emerged to indicate that females in rural areas are a particularly vulnerable group, especially since the fall of the Soviet Union.[7] Future projects that address rural development activities could take this under consideration.

Social Development: Given the prominent role of agriculture in economic production, the project had an inherent social benefit for a population that relies on subsistence farming for survival. Thus, the fact that the project funded activities that benefited these farmers, who are predominantly poor, had an inherent social benefit. In addition, biogas

[7] IFAD "Rural Poverty in Georgia" indicates that poverty in the rural areas is particularly severe for women and for female headed households. Females face particularly heavy burdens in the rural areas, since the erosion of public services has impacted the tasks that women are typically responsible for, such as farm work, cultivating crops, tending livestock and processing agricultural and dairy products. Overall, and especially in rural areas of Georgia, female headed households face particular vulnerability to poverty, and economic and social crises have eroded much of the gender equality promoted under the Soviet Union. Increased outmigration of men to urban areas and to other post-Soviet countries has increased the number of female headed households. Under the project, no specific targeting was done to address these vulnerable households, and the beneficiary survey respondents were predominantly men (97%). It is unclear whether this means that the beneficiaries of the project typically did not include female headed households, or whether the sampling techniques of the final survey tended to favor male respondents, or even whether outmigration is an issue in the project areas. Again, little data exists to confirm or deny the importance of gender issues in the project areas, but given the increasing vulnerability of women, this could be addressed in future projects.

digesters were installed for populations to provide cooking gas for remote rural populations, this also alleviates some of the cost burden on the poor for gas, or time spent on collecting wood.

(b) Institutional Change/Strengthening

The project restructured the institutional mechanisms involved in basic agricultural research as well as disseminated agricultural technology. These changes were necessary since research and farm information had previously only been disseminated at the level of agronomists working for collective farms (sovkhozes and kholkhozes). The new mechanism improves delivery to the grassroots i.e. farmers directly, and also allows for better feedback up the agricultural information chain. The competition introduced in the model also ensures that research is more in line with demand of the sector and farmers in general. For Component 1, institutional configurations to administer grants in a competitive way were adopted, and the project funded an important development in this end.

While it was understood that the resources under the project would only suffice for the restructuring of one of the units of the Agricultural Academy, there was the expectation that the reforms pioneered under the project would be adopted across the Agricultural research sector. Although an overall plan and strategy have been adopted, little has been done beyond the IVHO's restructuring and the adoption of the competitive grants mechanism across the Agricultural Academy, mainly due to a lack of resources. For Component 2, the hope was that the research institutes would benefit from the examples of reforming the IVHO, but in the end, little progress has been made to this end.

Under Component 3, the introduction of BGD technologies was done with the implicit objective also of building the capacity of local producers to replicate and disseminate this technology. Specific provisions were made under the project that the BGD technology adopted would be licensed under Georgian law, and for local production. As a result of this, several local businesses developed to promote and replicate the technology. As demand has risen for the technology, the volume of production has increased, and the costs of production have fallen, making local companies competitive in the production of BGD. In addition, local companies have introduced innovations and improvements to the technology: where BGD were initially built from concrete blocks, one local producer has introduced reactors built of polymeric materials. In addition to reducing production costs, these plastic digesters last longer and don't deteriorate under harsh weather conditions. While the capacities of local production companies has been built in the production and installation of BGD technologies, it is unclear whether the demand for this technology would continue once the project closed, given the relatively high costs of the technology.

(c) Other Unintended Outcomes and Impacts (positive or negative)

The introduction of a competitive financing mechanism introduced under Component 1 required significant training for staff and reviewers, and a detailed operational manual was prepared to systematize this mechanism. This approach to financing has been well received in Georgia, and has been mainstreamed throughout the National Science Foundation as administered by the department of Education. This mechanism now leads

to more demand driven and outcome based research, not only for agriculture but for research funding in Georgia overall. The project has greatly contributed to the development of grant writing skills. This newly acquired skill has already helped a number of scientists at the IVHO to apply for funding from outside resources and help present their research data to attract investors, as well as consulting assignments.

Under Component 3, the approach of the project was to pilot and test the BGD technologies to eventually build a model that was suitable to the local conditions of Georgia. The extensive piloting of biogas digesters and close collaboration with construction firms and designers has contributed to build significant local capacity in the design and implementation of Biogas systems. Local expertise has grown to the point that some of the firms that supplied the project have managed to bid on international assignment in neighboring countries

3.6 Summary of Findings of Beneficiary Survey and/or Stakeholder Workshops
During the course of the project, there were two beneficiary workshops that were held throughout the country. Workshop summaries are presented in Annex 6.

(a) Assessment of Risk to Development Outcome and Global Environment Outcome

Rating: Moderate
The risk to the Development and Global Environment outcome as formulated in the PAD cannot be assessed, since there the relationship between these and the actual project activities carried out remains underdeveloped. However, the risk to the objectives of each component as described in the PAD is assessed as being moderate. The CGS has already been mainstreamed nationwide and much of the capacity that was built under the project to administer the CGS and to review grants is currently being used by the Georgian National Science Foundation. The risk to adoption rates of technologies is low, since farmers continue to benefit from the demonstration services. Risks to the institutional reform component (Component 2) remain moderate, since the IVHO is currently operating as a research institute and has successfully procured large parts of its own funding. While the BGDs that have been put in place are sustainable and will be maintained due their contribution in energy generation for the beneficiary households, it is likely that the number of these digesters will not increase significantly without additional outside funding and thus the demonstration effect of these facilities and further reduction in reducing organic pollutants will remain limited.

5. Assessment of Bank and Borrower Performance

5.1 Bank Performance
(a) Bank Performance in Ensuring Quality at Entry
Rating: Moderately Satisfactory
The Bank's performance at entry and throughout the lending phase of the project is ranked moderately satisfactory. The project activities remain highly relevant to the country, and the team coordinated closely with the Government of Georgia to devise a relevant project in the agriculture sector. The project drew on lessons learned from

global experiences of introducing BGD technologies, and initiating the CGS process within the agriculture sector. In addition, the project drew on recommendations from the country-level to complement and ongoing agriculture project that identified the knowledge and extension systems as being a severe impediment to the ongoing performance of the agriculture sector. However, some key areas of the project design remained underdeveloped, most notably between the PDO and the design of the components, and the design of the components and the M&E sections. From the project component designs, the team seems to have had a clear vision for activities, although these related only loosely to the PDO and the M&E sections.

Project preparation was professional and the overall emphasis of the project to support agricultural knowledge and its delivery at field level was based on solid analytical work. The project remained flexible in using a "pilot" design; by introducing new technologies and initiatives slowly and gathering feedback along the way, the project aimed to find the most relevant and effective measures to achieve its objectives. The work of the team and the pilot approach proved highly relevant to the context, and these factors counterbalance the loose linkages between the PDO and project activities in the PAD to merit a rating of *moderately satisfactory*.

(b) Quality of Supervision
Rating: Satisfactory
The quality of supervision is rated Satisfactory. This assessment is based on the fact that supervision missions were conducted on a regular semi-annual basis. In addition, as issues with the project emerged they were handled in a timely fashion by the Task Team Leader, who is based in Tblisi. The supervision team identified and followed up on issues in a timely fashion, and the team composition reflected adequate expertise. The supervision team adequately addressed periods of shortage of counterpart funding with proactive reminders of the government's obligations for co-financing project activities. The services of environmental specialists by GEF budget were very helpful in monitoring the impact of demonstrated technologies on the GEF objectives. Beyond initial problems with counterpart funding before the rose revolution there were no few issues with fiduciary or safeguard policies that that were addressed in a timely fashion.

(c) Justification of Rating for Overall Bank Performance
Rating: Moderately Satisfactory
The project design was solidly grounded in a sector review, and the experience gained from the previous Agriculture Development Project that identified agricultural knowledge transfer as a key issue constraining the potential of the sector in Georgia. The greatest issue with the project design was the fact that the overall objectives and outcomes of the project remained underdeveloped, particularly in creating clear links to the project activities. In addition, the monitoring and evaluation framework measured inputs rather than outputs and outcomes of the project at design. The Bank was proactive in working with the government to improve the indicators, although the revised M&E framework remained further removed from the stated objectives. While the project required two extensions (the closing date of the IDA credit and the GEF grant were each

extended trice), the scope of activities as outlined in the PAD were generally completed. For these reasons, the Bank's performance is rated *moderately satisfactory*.

5.2 Borrower Performance
(a) Government Performance
Rating: Moderately Satisfactory
The project was implemented during a time of great transitions for the Government of Georgia. This transition resulted in frequent staff turnovers within the Ministry of Agriculture, and, at times, to shortages of counterpart funding. Funding problems occurred in all projects in Georgia at the time, and were not only present in ARET. However lack of counterpart funding never reappeared once the Rose Revolution took hold. Given the extent of the changes at the top political levels, the project was generally implemented in a timely fashion.

(b) Implementing Agency or Agencies Performance
Rating: Satisfactory
During the course of the project, the political environment was one of frequent changes, and this led to staff turnovers at the highest levels. Just in the course of the project, the Minister of Agriculture changed six times. These Ministers had conflicting visions of the shape and role of the agricultural sector and related institutions, which led to some delays during the implementation of the project. Some of this delay was made up by the consolidation of all Project Management Units (PMU) for agricultural projects within the Ministry of Agriculture under the ADPCC. This centralization allowed for more consistent follow up, and interaction between implementing actors and relevant Ministry staff, which enable the project to also move faster. Thus, the implementing agency's performance is rated as *satisfactory*.

(c) Justification of Rating for Overall Borrower Performance
Rating: Moderately Satisfactory
Given the above, in spite of the delays in project implementation due to the many changes at the Ministerial level, overall borrower performance is rated as *moderately satisfactory*. This is based on the fact that the project required three extensions of closing dates because of delays experienced in implementing the project. However, many of the delays occurred because of the broader political context rather than from the Borrower's doing.

(a) Lessons Learned
Some key lessons learned from this project include:

Designing programs must take account of the broader social and economic contexts.
The Government of Georgia, as one of the most liberal economies in the region, has, over the past decade, reduced trade barriers and eased red tape to attract foreign direct investment. In 2006, Georgia was named the top reformer by the World Bank's Doing Business Report because of a drastic reduction in business regulations. However, market liberalizations, while beneficial for the country as a whole, has had a more significant impact on rural subsistence farmers who compete with relatively cheap imports for basic

foodstuffs. Given this environment, the project's focus on extension services as a catalyst for increasing production was hampered by weak supply chains and relatively low producer prices. In addition, small farms that provide subsistence living may not have been the best poised to take advantage of technology and extension services for export production.

Technology adoption rates are dependent on factors beyond the control of extension services that affect profitability of investments. The broader social and economic context presented a difficult environment for small farmers to boost production significantly. The weak supply chains and high margins at the retail level favor cheap agricultural imports from more advanced neighboring countries and result in low producer prices for small farmers. In such an environment, yield and production increases by small farmers do often not result in improved incomes. The project could have benefitted from a more clear linkage between markets, supply chains, and the purported increased production of the project areas.

Projects benefit from a clear set of objectives that relate closely to proposed activities. The ARET Project undoubtedly achieved a number of significant outcomes. However, the link between these outcomes and the objectives of the project remains underdeveloped. Project documents (such as Aide Memoires and ISRs) throughout implementation of the project frequently listed varying project objectives (at times to provide extension services to small farmers, at times to assist scientific researchers working in agricultural extension), and the activities under each of the components were not consistently linked to the ambitious overall objectives of the project. In addition, some objectives of the project (most notably the aim to improve production and increase farmer incomes) were mentioned in the PAD, but follow up, either through M&E or through specific activities were assumed to occur. Thus, this project could have benefitted from strengthened links between the project objectives, the project activities, and the monitoring and evaluation. Close linkages between each of these typically provide improved focus to the project activities, as well as a clearer ability to assess outcomes and achievements of projects.

Broader social benefits are important to consider in cost-benefit analysis of technologies. In the context of Component 3, biogas digesters and manure pits were installed with the objective of reducing water pollution. The digesters were also expected to bring some monetary benefit to consumers in reduced costs for energy used for heating and cooking. From a cost standpoint, the manure pits were arguably more cost effective in achieving the objective of reducing water pollution, since the installation and maintenance costs of the pits are negligible. The costs of the biogas digesters, on the other hand, were in the range of US$2,000- US$2,500 (although during the project, the cost of the biogas digesters was subsidized by 80%). Despite the relative cost of installation, operation and maintenance, the biogas digesters proved to be much more popular because of the tangible economic benefit they brought to relatively poor households. As a result, the project shifted more resources to the installation of biogas digesters, and away from manure pits. These broader social benefits are not captured in the cost benefit analysis comparing the two technologies, yet projects aiming to introduce

similar types of technologies would do well to examine the broader social context and demand for technologies, and allow for flexibility in shifting resources based on demand.

Prioritizing needs in the agriculture sector is best done around a core set of themes. The Competitive Grant Scheme was designed to provide grants based on a number of priority themes set forward by the Government of Georgia. However, the list of priority themes remained fairly long and comprehensive at the project start; nine priority areas were identified as being of particular importance to the agriculture sector, each with countless subsectors. One lesson that can be derived is that this list of priority areas remained too large, essentially funding any activity within agriculture. A more directed approach could be achieved with a more narrow set of priorities that defines the key areas for investment in the agriculture sector. By focusing the grant scheme around a smaller set of priorities, the investments made with the CGS could achieve a more targeted and comprehensive result.

7. Comments on Issues Raised by Borrower/Implementing Agencies/Partners

(a) Borrower/implementing agencies

The comments of the GOG (Annex 8) highlight the significant achievements attained under the ARET project, and the positive role the implementing agency (ADPCC) at the Ministry of Agriculture played in completing project activities, particularly in the face of significant political turnover. These comments are duly noted and reflect the engagement of the government in the implementation of the project. However, as discussed in previous sections of the ICR, while the project attained several noteworthy outcomes, a number of these achievements fall outside of the project objective, as stated in the PDO. While these achievements are not to be discounted, without a formal revision of the PDO, the ICR did assess the achievements of the project based on original project objectives, and on that measure, they remain moderately satisfactory. The GOG also noted that it successfully implemented the project. This ICR rates the performance of the ADPCC as satisfactory while overall borrower performance remains moderately satisfactory essentially due to the lack of continuity in policy that has hampered implementation and resulted in significant implementation delays, and 3 project closing date extensions.

(b) Cofinanciers.

(c) Other partners and stakeholders

(e.g. NGOs/private sector/civil society)

Annex 1. Project Costs and Financing

(a) Project Cost by Component (in USD Million equivalent)

Agricultural Research, Extension & Training Project – P065715			
Components	**Appraisal Estimate (USD millions)**	**Actual/Latest Estimate (USD millions)**	**Percentage of Appraisal**
Competitive Grant Scheme	**4.07**	**3.33**	**82%**
Reform of the Ag Research System	**2.76**	**3.71**	**134%**
Pilot environmental pollution control program	**0.00**	**0.04**	**-**
Project management unit	**0.71**	**0.90**	**127%**
Total Baseline Cost	**7.54**	**7.98**	**105%**
Physical Contingencies	0.51	0.00	
Price Contingencies	0.82	0.00	
Total Project Costs			
PPF	0.00	0.00	
Front-end fee IBRD	0.00	0.00	
Total Financing Required	**8.87**	**9.65**	**108%**
Agricultural Research, Extension and Training GEF Project – P064091			
Components	**Appraisal Estimate (USD millions)**	**Actual/Latest Estimate (USD millions)**	**Percentage of Appraisal**
Competitive grant systems	**1.19**	**0.89**	**75%**
Reform of the ag research system	**0.00**	**0.00**	
Pilot environmental pollution control program	**1.29**	**1.54**	**119%**
Project management unit	**0.00**	**0.05**	**-**
Total Baseline Cost	**2.48**	**2.48**	**100%**
Physical Contingencies	0.00		
Price Contingencies	0.00		
Total Project Costs			
PPF	0.00		
Front-end fee IBRD	0.00		
Total Financing Required	**2.48**	**2.48**	**100%**

(b) Financing

P065715 – Agricultural Research, Extension & Training Project				
Source of Funds	**Type of Financing**	**Appraisal Estimate (USD millions)**	**Actual/Latest Estimate (USD millions)**	**Percentage of Appraisal**
Borrower		1.26	1.67	140%
International Development Association (IDA)	Credit	7.60	7.98	105%
P064091 – Agricultural Research, Extension and Training GEF Project				
Source of Funds	**Type of Financing**	**Appraisal Estimate (USD millions)**	**Actual/Latest Estimate (USD millions)**	**Percentage of Appraisal**
Borrower		0.41	0.0	-
Local Communities		0.66	1.41	214%
Global Environment Facility (GEF)	Grant	2.48	2.48	100%

Annex 2. Outputs by Component

Component 1: Competitive Grant Scheme

Under this component one pilot and three full scale CGS rounds were held between 1999 and 2003. Out of the total 157 awarded sub-grants, 154 are closed and fully accounted for. One sub-grant project is completed, but the recipient failed to submit the final report in a format acceptable to the Competitive Grants Board (CGB). Two sub-grants were cancelled after payment of the first tranches due to failure of recipients to perform. In more detail the following grants were administered under the component.

Category	**Activities**	**Outcome**
Viticulture	- 10 sub-projects covering some 13 villages in the 9 districts under the project - 84,000 grape seedlings were planted on a surface of some 25 ha. - 10 demonstrative nurseries were established and 290,000 high quality seedlings were produced	These activities reflect significant steps towards the preservation of the genetic fund of unique Georgian vine varieties such as Aleksandrouli, Mujuretuli, Usakhelauri, Chkhaveri, Aladasturi, Ojaleshi, etc. (no data on sale of seedlings)
Field crop – potato	- 9 sub-projects in 36 villages of 16 districts. - New varieties introduced and multiplied on 64 Ha.	New higher yielding material has successfully been introduced in South Georgia (no harvest data)
Orchard trees	- 11 sub-projects in 29 villages and 18 districts - a total of 42.5 ha of orchards were planted. - 6 apple nurseries were established that produced 118,000 seedlings	Demonstrated techniques for grafting, reproduction, and seedling production. (no data on sales of seedlings)
Sub tropical crops	- 7 sub-projects in 16 villages and 13 districts - Some 250,000 high quality seedlings of lemon, tangerine, orange, kiwi and feioja were produced	Introduced sub-tropical crop production in new areas. Methods of production and cultivation of citrus planting stock improved.
Livestock	- 19 sub-projects in 26 villages and 13 districts. - some 162 cows and 300 goats higher yielding breeds introduced. - Demonstrated IA program for higher yielding breeds on 500 cows Demonstrated vaccination effects covering some 1,800 animals -Demonstrated feeding improvements correlation with milk production - Tested hybrid breeds for suitability of local conditions	Introduced improved feeding practices and more intensive dairy cow management as cornerstone to improve dairy productivity
Field crop- grains	- 18 sub-in 58 villages of the project's	350 endemic varieties

and legumes	29 districts. - Wheat, maize, soya, pea, lentil, bean production technologies tested on 30,000 ha - 322 t of high quality seeds of cereals produced	collected recorded and certified.
Marketing and processing	- 14 sub-projects in 19 villages of 12 districts - milk and mushrooms processed in small farms - Introduced non-traditional crops; hot and sweet peppers, garlic, spices, walnut, citrus flowers, sea-buckthorn, bay and stevia leaves, potato	Demonstrated small artisanal processing technologies and non traditional crops
Land management	-55 sub-projects in 42 villages in 8 districts - erosion control integrated methods conducted on 57.2 ha - land degradation restoration in 43 villages covering total of 53.25 ha (rehabilitation of the drainage network, sideration, introduction of cover crops - soil fertility demonstration with digester residue and spreading techniques	Demonstrated techniques to help land erosion and degradation reduction
Non-agricultural activities	14 sub-projects.	Demonstrated off farm economic activities

In November 2007 two meetings of CGS stakeholders were held in the eastern and the western parts of the country. These forums were provided to discuss outcomes of the CGS-financed sub-projects, to look at their impact a few years since completion, and to work out recommendations for more efficient assistance to small farmers in future. The meetings were attended by prominent agro-scientists of the nation, managers and participants of the CGS-financed sub-projects, authorities representing local government bodies, managerial and operational staff of ADPCC and the World Bank Task Team. A unanimous opinion of the workshop participants is that small scale farms will continue to exist to carry important social role in rural Georgia for medium term perspective. Therefore, improving management systems and technologies used in them is of much importance for addressing rural poverty as well as for improving quality of the environment. CGS stakeholders spoke about critical importance of the project assistance delivered to a great number of agricultural science and production units in the most difficult times of economic crisis in Georgia, multiple positive externalities of this assistance, and bright examples of post-project sustainability of the initiatives piloted under CGS.

The CGS model is now mainstreamed nationwide. It is being used by the Georgian National Science Foundation, created in 2005 to give out grants on the competitive basis. Technical expertise and lessons learned from operating CGS under ARET project are

factored into the set-up of this Foundation. It has separate branches of financing for the young scientists, travel to scientific forums, supplying of equipment and development of infrastructure for scientific needs. The main branch of funding is grants for carrying out priority research programs. It is noteworthy, that the Georgian National Foundation is a party to the South Caucasian Science Foundation. This regional institution pools public resources from the three countries of the South Caucasus and finances research programs from the three member states on the basis of international competition.

Component 2: Reform of the Agricultural Research System

IVHO was nominated the main beneficiary of the reform component by multiple stakeholders, because it had been a lead institution providing scientific support to the priority field of Georgia's agriculture with many decades of prominent history and with a strong potential to revitalize its capacity. A comprehensive plan of reform was developed for IVHO, covering all aspects of its activity. A respective investment plan was also produced.

After several years of reforming the institute re-establishing itself as a strong research and extension facility adapted to the current economic and legal framework of Georgia and relevant in the context of modern international scientific community. In the course of reform the mission statement of IVHO was re-though and newly formulated. A new, consolidated research plan was produced narrowing down the number of priority research themes from 33 to 9. This plan is realistic and responsive to the client demand. The research plan aims at ensuring steady yields of grapes and fruits; facilitating sustainable use of natural resources; enhancing food security, restoring and strengthening strategic alliances between agro-scientists, farmers, and business clients.

One of the main challenges of restructuring IVHO was introduction of a modern and effective model of research management that drives towards the overall goal of reform and is fit for market-driven economic environment. A new organizational chart was developed for IVHO and optimization of the institutional set-up was carried out accordingly. The existing 30 research departments and laboratories were replaced with newly assembled 5 research and 3 service departments, including a computerized information center, an extension and training center, and a central laboratory. Two neighboring testing and extension stations of Gori and Skra were merged under a single management unit and a number of other small unsustainable stations were abolished.

Administration and financial management of IVHO underwent fundamental changes. A new legal status allowed the Institute to diversify sources of income, previously confined to public funding from the State budget. At present IVHO is encouraged to generate its own revenues from providing services that fall in the scope of the Institute's mission statement. IVHO managed to quickly expand client services, including advice and guidance for planning and starting new vineyards and fruit orchards; a vide spectrum of chemical analysis of soil, plants, and agricultural products; and a variety of training opportunities provided to undergraduate, graduate, and PhD students. Research teams of IVHO are successfully competing for local and international research grants.

The building of IVHO was fundamentally rehabilitated and new premises were provided for Skra, Sakara, and Telavi testing and extension centers. Highly valuable living collections of Georgia's vine varieties, as well as trial and demonstration plots of IVHO (11,5 ha) and Georgia State Agrarian University (4,5 ha) were rehabilitated and emergency repair works completed at the premises of IVHO's historical collection of wine samples used for research purposes. The Institute was provided with a full set of up-to-date information technologies. The brightest highlight of the investments made in IVHO is the delivery of the most contemporary laboratory equipment allowing to carry out high-tech research in almost any field of natural science. An initial stock of chemical and other laboratory supplies were also provided. Staff was trained on-the-job in calibration, use, and servicing of the equipment.

The above changes in IVHO allowed the Institute to reinforce it lost links with the research centers of the former Soviet Union and other foreign countries. Several new partnerships emerged in the specific fields of research. An increasing number of KHVO staff members are being invited to the professional international forums to present outcomes of their studies and IVHO staff's publications appear in the lead scientific periodicals. One bright sign of the international acknowledgement was holding of the third meeting of a working group on *Malus/Pyrus* under the European Cooperative Programme for Crop Genetic Resources Networks (ECP/GR) in IVHO in October 2007. Scientists from 20 European countries traveled to Georgia to attend this meeting devoted to facilitation of the long-term *in situ* and *ex situ* conservation of Malus/Pyrus resources, enhancement of utilization of plant genetic resources, improvement of cooperation between stakeholders, and better sharing of conservation responsibilities for plant genetic resources.

During the supervision mission's work in Georgia IVHO hosted a workshop on Piloting Reform of Agricultural Knowledge System – IVHO as a Model of Institutional Reform. The purpose of this event was to publicize the reform model piloted in the IVHO to a wide audience of the national stakeholders. The workshop was chaired by Minister of Agriculture. The Members of the Parliament of Georgia, authorities of Ministry of Agriculture, Ministry of Education and Science of Georgia, GSAU, Tbilisi State University, the National Academy of Science of Georgia, the Academy of Agricultural Sciences of Georgia, also a number of prominent agro-scientists and other stakeholders attended the meeting. The reform model piloted in IVHO received full recognition from the represented agencies. Lessons learned and experience gained from its implementation were acknowledged and analyzed for the future sector-wide use.

Reform component provided some assistance to the Georgian State Agrarian University (GSAU) as well. Several classrooms were renovated with the project proceeds and are being used for teaching at the horticulture and wine technology departments. An information center delivered under the project is up and running, being heavily used by undergraduate, graduate, and PhD students and the faculty as well. The assistance delivered to GSAU contributed to its successful accreditation and stimulated further investment from the State budget. The Government delivered more PCs and other

information technologies to the GSAU and also provided heating system for the university building.

Environment Pollution Control Program

The most successful outcome of the EPC Program is promotion and dissemination of the biogas digesting technology, as a powerful element of sound manure management practices in animal farms, which has proven to be most appealing for farmers. During several years of implementation, the Program provided for testing out several models of biogas digesters (BGDs), selecting the one most suitable for the environment of West Georgia, improving some glitches in operation of BGDs, creating public awareness and demand for the technology, increasing local capacity to manufacture and install BGDs, and, finally, demonstrating positive environmental impact of operating BGDs in the locations with high coverage. Upon demand the initially intended geographic area for BGD dissemination had been expanded and several units were installed with demonstration purposes in additional administrative districts. Government of the Autonomous Republic of Achara allocated public resources to co-finance dissemination of BGDs to rural communities.

In response to the clients' demand and based on the outcomes of a quick feasibility study, construction of 20 units of $10m^3$ BGDs had been commissioned in 2007. All of them were delivered and entered into operation. Operational capacity of the $10m^3$ BGDs in terms of the produced biogas and processed manure is 1.6 times higher compared to $6m^3$ BGDs disseminated earlier under the EPC Program. According to the findings of an independent impact assessment of the ARET project, 98.5% of BGDs ever constructed with the project support remain fully operational. Cumulative annual output of methane generated from 292 BGD units installed during the ARET project life varies from 180,000 to 200,000 m^3, which substitutes for about 2,000 m^3 of fuelwood. Increasing demand for BGDs stimulated development of local businesses offering construction and installation of digesters. There are ongoing attempts to bring down the cost of BGD units through using variety of alternative materials and through cutting volume of on-site works required for their installation.

In June 2008 a workshop on the Adoption of Biogas Digestion Technology is Georgia and Perspectives for Its Regional Replication was conducted in Tbilisi, followed by a field trip to the field sites where BGDs are being successfully operated. The goals of this workshop were to summarize experience and lessons learned from the EPC Program implementation in Georgia, to share the knowledge and experience with other multiple stakeholders and to stimulate new initiatives towards further dissemination of the technology throughout the country and the region. The event was attended by representatives of the Government, donor organizations, private sector, and NGOs. The workshop was chaired by the Minister of Agriculture of Georgia. Personal participation of the Minister of Agriculture of Georgia and the Minister of Energy of Georgia shaped particularly high profile of the workshop, emphasizing the interest of and the likely support to further promotion of this technology from the Government. As relevantly mentioned by the authorities of the Ministry of Environment Protection and Natural Resources attending the workshop, after years of successful demonstration of BGDs the

time is ripe for building a strategic plan of scaling up application of the technology throughout the country by providing the State support and right incentives for its adoption.

In the last quarter of 2007 the National Code of Good agricultural Practice was published under the ARET Project in both Georgian and English and disseminated to the relevant audiences within and outside the country. Development of the Code of Good Agricultural Practice leads Georgia closer to the standards established by the EU Clean Water Directive and the EU Nitrate Directive and nicely fits into the nation-wide reforms in the sphere of water resource management.

A comprehensive survey of pastures and grassland of West Georgia was carried out with the project support and published in Georgian and English languages. This document, supplemented with rich photo material and maps, carries important information on the present condition of pastures in terms of their productivity and intensity of use, as well as characteristics of herbal and other vegetation, diversity of flora and fauna, occurrence of erosion, water resources and their quality. The publication provides recommendations and a key action plan for decreasing negative environmental impacts from the use of pastures and grasslands and for sustaining their use in a long term.

Annex 3. Economic and Financial Analysis, Efficiency

At the time of appraisal, there was no analysis done on the economic rate of return (ERR) for the IDA Credit. The GEF component was based on the adoption of more environmentally sustainable agricultural practices and investments that would lead to a reduction in pollutants reaching the Black Sea. This was defined in the incremental cost analysis.

Component 1 – Competitive Grant Scheme: Given the demand-driven nature of the Grant Scheme, type and size of subproject investments were not known during project preparation stage. Instead of computing an economic rate of return at the time of project appraisal, the Operational Manual required an analysis to be performed as part of each grant application process. Since 155 of 157 grants have been completed under ARET a sample from the most significant grants are representing all categories of grants. In addition, at project's closing, there was an extensive survey conducted of the beneficiaries and non-beneficiaries of Components 1 and 3 that showed high levels of satisfaction among the beneficiaries for the services and technologies implemented.

The economic assessment concentrated on a sample of projects with beneficiaries and that have retained the new technology spread by the sub-projects. IRR calculations were based on 10 years of operating the investments made under the sub- projects.

The information needed for conducting the economic impact assessment is based on:

- sub-projects documentation, mainly final grant reports for assessing expenses incurred by the farmers in operating/maintaining the technology introduced under the investment;
- market prices of goods produced by farmers to derive gross revenues; and
- price indices provided by state statistics services for calculating other incomplete information and forecasting future cash flows from operating the investments.

The analysis shows that the average internal rate of return of projects funded under the CGS amounted to 38%, with significant difference in rates of return across the various categories, but also sub-projects. Given the data available to the team, it is not possible to determine what the main reasons are for the wide range of results.

Categories of Sub-Projects by category	Total sub-projects and categories	Number of projects sampled	% of total CGS amount	Average IRR for the category of Sub Project	IRR per Sub Project sampled			
Viticulture	11	3	8%	49.71%	32.36%	64.62%	52.15%	
Potatoes	10	3	8%	79.54%	90.77%	68.23%	79.62%	
Other annual crops	17	4	13%	37.74%	-3.27%	18.36%	37.67%	98.22%
Tree crop development (sub-tropical)	12	3	8%	54.57%	23.16%	78.35%	62.20%	
Cattle breeding	27	3	19%	30.75%	18.81%	43.37%	30.06%	

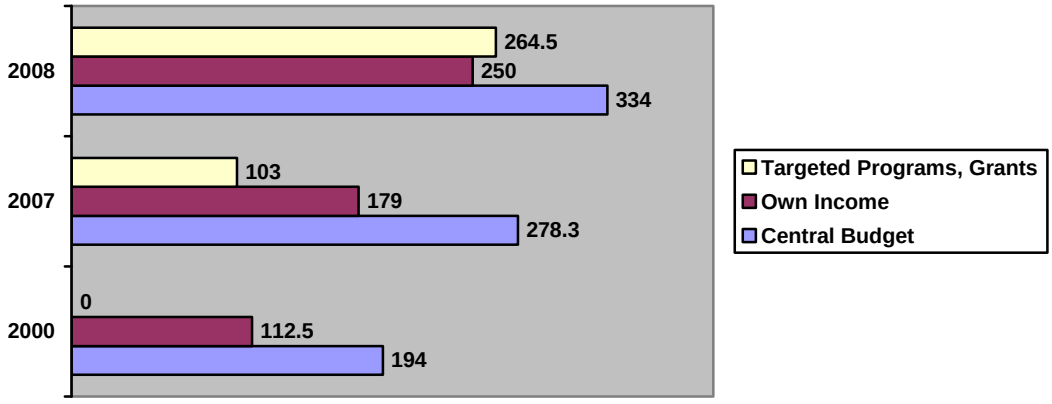
Processing and marketing	13	4	8%	4.39%	7.17%	22.79%	-9.48%	-2.94%
New crop development	14	3	9%	32.16%	-5.33%	20.10%	81.73%	
Anti-erosion	20	3	10%	14.24%	28.99%	15.12%	-1.38%	
Soil fertility	29	4	14%	42.76%	80.82%	49.79%	17.04%	23.37%
Others	4		3%					
Total	**157**	**30**	**100%**	**38.43%**				

In spite of the general success of the demonstrated technologies, the lack of adoption by farmers results in a very limited incremental impact of this component on the economy of the regions covered by the project. However as stated earlier in the text, the economic value of the CGS component is also to be found in the fact that the project has established a new system for output based research and extension and "re-building the bridge" between farmers, research and scientists. Quantifying this aspect was not possible within the purview of this ICR but its impact especially on the productivity of larger commercial farms is be substantial.

Component 2 – Reform of Agricultural Research System: The IVHO as a result of its reorganization has been able to greatly increase its revenues and undertake research and provide advisory services that are beneficial for the farming community and for which to a significant extent commercial farmers and processors are willing to pay. While it largely has been able to retain its state budget allocations today these resources only represent about 30% of its operating budget. In addition to state funds the IVHO is now contracting some 30% of its operating resources in the form of research grants from the National Science Foundation and another 35% from the sale of services to farmers and agri-business. As a result, resources to deliver agricultural knowledge to the farm level have significantly increased while demands on the state budget have remained constant. Thus the component has been instrumental at ensuring financial sustainability in the delivery of research and extension knowledge at the farm level.

The Budget composition of the IVHO for the years 2000, 2007 and 2008 are as follows:

Figure 1: Financial Analysis of IVHO Operating Budget, 200, 2007 and 2008 (US$ millions)



Component 3 – Pilot Environmental Pollution Control Program: Results from the survey showed high levels of satisfaction with the BGD technology that was introduced. The biogas, for households that have no connection to public utilities provides immense benefits for lighting and cooking and time savings. However, in Georgia, most houses are connected to the electric grid, the rural population is relatively sparse, and deforestation is not recognized as a significant issue (0.3% over the past 20 years) benefits remain limited. Thus, the actual benefits from energy remain marginal, at an estimated US$120.00 per year, against an investment cost per BGD of between US$2,000 and US$2,500. Initial estimates for construction were estimated at between US$1,500 to US$ 1,700 so the unit costs of the installations have increased some 20% to 30% with the refinement and adaptation of the design to Georgian conditions.

Significant value added of BGDs comes from the conversion of manure to nitrogen enriched organic fertilizer. Farmers with intensive farming operations such as green houses and high value horticultural crops have significantly higher benefits stemming from the residues removed from BGDs as high nitrogen content, sanitized fertilizer than the value of the energy it supplies.

The value of actual benefits of BGDs therefore is highly dependent on the farming model and the extent to which alternative sources of cheap energy are available, reaching from estimates of US$120.00 per year without counting the value of fertilizer, up to US$$480.00 including the value of fertilizer for the type of BGDs installed under the project. Assuming an average benefit of around US$200.00 per year given that most farmers do not practice intensive agriculture, the NPV of the savings realized by a typical BGD such as installed under the project are at US$ -575 and a rate of return of 5% when using a discount rate of 12%. However, this figure is highly sensitive to farming models as indicated above. The more farmers develop their intensive production and maximize the use of the high value fertilizer from the BGDs, the greater the benefits from BGDs.

As the STAP review of the GEF incremental cost analysis noted, BGDs were in all likelihood not the most effective method to reduce organic pollution from reaching the Black Sea. The residue extracted after digestion has increased nitrogen contents, and retains the main nutrient compounds of manure. Digestion does greatly reduce volumes, which makes storage and management somewhat easier. Proper manure storage does have a beneficial impact on reducing contamination of surface water with nutrients. Data collected as part of the project shows a clear reduction in nutrient loads in small stream adjoining the project areas.

However, the attribution of these impacts directly to the demonstration investments is extremely difficult given that in Georgia mineral fertilizer use and agricultural productivity have significantly dropped over the past 20 years and agriculture has returned to mainly subsistence levels. Estimation of impact is made more difficult from the fact that no baseline existed and no control sampling was done of soils and water in comparable non-project areas to compare the impact on organic matter contamination and reduction in Nitrogen and Phosphorus.

Annex 4. Bank Lending and Implementation Support/Supervision Processes

(a) Task Team members

Names	Title	Unit	Responsibility/ Specialty
Lending			
Jitendra Srivastava	Agronomist	ECSSD	TTL
Ian Shuker	Agricultural Economist	ECSSD	Team Leader
David Bontempo	Operations Analyst	ECSSD	Operations
Meeta Sehgal	Consultant	ECSSD	Operations
David Bontempo	Operations Analyst	ECSSD	Project Costing
Darejan Kapanadze	Operations Officer	ECSSD	Environment
Sharifa Kalala	Team Assistant	ECSSD	Editing
John Hayward	Sector Manager	ECSSD	Quality assurance
Ranjan Ganguli	Financial Management Specialist	ECSSD	FM
Snezana Mitrovic	Procurement Specialist	ECSSD	Procurement
Supervision			
Ian Shuker	Agricultural Economist	ECSSD	TTL
Arman Vatyan	Sr. Financial Management Specialist	ECSPS	FM
Guranda Elashvili	Procurement Asst.	ECCGE	Procurement
Jitendra P. Srivastava	Consultant	ECSSD	Agronomist
Karl Skansing	Consultant	ECSPS	Procurement
Nicolas Gergely	Consultant	AFTAR	Environment
Plamen Stoyanov Kirov	Procurement Specialist	ECSPS	Procurement
Darejan Kapanadze	Operations Officer	ECSSD	Environment, TTL
ICR			
Darejan Kapanadze	Environmental Specialist	ECSSD	Environment
Daniel Gerber	Operations Analyst	ECSSD	TTL
Anna O'Donnell	Consultant	ECSSD	Edit/Analysis

(b) Staff Time and Cost

Stage of Project Cycle	Staff Time and Cost (Bank Budget Only)	
	No. of staff weeks	USD Thousands (including travel and consultant costs)
Lending		
FY00	47	151.77
FY01		0.00
FY99		0.00
Total:		0.00
Supervision/ICR		
FY00	2	4.26
FY01	16	40.89
FY02	21	68.79
FY03	22	47.05
FY04	17	28.66
FY05	14	24.48
FY06	16	16.37
FY07	17	0.00
FY08	15	0.00
FY09		0.00
Total:	140	230.50

The above table is system generated and does not reflect the combined budgets from P065717 and P064091 used for the preparation and supervision of this project. Overall the following figures apply in terms of budget resources absorbed as part of preparation and supervision of this project. An estimated US$ 385,248.26 of BB resources were allocated under the life of the project for the management of the IDA portion of the project P065715, while another US$297,066.99 were allocated from GEF BB under P064091 for the same task. Combined BB resources absorbed under this activity amount to US$ 682,315.25, at the time of the writing of this report.

Annex 5. Beneficiary Survey Results

Within the Competitive Grants Component the survey revealed that introduced technologies are rather important for farmers. For one third of the respondents the introduced technology was innovative. Most of the direct beneficiaries' consider that the technology increased quantity and improved quality of their production/yield, as well as positively impacted the economical condition of farmer' household. However, positive benefits are not yet fully realized by those farmers involved in type of projects that take longer time to pay off (e.g. perennials and improvement of breed). At the moment more than two third of the respondents are still applying the technology and would agree to introduce it today under similar conditions (should it have not been introduced in the past) and would recommend the technology to other farmers. Other farmers' indirect beneficiaries expressed rather high interests in the technology; yet, the survey registered only two individual case of replication of the technology by neighboring farmers.

To compensate on the shortcomings revealed by the evaluation and to increase the effectiveness of the project in the future the evaluation made a number of recommendations. There is a need for better communication of the innovative elements of introduced technologies and benefits that can be expected from its introduction, as well as for more comprehensive training paying adequate attention to all aspects of the application of technology. For effective implementation of large-scale crops-related technologies the availability of preliminary geological assessment and detailed study of soil would be essential. Market studies that would secure farmer's access to the market should be a pre-condition for funding agricultural projects.

The services provided by the ***Information-Consultancy Centers*** established under the project were appreciated by those farmers who were aware of their functioning, but centers failed to sustain their functioning after the completion of the project. On the background of the importance of the service for farmers and the investments of the project into the Centers this final outcome is not acceptable. In future sustainability of such support services and their better anchoring with the Ministry of Agriculture and other relevant institutions should be approached more carefully.

Within the Environmental Pollution Control Program farmers gave high assessments to the need to install the biogas digester and the manure storage facility due to various benefits associated with the installment, including savings on fertilizers, liquid gas, firewood, increase of harvest and improvement of harvest quality. Therefore, most of the targeted farmers during the survey period were still using the biogas digester/manure storage facility apart from single cases of damaged facilities. Most of the respondents' expectations with regards to the biogas digester were met and they would recommend it to other farmers. Lower level of satisfaction was registered in case of the manure storage facility due to false expectations of the farmers to benefit from a biogas digester installation in the future. Indirect beneficiaries are quite positively assessing both equipment and are expressing their potential interest in both the biogas digesters and the

manure storage facilities. However, due to the lack of own financial resources and/or will to invest none of them has installed the technology on their own up to now.

To minimize on weakness revealed during the evaluation in the future the project should pay adequate attention to ensuring maintenance of installed facilities on a long run and avoid cases of defect installment by strengthening control and supervision of construction/installation sub-contractors.

Annex 6. Stakeholder Workshop Report and Results

STAKEHOLDER WORKSHOPS

CGS stakeholder workshops. In November 2007 two meetings of CGS stakeholders were held in the eastern and the western parts of the country. These forums were provided to discuss outcomes of the CGS-financed sub-projects, to look at their impact a few years since completion, and to work out recommendations for more efficient assistance to small farmers in future. The meetings were attended by prominent ago-scientists of the nation, managers and participants of the CGS-financed sub-projects, as well as authorities representing local government bodies, managerial and operational staff of ADPCC and the World Bank Task Team. A unanimous opinion of the workshop participants is that small scale farms will continue to exist to carry important social role in rural Georgia for medium term perspective. Therefore, improving management systems and technologies used in them is of much importance for addressing rural poverty as well as for improving quality of the environment. CGS stakeholders spoke about critical importance of the project assistance delivered to a great number of agricultural science and production units in the most difficult times of economic crisis in Georgia. Multiple positive externalities of this assistance, and several examples of post-project sustainability of the initiatives piloted under CGS were discussed.

The beneficiaries addressed in writing the Minister of Agriculture their opinion on the implemented subprojects and asked his mediation towards the World Bank in order to continue provision of the assistance to the agrarian sector.

Workshop on Piloting Reform of Agricultural Knowledge System - "IVHO as a Model of Institutional Reform". The workshop was held in late June 2008 and sponsored jointly by Ministry of Agriculture, ADPCC - ARET Project and IVHO. The purpose of this meeting was to publicize the reform model piloted in the IVHO to a wide audience of national stakeholders. The workshop was chaired by Minister of Agriculture. The Members of Parliament of Georgia, authorities of Ministry of Agriculture, Ministry of Education and Science of Georgia, the Rector of the Agrarian University, representatives of Tbilisi State University, members of National Academy of Georgia and Academy of Agricultural Sciences, Staff of ADPCC, agro-scientists, the WB staff, IVHO staff and other stakeholders attended the meeting. The Project's outcomes were introduced and summarized by ARETP staff, Director of IVHO and WB representatives.

Participants agreed that a model of reforming an agricultural scientific research institute implemented in IVHO carries important lessons learned and experience gained in practice.

Regional Workshop on "Adoption of Biogas Digestion Technology is Georgia and Perspectives for Its Regional Replication" was conducted in June, 2008. The workshop discussion was held in Tbilisi followed by a field trip to the sites where biogas

digesters are being successfully operated in the Black Sea coastal area near the city of Batumi. The overall goal of the workshop was to summarize experience and lessons learned from the 9 years of Environment Pollution Control Program implementation in Georgia, to share the knowledge and experience with other organizations concerned and to stimulate new initiatives towards further dissemination of the technology throughout the country and region. This was the first and successful attempt to bring all stakeholders and participants being interested in BGD technologies (working in agricultural, environmental and power engineering spheres,) together, including Government, donors, private sector and non-governmental sector. The workshop was chaired by the Minister of Agriculture of Georgia. Minister of Energy of Georgia, Deputy Minister of Energy of Georgia, authorities of Ministry of Environment and Energy recourses also attended the workshop. The main conclusion of the conference was that the introductory stage of Biogas Technology has been successfully completed at country level. However the Georgian Government should take the next steps in support of dissemination of the BGD technology by elaborating a strategic plan at state level and review the possibilities to mobilize additional resources to implement an expansion strategy.

Annex 7. Summary of Borrower's ICR and/or Comments on Draft ICR

Agricultural Research, Extension and Training Project

Implementation Completion Report

Ministry of Agriculture of Georgia

Legal Entity under Public Law - World Bank Financed
Georgian Agriculture Development Projects Coordination Center

INTRODUCTION

Historically agriculture is the mainstay of the Georgia economy. However Agriculture production was seriously disrupted as a result of collapse of Soviet Union. The main sector issues reflect the shift from a command economy to a market – based economy and the problems faced by emerging private farmers, who have little experience with the farm management or operating in a market economy. Shortage of knowledge/information on sustainable agricultural practices in light of global environmental needs, equipment and service facilities, suspended linkage between researchers and farmers resulted in decreased agricultural productivity and competitiveness of Georgia's agricultural market and increased agricultural sourced environmental pollution.

Agricultural Research, Extension and Training Project was designed to help Georgian Government to establish and introduce an efficient and cost effective agricultural knowledge system, to demonstrate, disseminate and promote the adoption of appropriate technologies that increase sustainable agriculture production and to reduce the pollution of natural resources from agriculture sector and thus to assist the Government of Georgia to meet its international commitments under the Bucharest Convention.

Strengthening the agricultural knowledge system and adopting environmentally sustainable agricultural practices would assist farmers in realizing their potential for increased agricultural productivity and profitability, and improve competitiveness of Georgia agricultural sector. In line with government policy the provision of more productive technologies and improved access to information would also support more efficient and profitable production for traditional and new export markets as well as the development of new products.

The Project was developed in three directions, namely: (i) Competitive Grant Scheme to support adaptive research and technology dissemination at the farm level: (ii) agricultural research, extension and training system reform for a selected high priority research direction; (iii) environmental pollution control to reduce agricultural nutrient pollution of the rivers draining into the Black Sea.

MAIN ACHIEVEMENTS

(A) Competitive Grants Scheme

Competitive Grants Scheme (CGS) was a mechanism of financing of the applied research and disseminating its results, aimed at serving improvement of capacity of private farms and ensuring profitability and long-term sustainability. By implementation of this component the first steps were made to reinstate liaison between farmers and scientists to adjust the research works to the actual needs of farmers and to deliver efficient and environment friendly technologies to the wide audience. Later the already tested CGS model was successfully replicated and is being used by the National Science Foundation of the Ministry of Education and Science of Georgia.

Competitive selection of sub-projects under the CGS was carried out in compliance with a comprehensive set of guidelines. The guidelines were developed based on an example provided by the World Bank (WB) and approved by the Government of Georgia. The Competitive Grants Board (CGB) was formed by the order of the Minister of Agriculture of Georgia. The Board consisted of representatives of the Parliament of Georgia; Ministry of Agriculture; Ministry of Finance; Ministry of Economics, Industry and Trade; Ministry of Environment; Academy of Agricultural Sciences; State Agrarian University; farmer NGOs; and farmer communities. The chairmen of the CGB were approved by the Minister of Agriculture. CGB was responsible for operating CGS. ARET Project Technical Unit (PTU) and the CGB Secretariat, being sub-sections of ADPCC, provided day-to day management of CGS.

After an initial review of grant applications by the Secretariat, they were handed over to Georgian and foreign peer reviewers. The final review of applications was carried out by the CGB, grant-winning sub-projects were named, and then grant awarded after obtaining the WB's no objection.

Total of 4 competitions were held. 9 main fields and 32 priority themes under them were covered. 637 initial applications were received by CGS and 157 sub-projects were financed. Out of 157 winner sub-projects 2 sub-projects were terminated due to non-performance against interim indicators. Overall outputs of CGS are as follows:

- 10 sub-projects financed in viticulture sector. 13 villages of the 9 districts covered by the sub-projects. 84,000 seedlings planted on 25 ha, 10 demonstrative nurseries for trees arranged and 290,000 high quality seedlings produced. Significant steps made toward preservation of genofond of unique Georgian vine varieties such as Aleksandrouli, Mujuretuli, Usakhelauri, Chkhaveri, Aladasturi, Ojaleshi etc.
- 9 potato growing sub-projects financed. 36 villages of the 16 districts covered by the sub-projects. New potato varieties seeded on 64.4 ha. Production of high quality planting stock was successfully introduced in South Georgia resulted in real increase of local farmers' incomes and improved social-economic conditions.

- 11 fruit-growing sub-projects financed. 29 villages of the18 districts covered by the sub-project. Total 42.5 ha of Hazelnut, almond and apple gardens planted. 6 nurseries for apple trees, walnut and peach arranged on 6.4 ha producing 118,000 high quality standard seedlings. Fruit tree grafting, seedling growing, vegetative reproduction of walnuts and other improved technologies tested and spread.
- 7 sub-projects financed in sub-tropical crop production sector. 16 villages of the 13 districts covered by the sub-project. Nurseries for lemon, tangerine, orange, kiwi, feijoa arranged and 250,000 high quality seedlings produced. Methods of production and cultivation of citrus planting stock improved, production of certain sub-tropical crops and their introduction to untraditional areas commenced.
- 19 sub-projects financed in cattle breeding sector. 26 villages of the 13 districts covered by the sub-projects. 162 cows and 300 goats of the desired breeds purchased for the farmers. 500 head of cattle inseminated artificially by highly productive breeds of cattle. Total of 1,800 head of cattle vaccinated. Possibility of improvement of milking productivity and milk quality demonstrated through improving cattle nutrition. Various interbreeding tested taking into consideration the existing conditions.
- 18 sub-projects financed in grain growing sector covering total 58 villages of the 29 districts. Wheat, maize, soya, pea, lentil, bean production technologies tested on 30,000 ha. 322 t of high quality seeds of cereals produced and spread. Production of some forgotten varieties of grains restored. 3 expeditions conducted and 350 whet endemic and old Georgian varieties collected which certified and conserved in farms.
- 14 sub-projects financed in the sector of production, processing and selling agricultural raw materials covering total 19 villages of the 12 districts. Hot and sweet peppers, garlic, spices, walnut, citrus flowers, sea-buckthorn, bay and stevia leaves, non-standard potato, milk and mushrooms processed in small farms.
- Environment friendly technologies introduced in 55 sub-projects covering 8 districts of Khobistskhali River and Black Sea basins. In 42 villages of the said districts erosion control integrated methods conducted on 57.2 ha; degraded soil restoration complex methods introduced in 43 villages covering total of 53.25 ha (rehabilitation of the drainage network, sideration, development of new crops etc). Technologies of increase of soil fertility by using the processed manure introduced and spread;
- 14 sub-projects financed in various directions such as bee-keeping, development of extension and training centers, irrigation, etc.

(B) Institutional Reform

As a result of successful implementation of the Institutional Reform Component (IRC) the Institute of Horticulture, Viticulture and Oenology (IVHO) will greatly contribute to the development of priority sectors of Georgia's agriculture such as horticulture, viticulture, and oenology. After reforming the IVHO has become one of the most sustainable research centers of Georgia having optimal research themes, improved staffing, renovated infrastructure, informational technologies, modern divisions and

laboratories, financial sustainability mechanism and close liaison with international and local research organizations.

Development of priority research programs. The project contributed to the development of Consolidated Research Plan which represents the framework for the research programs to be carried out in the context of the Institutional Reform Program. It reflects broadly-shared priorities for the fields of viticulture and horticulture in Georgia's rural sector. As a result of Reform the number of research themes was reduced from 33 to 9 priority themes. Multi-disciplinary research themes of this plan are based on existing client demand and the expected economic opportunities. The core objectives of the planned research are to ensure stable yields of grapes and fruits; facilitate the sustainable use of natural resources; enhance food security and economic growth; and, restore and strengthen strategic alliances between agro-scientists, farmers and other private sector clients.

Upgrade of organization and management of research. One of the main challenges of restructuring IVHO was introduction of a modern and effective model of research management that drives towards the overall goal of reform and is fit for market-driven economic environment. A new organizational chart was developed for IVHO and optimization of the institutional set-up was carried out accordingly. The former 30 research departments and laboratories were replaced with newly created 5 research and 3 service departments, including a computerized information center, an extension, and training center and central laboratory. Gori and Skra testing stations were merged under a single management unit, as planned by the reform program.

Rehabilitation of infrastructure. The building of IVHO was fundamentally rehabilitated, including provision of utilities, office, laboratory, and library furniture. The new premises of Skra, Sakara (Vachevi) and Telavi extension centers were built; rehabilitation works of trial-demonstration plots of IVHO (11,5 ha) and GSAU (4,5 ha) completed; rehabilitation of on farm irrigation scheme at Skra extension center plot made and access driveways constructed; rehabilitation works finalized for construction of driveways and protective fencing of Vachevi plot, as well as for the Institute's entrance and enothec roof. In addition the rehabilitation works of hydro insulation, drainage and climate control systems for enothec made.

The space allocated for setting up computerized information and training center at GSAU rehabilitated and furnished, the alarm system installed. Four classrooms at GSAU Horticulture and Viticulture departments rehabilitated and equipped with the new furniture and computers.

Re-equipping research departments and laboratories, providing up-to-date information technologies. One of the most important investments of the Reform Program was to establish an up-to-date computer and communications network, which enabled to create the electronic databases for the IVHO library and other scientific information. The network will allow introduction of Geographical Information Systems.

Desktop publishing hardware was purchased for producing handouts, brochures, flyers. The Institute's laboratory was re-equipped with new field research facilities, advanced laboratory equipment and chemicals.

Human resource management. Switching to the newly developed stuff structure and recruitment through an open competitive process were among the most challenging elements of IVHO restructuring process. The AKIS pilot reform program provided staff optimization, conducted capacity building activities- trainings, study visits. An average age of department heads came down from more than 70 years to less than 50. In result of staff optimization, the number of employees shrunk from 245 to 140. Training opportunities were permanently being offered to IVHO staff. Trainings in various specific issues, including plant variety protection and intellectual property rights, food safety, legislation, etc conducted. Workshop on developing project proposals for grant-financing, English language courses and computer training courses organized.

Improving financial management through arranging for more sustainable financing mechanisms. Financial management and funding issues are very important for successful implementation of the reform. Expected future sources of IVHO funding include: the State budget, own income, local and international research grants, and donor organizations. Success of the Reform Program depends in significant measure on the national budget contribution because this is an integral part of the program financing and its timely provision will ensure unconstrained implementation. To facilitate the latter, the IVHO budgeting and accounting processes would be made open and transparent at all levels. As a result of project implementation IVHO's financial management system improved by setting up an accurate recording system, consequently the IVHO services provided to external clients also improved and commercial income from testing stations, germ-plasm collections, experimental fields increased. The State Budget financing was increased by 12 percent and Institute's own income five times compared to the past year. In addition, the average salaries of scientists are increased 3.5 times.

Enhanced collaboration with local and foreign partners. In parallel with the institutional reform and rehabilitation, much attention was given to reinforcing and expanding of IVHO's partnerships that have weakened during more than a decade of an extreme economic hardship. Some part of investment, coming to IVHO for piloting AKIS reform, was used to facilitate participation of the Institute's lead staff in international scientific events. Two research staff was sent to Moldova Viticulture & Oenology Institute in order to bring back Georgian aboriginal vine varieties which were identified and kept in their collections. As a result of the tour 77 Georgian vine species returned to home land. Successful efforts are being made to increase cooperation not only with scientific partners, but with private clients as well. For achieving the latter, the Extension, Design and Training Center existing under the IVHO developed a large package of services focusing on the demand from the clients. Now the Institute and its Extension and Training Center have possibility to publish scientific studies, recommendations, booklets etc. Relations of the Institute with public and private sectors have been strengthened. Works with the public organizations, private sector representatives, agro-firms, farmers etc. were performed.

IVHO hosted (October 24-28) the third meeting of the working group on *Malus/Pyrus* under the European Cooperative Programme for Crop Genetic Resources Networks (ECP/GR). Scientists from 20 European countries traveled to Georgia to attend this meeting devoted to facilitation of the long-term *in situ* and *ex situ* conservation of Malus/Pyrus resources, enhancement of utilization of plant genetic resources, strengthening links between all plant genetic resources program in Europe, encouragement of cooperation between stakeholders, including NGOs and private breeders, better sharing of conservation responsibilities for plant genetic resources for food and agriculture, increasing awareness of ECP/GR networks, and seeking collaboration with other relevant regional and global initiatives. Number of international study tours of the Institute research staff financed.

(C) Environment Pollution Control Program

The pilot scheme to achieve gradual reduction of pollution of ground and surface waters flowing in the Black Sea basin, by introducing and promoting environmental friendly agricultural modern practice successfully introduced and disseminated. .

Demonstration, extension and dissemination of Biogas Digester Technologies. Digestion of manure in biogas digesters (BGD) is found the most successful practice introduced under the Environment Pollution Control (EPC) Program from the point of view of sustainability, quantity of direct and indirect beneficiaries, increased demand, and efficiency of direct environmental and socio-economic impact. The main conditional factors for success are: essential savings made by farmer by reduced used of liquid gas, fertilizers and fire wood; reduced environmental pollution (water, soil, atmosphere), reduced consumption of firewood; improved hygienic conditions on farms.

Follow-up: The BGDs success story stimulated replication and dissemination of BGDs construction activities in almost every region of Georgia supported by various donors (UNDP, USAID). It is noteworthy to mention that notwithstanding of the high construction costs number of farmers installed the BDGs at their own expense (41 – units). The interest of Gov. of Georgia to support the BGDs initiated - One of the regional (Adjarian) government already financed 10 percent of construction 60 biogas digesters in 2002-2006; Private-Public partnership strengthened: Ministry of Economic Development of Georgia cooperates with USAID to pilot the BGDs new design with polymeric construction materials; Political Support strengthened: The Presidential National Program of 2006 encouraged implementation of activities for support of introduction of biogas digesters; local capacity and skills increased of about ten construction companies;

BGDs Public Awareness Campaign. An active public awareness and promotion campaign was carried out during the 2002-2008. Including preparation and publicizing of a TV Program on bio-gas digesters, numerously aired video film (in Georgian and English languages) on a local and rural TV, widely circulated books and brochures among the farmers of various regions of Georgia. More than 2 500 farmers took part in 200 trainings arranged for 680 farmers participating in the program and for their

neighbors during 2002-2004. Individual nutrient management plans, including recommendations for the appropriate doses and timing of application of organic fertilizer for 220 farmers were developed and disseminated. *The Brochure "Biogas Technology in Georgia*– achievement and future vision" was designed, published and disseminated at the final stage of the EPCP. The purpose of this Brochure is the popularization of a technology among the farmers involved in animal husbandry. It may also be useful for those interested in agriculture, renewable energy, and environment protection. The Brochure contains brief description of BGD operating mechanism, the most widespread types of BGD design, as well as the economic and the environmental benefits of this technology. Key recommendations for safe and proper operation of BGDs are also provided. The publication describes brief history of biogas generating technology in Georgia and provides data on BGDs installed in various regions of the country. The attached map depicts administrative regions of Georgia where BGDs are installed and gives their numbers per region. *The BGDs promotion Poster,* with pictures, explanatory notes, brief information on BGDs benefits was also designed and published for the same purposes.

Dissemination of other environment-friendly technologies. The practices to combat the soil erosion through terracing, contour plowing, arrangement of buffer strips is being considered by Program as one of the most sustainable, as it has the direct and long term impact. The practice of increasing of productivity of the degraded and non-fertile arable lands through seed rotation, introduction of new crop varieties, amelioration etc is also considered as one of the prospective method.

Environment pollution monitoring: Soil, ground water, drinking and river water, crop quality monitoring within the Khobistskali river basin. Environment pollution monitoring Scheme established and implemented in Khobi, Tsalenjikha and Chkhorotsku districts of the Khobistskali river basin during 2002-2006 years, in particular: optimum system for complex investigation of the soil, ground water and river quality monitoring developed; Operational manual for "Quality Control / Safety Precautions to ensure validity of data elaborated; sample analyses according to ISO standards carried out; Co-relation and regressive analysis of the statistical data made etc.

Assessment of impact of improved agricultural practices on farming efficiency and environment quality. Integrated Methodology for assessing impact of the extended improved agricultural practices on the farm productivity and for monitoring of pollution of environment at the levels of individual farm units, villages, river basins and administrative districts developed. Recommendations for decreasing their adverse environmental impacts through studying correlation between specific agricultural practices and pollution elaborated.

Development of the National Code of Good Agricultural Practice. The Code of Good Agricultural Practices developed, published and disseminated among the individual growers and farmers, large agricultural companies, agriculture service and extension employees. Ministry of Agriculture and Ministry of Environment and Natural resources of Georgia provided official appraisal for the final version of Code of GAP. The

statement signed by Ministers is endorsed to the publication. The Code provides information on gained experience of agricultural practices to local farmers and farmers' associations what will ensure farm sustainability and increase prospects of efficient selling the product on internal as well as external markets. The Code sets recommendations taking into consideration of which will enable reduction of environmental pollution from agricultural sources by economically and environmentally efficient ways.

Integrated Study of Resource Use in pastures and Meadows of West Georgia. The integrated research of pastures and meadows of west of Georgia carried out. The results were designed, published ad disseminated. Study provides a fundamental and comprehensive study of pasture lands in West Georgia to define the actual forms of their exploitation, as well as to study the specific and quality state of plant growth and wild fauna, the state of soil erosion and dynamics of landslide processes, to define a possible impact of grazing on forests, water reservoirs and biodiversity. The target territory covers 1 mln ha and consists of 31 districts of Georgia. Hayfields and pasture lands are located in all three landscape zones of Georgia The research has been conducted in the following main directions: flora and fauna species in hayfields and pasturelands; species/variety of cattle and assessment of quantity/quality of herds; feeding value of hayfields and pasture lands according to the livestock and quality and specific indicators of the growth; geodynamic processes, including the reasons provoking them and main characteristics of dynamics; physical and chemical characteristics of water reservoirs, hydrodynamics and pollution sources; forest stands, determination of specific/age structure, main forms of exploitation and its intensity, ability of self-regeneration of forests. The recommendations for sustainable management of pasture lands have been elaborated. The maps of studied and main pastures of west of Georgia have been developed.

TRAINING AND CAPACITY BUILDING

Project has contributed to capacity building of the Ministry of Agriculture of Georgia and IVHO through trainings, workshops and sponsoring attendance at various international and national meetings conferences related to the Environmental and Agricultural issues.

The trainings of farmers/beneficiaries at various stages of project implementation have been also conducted. A few most important training events attended with the ARETP project support by the Georgian public servants and farmers include:

- Management Information System, monitoring and evaluation of the projects supported by Grants, Roven, Croatia. 2002.
- Sustainability of Competitive Grants Programs and modernization of Agricultural Knowledge and Information System" - Tbilisi, 2003;
- Integrated Nutrient Pollution Control in Black sea - Danube partnership Countries Romania, 2003
- Black Sea Ecological problems and Environmental Friendly Agrarian Technologies, Chakvi, Georgia. 2004.
- VI International congress of Hazelnut - Tarragona, Spain. 2004

- International Symposium of on Walnuts, Sorrento, Italy, 2004
- Short time study tour on advanced methods of root stock selection, Montpelier, France, 2004;
- Short time study tour on using of entomophags and entomopatogens microorganisms against plant deceases, Bet-Dagan Israel, 2005
- Short time study tour on Genetic Identification method of plants, Germany, Gaizenhaim, 2005;
- English language and computer Courses for Civil Servants, 2003-2004-2005;
- International Conference – Agricultural Nutrient Management in the Danube – Black See and Baltic Sea Riparian Countries, Tbilisi, 2005,
- International Symposium of Horticulture, Adana, Turkey, 2006
- Integrated Nutrient Pollution Control in Black sea - Danube partnership Countries, Moldova 2006
- Short professional courses for the staff of the Ministry of Agriculture, 2007
- Nutrient Pollution Control in Black sea - Danube partnership Countries, Ankara, Turkey, 2007.

Annex 8. Comments of Cofinanciers and Other Partners/Stakeholders

MINISTER OF AGRICULTURE OF GEORGIA

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Phone: /+99532/ 37-80-37 * Fax: /+99532/ 37-80-13

N 1-1/144 29-05-09

Mr. V. Roy Southworth
Acting Country Manager for Georgia
World Bank office Tbilisi
5A, 1st Drive, Chavchavadze Ave.
Tbilisi, Georgia

Subject: Implementation completion and results report for the Agricultural Research, Extension and Training Project (IDA 33470, GEF TF-23752)

Dear Mr. Southworth,

Herewith we confirm the receipt of the Implementation Completion and Results Report for the above project.

We would like to express our frank acknowledgement for the positive assessment of project outcomes set out in ICR of ARETP prepared by WB.

Although we would like to stress that the borrower successfully handled project indicators and tasks despite the difficulties in agricultural sector faced during project implementation. We consider that the project objectives have been achieved as we have already mentioned in our ICR of ARETP.

We would like to take an opportunity and thank you for your kind assistance provided to Georgian agriculture sector and hope for future fruitful cooperation.

Sincerely,

Bakur Kvezereli

Annex 9. List of Supporting Documents

The information for this report was extracted from:

- *An Update of Agricultural Developments*, A Study by Iain Shuker, July 24, 2000
- Project Appraisal Document, April 11, 2000
- Grant Manual
- Mission supervision aide memoires, PSRs and ISRs
- Quality at Entry review, response by the project team.
- Final project beneficiary survey
- *Assessment of technologies for management and treatment of dairy manure in California's San Joaquin valley*, December 2005
- Engineering Notes, Winter 1995 – pollution potential of livestock manure.
- Review of Small Scale, community Biogas in the Industrialized World, Kealan Gell.
- Biogas digesters in Georgia
- *Economics and Environmental Impact of Biogas Production as a Manure management Strategy*, Cady R. Engler, Ellen R. Jordan, Marshall J. McFarland, and Ronald D. Lacewell.

Annex 10. Additional Information

1. Introduction:

a. Implementation Approach

The implementation of the GEF-funded components (Component 1b and Component 3) is rated as moderately satisfactory. This rating is based on the following reasons. First, the logical framework that was developed at project design was preliminary, since both of the activities that were funded under the GEF grant were of a pilot nature. Thus, the indicators chosen were considered to be best estimates of potential achievements. After the Mid-Term Review of the project, the team had a better grasp of the project's potential achievements, and the M&E indicators were revised accordingly. This also served as a better management tool for the project, since the goals of the project were more realistic and reflective of the local environment. In this way the team reflected a level of adaptation in their management of the GEF-financed components.

Second, during implementation the project made good use of different partnership arrangements. For example, the installation of the bio-gas digesters under Component 3 brought together local manufacturers and farmers, where the project funding covered 80 percent of the biogas digesters and their installation, farmers contributed either in cash or kind to become beneficiaries of the project. This partnership arrangement strengthened ties between local manufacturers and clients to arrive at an optimal design in terms of cost, user friendliness and efficiency. A subset of the competitive grant scheme, sub component 1b (CGS) was set aside for GEF funded initiatives that had a particular environmental focus to them. Because this process was well integrated into the CGS, this funding was able to reach a wide audience, even if ultimately adoption remained limited. Both achievements under these Components were discussed in the two stakeholder workshops.

Finally, the design of the GEF-financed activities was based on lessons from other relevant projects. First, the design of these components drew on global experiences in pollution reduction, with both the use of bio-gas digesters and more efficient manure practices (Component 3). The project recognized that these activities were new to the region, however, and allowed for a systematic pilot approach to determine the best technology for the local conditions. Under Component 1, a subset of activities was financed on a competitive basis through grant proposals submitted by local groups and farmers with help from specialists. This allowed for locally-relevant and innovative activities that address the particular pollution issues in Georgia.

b. Country Ownership/Driveness.

The GEF-financed components of the project remain consistent with national and sectoral development plans. The legacy of the Soviet Union meant that Georgian agriculture relied heavily on chemical fertilizers and pesticides that resulted in high levels of

pollutants flowing into the Black Sea. The funding in this project aimed to address that issue through the implementation of agriculture practices that would reduce pollutants.

In the earlier phases of the project, there were some issues with counterpart funding. This, however, was reflective of difficulties with the financial commitments to the agriculture sector in general, and not a unique problem of this project, nor of the Government's commitment to the project as a whole. During this period The GEF-financed components continued to operate without any significant delays, because the counterpart financing came primarily from local communities. In fact, there was much enthusiasm for the bio-gas digesters, and in Ajara the local government even offered to pay the 20 percent contribution expected from farmers to ensure the continued installation of what was seen to be a valuable source of consistent energy for local residents.

c. Public Involvement.

Information dissemination

Much effort was made under the project to promote the Competitive Grant Scheme (Component 1) as well as the new technologies and practices under Component 3. Outreach activities included workshops and pamphlets along with demonstrations. Results of the CGS were published in a booklet that was distributed to project stakeholders and made available on the World Bank Country website in both Georgian and English.

Consultation and stakeholder participation

Two stakeholder workshops were held in late 2007 and June of 2008 to discuss impact of the competitive grant scheme as well as reforms of institutions undertaken as part of the project.

d. Replication approach*:*

Much of the overall project's design incorporated systems of knowledge transfer with the development of an extension services system. This was designed to teach farmers innovative and locally appropriate methods and to introduce relevant technologies for farming practices. For GEF-financed project activities under Component 1, these activities were focused on transferring knowledge on sustainable agricultural practices that would, in turn, reduce pollution. Similarly, the activities financed under Component 3 brought new technologies and practices with the specific aim of reducing pollutant runoffs to the Black Sea. As such, bio-gas digesters were demonstrated and tested, and then the technology was disseminated, the capacity of individuals to operate and maintain the bio-gas digesters was undertaken. Similarly knowledge about more efficient manure practices was transferred to the local populations. While the techniques are easy to replicate farmers who were not direct beneficiaries of the project have not taken up these technologies or practices.

e. Financial Planning

The last financial management review of operations managed by ADPCC was carried out on June 17, 2008. The rating for financial management of the project remained Highly Satisfactory. ADPCC has a significant experience with the projects' closure and grace period payments and no issues are expected with the payments to be made during the grace period.

All books and accounts of the IDA Credit and the GEF Trust Fund Grant will be closed on October 30, 2008. ADPCC plans to submit the final report of an independent auditor to the Bank by end CY 2008.

Project Costs and Financing

At appraisal, the total project cost was estimated at US$ 12.41 million, of which US$ 7.60 million was to be provided as IDA credit; US$ 2.48 million as GEF Trust Fund grant, US$ 0.66 million as beneficiary contribution, and US$ 1.67 million as contribution of the Government of Georgia. At project completion, the total cost is estimated at US$ 13.03 million, including an estimate of the payments engaged but still to be made during the grace period ending October 30, 2008. The cost at completion is 105 percent of the appraisal estimate. More information on the costs at appraisal and at closing is detailed in the below table.

	Funding Sources	Component 1	Component 2	Component 3	Component 4
Appraisal estimate	IDA	4.07	2.76	-	0.71
	GEF TF	1.19	-	1.29	-
	Beneficiaries	0.53	-	0.13	-
	GoG	0.10	1.38	0.05	0.14
Latest estimate	IDA	3.33	3.71	0.04	0.90
	GEF TF	0.89	-	1.54	0.05
	Beneficiaries	1.21	-	0.20	-
	GoG	0.06	0.77	0.04	0.30
% of Appraisal	IDA	82%	134%	N/A	126%
	GEF TF	75%	-	119%	N/A
	Beneficiaries	228%	-	154%	-
	GoG	60%	56%	80%	214%

Procurement

All planned goods, works, and services were procured before the project Closing Date. The last post review of contracts under ARET project was conducted in shortly before project closing. Procurement was found to have been conducted in compliance with the provisions of the legal agreements.

Project Administration

ARET PTU and CST of the ADPCC remained sufficiently staffed through the project Closing Date. ADPCC with its CST continues to operate post-project, as it serves several other projects which are yet operational. Therefore, no administrative issues are expected in relation with the ARET project closeout. Borrower's Project Completion Report (PCR) of the acceptable quality and content was submitted to the Bank on August 27, 2008.

Leveraged Resources

Beneficiary farmers contributed 20 percent of the value of the biogas digesters, amounting to a sum of US$1.40 million.

f. Cost-effectiveness

Results from the survey showed high levels of satisfaction with the BGD technology that was introduced. Under and intensive farming model, BGDs provide significant savings as a result of Nitrogen enriched organic fertilizer extracted form the digester. In addition, the biogas, for households that have no connection to public utilities offers immense benefits for lighting and cooking. However, in Georgia most houses are connected to the electric grid, the rural population is relatively sparse, and deforestation is not recognized as a significant issue (0.3 percent over the past 20 years). Thus, the actual benefits from energy remain marginal at an estimated US$120.00 per year, against an investment cost per BGD of between US$2,000 and US$2,500. Cost effectiveness has also been negatively affected by an increase in unit costs of the installations by some 20 percent to 30 percent with the refinement and adaptation of the design to Georgian conditions.

The value of actual benefits to farmers of BGDs therefore is highly dependent on the farming model and the extent to which alternative sources of cheap energy are available, reaching from estimates of US$120.00 per year without counting the value of fertilizer, up to US$$480.00 including the value of fertilizer for the type of BGDs installed under the project. Assuming an average benefit of around US$200.00 per year given that most farmers do not practice intensive agriculture, the NPV of the savings realized by a typical BGD such as installed under the project are at US$ -575 and a rate of return of 5 percent when using a discount rate of 12 percent. However, this figure is highly sensitive to farming model as indicated above. The more farmers develop and maximize the use of the high value fertilizer from the BGDs, the greater the benefits from BGDs.

As the STAP review of the GEF incremental cost analysis noted, BGDs were in all likelihood not the most effective method to reduce organic pollution from reaching the waters of the Black Sea. The residue extracted after digestion has increased nitrogen contents, and retains the main nutrient compounds of manure. Digestion does greatly reduce volumes, which makes storage and management somewhat easier. Proper manure storage to reduce run-off, does have a beneficial impact on reducing contamination of surface water with nutrients. Data collected as part of the project shows a clear reduction in nutrient loads in small stream adjoining the project areas. While this is a positive outcome, the attribution of these impacts directly to the

demonstration investments given the lack of control samples in non-project areas of similar biological make up is extremely difficult given that in Georgia mineral fertilizer use and agricultural productivity have significantly dropped over the past 20 years and agriculture has returned to mainly subsistence levels.

Finally, GEF financing assumed that manure of some 75.600 cattle would be affected by the investments under component. Given the small size of farms and the 540 manure pads and 292 digesters that have been built in the country, and the limited adoption of the technologies without additional outside financing, this is a highly optimistic figure. In the project area the average beneficiary farmer owns between 2 and 5 large livestock units, equivalent to approximately 2000 to 2500 heads of cattle or roughly 3 percent of the figures used at project design. Given the low adoption of improved manure management technology beyond BGDs and manure platforms established under the project, the reduction in water contamination of the Black Sea estimated at design is not likely to be achieved without significant additional external funding.

g. ***Monitoring & Evaluation***.

Overall, the monitoring and evaluation design of the project is somewhat inconsistent with its objectives. Two main issues stand out in relation to the design, implementation and utilization of the monitoring and evaluation framework. First, at project design, the indicators that were chosen measured inputs rather than outputs of the project. For example, under Component 1, the overall objective was to increase adoption rates of technologies that were introduced under funding through the CGS. However, the indicators chosen measured the establishment of the CGS, the number of grants administered, and the numbers of farmers receiving grants (inputs). Similarly, under Component 2, the objective of rehabilitating the IVHO was that the institute would become more sensitive to the needs of small farmers and would begin providing research and extension services for a domestic market. However, the indicators chosen to measure implementation progress focused on the adoption of a reform plan and the rehabilitation of the IVHO (inputs) rather than the services provided by a rehabilitated IVHO (outputs). Finally, the objective of Component 3 was to reduce pollution to the Black Sea. However, the indicators measured the number of farms with biogas digesters or manure pits (inputs) rather than the reduction of levels of pollution directly linked to the farms (outputs).

This issue was recognized at the Mid-Term Review, and, as a result, the monitoring and evaluation indicators were revised to measure project outputs and outcomes as well as to update the figures with a more realistic assessment of projected achievements under the project. However, these revisions led to the second issue with the monitoring and evaluation framework in that they tended to measure activity outputs rather than the stated outcomes of the project components as set out in the Project Development Objective. For example, under Component 1, the revised indicator measures the percentage of *beneficiary* farmers that continue using/benefit from extended technologies. However, the objective of the project was to create a mechanism for *adoption rates* among the non-beneficiary population. While the project states to have achieved 122

percent of the target value, the proposed measurement does not capture the intended objectives of the project. Likewise, under Component 3, the indicator was revised to measure the percentage of *beneficiaries* that adhere to the manure management practices. However, the objective of the component as stated in the PAD was to develop a technology for the local conditions that would be demonstrated and *adopted*. While anecdotal evidence exists to suggest that the popularity of the biogas digesters, in particular, led to adoption of the technology even after the project closed, the indicator only measures the sustainability of the technology amongst beneficiaries, rather than amongst the non-beneficiary populations.

Attachment 1

Financial Planning: GEF Grant and Co-financing

Co financing (Type/Source)	GEF Grant (mill US$)		Bank: IBRD/IDA (mill US$)		Government (mill US$)		Other* (mill US$)		Total (mill US$)	
	Planned	**Actual**	**Planned**	**Actual**	**Planned**	**Actual**	**Planned**	**Actual**	**Planned**	**Actual**
– Grants	2.48	2.48							2.48	2.48
– Loans										
– Credits			7.54	7.98					7.54	7.98
– Equity investments					1.67	1.17			1.67	1.17
– In-kind support							0.13	0.20	0.13	0.20
– Other										
Totals	2.48	2.48	7.54	7.98	1.67	1.17	0.13	0.20	11.82	11.83

* Other refers to contributions mobilized for the project from other multilateral agencies, bilateral development cooperation agencies, NGOs, the private sector and or beneficiaries.


GEORGIA
SELECTED CITIES AND TOWNS
AUTONOMOUS OBLAST (AO) CENTER
AUTONOMOUS REPUBLIC (ASSR) CENTERS
NATIONAL CAPITAL
RIVERS
MAIN ROADS
RAILROADS
AUTONOMOUS OBLAST (AO) BOUNDARY
AUTONOMOUS REPUBLIC (ASSR) BOUNDARIES
INTERNATIONAL BOUNDARIES
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RUSSIAN FEDERATION
GEORGIA
ABKHAZIA
ADJARA
South Ossetia
TURKEY
ARMENIA
AZERBAIJAN
Black Sea
Lake Sevan
Mingechevir Reservoir
Caucasus Mountains
Kolkhida Lowland
Gagra
Suhumi
Ochamchira
Tkvarceli
Zugdidi
Dzvari
Mestia
Oni
Ambrolauri
Mainvartsveri (5047 m)
Kazbegi
Vladikavkaz
Tkibuli
Sachkhere
Kutaisi
Chinvali
Senaki
Poti
Samtredia
Ozurgeti
Kobuleti
Batumi
Khashuri
Gori
Akhmeta
Telavi
Lagodehi
Mtskheta
T'BLISI
Gurjaani
Akhaltsikhe
Rustavi
Marneuli
Tsiteli-Tskaro
Ahalkalaki
Kazreti
Ninocminda
Inguri
Rioni
Tskenistskali
Kvirila
Iori
Alazani
Mtkvari (Kura)
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To Trabzon
To Erzurum
To Armavir
To Vladikavkaz
To Yevlax
To Zagatala
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NOVEMBER 2004
IBRD 33410