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First Annual Report

Covering period from June 15, 2002 to June 15, 2003

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**Privatization, Liberalization and the Emergence of Private Farms in
Georgia**

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Project No. CA21-042

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ISRAEL

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GEORGIA

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Project duration: June, 2002-June, 2004

Executive Summary

The purpose of this project is to examine the situation of the land individualization process in Georgia in comparison to a baseline which was documented in a 1996 farm survey. The basic question is whether the process is still going full force, and what are the consequences of this process for the development of the agricultural sector, and more generally for the well-being of farm families and rural poverty.

During the past six months the project progressed in two parallel directions. First, a new farm survey was conducted, following a revised questionnaire that will enable to compare the findings to the findings of the 1996 survey but also to analyze new aspects of farm household well-being. Second, the 1996 agricultural productivity was analyzed using a specialized methodology, and the effects of policy-sensitive variables on agricultural productivity were quantified. Collaboration during the last six months was mostly accomplished through electronic communication about questionnaire revisions.

The results indicate that the yield of wheat is positively related to infrastructure variables such as roads and electricity, the yield of beans is also positively related to having electricity in the farm buildings, and the yield of vegetables is positively related to plot size, to years on the farm, to being registered as a juridical person and to the possession of an official land document. The vegetables results clearly demonstrate the possibility of continued land reforms to enhance agricultural productivity in Georgia and possibly elsewhere.

Section I: Technical Progress

A) Research Objectives

The purpose of this project is to examine the situation of the land individualization process in Georgia in comparison to a baseline which was documented in a 1996 farm survey. The basic question is whether the process is still going full force, and what are the consequences of this process for the development of the agricultural sector, and more generally for the well-being of farm families and rural poverty. During the past six months we have addressed two specific objectives: to analyze the responsiveness of agricultural productivity to land policy using the baseline 1996 farm survey, and to document the progress of the land individualization process up to 2003 by conducting a new farm survey.

B) Research Accomplishments

The empirical analysis of agricultural productivity using the 1996 farm survey is based on the methodology discussed in the work plan with several revisions brought about due to specific properties of the data and due to scientific developments in the field. At this stage, due to methodological reasons, we focus on annual crops only and exclude plots planted with fruits or grapes. These annual crops are divided into four major categories: (1) Wheat, Barley and Hay; (2) Corn and Sunflowers; (3) Vegetables and Melons; (4) Beans and Potatoes. We had to group these crops together in order to avoid a serious dimensionality problem. The analysis of productivity in each crop category was conducted separately, but the estimation procedure involved the whole data set in the initial stages. The stages of estimation are the following:

- (1) Estimating a multinomial logit model of the choice of crop combination among the 16 possible combinations of the 4 crop categories.
- (2) Deriving selectivity-correction terms, according to a new procedure that recently became available, that enables to estimate consistently regression equations based on subsets of the data that are defined for each combination of crop categories.
- (3) Combining the selectivity-correction terms for each crop category so that a single equation can be estimated for each crop category but the relevant term is associated with each observation.
- (4) Estimating the fraction of land allocated to each crop category using a principal components regression, including among the explanatory variables the total land available and the selectivity-correction terms.
- (5) Calculating predicted values of the quantity of land allocated to each crop category using the estimated fractions of land multiplied by the total land available.
- (6) Estimating the yield (output per hectare) of each crop category using a principal components regression, including among the explanatory variables the predicted land allocated to that category and the selectivity-correction terms.

Table 1 summarizes the results of the final stage.

Table 1. Yield regression results

Variables	Wheat (12 principal components)			Corn (25 principal components)		
	Coefficient	t-statistic	P-value	Coefficient	t-statistic	P-value
Observations	220			679		
F(11, 208)	1.56			1.4		
Prob > F	0.1119			0.0957		
R-squared	0.0763			0.049		
Adjusted R ²	0.0275			0.0141		
Root MSE	31.197			36.588		
Predicted land used for crop category	-7.967	-1.145	0.254	0.418	0.094	0.925
Mtskheta region	0.807	0.510	0.611	2.591	1.849	0.065
Dusheti region	-2.053	-1.965	0.051	-1.755	-1.254	0.210
Sagaredj region	-0.659	-0.352	0.725	-1.439	-0.715	0.475
Number of parcels	0.277	0.592	0.554	1.207	1.254	0.210
Born in another village	0.287	0.114	0.910	-1.259	-0.324	0.746
Born in city	-3.894	-1.688	0.093	7.081	1.628	0.104
Registered as a juridical person	-0.897	-0.501	0.617	-1.909	-0.663	0.507
Age	-0.034	-0.632	0.528	0.029	0.530	0.596
Male	0.291	0.164	0.870	-3.982	-1.038	0.300
Owning a tractor or mini-tractor	0.437	0.197	0.844	0.544	0.197	0.844
Owning a sprinkler or sprayer	-0.399	-0.180	0.857	5.313	1.813	0.070
Having transportation difficulties	-1.918	-1.106	0.270	-3.652	-1.246	0.213
Having an official land document	2.168	1.511	0.132	-2.075	-0.823	0.411
Years of being an independent farmer	0.077	1.292	0.198	0.182	1.951	0.051
Education indicator	1.063	0.791	0.430	-1.877	-0.664	0.507
Having water in the farm	1.588	1.032	0.303	1.163	0.572	0.567
Having electricity in the farm	3.183	1.979	0.049	-2.006	-0.782	0.435
Having roads in the farm	3.617	2.065	0.040	-1.136	-0.469	0.639
Having difficulties in obtaining credit	-2.148	-1.003	0.317	-0.190	-0.073	0.942
Number of youth in the family	-0.973	-0.946	0.345	3.693	2.083	0.038
Number of adults in the family	0.708	1.297	0.196	1.664	1.612	0.107
Number of elderly in the family	-0.832	-0.855	0.394	-1.243	-1.139	0.255
Difficulty factor 1	0.817	0.989	0.324	2.254	1.749	0.081
Difficulty factor 2	-1.750	-2.482	0.014	1.247	1.210	0.227
Difficulty factor 3	-2.076	-1.263	0.208	0.375	0.241	0.810
Difficulty factor 4	2.449	1.305	0.193	-0.603	-0.359	0.719
Difficulty factor 5	-0.998	-0.526	0.599	-1.301	-0.589	0.556
Difficulty factor 6	-2.570	-0.938	0.349	-0.278	-0.104	0.917
Constant	21.443			22.601		

Notes:

1. Bolded coefficients are statistically significant at 10%.
2. The 6 difficulty factors are the principal orthogonal factors of 13 indicators of farming difficulties.
3. The standard error of the intercept cannot be estimated in the principal components procedure.
4. The coefficients of the selectivity-correction terms are not shown.

Table 1. Yield regression results (continued)

Variables	Vegetables (25 pr. components)			Beans (26 principal components)		
	Coefficient	t-statistic	P-value	Coefficient	t-statistic	P-value
	Observations	682		Observations	741	
	F(11, 208)	2.62		F(24, 654)	3.07	
	Prob > F	0		Prob > F	0	
	R-squared	0.0874		R-squared	0.0968	
	Adjusted R ²	0.0541		Adjusted R ²	0.0653	
	Root MSE	81.069		Root MSE	74.922	
Predicted land used for crop category	26.000	2.946	0.003	10.529	1.092	0.275
Miskheta region	-8.483	-2.654	0.008	-17.545	-4.688	0.000
Dusheti region	-4.446	-1.451	0.147	1.630	0.695	0.487
Sagaredj region	6.873	1.455	0.146	5.373	1.270	0.205
Number of parcels	-1.177	-0.766	0.444	1.317	0.953	0.341
Born in another village	-1.841	-0.200	0.842	15.513	1.886	0.060
Born in city	8.626	0.782	0.435	7.463	0.825	0.410
Registered as a juridical person	13.807	2.347	0.019	-3.718	-0.723	0.470
Age	0.194	1.295	0.196	0.180	1.439	0.150
Male	9.879	1.093	0.275	3.701	0.485	0.628
Owning a tractor or mini-tractor	-4.250	-0.667	0.505	8.170	1.168	0.243
Owning a sprinkler or sprayer	-13.848	-1.940	0.053	14.413	1.679	0.094
Having transportation difficulties	-0.223	-0.037	0.970	-1.344	-0.254	0.800
Having an official land document	8.846	1.718	0.086	-1.866	-0.404	0.687
Years of being an independent farmer	0.375	2.097	0.036	0.050	0.312	0.755
Education indicator	1.540	0.218	0.828	8.382	1.369	0.172
Having water in the farm	-4.421	-0.952	0.341	-4.159	-1.094	0.275
Having electricity in the farm	5.888	0.996	0.320	16.232	3.351	0.001
Having roads in the farm	-6.062	-1.358	0.175	-3.911	-0.873	0.383
Having difficulties in obtaining credit	5.135	0.801	0.423	-0.677	-0.129	0.897
Number of youth in the family	0.017	0.005	0.996	1.533	0.448	0.654
Number of adults in the family	1.524	0.659	0.510	0.088	0.042	0.966
Number of elderly in the family	3.140	1.255	0.210	3.927	1.804	0.072
Difficulty factor 1	-1.250	-0.487	0.627	-4.054	-1.666	0.096
Difficulty factor 2	2.345	0.974	0.330	3.208	1.202	0.230
Difficulty factor 3	1.951	0.524	0.600	-1.890	-0.548	0.584
Difficulty factor 4	-5.046	-1.308	0.191	-1.332	-0.388	0.698
Difficulty factor 5	0.338	0.070	0.944	-7.383	-1.679	0.093
Difficulty factor 6	4.304	0.652	0.514	-6.659	-1.114	0.265
Constant	23.193			-30.623		

Notes:

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2. The 6 difficulty factors are the principal orthogonal factors of 13 indicators of farming difficulties.
3. The standard error of the intercept cannot be estimated in the principal components procedure.
4. The coefficients of the selectivity-correction terms are not shown.

The results indicate that the yield of wheat is positively related to infrastructure variables such as roads and electricity, the yield of beans is also positively related to having electricity in the farm buildings, and the yield of vegetables is positively related to plot size, to years on the farm, to being registered as a juridical person and to the possession of an official land document. The vegetables results clearly demonstrate the potential of continued land reforms to enhance agricultural productivity in Georgia and possibly elsewhere.

C) Scientific Impact of Collaboration

Collaboration took place during the year mainly with respect to planning and implementing the new survey. We have jointly revised the questionnaire (via email), and an Israeli scientist traveled to Georgia to participate in the pilot phase of the survey, after which the questionnaire was further revised. The administration of the survey helped the institution of the Georgian partner to gain experience in this kind of research activity.

D) Description of Project Impact

Not yet. We expect to derive policy recommendations based on the analysis of data collected during the new survey.

E) Strengthening of Developing-Country Institutions

No formal training was conducted and no other investments have been made in the first year of the project. Strengthening of the research capacity of the Georgian institution was achieved as described in (C) above.

F) Future Work

We have recently obtained the new data set and are beginning to conduct a descriptive comparison of the 2003 and 1996 farm situation. We have advertised a call for a Georgian postdoctoral fellow and hope to identify a suitable candidate that will work with the Israeli research team in the analysis of the new data as a form of training. In any case we will start estimating a similar model using the new data in the next few months, and also start working on the labor allocation issue. There is no need to revise the work plan at this stage.

Section II: Project Management and Cooperation

A) Managerial Issues

There seems to be a repeated problem with the payments to the Georgian institution. Having the payments delayed for long periods makes it difficult for the Georgian partners to conduct their part of the project as scheduled and makes them less enthusiastic about such collaborative projects.

B) Special Concerns

No protocols have changed.

C) Collaboration, Travel, Training and Publications

1) List of Project Participants

Ayal Kimhi (PI), The Hebrew University, Israel.

Josef Gogodze (Co-PI), CRC Ltd., Georgia.

Iddo Kan (post-doctoral student), The Hebrew University, Israel.

2) Completed Travel

Iddo Kan traveled to Georgia for about a week in December 2002 to take part in the pilot survey and discuss revisions in the survey questionnaire with the Georgian partners.

3) Project Publications

None so far.

4) Anticipated activities in next 6 months

We expect to find a suitable Georgian candidate for a post-doctoral position at the Hebrew University who will take part in the analysis of the new data set as a form of collaboration and training.

D) Summary of Requests for CDR Program Actions

None.