

האוניברסיטה העברית בירושלים
The Hebrew University of Jerusalem



המרכז למחקר בכלכלה חקלאית
The Center for Agricultural
Economic Research

המחלקה לכלכלה חקלאית ומנהל
The Department of Agricultural
Economics and Management

Discussion Paper No. 9.05

**The Impact of Land Reform on
Rural Household Incomes in Transcaucasia and
Central Asia**

by

Zvi Lerman

Papers by members of the Department
can be found in their home sites:

מאמרים של חברי המחלקה נמצאים
גם באתרי הבית שלהם:

<http://departments.agri.huji.ac.il/economics/indexe.html>

P.O. Box 12, Rehovot 76100

ת.ד. 12, רחובות 76100

The Impact of Land Reform on Rural Household Incomes in Transcaucasia and Central Asia

Zvi Lerman

The Hebrew University of Jerusalem, Israel

The former socialist countries embarked on a transition from plan to market with the objective of increasing the productivity and efficiency of their economies. In a way, this was a new strategy to achieve the old dream of “catching up” with the economically more successful Western world (not to say “overtaking” it, as in Khrushchev’s days). But behind the macroeconomic and sectoral arguments of improved productivity there always lurks (so we hope) the human objective of improving the standard of living of the common people. In this article we focus on the changes in land use and their impact on rural incomes in a group of particularly agrarian transition countries with relatively large rural populations – the three Transcaucasian states (Armenia, Georgia, and Azerbaijan) and the five Central Asian states (Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan).

The paper starts with a brief profile of rural Transcaucasia and Central Asia in comparison with the core CIS countries (Russia and Ukraine). Then we describe the three distinct modes of land reform in these regions and present sectoral evidence suggesting that agricultural growth and hence higher well-being of the rural population may be positively linked to individualization of farming structure. The last section discusses survey results indicating that increase of farm size leads to higher rural incomes and greater readiness to engage in sale of the farm products, while commercialization of farm activity in turn generates higher household incomes. We conclude with some policy implications.

The data for our analysis derive from official country statistics as reported in CIS (2005) or national statistical yearbooks, and various farm surveys conducted in Transcaucasia and Central Asia by the World Bank and by the Hebrew University of Jerusalem (HUJ) with financial support from USAID/CDR. Literature references are given in cases when the survey findings have been published; in other cases only the survey sponsor and date are indicated, while further details can be obtained from the author.

A Profile of Transcaucasia and Central Asia

Armenia, Georgia, and Azerbaijan are mountainous countries, with a large part of agricultural land in green mountain pastures and about 40% suitable for cultivation. The climate ranges from warm, almost Mediterranean, in the coastal plains and in the valleys, to severe in the snow-bound mountains. In the Central Asian countries, on the other hand, the climate is arid, most of the agricultural land is in desert pastures, and arable agriculture is confined to a mere 20% of land.

Table 1 presents the aggregated profiles of Transcaucasia and Central Asia compared to the core of CIS – Russia and Ukraine. Georgia, Armenia, and Azerbaijan are small countries, with total population of only 16 million. The rural population in these countries

is around 40%, which is less than in Central Asia, where nearly 60% live in rural areas, but substantially higher than the rural percentage in Russia and Ukraine (30%). The large size of the rural population and the relative scarcity of cultivable land combine to produce a high population density per hectare of good productive land in both Transcaucasia and Central Asia.

Transcaucasia and Central Asia are much more agrarian than Russia and Ukraine by the share of agriculture in GDP and in total employment. In Azerbaijan and Kazakhstan, with their well-developed oil and gas sectors, agriculture is relatively less important to the economy than throughout the rest of the region (14% of GDP in Azerbaijan, 8% in Kazakhstan), but nevertheless nearly half the population in these countries is rural. The Transcaucasian states with per-capita GNP at around \$850 are slightly better off than Central Asia, where the per-capita GNP is below \$800. Yet both regions are poor compared to Russia and Ukraine, not to mention western Europe.

Table 1. Profiles of Transcaucasia and Central Asia (1999-2004)

	Transcaucasia	Central Asia	Russia, Ukraine
Population, millions	16	56	193
Rural population, %	44	60	30
Agricultural land, million hectares	8.9	154	234
Cultivable land, %	40	20	67
Cultivable land per rural resident, ha	0.5	0.9	2.7
Agriculture in GDP, %	19	23	9
Agriculture in total employment, %	42	45	18
GNP per capita	\$847	\$774	\$1,790

Source: CIS (2005); GNP per capita from World Development Indicators 2005 database.

The Process of Land Reform¹

During the Soviet era, agriculture was characterized by two salient features: absolute state ownership of all agricultural land and concentration of production in large-scale collective farms. These two features are generally counted among the main reasons for the inefficiency of socialist agriculture, because in market economies land is typically in private ownership and production is dominated by relatively small family-operated units. Land reform programs in all transition countries were designed to correct these deviations from the market pattern, and their achievements are usually assessed by examining the extent of privatization of land ownership and (perhaps more importantly) the extent of individualization, i.e., transition from traditional large-scale collectives to smaller family farms.

The former socialist countries in transition – there are about 25 of them in Central Eastern Europe and the former Soviet Union – have made different land reform choices from the start. It is therefore not surprising that Transcaucasia and Central Asia also follow distinctly different land reform paths, and there are furthermore clear differences

¹ This section draws on Lerman, Csaki, and Feder (2004), Lerman (2004), and Lerman and Stanchin (2004).

in implementation among countries within each region. A distinctive feature of the three small Transcaucasian countries is the full acceptance of private land ownership and the total transition to individual farming, accompanied by the virtually complete elimination of large-scale corporate farms. Central Asia, on the other hand, pursues much more conservative land policies. Tajikistan, Uzbekistan, and in a certain sense Turkmenistan do not recognize private land ownership to this day: all agricultural land in these countries remains state owned and non-transferable. Kyrgyzstan and Kazakhstan recognized private land ownership quite recently (1999-2000 in Kyrgyzstan, 2003 in Kazakhstan), after prolonged and sometimes agonizing legal debates. In all five Central Asian countries the creation of individual farms has been minimal, and the bulk of agricultural land is still controlled by large corporate farms that succeeded the former kolkhozes and sovkhozes.

While the Transcaucasian states resolutely individualized their agriculture during the early years of transition by distributing most of the arable land in the form of physical plots to rural households, Kazakhstan and Kyrgyzstan adopted the “share-based distribution” strategy favored by Russia and Ukraine. While the distribution of land and asset shares to the rural population allowed creation of independent family farms and augmentation of existing household plots, the share privatization mechanism definitely favored the preservation of large-scale corporate farms. As a result, these successors of former kolkhozes and sovkhozes continue to control most of the agricultural land in all former Soviet countries that opted for share distribution mechanisms (Russia and Ukraine, as well as Kazakhstan and Kyrgyzstan).

Land reform in Turkmenistan and Uzbekistan occupies an intermediate position between the share-based distribution in Kazakhstan and Kyrgyzstan, on the one hand, and the total individualization of land use in Transcaucasia. Although family farms remain a marginal phenomenon in these countries, there has definitely been a kind of a shift from traditional collective farming to more individualized agriculture. Around 1998, the traditional large-scale farms were transformed into “associations” (*daikhan berleshik* in Turkmenistan, *shirkat* in Uzbekistan) that began to distribute land to their population in leasehold. Former employees of collective farms thus became leaseholders on state-owned land and gained a certain measure of limited independence in their production decisions. The “associations” themselves stopped producing: they act as the guardians or administrators of state-owned agricultural land that is distributed to leaseholders for cultivation; they are the municipal authority responsible for maintaining rural infrastructure in the villages; and most problematic of all, they are the conduit for transmitting state orders for production of strategic commodities to the leaseholders and enforcing compliance.

The countries of Transcaucasia and Central Asia thus fall into three groups by their land reform choices. The first group includes the three Transcaucasian states that have privatized their agricultural land and switched to fully individual agriculture. Armenia and Georgia completely individualized their farm structure as early as 1992-93, whereas Azerbaijan delayed its land reform until about 1995-96, when it recognized private land ownership and began to distribute paper certificates of entitlement (“land shares”), not actual land plots, to the rural population. The conversion of land shares to physical plots came in 1997-98, and since 2001 the farm structure in Azerbaijan is similar to that in

Armenia and Georgia. The second group consists of Turkmenistan and Uzbekistan that have retained state ownership of land but are moving toward increased individualization through leasehold arrangements within peasant associations (this also seems to apply to Tajikistan to a certain extent). Finally, Kazakhstan and Kyrgyzstan have privatized their land but have chosen to maintain an agriculture that continues to be dominated by large-scale corporate farms, as it is in Russia and Ukraine.

The individual sector in Transcaucasia currently produces almost 100% of agricultural output, up from 30%-40% before 1990 (Table 2). The share of individual production in Transcaucasia is substantially higher than in Russia, Ukraine, and Kazakhstan, where the individual sector accounts for 60%-70% of agricultural output, up from 25%-30% before the transition. The shift of production to the individual sector is a reflection of the dramatic increase in the land holdings of rural households. Prior to 1990, only 4% of agricultural land was on average in individual use in the Soviet republics. A decade later, in 2000, more than one-third of agricultural land is in individual use in Transcaucasia, compared to about 15%-20% in Russia, Ukraine, and Kazakhstan.

Table 2. Land in Individual Use in Transcaucasia and the Rest of CIS

	1990		1999-2000		
	Land in individual use, %	Share of ag output, %	Land in individual use, %	Share of ag output, %	Relative productivity of land in individual use*
Armenia	4	35	33	98	3.0
Georgia	7	48	37	94	2.5
Azerbaijan	3	35	34	96	2.8
Kazakhstan	0.2	28	21	75	3.6
Russia	2	24	13	57	4.4
Ukraine	7	27	18	60	3.3

* The ratio of share of agricultural output to share of land in individual use. This value is 1 for agriculture as a whole. Values greater than 1 imply greater productivity than the average for the entire sector.

Source: Lerman, Csaki, and Feder (2004).

Table 3. Structure of the Farm Sector in Turkmenistan: 2002

	Number	Land, ha	Average size, ha
Associations	587	33,900,000 (incl. pastures)	
Leaseholders	357,000	1,500,000 (arable)	4
Peasant farms	5,200	81,000	16
Household plots	616,000	133,000	0.2

Source: Stanchin and Lerman (2003).

The creation of leaseholder-based associations in Turkmenistan and Uzbekistan may be regarded as a highly significant – if not the most significant – step of the land reform program in these countries because of its scope. The reforms aimed at household plots and private farms, however important, were marginal by the amount of land that they encompassed. The transition to leasehold contracts in Turkmenistan alone involved more than 350,000 rural family units and 1.5 million hectares of arable land, i.e., practically the entire rural population and 90% of arable land in the country. The current structure of the farm sector in Turkmenistan is presented schematically in Table 3.

Agricultural Performance

The numbers in Table 2 suggest that the individual sector is much more productive on average than agriculture as a whole. The share of individual farms in agricultural output is roughly three times its share in cultivated land. This phenomenon, however, is not an outcome of the new land policies during transition, as is clear from the pre-transition data for 1990 in the same table. Are there any indications that the unique land policies in Transcaucasia have had a positive impact on agriculture? Has the leasehold system in Turkmenistan produced a measurable result? To answer these questions, we will start by looking at the changes in agricultural performance in Transcaucasia and compare them to the corresponding changes in Kazakhstan, Russia, and Ukraine.

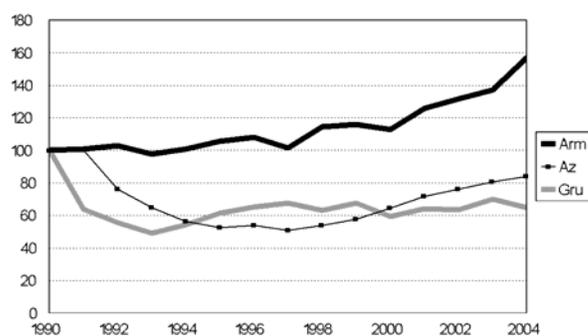


Figure 1. Gross agricultural output in Transcaucasia 1990-2004 (1990=100). Source: CIS (2005).

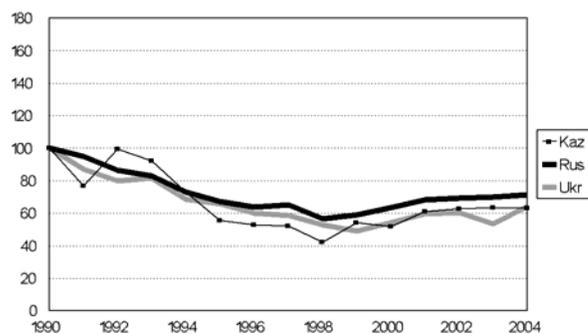


Figure 2. Gross agricultural output in Kazakhstan, Russia, and Ukraine 1990-2004 (1990=100). Source: CIS (2005).

Figure 1 shows the changes in agricultural output in Transcaucasia since 1990. Armenia individualized its agriculture swiftly and comprehensively starting March 1991, and there was practically no decrease in agricultural production following the disintegration of the Soviet system, despite the war with Azerbaijan and the aftermath of the 1989 earthquake. Armenian agriculture shows a clear upward trend over the entire period since 1992-93.

Georgian agriculture collapsed in 1991, when the entire country was in total disarray facing a bitter civil war. Land was then quickly distributed to rural households in an attempt to avoid famine. This desperate goal was achieved as Georgian agriculture quickly recovered in 1993-95. The recovery raised the volume of agricultural production in recent years by 25%-30% above its lowest level in 1993, yet the initial collapse was so dramatic that the agricultural output today is still 40% below what it was in 1990.

Azerbaijan also experienced an initial decline of agriculture. The decline continued until 1995, a couple of years longer than in Georgia, and recovery came only in 1997, just as Azerbaijan embarked on mass conversion of paper land shares into physical plots for rural households. Between 1997 and 2004, the index of agricultural output in Azerbaijan rose by 65%, matching and even exceeding the growth in Armenia.

Agricultural performance in Kazakhstan, similarly to that in Russia and Ukraine, presents an entirely different pattern (Figure 2). In these countries, the agricultural output showed a steady downward trend throughout most of the 1990s. First signs of modest agricultural recovery appeared only in 1998-99. Without any war, civil upheavals, or natural disasters, the agricultural output in Kazakhstan, Russia, and Ukraine in 2004 is 40% below the 1990 level, comparable to Georgia and much less than in Azerbaijan, both of which had to recover from a traumatic initial collapse. In other words, Kazakhstan, like Russia and Ukraine, reached the present low level of agricultural production along a downward path of continuing decline, whereas Georgia and Azerbaijan are now moving along an upward path from a deeper abyss.

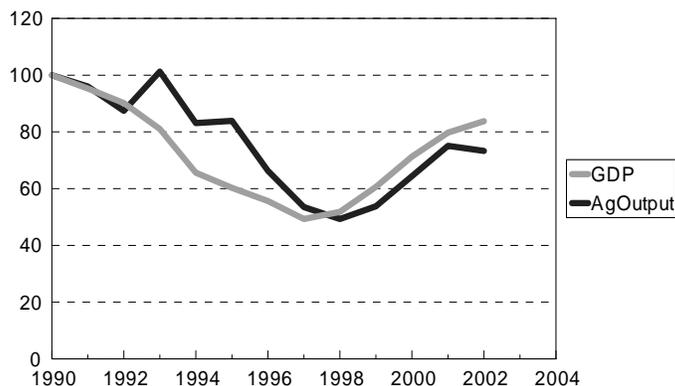


Figure 3. Gross agricultural output and GDP in Turkmenistan 1990-2002 (1990=100). Source: Lerman and Stanchin (2004).

In Turkmenistan, both agricultural output and GDP declined sharply after 1990, but signs of recovery appeared in 1997-98 – coincidentally with the introduction of individual leasehold arrangements in agriculture (Figure 3). We would like to hope that the incipient recovery is indeed linked with the impact of agricultural reforms, but the data for Turkmenistan are incomplete and only the future will show if this is so.

The data in all countries are still insufficient to establish rigorously a causal relationship between individualization of land and agricultural growth. However, we cannot ignore the strong evidence of Figures 1-3: in Transcaucasia agriculture recovered roughly in sync with the sweeping individualization of land, in Turkmenistan recovery coincided with the introduction of the individual leasehold system, whereas in Russia, Ukraine, and Kazakhstan, where large-scale corporate farms still dominate agriculture, agricultural output continued to decline until very recently. This conclusion is borne out by an analysis of all 23 transition countries, which shows a strong association between agricultural growth since 1992 and the share of land in individual use (Lerman, Csaki, and Feder, 2004). On an anecdotal level, Ministry of Agriculture officials in Azerbaijan report significant increases in crop yields in 2001, which they proudly attribute to the new land policy.

Farm Sizes and Commercialization of Individual Farming

While individualization appears to encourage agricultural growth in transition countries, this process has a downside in that it inevitably produces fragmentation of land holdings – especially in situations where land allocation is based on universal and equitable principles. In Transcaucasia (similarly to Albania, for instance) land was distributed free of charge to the entire rural population. The universality of the process necessarily imposed size limits on the amount of land that an individual or a household could receive. In Armenia, land was allocated in fixed units calculated by dividing the total available land in the village by the total population. In Georgia, rural families actually engaged in agriculture (i.e., families of collective-farm workers – the majority of the population in the villages) were entitled to receive up to 1.25 hectares, while the actual allocation was determined by local availability of land. In Azerbaijan, the land held by local collective or state farm in each village (or cluster of villages) was equally distributed among all rural residents, regardless of occupation or age. The universal process of land distribution, coupled with scarcity of cultivable land, naturally created a large number of small individual farms in Transcaucasia. The average individual holding is between 1-2 hectares (Table 4). In Armenia, only 12% of individual farms use more than 2 hectares; in Georgia, this category accounts for less than 5% (Table 5). The Transcaucasian individualized agriculture is thus essentially an agriculture of smallholders.

Table 4. Number and Size of Individual Farms in Transcaucasia (2000)

	Number of farms, '000	Land used, '000 ha	Average size, ha
Armenia	332.6	458.6	1.38
Georgia	1,015.7	977.7	0.96
Azerbaijan	869.8	1,614.9	1.86

Source: Official country statistics.

Table 5. Size Distribution of Individual Farms in Armenia and Georgia (percent of individual farms)

Size category	Armenia	Georgia
Up to 0.5 ha	–	22.1
0.5-1 ha	30.9	29.7
1-2 ha	56.8	43.6
Over 2 ha	12.3	4.6

Source: Official country statistics.

The pattern of farm sizes is not much different in Turkmenistan, where in principle every family in the village is entitled to a leasehold. In a large survey conducted in 2002 by HUI with USAID/CDR support, the average leasehold was 5.6 hectares with 3.8 working-age adults in the family, or less than 1.5 hectares per family worker (Stanchin and Lerman, 2003). In countries that do not follow the principle of universal distribution of land for the creation of new peasant farms and land is allocated by application against paper shares, the average farm sizes are much larger (about 50 hectares in Russia, Ukraine, and Kyrgyzstan, and as much as 200 hectares in land-rich Kazakhstan).

Small farms typically generate small incomes. Although they provide a reliable source of food and possibly cash in times of adversity, they may trap the rural population in chronic poverty. Analysis of survey results in all transition countries clearly shows that family income (including both farm and off-farm components) rapidly increases with the increase of land holdings. This effect is demonstrated in Figure 4 using the results of a 2003 survey of farm households in Georgia. The level of income reported by families with 5-10 hectares of farmland is double that reported by families with 1-2 hectares. It is mainly the farm component of family income that increases with farm size, while the off-farm components (outside salaries, pensions, etc.) remains fairly stable. Land markets and readiness to engage in land transactions are standard mechanisms for achieving larger farm sizes and thus increasing family incomes.

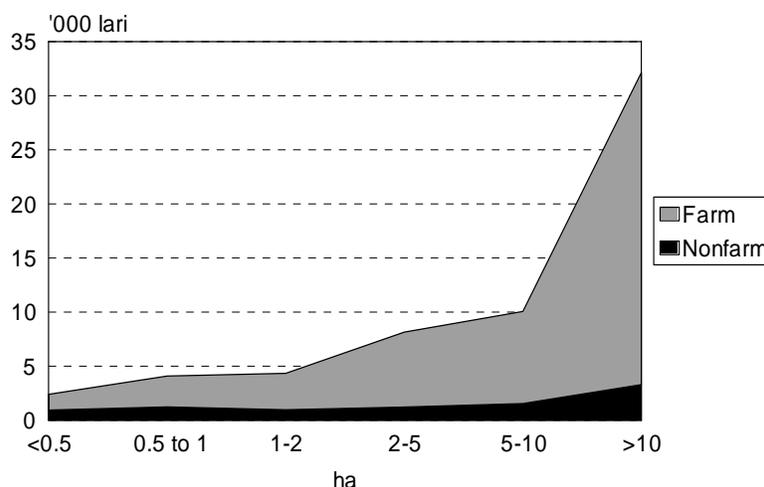


Figure 4. Family income versus farm size in Georgia. Source: HUI 2003 survey.

In agriculture, smallness is usually interpreted as being synonymous with subsistence farming (see, e.g., Abele and Frohberg (2003)). Yet the small individual farms in

Transcaucasia are far from being pure subsistence operations. In recent farm-level surveys, a high percentage of respondents (64% in Georgia, 80% in Armenia, 87% in Azerbaijan) report that they sell at least some of their products, and the average individual farm in these countries sells 40% of its output (Table 6). Moreover, as we see from Table 6, this phenomenon is not restricted to Transcaucasia, and even the small household plots in CIS – so often brushed off by local experts and officials as irrelevant for “true” commercial agriculture – are characterized by significant commercialization levels. Although individual farms in transition countries are certainly far from the level of commercial operation as we understand it in market economies, we must acknowledge that their commercial activities are not negligible and that on the whole the picture that emerges from Table 6 is definitely different from the traditional view of subsistence agriculture.

Table 6. Level of Commercialization in the Individual Sector

	Percent of “sellers”	Percent of output sold by “sellers”
Armenia	80	40
Georgia	64	40
Azerbaijan	87	46
Moldova – small private farms	83	48
– household plots	60	31
Ukraine – household plots	60	50
Belarus – household plots	76	22

Source: World Bank surveys, 1996-2003.

Table 7. Armenia: Comparative Characteristics of Sellers and Non-Sellers

	Sellers (1,104)	Non-sellers (264)
Land, ha	2.3	1.4
Irrigated land, ha	0.44	0.24
Animals, standard head	2.2	1.0
Family size	5	4
Number of farm workers	4	3
Full time occupation on farm	63%	45%
Annual cost of mechanical field services	19,500 dram/ha	8,900 dram/ha
Product mix	60% crops	59% crops
Educational endowment of head of household	13% higher	12% higher
	59% secondary	62% secondary
Household cash income	\$430	\$210

Source: Lerman and Mirzakhianian (2001), except for household cash income, which has been calculated separately from the same 1998 rural household survey as the other data in the table.

Agricultural policies obviously should strive to avoid the “subsistence trap” and encourage commercialization of individual farms. Sales of farm products keep the urban population supplied with food and thus extend the benefits of farming outside the rural communities. It is therefore important to identify the determinants of the decision to sell among individual farmers. Table 7 presents the comparative profiles of “seller” and “non-seller” farms in Armenia. The sellers are characterized by larger land holdings, a larger amount of fertile irrigated land, and more animals. Sellers also command a larger pool of

potential family labor, and the head of the household works full time on the family farm in a significantly higher percentage of cases. Finally, sellers allocate much greater sums of money to payment for mechanical field services (both in absolute terms and per hectare). Interestingly, some variables that a priori would appear relevant to the decision to sell are not significantly different between the two categories of households. For example, the average distances to the main delivery location or point of sale and the average road conditions are virtually identical for sellers and non-sellers. The product mix is practically the same. The educational endowment is not different. The picture emerging from the profiles of Table 7 is confirmed by logistic regression: the probability that a household is a “seller” increases with the increase of its land endowment, the number of animals, the number of family members, and the number of farm workers per hectare.

In a broader regional analysis, the specific profile components and regression results vary from country to country because of local differences and also because of different availability of particular variables. Yet farm size as measured by land emerges clearly and consistently in all countries as the major determinant of the decision to engage in sale of farm products. This has been shown by the author’s studies of CIS countries and by a recent analysis of Mathijs and Noev (2002) for individual farmers in four transition countries in Central Eastern Europe. Seller farms are larger and use greater inputs of productive resources. They accordingly produce more output and have a greater saleable surplus after satisfying the family’s consumption needs. Small farms produce just enough to satisfy family consumption and do not trade. To have saleable surplus output, the farm must be larger than some minimum size.

Table 8. Effect of Farm Size on Commercialization Level in Georgia

	Small individual farms (1996 survey)	Large individual farms (1998 survey)
Average size, ha	0.75	62
Percent of “sellers”	64	98
Percent of output sold	40	70

Source: World Bank surveys, 1996-98.

In transition countries, the level of commercialization is generally observed to increase with farm size. This effect clearly emerges in Georgia from the results of two World Bank surveys (1996 and 1998). The 1996 survey was based on a representative sample of 2,000 individual farms, with average size of 0.75 hectares. The 1998 survey focused on 1,200 relatively large individual farms with 62 hectares on average (of which 61 hectares was leased land). The small individual farms reported selling 40% of their output (this is the number shown in Table 7), while the large individual farms were selling 70% of their output. Among small individual farms about two-thirds had any sales, whereas among the large individual farms virtually all reported commercial sales of products (Table 8). In the HUIJ 2003 survey in Georgia, the probability of being a “seller”, i.e., of selling at least some of the farm output, was observed to increase with farm size. Figure 5 shows the behavior of this probability as a function of farm size, estimated by logistic regression.

The probability of engaging in commercial activity is about 0.7 for very small farms of up to 1 hectare and approaches 1 for relatively large farms of 50 hectares and more.

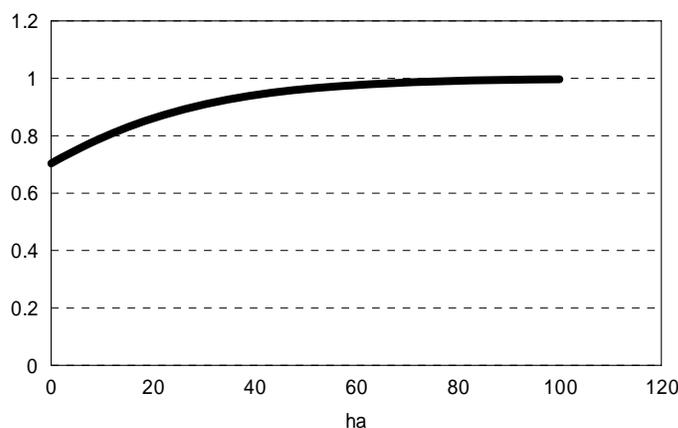


Figure 5. Probability of being a “seller” versus farm size in. Estimated by logistic regression on the basis of the HUI 2003 survey in Georgia.

The very fact that sellers engage in additional income-generating commercial activities leads to a striking difference in the level of family income. According to previously unpublished results of the World Bank 1998 survey of rural households in Armenia, “sellers” report an average cash income of 216,000 dram (\$430 per year), while “non-seller” households earn less than half this amount (103,000 dram or \$210; see Table 7). The entire difference is attributable to sale of farm products, as off-farm income and unearned income (pensions, transfers, etc.) are on average equal for the two categories of rural households. If the household incomes are adjusted for the value of own consumption of farm products (estimated at 445,000 dram or \$890 for the average household; see Lerman and Mirzakhaniyan (2001)), the percentage gap shrinks to 20%, but the absolute difference (over \$200) is preserved. Recent household surveys in Azerbaijan indicate that “seller” households earn incomes that are 8% higher than the incomes of “non-sellers” (Sedik et al., 2002). This figure is based on household income that includes the value of own consumption of family-produced food and derives from a regression analysis that controls for many additional factors not considered for Armenia. The findings of the HUI 2003 survey in Georgia presented in Figure 6 show that “commercial” households (i.e., households selling some of their farm products) earn incomes that are double the income of “subsistence” households (i.e., households where the entire farm output is consumed by the family). Most of the difference in household incomes between “sellers” and “non-sellers” is attributable to cash revenue from the sale of farm products. The same pattern is observed consistently in all transition countries. Figure 6 also highlights the fact that the “seller” farms (averaging 2 hectares in the survey) are significantly larger than the “non-seller” farms (1 hectare only). Survey results for other transition countries also indicate that sellers enjoy higher total incomes, and the difference is basically attributable to cash earned from sales of farm products.

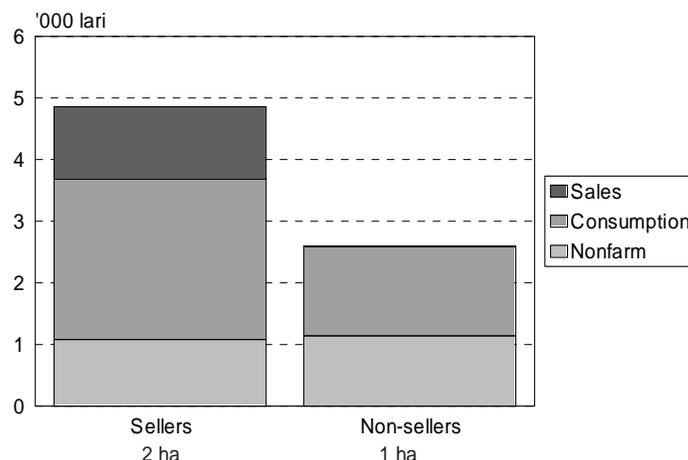


Figure 6. Family income for “sellers” and “non-sellers” in Georgia. Source: HUI 2003 survey.

The importance of the farm for the family welfare thus increases markedly with the increase in the level of commercialization, which is observed to rise for larger farms. Individual farmers apparently recognize the advantages of operating a larger farm, as our surveys in transition countries reveal a clear pattern of willingness to increase the farm size. In Armenia, 20% of individual farmers expressed a desire to double their land holdings from 2 hectares to 4 hectares. In Georgia, half the respondents (in the World Bank 1996 survey) indicated that they would like to treble the size of their farm from 0.9 hectares to 2.7 hectares. In Turkmenistan, 55% of leaseholders in the HUI 2002 survey wanted to increase their farm by 6.6 hectares, to more than double the average size. Moreover, half of the respondents seeking to enlarge their farm argued in justification that “a small farm produces insufficient income” and “small farms are unprofitable”.

Conclusion

We have tried to demonstrate two main points. First, the transition to individual (as opposed to corporate) farms is conducive to agricultural growth and thus potentially increases the well-being of the rural population. Second, larger holdings lead to greater commercialization and thus to higher family incomes – both directly due to increased production, and indirectly due to additional revenue from sales.

The policy implications for rural poverty are clear. Land should be distributed to the rural population, and not hoarded in large corporate farms in the imaginary interests of efficiency. In parallel, policies should be implemented to overcome the obstacles of fragmentation and smallness that are an inevitable concomitant of the universality of land distribution in rural areas. Poverty alleviation requires overcoming the “subsistence trap” of small-scale farming and developing a stronger commercial orientation than today. This can be achieved by encouraging the development of land markets and investing in rural infrastructure and services, including farmer-owned service cooperatives. In a way, the two directions are interrelated, because investment in rural infrastructure and services, in addition to enabling farmers to sell more, will also have an indirect effect: it will create

off-farm employment opportunities in rural areas, thus enabling some people to stop farming for subsistence and put their land on the market – either for sale or for lease. The governments also should support the supply side of land markets by unblocking the large state reserves of land, and the 2001 Land Code of Armenia definitely points in the right direction. Off-farm job opportunities and land markets will encourage the enlargement of family farms; larger farms will generate saleable surpluses; infrastructure and service channels – including agroprocessing – will enable farmers to convert their surpluses into cash; and cash revenues will ultimately increase household incomes and family welfare.

An additional policy-oriented observation is suggested by the analysis of the leasehold-based reforms in Central Asia. Although the transition to leasehold arrangements in Turkmenistan and Uzbekistan is definitely a move toward greater individualization of farming, survey results show that the productivity of leaseholds is substantially lower than the productivity achieved by the same families on their household plots (Lerman and Stanchin, 2004; Stanchin and Lerman, 2003). The only possible explanation, in our view, lies in the different incentives attributable to the sharp differences in the institutional production and marketing arrangements between the household plots and the leasehold sector. Leaseholders are strictly bound by state orders, and there is not much room for true private initiative in their production and marketing decisions. The household plots, on the other hand, are not subject to these restrictions and they are flourishing thanks to private initiative. To enable the rural population to reap the full benefits of individualization, agricultural policies should ensure freedom of production and marketing decisions at the farm level and thus create incentives for maximizing private initiative.

References

- Abele, S. and K. Frohberg (2003), *Subsistence Agriculture in Central and Eastern Europe: How to Break the Vicious Circle?*, Studies on the Agricultural and Food Sector in Central and Eastern Europe, Vol. 22, IAMO, Halle.
- CIS (2005). *Official Statistics of the Countries of the Commonwealth of Independent States*, CD-ROM 2005-10, Goskomstat SNG, Moscow.
- Lerman, Z. (2004), “Successful Land Individualization in Trans-Caucasia: Armenia, Azerbaijan, Georgia,” in: D. Macey, W. Pyle, and S. Wegren, eds., *Building Market Institutions in Post-Communist Agriculture: Land, Credit, and Assistance*, Lexington Books, Lanham, MD, pp. 53-75.
- Lerman, Z. and I. Stanchin (2004), “Institutional Changes in Turkmenistan’s Agriculture: Impacts on Productivity and Rural Incomes,” *Eurasian Geography and Economics*, Vol. 45, No. 1, pp. 60-72.
- Lerman, Z. and A. Mirzakhani (2001). *Private Agriculture in Armenia*, Lexington Books, Lanham, MD.
- Lerman, Z., C. Csaki, and G. Feder (2004). *Agriculture in Transition: Land Policies and Evolving Farm Structures in Post-Soviet Countries*, Lexington Books, Lanham MD).
- Mathijs, E. and N. Noev (2002). “Commercialization and Subsistence in Transition Agriculture: Empirical Evidence from Albania, Bulgaria, Hungary and Romania,”

World Bank Annual Conference on Development Economics, World Bank, Washington, DC, April.

Sedik, D., K. Fock, B. Davis, S. Trento, and B. Molinari (2002). *Azerbaijan Rural Poverty Assessment*, working draft, World Bank, Washington, DC.

Stanchin, I. and Z. Lerman (2003). *Agrarian Reform in Turkmenistan*, Center for Agricultural Economic Research, The Hebrew University of Jerusalem, Rehovot, Israel [in Russian].

PREVIOUS DISCUSSION PAPERS

- 1.01 Yoav Kislev - Water Markets (Hebrew).
- 2.01 Or Goldfarb and Yoav Kislev - Incorporating Uncertainty in Water Management (Hebrew).
- 3.01 Zvi Lerman, Yoav Kislev, Alon Kriss and David Biton - Agricultural Output and Productivity in the Former Soviet Republics.
- 4.01 Jonathan Lipow & Yakir Plessner - The Identification of Enemy Intentions through Observation of Long Lead-Time Military Preparations.
- 5.01 Csaba Csaki & Zvi Lerman - Land Reform and Farm Restructuring in Moldova: A Real Breakthrough?
- 6.01 Zvi Lerman - Perspectives on Future Research in Central and Eastern European Transition Agriculture.
- 7.01 Zvi Lerman - A Decade of Land Reform and Farm Restructuring: What Russia Can Learn from the World Experience.
- 8.01 Zvi Lerman - Institutions and Technologies for Subsistence Agriculture: How to Increase Commercialization.
- 9.01 Yoav Kislev & Evgeniya Vaksin - The Water Economy of Israel--An Illustrated Review. (Hebrew).
- 10.01 Csaba Csaki & Zvi Lerman - Land and Farm Structure in Poland.
- 11.01 Yoav Kislev - The Water Economy of Israel.
- 12.01 Or Goldfarb and Yoav Kislev - Water Management in Israel: Rules vs. Discretion.
- 1.02 Or Goldfarb and Yoav Kislev - A Sustainable Salt Regime in the Coastal Aquifer (Hebrew).
- 2.02 Aliza Fleischer and Yacov Tsur - Measuring the Recreational Value of Open Spaces.
- 3.02 Yair Mundlak, Donald F. Larson and Rita Butzer - Determinants of Agricultural Growth in Thailand, Indonesia and The Philippines.
- 4.02 Yacov Tsur and Amos Zemel - Growth, Scarcity and R&D.
- 5.02 Ayal Kimhi - Socio-Economic Determinants of Health and Physical Fitness in Southern Ethiopia.
- 6.02 Yoav Kislev - Urban Water in Israel.
- 7.02 Yoav Kislev - A Lecture: Prices of Water in the Time of Desalination. (Hebrew).

- 8.02 Yacov Tsur and Amos Zemel - On Knowledge-Based Economic Growth.
- 9.02 Yacov Tsur and Amos Zemel - Endangered aquifers: Groundwater management under threats of catastrophic events.
- 10.02 Uri Shani, Yacov Tsur and Amos Zemel - Optimal Dynamic Irrigation Schemes.
- 1.03 Yoav Kislev - The Reform in the Prices of Water for Agriculture (Hebrew).
- 2.03 Yair Mundlak - Economic growth: Lessons from two centuries of American Agriculture.
- 3.03 Yoav Kislev - Sub-Optimal Allocation of Fresh Water. (Hebrew).
- 4.03 Dirk J. Bezemer & Zvi Lerman - Rural Livelihoods in Armenia.
- 5.03 Catherine Benjamin and Ayal Kimhi - Farm Work, Off-Farm Work, and Hired Farm Labor: Estimating a Discrete-Choice Model of French Farm Couples' Labor Decisions.
- 6.03 Eli Feinerman, Israel Finkelshtain and Iddo Kan - On a Political Solution to the Nimby Conflict.
- 7.03 Arthur Fishman and Avi Simhon - Can Income Equality Increase Competitiveness?
- 8.03 Zvika Neeman, Daniele Paserman and Avi Simhon - Corruption and Openness.
- 9.03 Eric D. Gould, Omer Moav and Avi Simhon - The Mystery of Monogamy.
- 10.03 Ayal Kimhi - Plot Size and Maize Productivity in Zambia: The Inverse Relationship Re-examined.
- 11.03 Zvi Lerman and Ivan Stanchin - New Contract Arrangements in Turkmen Agriculture: Impacts on Productivity and Rural Incomes.
- 12.03 Yoav Kislev and Evgeniya Vaksin - Statistical Atlas of Agriculture in Israel - 2003-Update (Hebrew).
- 1.04 Sanjaya DeSilva, Robert E. Evenson, Ayal Kimhi - Labor Supervision and Transaction Costs: Evidence from Bicol Rice Farms.
- 2.04 Ayal Kimhi - Economic Well-Being in Rural Communities in Israel.
- 3.04 Ayal Kimhi - The Role of Agriculture in Rural Well-Being in Israel.
- 4.04 Ayal Kimhi - Gender Differences in Health and Nutrition in Southern Ethiopia.
- 5.04 Aliza Fleischer and Yacov Tsur - The Amenity Value of Agricultural Landscape and Rural-Urban Land Allocation.

- 6.04 Yacov Tsur and Amos Zemel – Resource Exploitation, Biodiversity and Ecological Events.
- 7.04 Yacov Tsur and Amos Zemel – Knowledge Spillover, Learning Incentives And Economic Growth.
- 8.04 Ayal Kimhi – Growth, Inequality and Labor Markets in LDCs: A Survey.
- 9.04 Ayal Kimhi – Gender and Intrahousehold Food Allocation in Southern Ethiopia
- 10.04 Yael Kachel, Yoav Kislev & Israel Finkelshtain – Equilibrium Contracts in The Israeli Citrus Industry.
- 11.04 Zvi Lerman, Csaba Csaki & Gershon Feder – Evolving Farm Structures and Land Use Patterns in Former Socialist Countries.
- 12.04 Margarita Grazhdaninova and Zvi Lerman – Allocative and Technical Efficiency of Corporate Farms.
- 13.04 Ruerd Ruben and Zvi Lerman – Why Nicaraguan Peasants Stay in Agricultural Production Cooperatives.
- 14.04 William M. Liefert, Zvi Lerman, Bruce Gardner and Eugenia Serova - Agricultural Labor in Russia: Efficiency and Profitability.
- 1.05 Yacov Tsur and Amos Zemel – Resource Exploitation, Biodiversity Loss and Ecological Events.
- 2.05 Zvi Lerman and Natalya Shagaida – Land Reform and Development of Agricultural Land Markets in Russia.
- 3.05 Ziv Bar-Shira, Israel Finkelshtain and Avi Simhon – Regulating Irrigation via Block-Rate Pricing: An Econometric Analysis.
- 4.05 Yacov Tsur and Amos Zemel – Welfare Measurement under Threats of Environmental Catastrophes.
- 5.05 Avner Ahituv and Ayal Kimhi – The Joint Dynamics of Off-Farm Employment and the Level of Farm Activity.
- 6.05 Aliza Fleischer and Marcelo Sternberg – The Economic Impact of Global Climate Change on Mediterranean Rangeland Ecosystems: A Space-for-Time Approach.
- 7.05 Yael Kachel and Israel Finkelshtain – Antitrust in the Agricultural Sector: A Comparative Review of Legislation in Israel, the United States and the European Union.

- 8.05 Zvi Lerman – Farm Fragmentation and Productivity Evidence from Georgia.
- 9.05 Zvi Lerman – The Impact of Land Reform on Rural Household Incomes in Transcaucasia and Central Asia.