Studies on the Agricultural and Food Sector in Central and Eastern Europe

Zvi Lerman, David Sedik,
Nikolai Pugachov, Aleksandr Goncharuk

Rethinking agricultural reform in Ukraine

Rethinking agricultural reform in Ukraine

Studies on the Agricultural and Food Sector
in Central and Eastern Europe

Edited by
Leibniz Institute of Agricultural Development
in Central and Eastern Europe
IAMO

Volume 38

Rethinking agricultural reform in Ukraine

Zvi Lerman
David Sedik
Nikolai Pugachov
Aleksandr Goncharuk

IAMO

2007

Bibliografische Information Der Deutschen Bibliothek
Die Deutsche Bibliothek verzeichnet diese Publikation in der Deutschen Nationalbibliografie; detaillierte bibliografische Daten sind im Internet über http://dnb.ddb.de abrufbar.

Bibliographic information published by Die Deutsche Bibliothek
Die Deutsche Bibliothek lists the publication in the Deutsche Nationalbibliografie; detailed bibliographic data are available in the internet at: http://dnb.ddb.de.

Leibniz-Institut für Agrarentwicklung in Mittel- und Osteuropa (IAMO)
Theodor-Lieser-Straße 2
06120 Halle (Saale)
Tel.: 49 (345) 2928-0
Fax: 49 (345) 2928-199
e-mail: iamo@iamo.de
http://www.iamo.de
ISSN 1436-221X
ISBN 3-938584-18-1

In der Schriftenreihe *Studies on the Agricultural and Food Sector in Central and Eastern Europe* werden durch das IAMO Monographien und Tagungsberichte herausgegeben, die sich mit agrarökonomischen Fragestellungen zu Mittel- und Osteuropa beschäftigen. Wissenschaftlern, die in diesem Bereich forschen, steht die Schriftenreihe als Diskussionsforum offen.

In its series *Studies on the Agricultural and Food Sector in Central and Eastern Europe* IAMO publishes monographs and proceedings focusing on agricultural economic issues specific to Central and Eastern Europe. This series offers a forum to researchers studying this area.

ISSN 1436-221X

ISBN 3-938584-18-1

PREFACE

Land reform and farm restructuring have always been a major component of the transition from plan to market in all formerly socialist countries, and especially in the 12 former Soviet republics forming the Commonwealth of Independent States (CIS). Ukraine, the second most populous country in CIS (after Russia) and the third largest by area (after Russia and Kazakhstan), began the process of agrarian reform in March 1991, six months before the declaration of independence from the Soviet Union. However, all through the 1990s international organizations berated Ukraine for its slow and insufficient reforms. Derogatory phrases like "one step forward, two steps back", "changing the sign on the door", "disappointing performance", "lack of vigorous progress" were universally (and justifiably) used to describe the Ukrainian reforms during the presidency of Leonid Kravchuk (1991-1994) and then (perhaps with less justification) under Leonid Kuchma (1994-2004). Evaluating the outcomes of nine years of reforms through 1999, World Bank experts summarized the conclusions of their continuous monitoring efforts in the following uncomplimentary language (CSAKI, LERMAN, 2001):

> In Ukraine, land reform has been mostly limited to transforming state ownership into collective ownership… The weak reforms have failed to radically change the traditional collective organization of Ukrainian farms… Break-up and internal restructuring of large farms has been very limited. Hence it should not be a surprise that the transition process is not delivering in terms of increased profitability and efficiency.

The "big bang" came in December 1999 in the form of Presidential Decree No. 1529/99 "On immediate measures to accelerate the reforms in the agricultural sector". By this decree Ukraine made the momentous decision to complete land privatization through conversion of the "land shares" – paper certificates of landownership previously distributed to the rural population – into demarcated and titled physical plots. This decision, long advocated by international donors, set Ukrainian land policies sharply apart from the policies of other large CIS countries (Russia, Kazakhstan, Belarus), and put Ukraine roughly on the same land reform path as the two smallest CIS members, Moldova and Azerbaijan.

January 2005 marked the five-year anniversary of this landmark decree. FAO accordingly launched a monitoring study to assess the outcomes of reform since 2000 and to formulate a set of policy recommendations based on the post-2000

reality in the rural sector.[1] The overall purpose of the study was to determine to what extent and in what ways there had been fundamental changes in land and farm policy after 2000. The methodology included a structured questionnaire-based survey of three constituencies representing the Ukrainian farm structure: The managers of large corporate farms, individual peasant farmers, and operators of rural household plots (this survey is referred to as the 2005 FAO farm survey). Interviews were also conducted with regional agricultural officials to get a view of farm-level changes "from the outside". Official national statistics were used to construct a picture of sectoral changes. The survey was designed to conduct a comparative analysis of land rights, management structure, and economic performance in the two main sectors of Ukrainian agriculture – corporate farms and individual farms. We were also planning to collect information that would enable us to detect significant differences between the "new wave" corporate farms created on the basis of the new legislation in the post-2000 period and the "old wave" descendants of the traditional collective and state farms.

The study is a collaborative effort of three institutions: The Policy Assistance Branch of FAO's Regional Office for Europe and Central Asia (REUP) in Rome, the UNDP-sponsored Agricultural Policy for Human Development (APHD) project in Kiev, and the Institute of Sociology, also in Kiev. David Sedik as the Head of REUP was responsible for the overall design, management, and coordination of the study. Vladimir Artyushin and Nikolai Pugachev from the APHD project were in charge of the local implementation of the study in Ukraine, including collection and analysis of sectoral data. Yurii Privalov, Aleksandr Goncharuk, and Maria Olenina from the Institute of Sociology were responsible for the survey field work and over-saw the construction of the computer database with the survey data. Zvi Lerman from the Hebrew University of Jerusalem provided overall scientific guidance for the survey and, together with David Sedik, carried out the final analysis on which the study is based.

This book is organized in two parts. Part I presents a brief overview of the agricultural policy environment in Ukraine before and after 2000, followed by a detailed discussion of the legal foundations of land and farm reform and an overall picture of the impacts of reform on the farm sector since 1990. Part II presents the findings of a survey of nearly 1,400 individual and corporate farms conducted in the spring of 2005 in eight oblasts. The survey has been designed to provide focused information highlighting the changes that occurred at the farm level since the 1999 Presidential Decree. The Executive Summary at the beginning of the volume contains the main findings of the study and some policy recommendations. The last chapter (Chapter 16) brings together our main conclusions in a more detailed format.

[1] For detailed analyses of the reforms during 1991-99 see LERMAN et al., 1994; LERMAN et al., 1995; LERMAN, CSAKI, 1997; LERMAN, CSAKI, 2000.

The main literature and data sources used in the study are given in the list of references at the end. Tables and figures without references to a specific source are based on the 2005 FAO farm survey.

TABLE OF CONTENTS

EXECUTIVE SUMMARY

Land and farm reform in Ukraine began more than 15 years ago and has proved to be a lengthy and difficult process. The first round of farm reforms in 1992-93 initiated privatization of land through the distribution of paper shares to the rural population and mandated the transformation of former collective and state farms into corporate shareholder structures. The second round of reforms began in December 1999 when the corporate farms were obliged by presidential decree to convert the paper land shares into fully titled land plots for their shareowners. The land received through the conversion of the share certificates could be used to establish a new private farm or to enlarge an existing household plot. Corporate farms could continue to use the land represented by privately owned land shares only if they signed a formal lease contract with the landowners.

FAO marked the five-year anniversary of the 1999 landmark decree by launching a monitoring study to assess the outcomes of reform since 2000 and to formulate a set of policy recommendations based on the post-2000 reality in the rural sector. Official national statistics were used to construct a picture of sectoral changes, while data collected in a questionnaire-based survey of nearly 1,400 respondents in the spring of 2005 made it possible to conduct a comparative farm-level analysis of the reform impacts in the two main sectors of Ukrainian agriculture – corporate farms and individual farms.[2]

Change of land policy and GDP growth spur sectoral recovery after 1999

Following the 1999 land reform nearly 7 million rural residents became owners of physical land plots, not just paper shares, and 70% of agricultural land is now physically owned by rural individuals. The Ukraine land reform may provide an important source of income for rural residents, as the average landowner should earn about 400 hryvna per year by renting out his land, the equivalent of two and one half months of wages. However, the new landowners are prohibited from selling their land because of a moratorium that remains in force until January 2008 (and may be extended to 2012).

The 1999 reform has led to the emergence of a new wave of "private" corporate farms organized by a single entrepreneur on land leased from rural landowners. As of 2004 there were over 4,000 such "private" corporate farms or almost 25% of the total number of corporate farms in Ukraine. The remaining 12,000 corporate

[2] This survey is referred to in what follows as the 2005 FAO farm survey. The survey design is described in more detail in Chapter 6.

farms were organized as "business" companies (*hospodarski tovaristva*), including joint stock companies, limited liability companies, agricultural cooperatives etc.

The ongoing process of reform has totally changed the face of Ukrainian agriculture: From agriculture with predominant concentration of production in collective farms it has evolved into agriculture characterized by clear dominance of individual farms. Corporate farms today control less than 60% of agricultural land (down from nearly 95% prior to the start of reforms in 1990) and contribute about 30% of gross agricultural output (down from 70% in 1990). The individual sector (consisting of the traditional household plots and the independent peasant farms that began to emerge after 1992) controls today more than 40% of agricultural land, contributing 70% of agricultural output. Within the individual sector, the main contribution to agricultural production is from household plots, not peasant farms, as they also control much more land (33% versus 8%). The farm structure in Ukraine today is much closer to that in Moldova than in Russia.

The transfer of agricultural land from corporate to individual farms accelerated markedly in 1999: The share of the individual sector in agricultural land increased from 6% in 1990 to 17% in 1998 and then soared to 41% in 2004. The increased share of individual farms in land is reflected in increased size of holdings because the total agricultural land in Ukraine has remained constant at 42 million hectares. Thus, the average peasant farm increased from 25-30 ha in 1998 to 70-80 ha in 2003-2004, while household plots grew from an average of 1 hectare in 1992-99 to 2.5 hectares in 2004.

The 1999 reforms have also affected the performance of Ukrainian agriculture. **The agricultural output from both individual and corporate farms made a spectacular recovery in 1999**, as it grew by 30% (in constant prices) between 1999 and 2004. The recovery has been largely due to growth in the individual sector, but some spillover effects are also observed among corporate farms (where the decline in output stopped in 2000 and the number of unprofitable farms dropped from almost 100% in 1997-99 to around 40% in 2000-2004). It is tempting to attribute the sudden improvement in farm performance to the turn-around in government's agricultural policies. In fact, however, the increase in agricultural output paralleled the increase in GDP and may have been one manifestation of general economic recovery in Ukraine.

The two partial productivity measures – the productivity of agricultural land and the productivity of agricultural labor – also show signs of recovery since 1999. The productivity of agricultural land rose from 1,200 hrivny per hectare (in 2000 prices) in 1999 to 1,600 hrivny per hectare, an increase of one-third, reflecting primarily the growth of agricultural output (since the total agricultural land remained roughly constant). The increase in the productivity of agricultural labor was even larger: From 10,000 hrivny per worker in 1999 to more than 15,000 hrivny per worker in 2004, but a large part of this increase may be due to

a change in the methodology of labor surveys that dramatically depressed the reported number of agricultural workers starting in 2002.

Farm reorganization: Rural people are now less dependent on the local corporate farm

Collective agricultural enterprises (CAE), the organizational form that dominated the farm structure in Ukraine between 1993 and 1999, have completely disappeared since 1999. Corporate farms are now mainly represented by limited liability companies and private lease enterprises. While the number of shareholders in corporate farms ranges from 1 to 1,600, fully 16% are single-shareholder entities and 31% have only 1 to 3 shareholders.

Two-thirds of the rural households surveyed received their land shares at least in the form of paper certificates and more than half received them in the form of a physical plot. These share assignment rates are substantially higher than in previous surveys (1994, 1996). However, only peasant farmers have kept the land received in the process of reform for their own use. Households mainly lease out their land to local corporate farms, and retain a relatively small portion for their own use. There is a clear preference on the part of the rural population for leasing their shares, not investing them in corporate equity.

The local corporate farm has lost its role as the main rural employer. Only 20% of the adults in the survey report that their main employment is with the corporate farm, compared with 67% in 1996. **Fully two-thirds of respondents have no relations with the corporate farm.** Those who have no relation with the local corporate farm work mainly on the family farm and in nonagricultural jobs.

Land and land markets: Significant reliance on leasing contracts

There are huge gaps in size between the three main categories of farms: The mean size in the survey is 1,700 hectares for corporate farms, 140 hectares for peasant farms, and 1.7 hectares for household plots. The corporate farms are still much larger than in market economies (500-600 hectares per corporate farm in the U.S.), while the household plots are still much smaller than the average family farm in market economies (130 hectares in land-rich U.S., 20 hectares in EU-15). The size gaps perpetuate the strong duality of farm structure that characterized Soviet agriculture.

In household plots the land used for farming is just 36% of the family's total land holdings and the rest is leased out. More than half the rural families lease out at least some of their land, while leasing in by households is marginal (3% of respondents). The few families who lease in land cultivate much larger holdings: Nearly 16 hectares compared with 1-2 hectares for the rest. The entire difference is leased land. Growth of the much larger peasant farms is also entirely attributable to land leasing: Farms with leased land achieve sizes in excess of 200 hectares, while farms without leased land average only 50 hectares. Of the 140 hectares in an

average peasant farm, only 18% is owned land, while the remaining 82% is leased from other landowners or from the state. Thus, on the whole, peasant farmers follow a totally different leasing strategy: **Most peasant farmers lease in land to enlarge the cultivated area, while most rural households lease out land that they cannot cultivate.**

Corporate farms, unlike peasant farms and household plots, have very little own land and they rely primarily on land leased from individuals (members, shareholders, and other rural landowners). In the present circumstances only a small minority of shareholders and other lessors actually work in the corporate farm: Most are passive landowners who entrust their land to the corporate farm without expecting the security of a wage job.

The average lease payments in the survey are around 100 hrivny per hectare per year (based on the answers of both lessors and lessees). Rural families that lease out land earn 500-550 hrivny (about $100) a year in lease payments.

While the participation rates in land lease markets are quite high, the market for buying and selling of land is still hopelessly undeveloped: Nobody in the survey reported selling land and only 5% of peasant farmers reported buying land in the last 5 years. In these few cases, buying, like leasing, has a positive impact on farm sizes, strengthening the overall impression that land market transactions are indeed conducive to farm enlargement. There is still considerable resistance to the very notion of buying and selling land, especially among corporate farm managers and household plot operators, less so among peasant farmers. Yet nearly 30% of household plot operators think they will be able to buy more land for their plot if they so desire in the future, while peasant farmers and farm managers expect to rely more on leasing from private individual to enlarge their farms.

Changing business environment: Private trade has replaced state supply and procurement

Respondents from the individual farming sector – peasant farmers and heads of rural households – provide a much more positive evaluation than corporate-farm managers of the overall effect of the changes associated with the second-wave reforms. The managers' view is less enthusiastic because corporate farms have been faced since 2000 with labor force shrinkage, reduction of output, erosion of farm profits, and an increase of the tax burden.

The reduction of farm production notwithstanding, farm managers give a positive assessment of the change in the behavior variables among farm workers. **The traditionally problematic behavioral attributes, such as work discipline, motivation, theft and pilfering, or drinking, are better today than in the past.**

Managers complain that access to purchased inputs is worse now than before 2000. Yet a quantitative analysis shows that around **80% of both managers and**

peasant farmers manage to buy inputs, and roughly half this number actually buys all that they need. Private trade – commercial suppliers and private individuals – is the main channel for farm inputs today. Although state suppliers continue to play an important role, they are far behind the commercial trade channels and their role has declined dramatically over time.

There is no evidence of acute shortage of farm machinery in the survey. Around 90% of both corporate and peasant farms report tractors and harvesters, as well as a complement of light machinery. The much larger corporate farms naturally have a larger machinery pool: 67 pieces of various farm machines per corporate farm compared with only 11 pieces per peasant farm. The machines used by corporate farms are larger and more expensive than those in peasant farms. Both corporate and peasant farms rely mainly on own machinery, although rentals are reported with considerable frequency. Most of the **rented equipment originates from private sources: Access to state leasing programs is virtually nonexistent in the survey**. Household plots have a much smaller machinery complement: On average 3 pieces per household, of which only 1 piece is heavy equipment (a tractor or a harvester). Rural households rely much more heavily on equipment rentals and jointly purchased machinery, presumably because of capital constraints.

Managers are far less constrained by the directives of the regional authorities and have more freedom in making economic and business decisions than before 2000. Access to credit is reported to have improved, although this effect may be a purely subjective feeling due to the persistence of soft-budget constraints and write-offs at the regional level. Regional authorities claim that they have no influence over the allocation of agricultural credit and that these issues are decided directly by the commercial banks.

Rural social sphere: Households now pay for services

The responsibility for the rural social assets has been largely transferred from corporate farms to the local municipality. **The corporate farms continue the traditional policy of providing support to household plot production.** This includes assistance with plot cultivation and farm sales, provision of farm inputs, transport, and even purchase of consumer goods. Today, however, the households cover most of the costs incurred by the corporate farm and household support in the survey is about 0.5% of the total annual expenditure of the average farm.

Farm production and sales: Even household plots are not pure subsistence operations

The value of production shows order of magnitude differences across the spectrum of corporate farms, peasant farms, and household plots, which reflect the differences in land use. Both corporate and peasant farms concentrate on mixed primary agriculture (crops and livestock), with relatively little diversification into nonagricultural activities. Crop production dominates the product mix in corporate

and peasant farms, while household plots continue with evenly balanced crops and livestock. Corporate and peasant farms produce mainly cereals, while household plots allocate a significant share of their land also to potatoes and vegetables.

Although peasant farms have a smaller share of livestock in their product mix than corporate farms, a definite convergence is observed, which may reflect capital accumulation in peasant farms since 1998. Many farm managers and peasant farmers express their intention to increase livestock production subject to feed availability, although farms with livestock show significantly lower profit margins than crop-specialized farms. The attitude toward livestock is apparently still driven by emotions, not by profitability, although **regional authorities no longer intervene in livestock production decisions at the farm level.**

Corporate farms and peasant farms are true commercial producers, selling most of their output (mainly for cash, not barter). Household plots on average sell only 20% of their output, but even with these levels of commercial activity they cannot be regarded as pure subsistence operations: Nearly two-thirds of household plots surveyed report some farm sales and 10% sell more than half their output (like the true commercial producers). The stigma of subsistence farming attached to household plots is not entirely justified: **Household plots are in fact semi-commercial farms.** The share of output sold by household plots increases with plot size, which suggests that **the level of commercialization of household plots will increase if they are allowed to grow beyond the current limits through land market mechanisms.**

All farms sell mainly through private channels, including commercial traders and privatized processors. Sales to state procurement and the former consumer cooperative system are negligible. Household plots are distinguished by a relatively high share of direct sales to consumers in the marketplace.

Farm debt and access to credit: Increasing reliance on banks and suppliers

Both corporate and peasant farms have a perception of significant access to credit: 63% of corporate farm managers and 34% of peasant farmers report that they actually borrow. The access to credit has improved over time, and managers of corporate farms indicated that the credit situation today was better than before 2000. Rural households borrow much less frequently (15% of respondents).

Banks and input suppliers are the main sources of credit for corporate and peasant farms. Commodity credit or credit in kind plays a marginal role in the survey, while wage arrears or debt for taxes and social deductions do not appear to be a problem. The state has practically disappeared as a source of credit for peasant farms. Formal credit is gradually replacing informal borrowing from relatives and others in the individual sector.

Agricultural producers typically borrow for 12 months at annual interest rates of around 19%. Given inflation rates of around 9% in 2004, the real cost of agricultural borrowing in Ukraine is 9-10% annually, which is quite high by world standards. The respondents generally complained that the interest rates were too high and the credit term too short: An acceptable interest rate for future borrowing would be 8% with credit term of 3 to 4 years. These acceptable interest rates are equivalent to zero (or even negative) real interest, which is not attainable economically.

Borrowing from the banks naturally requires collateral, which most corporate and peasant farms manage to provide. Lack or insufficiency of collateral was perceived as one of the three main obstacles to borrowing (after high interest rates and short credit term).

Contrary to the situation in the past, the level of indebtedness is not particularly high: The average farm debt can be paid off with 6-7 months of sales revenue. For corporate farms, the situation in 2005 appears to be a significant improvement compared with 1998, when debt-to-sales ratios were around 2 years and farm indebtedness was a major concern. Farm profitability has also improved significantly since 1998, but farms with debt still have lower levels of profitability than farms without debt.

Investment plans: Farms have ambitious investment goals for the future

All respondents have extensive investment plans for the future, which is a sign of general optimism and considerable confidence in the economy. Two-thirds of commercial producers (corporate farms and peasant farms) plan to invest in production assets, with purchase of farm machinery and livestock at the top of the list of priorities. Rural households are evenly divided between those planning farm investments (also mainly machinery and livestock) and those planning consumption investments (i.e., build a house, buy a car, buy household durables).

The reported investment plans are quite ambitious, estimated at 33% of sales revenue for corporate farms and 53% for peasant farms. The total estimated investment costs are 5 to 8 times the actual amounts invested in 2004, which is clearly another reflection of the high degree of optimism concerning the future.

Managers and peasant farmers plan to finance their investment with a mix of own funds (savings) and bank credit, while rural households intend to rely mainly on family savings. Managers list leasing as one of the options for financing investment (primarily for machinery, but also for livestock and processing equipment), although in practice this channel has been used only marginally.

Rural employment: Farm labor is "just right"

Among families of peasant farmers, the farmer himself works primarily on the family farm and it is the spouse who is the main source of income diversification: 21% of spouses hold hired jobs and another 5% report self-employment outside the household. Heads of rural households and their spouses diversify to a much greater extent: Fully 40% have an off-farm job as their main occupation. Still work on the family farm is a major factor in time allocation: Heads of rural households work on the family plots for 8.6 hours a day during 295 days a year; those who also work in the corporate farm devote "only" 7.6 hours per day to their household plot for 301 days a year (compared to 247 days that they give to the corporate farm).

The average corporate farm in the survey employs between 120 and 130 permanent workers, with seasonal labor adding about 16% to the permanent labor force. Peasant farms employ on average less than 9 people, of which 3 are family members. Virtually all peasant farms report work inputs from family members, but only one-half engage hired labor. Overall, the family members contribute 55% of the total labor input in peasant farms, whereas hired workers contribute 45%. The differences in the number of employed in corporate and peasant farms are largely explained by differences in farm size.

The respondents appear to be satisfied with the labor situation. More than half the farm managers are of the opinion that their labor force is "just right" and only 2% admit that there are redundancies of farm labor. Labor shortages do not appear to be a serious problem among the farms surveyed, as only 40% of respondents in both corporate and peasant farms complain that they face shortage of labor. Peasant farms experience shortage of unskilled manual labor, whereas corporate farms need more skilled labor (machine operators, farm specialists). The number of unskilled workers needed is greater than the number of skilled workers for farms of both types.

Non-competitive low pay is an important factor in the inability to hire, but the main obstacle seems to be labor supply difficulties. There is lack of sufficiently qualified labor, there are problems with the age structure of labor, applicants suffer from "bad habits" (i.e., drinking, unreliability), and people simply have no motivation to work (they register at the labor exchange, but do not accept farm jobs).

Farm productivity: No advantages to large-scale corporate farms

From theoretical considerations we expect the productivity of small individual farms to be higher than the productivity of large corporate farms. We thus expect an overall productivity ranking household plots > peasant farms > corporate farms. Indeed, household plots achieve the highest productivity of land (measured by the value of output per hectare), but the land productivity in corporate and peasant farms is roughly the same. Nevertheless, regression analysis shows that

the productivity of land decreases with farm size both in the entire sample (all three farm types) and in the subsample consisting of corporate and peasant farms only. Productivity of labor, on the other hand, is higher in corporate farms than in peasant farms (no estimation for household plots was possible).

Accounting-based calculations of total factor productivity (TFP) as the ratio of the value of sales or value of output to the reported costs show that, consistent with our expectations, the accounting TFP is somewhat higher for peasant farms than for corporate farms (1.5 and 1.3, respectively, which means that the value of sales is 50% higher than costs for peasant farms and 30% higher than costs for corporate farms). On the other hand, attempts to estimate total factor productivity (TFP) by econometric production-function techniques did not produce conclusive results: The TFP scores were not significantly different for corporate and peasant farms. While these results do not demonstrate the expected productivity advantage of individual farms, they establish convincingly that **corporate farms are not more productive than peasant farms: We do not observe economies of size operating among Ukrainian farms, and farms of all types should be allowed to evolve on a level playing field.**

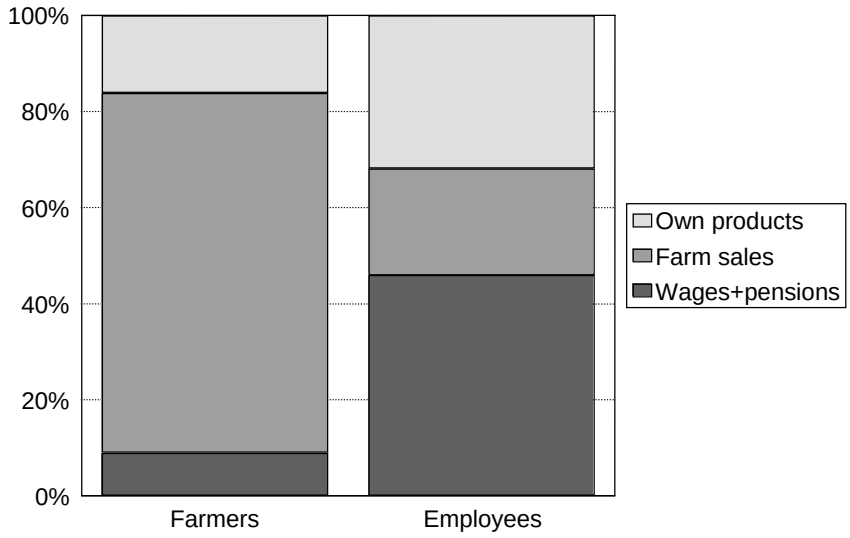
Rural family incomes: Peasant farmers earn more, while employee households diversify more

Incomes were estimated for two categories of rural families – peasant farmers operating an independent family farm ("farmers"), and other rural families operating a traditional household plot in addition to wage employment or reliance on social insurance ("employees"). Farmers earn much more than employees both per family and per capita. The average yearly income for farmer families is 54,500 hrivny, compared with less than 10,000 hrivny for employees. For farmers most of the cash income is from farm sales and a very small share comes from salaries and pensions. Employees, on the other hand, rely to a much greater extent on salaries and pensions and less on farm sales. Another component that differentiates farmers from employees is income from property (i.e., lease payments for land, dividend payments for asset shares, etc.), which accounts for 4.2% of family income for employees and is practically zero for farmers. While farmers cultivate all their land and rely primarily on farm production as a source of income, employees willingly lease out some of their land (mainly their land shares) and thus earn extra income from lease payments.

The value of own farm products consumed within the household can be regarded as additional non-cash income: Consumption of own farm products replaces cash expenditure on food purchases. The value of own consumption estimated from the survey adds nearly 50% to the cash income of employee families and 20% to that of farmer families. Based on these estimates, the value of own consumption of farm products is 32% of imputed income for employee families and 16% for farmer families. Farm sales remain the dominant component of farmers' income even after imputing the value of own products, whereas in

employee families wages, pensions, and the value of own products are more important than sales (see **figure**).

Structure of imputed income
(including value of own consumption)



The absolute difference in cash family income is largely an outcome of the difference in farm sizes: 113 ha for farmers, 1.7 ha for employees. Income also increases with family size (the labor pool available for production) and decreases with the age of the family head. The average age of family members has a positive effect on income due to the contribution of pensions that the older family members receive. Income naturally increases with family size and decreases with the age of the family head. The average age of family members has a positive effect on income due to the contribution of pensions that the older family members receive. There is also a certain farm type effect: Farmer families earn more than employee families adjusted for land and other factors. Answers relating to the family standard of living confirm the existence of this farm type effect: Farmers' families achieve a higher (perceived) well-being than the employee families.

Total cash income, and especially farm income, increase with the increase of farm size. The share of farm income increases from 17% in the smallest farms to more than 70% of total income in the largest. Income per capita also increases with farm size, rising quite dramatically from less than 5,000 hrivny per capita for households with up to 1-2 hectares to 20,000 hrivny and much more for farms larger than 50 hectares. Family well-being accordingly also increases with the area of land used (or in case of employee families, also with the area of owned land). Families reporting a low level of well-being command significantly less land than families reporting a comfortable level of well-being.

Peasant farmers earn more than other rural households in absolute terms, they report a substantially higher standard of living, and their family needs are more closely satisfied by their income. Yet despite the relatively lucrative financial situation the dichotomy of peasant farmers and rural employees appears almost solidly frozen: Only 4% of respondents are planning to become peasant farmers within the next 2-3 years. These few are mainly motivated by hopes of a better future for their children, prospects for higher income, and independence. The remaining 96% have no plans to become peasant farmers despite better financial prospects. They are primarily deterred by lack of capital, risk aversion, as well as age and poor health. Concerns about access to inputs and lack of enthusiasm on the part of other family members to continue with farming activities are also cited as obstacles.

Regardless of the relative success of peasant farming, the survey paints a bleak picture of the future of the Ukrainian village. Around 50% of respondents (both peasant farmers and rural employees) would like to see their children leave the village. Around 15% would like their children to stay in the village but go into business instead of farming. Farming as a future occupation of the children is envisaged by only 24% of peasant farmers and as few as 8% of other rural residents. The Ukrainian village is in the danger of being left without a continuing generation of farmers.

PART I

AN OVERVIEW OF SECTORAL DEVELOPMENTS AND POLICIES

This part reviews the agricultural policy environment in Ukraine before and after 2000. The discussion of the developing legal framework is followed by a description of the changes in farm structure and the observable impacts of reform on agricultural performance. The overview concludes with some international comparisons. The data in this part are from publicly available sources, including official statistics and published legal documents. Part I is organized around the following topics:

1. Agricultural policy in Ukraine before and after 2000
2. Legal framework for land reform in Ukraine
3. The farm structure in Ukraine
4. Impacts on agricultural performance
5. Ukrainian agriculture in comparative perspective

1 AGRICULTURAL POLICY IN UKRAINE BEFORE AND AFTER 2000

Land and farm reform has been at the center of agricultural policy in Ukraine since its declaration of independence from the Soviet Union in October 1991. Land and farm reform involves two basic interrelated tasks at the farm level: (a) allocating land use rights to individuals and (b) appropriate restructuring of former collective (and state) farms in line with the principles of market agriculture. Reform, however, should not be viewed as an end in itself. Rather, it is one part of a larger effort to create a financially sustainable and competitive agriculture and raise rural incomes. It requires a redefinition of government agricultural policies away from state intervention in farm-level decisions toward the design of appropriate policies for regulating and supporting market oriented agriculture.

Land and farm reform has proved to be a lengthy and difficult process in Ukraine. As noted in the **Preface**, Ukraine has had two main rounds of land reform and farm restructuring, which were initiated by the central government, but impacted on both regional authorities and the farms. The first round of farm reforms led in 1992-93 to a sweeping transformation of the 12,000 collective and state farms into so-called collective agricultural enterprises (CAE). CAEs then underwent share-based privatization with land and asset shares distributed to farm employees who theoretically enjoyed the right of exit. The second round of reforms began in December 1999 with a presidential decree stipulating that CAEs must change their organizational form to corporate farms (limited liability companies, joint stock companies, partnerships, cooperatives, etc.) by April 30, 2000 and distribute fully titled land plots to their shareowners. These reform measures are described in detail in the next section.

Throughout the 1990s agricultural policy in Ukraine emphasized ad hoc government intervention in agricultural production, marketing and finance, hindering land and farm reform. Agricultural exports were subject to quotas and licensing through 1996 and state grain procurement survived through 1997 (VON CRAMON-TAUBADEL, ZORYA, 2001; SEDIK et al., 2000). Even after 1997 neither internal nor foreign trade was liberalized. Indicative and recommended prices (minimum export prices) were set by the government for many commodities. Local regional authorities restricted commodity trade by banning sales of commodities to other regions until local commodity quotas had been filled. Large farm enterprises continued to receive state rationed or state guaranteed credits against commodity deliveries. When farms fell into heavy debt, debt repayment

was used as a justification for expropriation of agricultural commodity stocks (SEDIK, 2004).

Beginning in 1999-2000, in parallel with the second wave of land reform that reallocated land use rights from collectives to individuals, Ukrainian agricultural policy underwent a transformation that seemed to herald a new policy regime (OECD, 2003). First came a significant improvement in trade policies, particularly for exports, increasing the competitiveness of Ukrainian agricultural products. The government announced it would no longer intervene in farm finance and signify-cantly reduced its role in agricultural input supply and grain marketing, thus reducing the inherent inefficiencies of government controlled input supply and marketing systems. By 2002 the predominant form of government finance for the purchase of farm inputs became subsidized interest rates. Further legislation in 2000 transferred the responsibility for social sphere functions from farm enterprises to local govern-ments. The agribusiness privatization program that had been largely completed between 1994 and 1999 began to yield results in terms of increased efficiencies in marketing and input supply chains. For the first time in many years the terms of trade in agriculture, i.e., the index of real agricultural output prices relative to agricultural input prices, increased by 18% in 2000.

But again in 2003 doubt was cast on whether Ukrainian agricultural policy had actually been transformed fundamentally (VON CRAMON-TAUBADEL, 2003). A poor harvest – admittedly the outcome of unfavorable weather – prompted renewed state intervention in commodity markets. Minister of Agrarian Policy Serhiy Ryzhuk allegedly announced that the government would soon "return to its previous system of crop management, whereby it instructs farmers to produce specific quantities of each agricultural commodity." In July 2003, after severe winterkill and prolonged spring and summer drought, the government issued a decree that established government responsibility for the harvest failure, empowering regional authorities to "thoroughly monitor food grain movements and prices on regional markets" and "pay closer attention to monitoring staple food prices, mark-ups and profitability rates, and undertake measures to keep them from rising if there are no reasons for price increases". The decree also authorized intervention grain purchases by the State Reserve Committee. Under the terms of these decrees, regional authorities were given the power and incentives to interfere on commodity markets. The Ukrainian grain market was fragmented into regional markets. These interventions magnified the price increases due to the poor harvest.

The apparent backtracking on reforms in 2003 underlined the need for looking beyond agricultural policies and legislation to the state of affairs at the farm and local level. Central government agricultural policies in Ukraine are often contradictory and unclear so that their combined effect on farms is unpredictable. Changes at the farm level can take on a life of their own, often causing far reaching impacts that are not apparent by examining policies and legislation. Such changes can only be studied through interviews of local officials and farm surveys.

2 LEGAL FRAMEWORK FOR LAND REFORM IN UKRAINE

Ukraine embarked on the process of land reform and farm restructuring 15 years ago and the process has continued, at times erratically, ever since. As all other transition countries, Ukraine quickly realized that land reform and farm restructuring in the former Soviet environment was an extremely complex undertaking that required strong political will, commitment, and decisiveness to achieve any progress. The Ukrainian reforms came in two major waves: The cautious first wave that began in 1992 during Kravchuk's presidency and continued with halts and starts through Kuchma's first term in office; and the much more radical second wave initiated by Kuchma in December 1999. The 15 years of reform are accordingly divided into two stages: The first-wave reforms of 1990-99 and the second-wave reforms since 2000.

2.1 The formative stage 1990-1999

The need for reorganization of collective and state farms in the interest of improved productivity was recognized long before Ukraine's independence. On December 18, 1990, nine months before the declaration of independence, the Supreme Soviet of what then was still the Ukrainian Soviet Socialist Republic passed the first resolution "On Land Reform", according to which all land in the country (both agricultural and non-agricultural) became subject to reform. Exactly one year later, on December 20, 1991, independent Ukraine passed its first Law on Peasant Farms, which defined a peasant farm as a form of individual entrepreneurship established for commercial agricultural production and based primarily on own labor. Since land at that time was still state-owned, individuals willing to engage in peasant farming could receive up to 50 hectares of agricultural land in lifetime inheritable possession.

Collective and private forms of land ownership were legalized alongside state ownership in January 1992 by the Law on Forms of Land Ownership. In March 1992 the Ukrainian Parliament (the Supreme Rada) adopted a new Land Code that laid the foundation for privatization of state-owned land and distribution of paper certificates of entitlement ("land shares") to the privatized land that continued to be held in collective ownership by farm enterprises. Private ownership was intended for individuals (e.g., peasant farms and household plots[3]), while collective ownership was intended primarily for corporations that would

[3] A government resolution passed in December 1992 allowed privatization of household plots without any payment.

succeed the former collective and state farms. Yet even collective ownership was defined in the Land Code as ultimately the ownership of the individual holders of land shares.

The goals of land reform, originally formulated in terms of traditional Soviet forms of land tenure, such as lifetime inheritable possession for individuals and permanent use rights for farm enterprises, were reformulated in May 1993 using the following language (LAW, 1993):

> Land reform is a component of the economic reform implemented in Ukraine as part of the transition of the economy to market relations. The task of this reform is redistribution of land and its transfer to private and collective ownership, as well as usership by enterprises, with the purpose of creating equal conditions for the development of different forms of farming, diverse forms of economic organization, and efficient use and protection of land.

The provisions for land privatization and distribution of land shares set the stage for the restructuring of collective and state farms and for the development of private farming. The underlying philosophy assumed that the former collective and state farms would transform into collective agricultural enterprises (CAEs) or other agricultural corporations (joint-stock or limited liability companies, agricultural cooperatives) cultivating land privatized into collective, rather than individual, ownership. By 1995 fully 37% of agricultural land had been privatized into collective ownership of CAEs, but only 3% was privately owned by individuals at that time (DERZHKOMZEM, private communication). The acceptance of the notion of private land ownership was problematic, as the old Soviet Civil Code, which remained in force in Ukraine until January 1, 2004, did not recognize private property and entrepreneurial activity was punishable as "illegal speculation" under the Soviet Criminal Code (in force until September 1, 2001).

The privatization of land into collective ownership of farming corporations thus became an intermediate stage of Ukrainian land reform. It ended in August 1995 with the publication of Presidential Decree that established mechanisms for the division of the collectively owned land of farm enterprises into individual land shares. Rural residents would receive paper certificates of ownership, without physically getting a plot of land, and certificate holders would be allowed to convert the land share into a private plot when leaving the farm enterprise. The right of each member to exit the collective with a physical plot corresponding to a share of collective property was a highly important attribute of collective land ownership. This provision established a fundamental mechanism for transferring land from collective to private ownership, and guaranteed the individual's freedom of choice in the future. A collective was no longer a closed entity, as it had been during the Soviet era, and individuals were entitled to leave the collective taking their share of land with them.

By December 1999 more than 6 million rural residents had received paper certificates – land shares – confirming their entitlement to a plot of land of a specified size but in an unspecified location. The non-land assets (farm machinery, buildings, livestock) had been divided into value-based paper shares in all 10,800 former collective farms, which had transformed mainly into CAEs (or similar forms, such as "peasant unions" that were particularly popular in Western Ukraine). The assets of 2,300 state farms (98% of the total number) were first privatized and then also divided into asset shares. Nearly two-thirds of the corporate farms that emerged during the reforms were organized as CAEs: In a single year, from 1992 to 1993, their number jumped from 0 to 7,400 and continued to increase to a peak of 8,100 at the end of 1999 (Table 2.1).

Share-based privatization did not actually allocate land use rights to individuals. Very few CAEs distributed land in kind to the shareowners and few farm employees left large farms for independent farming. Moreover, share privatization did not encourage large farms to change their mode of operation by reducing costs (share privatization often resulted in only "changing the sign on the door"), nor did it eliminate the soft budget constraints implicit in government policies toward the farms. Most importantly, perhaps, it did not resolve the barriers to exit from CAEs. Neither farm directors nor shareowners generally supported allowing their other members to leave the farm. Many details of the exit procedure (allocation of land and property shares, the methodology of identification of concrete plots of land and division of large farm assets) were worked out only years after the initial decrees authorizing farm exit. The relatively unfavorable conditions for private farmers in matters of access to capital, inputs, and markets compared to agricultural enterprises dissuaded many from exiting CAEs. This imbalance resulted from state agricultural policies that supported agricultural enterprises with subsidies, state and bank credits, the authority to "borrow" from their employees through non-payment of wages, write-offs or rescheduling of state and bank debt, favorable input supply and marketing deals, etc. Finally, regional authorities had great influence over the implementation of in-kind privatization of farms by design, and they often used their power to effectively slow or stop in-kind privatization that was tantamount to dissolution of farms under their authority.

Perhaps the ultimate barrier to exit from agricultural enterprises was posed by the accumulation of overdue debt in CAEs. In Ukraine, neither land nor property of agricultural producers with unresolved debts could be distributed because of creditor claims on them (CSAKI et al., 2001). The simple reason for the accumulation of debt was the inadequacy of farm profits. In 1998, for example, 92% of agricultural enterprises in Ukraine were unprofitable. Behind this accumulation of debt were the agricultural policies that determined the willingness of the state, the banks, and the input suppliers to forgive or reschedule debt and to extend new credits and subsidies to inherently unprofitable enterprises. In essence, the soft

budgets that existed for agricultural enterprises in Soviet times continued into the post-Soviet period.

2.2 The 1999 watershed: Presidential decree on reorganization of farm enterprises

The reforms implemented in the 1990s failed to produce the expected improvements in agricultural productivity and efficiency, and the second phase of agricultural reforms began with Presidential Decree of December 1999 (DECREE, 1999). The 1999 decree essentially declared that CAEs, based as they were on collective land ownership, were incompatible with market conditions and had to reorganize into market-compliant forms based on private land ownership: Family farms private enterprises, farming corporations, and agricultural cooperatives. All CAE members (i.e., collective landowners) had the right to leave the enterprise with their land and asset shares. The Decree confirmed that this right did not require the approval of the general assembly of the members nor could it be limited in any other way. The land received through the conversion of the share certificates could be used to establish a new private farm or to enlarge an existing household plot. Corporate farms could continue to use the land represented by privately owned land shares only if they signed a formal lease contract with the landowners. Essentially, each corporate farm was required to conclude contracts for leasing the land parcels from its shareowners and pay for the use of their land. The lease payments could not be less than 1% of the assessed value of the land plot. Farm debt was written off or restructured according to legislation of 2000 and 2001, which removed a significant obstacle to withdrawal of individuals with their land from former collective frameworks (VON CRAMON-TAUBADEL, ZORYA, 2001).

The first impact of the 1999 decree was instantaneous, but purely cosmetic: The 8,000 CAEs simply disappeared from official statistics within three months, between December 1999 and March 2000, as they transformed into other corporate forms (including some 3,000 agricultural cooperatives; see **Table 2.1**). Despite the superficiality of these initial changes, the 1999 reform led to the emergence of a new wave of "private" corporate farms organized by a single entrepreneur. These "private" corporate farms are based primarily on leased land and are commonly known as "private lease enterprises", to distinguish them from private peasant farms that use mainly owned land. The number of these "private" enterprises jumped from 470 to 2,900 during the first three months of reform, rising from 4% to 22% of the total number of corporate farms. As of 2005 there were nearly 5,000 such "private" corporate farms or almost 30% of the total number of corporate farms in Ukraine. The total number of corporate farms increased substantially after 2000 as the new landowners made increasingly diverse choices for the disposition of their land plots (**Table 2.1**). If these new corporate farms behave differently from their predecessors, they could

Table 2.1: Changes in the number of farm enterprises 1990-2004

	1990	1992	1993	1995	12.1999	3.2000	12.2000	2001	2002	2003	2004	2005
Sovkhozes (state farms)	2438	2160	2000	1520	590	590	590	580	570	516	395	386
Kolkhozes (collective farms)	8354	5750	2680	450	0	0	0	0	0	0	0	0
CAE (collective farm enterprises)	0	0	7385	7344	8102	0	0	0	0	0	0	0
Other corporate farms*	0	435	697	1600	4598	13487	13718	15307	16003	16741	17293	17285
Agricultural cooperatives	0	320	345	486	284	3325	3328	2403	2294	2130	1962	1749
"Business" companies	0	125	362	1454	1803	6761	6890	7892	7852	8124	8123	7819
"Private" enterprises	--	--	--	--	470	2901	3006	3638	3972	4220	4471	4774
Other organizational forms	--	--	--	--	2041	500	494	1374	1885	2267	2737	2943
Total	10792	8345	12762	10914	13290	13487	14308	15887	16573	17257	17688	17671

Sources: 1990-95 from LERMAN, CSAKI, 1997, Table 3.4; 12.1999-3.2000 from SHMIDT, PUGACHOV (2000); 12.2000-2005 from tables of agricultural land users provided by Land Management Department in DERZHKOMZEM.

Note: * Excluding interfarm enterprises.

form a core of competitive market oriented agriculture for the future. The impact of the 1999 decree on the individual sector (household plots and peasant farms) is discussed in a separate section in Chapter 3.

The farm structure that emerged following the December 1999 decree showed considerable regional variation due to economic, historical, and other reasons. Local and regional authorities had a substantial influence on the implementation of reform and on the choice of specific organizational forms. Regional officials actively participated in the preparation of reform-related regulations and often appeared before general assemblies of CAE members forcefully advocating their views.

The land reform achieved some very important results for rural residents. First, nearly 7 million rural residents became owners of physical land plots, not just paper shares. The size of the average land share is 4.2 hectares. About 70% of agricultural land, or 80% of arable land, is now physically owned by rural individuals. Ukraine evolved from exclusive state ownership of land in 1990 to a mix of state and collective ownership in 1993-95 and finally to a mix of state and private land ownership in 2000-05 (Table 2.2). The land ownership structure seems to have stabilized since 2000 with roughly one-half in state ownership, one-half in private ownership, and virtually no collective land ownership.

Table 2.2 Structure of agricultural land ownership 1990-2005

Land ownership	**1990**	**1995**	**2000**	**2005**
State	100	60	50	49
Collective	0	37	2	0
Private	0	3	48	51

Source: DERZHKOMZEM, private communication.

Second, the Ukraine land reform may provide an important source of income for rural residents, as the average landowner should earn about 400 hryvna per year by renting out his 4.2 hectares share, the equivalent of two and one half months of wages. Third, land titles for specific parcels of land are being issued to the owners with financial support from international organizations and bilateral donors. As of May 1, 2002, about 40% of eligible residents had received these titles. Fourth, the new Land Code passed in 2001 as part of the second-wave reforms recognized private landownership, allowed certain land transactions (while retaining the moratorium on buying and selling of land until January 2008) and eliminated size restrictions for household plots and peasant farms. The new Land Code also banned the investment of agricultural land in the equity capital of newly created businesses, a precautionary measure to counter pressure from farm managers on landowners to transfer their land to the corporate farm, thereby losing legal rights to it (OECD, 2003).[4]

[4] The Land Code did not limit the lease term, however, and very long-term leases may lead to a de facto absorption of land in the corporate equity. In practice, most lease contracts are short term, with 89% of them for less than 5 years.

3 THE FARM STRUCTURE IN UKRAINE

The ongoing reforms have not only changed the organizational forms of "farm enterprises". They also have had a profound impact on the individual sector, accelerating the creation of independent peasant farms and allowing rural residents to double the size of their household plots. The post-1999 farm structure in Ukraine is totally different from the Soviet model, but it also significantly differs from the structure that emerged after 1992 in the course of first-wave reforms.

3.1 Typology of Ukrainian farms

Ukrainian farms today can be classified into two broad organizational categories: Individual farms and corporate farms (the latter are often called "agricultural enterprises"). The individual sector is subdivided into household plots and peasant farms. These are typical family farms and the main difference between them is one of size and commercial orientation. Household plots are generally smaller and more subsistence-oriented than peasant farms, although there is a lot of overlap between the two groups. Individual farms operate mainly on family-owned land, although growth is achieved by leasing additional land from other owners. In legal terms, household plots are subject to the Law on Household Plots passed for the first time in May 2003, whereas peasant farms are now subject to the new Law on Peasant Farms, which was passed in June 2003 replacing the original law from December 1991. Household plots are treated as physical bodies, whereas peasant farms according to the new law are required to register as legal bodies (formally peasant farms are thus corporations, but they are classified as individual and not corporate farms). The corporate sector consists of relatively large farms that have replaced the traditional collective and state farms (so-called "farm enterprises") in the process of reform since 1992. They are organized as private corporations with two or more shareholders that operate mainly on leased land and have strong commercial orientation. Legally, the corporate farms are subdivided into "business" companies (*hospodarski tovaristva* in Ukrainian, *khozyaistvennye obshchestva* in Russian), which are incorporated as joint-stock or limited liability companies by a group of shareholders investing money in corporate equity, and "private" enterprises (*privatny pidpriemstva* in Ukrainian, *chastnye predpriyatiya* in Russian), which are organized by a single entrepreneur on the basis of privately owned assets. Alongside private corporate farms there is a special category of "unitary" enterprises that are organized by a

single institutional shareholder, generally the state or the municipality. **Table 3.1** summarizes the main organizational forms defined in Ukrainian legislation (including the new Civil Code and the Business Code adopted in January 2003).

Table 3.1: Characterization of organizational forms

A. "Business" companies (*hospodarski tovaristva*)

Joint Stock Company: A corporate business entity created by investors (physical or legal bodies) who acquire shares in the company by contributing funds or assets to its equity capital. A shareholder wishing to leave a joint-stock company has to find a buyer for his share. The company has no obligation to redeem the shares for cash or assets in kind. The shareholder's liability for the company's debt is limited to the investment in share capital. The voting power is proportional to the number of shares held by the shareholder. In a closed joint-stock company, shares are transferable only among members. In an open joint-stock company, shares can be bought by outsiders. Joint stock companies are relatively large entities, with nominal equity (the sum total of the nominal value of all shares) equal to not less than 1,250 minimum wage payments (approximately $80,000).

Limited Liability Company: Similar to a joint stock company, except that when a member chooses to leave, the other members redeem his share of investment for cash. The nominal equity capital of a limited liability company is not less than 100 minimum wage payments ($6,500), much less than in joint stock companies.

Partnership: The partners bear full, unlimited liability for the obligations assumed by the partnership. When a partner decides to leave, the partnership is usually dissolved and the assets are divided in kind among the partners. The voting power is proportional to the investment of each partner.

Agricultural Cooperative: A voluntary association of members (individuals or legal bodies) established for the pursuit of a common agricultural activity. Each member makes a contribution to the statutory equity capital of the cooperative in the form of cash, land, or assets. The ownership of the contributed capital passes to the cooperative, as in a joint-stock company. On exit, members receive their share of investment in cash or in kind, as prescribed by the cooperative charter. The members bear an unlimited liability for the obligations of the cooperative. The voting power is "one man, one vote", and is not proportional to the invested capital. The law explicitly distinguishes between **production cooperatives** and **service cooperatives**. Production cooperatives are based on members' labor, whereas service cooperatives may employ hired labor. Because of this distinction, only physical persons may be members in production cooperatives, whereas membership in service cooperatives is also open to legal bodies.

Collective Agricultural Enterprise (CAE): An obsolete organizational form eliminated by the December 1999 Presidential Decree. Between 1992 and 1999, a variety of agricultural production cooperative, typically the successor of a former kolkhoz or sovkhoz with ownership of land and assets transferred from the state to the workers. Workers became shareholders through distribution of certificates of entitlement to land and assets. Exit of members with land and assets usually required approval of the general assembly.

B. "Private" enterprises (*privatny pidpriemstva*)

Private Lease Enterprise: A corporate farm established by one founding shareholder with a high proportion of resources leased from outsiders. Typically created when one enterprising individual leases the land and asset shares of a large number of former collective farm members in the village. Although a very popular term in the media, it is not listed as a legal category in the 2003 Business Code or in any of the preceding laws.

Peasant Farm: An incorporated entity created by an individual, a family, or a group of individuals on the basis of jointly owned land and assets. Peasant farms by assumption rely mainly on family labor and family owned resources, although they may employ hired labor and leased resources. Following the adoption of the May 2003 law, peasant farms must incorporate as legal persons. Although incorporated as a legal body, it is classified as an individual farm, not a corporate structure.

Farms of all organizational forms may lease land and assets in addition to their privately owned resources. In individual farms the main sources of land are the traditional household plot and the land plot obtained through conversion of land shares in the former collective enterprise. Individual farms may augment their privately owned holdings by leasing land from other owners. Corporate farms have two main sources for land and other production assets. One source is provided by land and asset shares invested by individuals in the equity capital of the enterprise. By investing their land and asset shares in the equity capital of a corporation, the individuals exchange their ownership of these assets for a promise of a stream of dividends from the profits of the corporate farm. The second source consists of land and asset shares that individuals lease to the corporate farm for a specified term in return for a contractual lease payment. At the end of the lease term, the individual may reconsider the leasing arrangements and decide on a different disposition of the assets.

3.2 Organization of the individual sector

The two components of the individual farm sector – household plots and peasant farms – differ in several substantive respects. For legal purposes, a household plot is a farm that operates as a physical person, without incorporation or formal registration. It relies on family labor, and its main objective is to satisfy the subsistence needs of the household. Surplus products may be sold outside the household and the income from sales of farm products from the household plot is exempt from taxes. In contradistinction to household plots, peasant farms are incorporated legal entities and are subject to taxes on income like corporate farms. Their main objective is commercial farming, not subsistence farming. Household plots have very limited access to commercial credit and do not receive any financial support from the state. Some salient differences between household plots and peasant farms are summarized in **Table 3.2**.

Given the importance of the household plot for the rural population and for agricultural production as a whole, the Law on Household Plots passed in

May 2003 guaranteed total tax exemption on income earned from the sale of home-grown food products. The new law codified an existing practice, since the output from the household plot has never been taxed. The original intention of the agrarian lobby was to exempt from taxes also the sales revenue from the extension acquired through the conversion of family-held land shares. The purpose was to encourage exits from collectives by making straightforward household plot augmentation more attractive. However, this provision was blocked by the Ministry of Finance, and as of today the sales revenue from the household plot remains tax exempt, whereas the sales revenue from the new extension is taxed like the sales revenue of a peasant farm. Despite the exemption from income taxes on farm output, households still have to pay land tax.

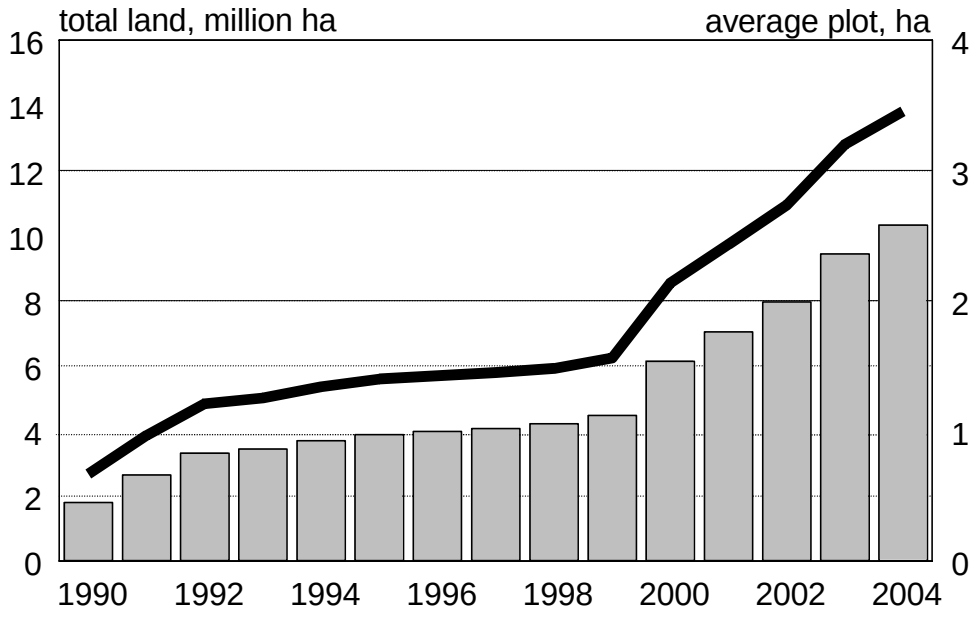
Table 3.2: Characteristic differences between household plots and peasant farms

	Household plots	Peasant farms
Organizational form	Physical body: No registration requirements	Legal body: Incorporated and formally registered
Size	2-10 ha	10-100 ha
Land	Mostly owned (including land share withdrawn from local collective)	Owned (by the family or the farm) plus large component of leased land
Size restrictions	2 ha plus land share	No size limits; owned land allocated without payment up to average land share in the district; additional land must be purchased
Production	Mainly subsistence oriented, with sale of surplus	Mainly commercial
Labor	Family	Family and hired help
Taxation	No tax on income from household plot	Farm income taxed
Financial support from the state	None	State Support Fund
Legal framework	Law on Household Plots, May 2003	Law on Peasant Farms, May 2003

Rural residents whose main occupation is the household plot face considerable uncertainty regarding their social insurance. Individuals in this category are treated as employed whenever their imputed monthly income is greater than the minimum wage. These individuals have to make compulsory monthly payments to social insurance to be eligible for health care, old-age pensions, and other social services. In practice, however, much of the imputed income comes from home-grown products consumed by the family, and there is simply not enough cash to make these compulsory payments. Large segments of the rural population thus unwillingly jeopardize their old-age security.

The basic household plot does not exceed 2 hectares of owned or leased land. However, the 1999 Presidential Decree made it possible for many rural residents to take their land share out of the former collective and use it to augment the traditional household plot (instead of establishing a peasant farm, as originally envisaged). This has led to a substantial increase in total land cultivated in household plots and their average size since 2000. **Figure 3.1** (dark curve) shows two distinct jumps in land cultivated by household plots, both clearly related to the two waves of land reform in Ukraine. The increase in 1990-1992 associated with the early reform efforts was followed by a much more robust increase associated with the post-1999 reforms. The total land in household plots increased from 6 million ha in 1998 to 8.5 million ha in 2000 and continued to rise to 14 million ha in 2004. The share of household plots in agricultural land accordingly climbed from 6% in 1990 to 14% in 1998 and onward to 33% in 2004. The number of rural households has remained fairly constant at 5.5 million since 1990 and the increase in total holdings is ccordingly reflected in a marked increase in the average size of household plots, which grew from 0.5 hectare in 1990 to about 1 hectare between the two reform waves (1992-99) and up to 2.5 hectares in 2004 (gray bars in **Figure 3.1**). This is the national average, but in some parts of Ukraine the land shares reached 10 hectares, so that augmented household plots created by pooling all family-held shares may be as large as several tens of hectares and even larger.

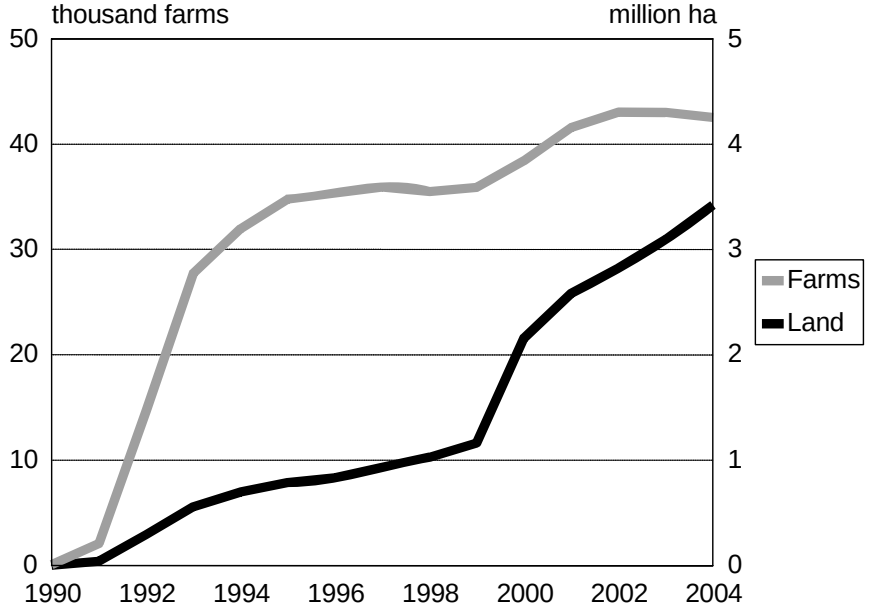
Figure 3.1: Land in households plots (curve, million ha) and average pot size (bars, ha) 1990-2004



Source: AGUKRAINE, 2004.

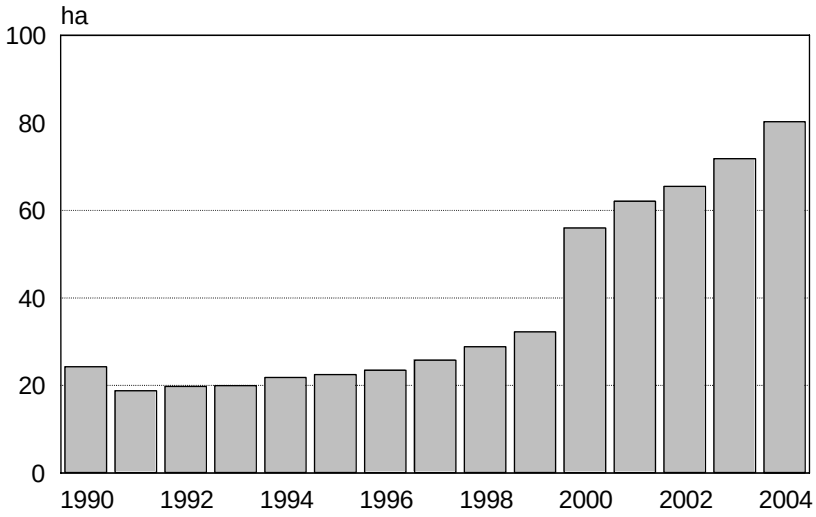
The 1999 decree had an immediate impact on both the number and the land holdings of peasant farms (**Figure 3.2**). The number of peasant farms increased by nearly 25% between 1999 and 2002, from about 35,000 to 43,000. The land in peasant farms more then trebled during this period, from about 1 million hectares to nearly 3.5 million hectares. The quantum jump in the number of farms after 1999 (gray curve in **Figure 3.2**) was small compared to the rapid growth of land in peasant farms (black curve in **Figure 3.2**). As a result, the average farm size increased from 25-30 ha up to 1998 to 70-80 ha in 2003-2004 (**Figure 3.3**). The share of peasant farms in agricultural land doubled from 2-3% in 1995-99 to 6% in 2000 and continued to rise to 8% in 2003-2004.

Figure 3.2: Growth of private farming 1990-2004: Number of peasant farms (gray curve, thousands) and land in peasant farms (black curve, million ha)



Source: AGUKRAINE, 2004.

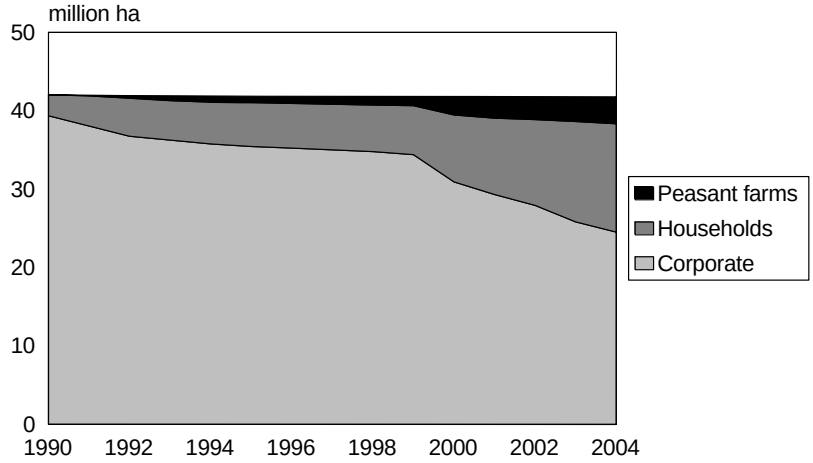
Figure 3.3: Average size of peasant farms 1990-2004 (ha)



Source: AGUKRAINE, 2004.

The two reform waves have produced a significant redistribution of agricultural land between the individual and the corporate sectors of Ukrainian agriculture. The land holdings of the corporate sector steadily shrunk between 1990 and 2004, while the individual sector grew by absorbing land from corporate farms. The transfer of agricultural land from corporate to individual farms accelerated markedly in 1999 (**Figure 3.4**). Thus, the share of the individual sector (household plots and peasant farms combined) in agricultural land increased from 6% in 1990 to 17% in 1998 and then soared to 41% in 2004 (**Table 3.3**). The share of corporate farms decreased correspondingly from 94% of agricultural land in 1990 to 59% in 2004. The increased share of individual farms in land is reflected in increased holdings because the total agricultural land in Ukraine has remained constant at 42 million hectares.

Figure 3.4: Agricultural land in farms of different types 1990-2004: Corporate farms (bottom layer), household plots (middle layer), and peasant farms (top layer)



Source: DERZHKOMZEM.

Table 3.3: Agricultural land by farm type (thousand hectares and percent)

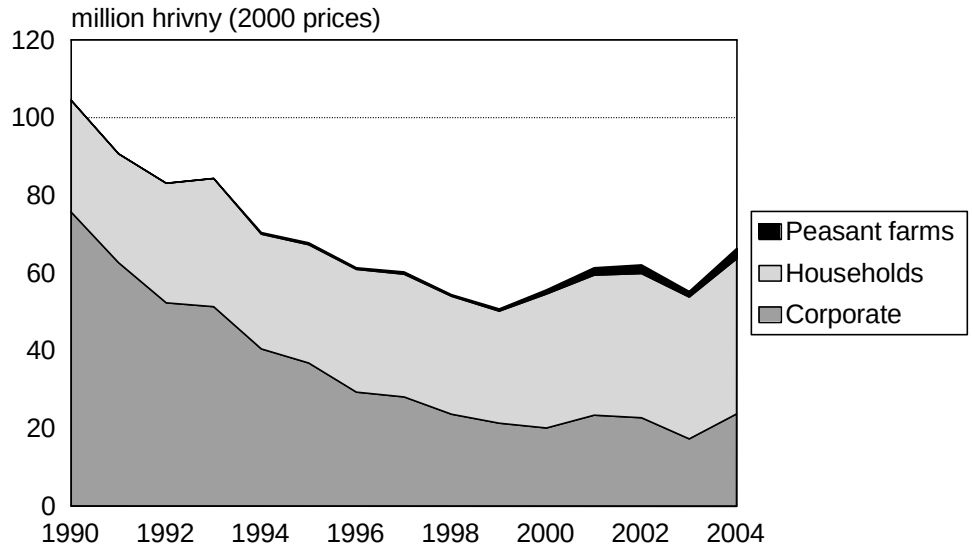
	Total ag land	Corpo-rate farms	House-hold plots	Peasant farms	Corpo-rate farms, %	House-hold plots, %	Peasant farms, %	Indivi-dual sector, %
1990	42,030	39,357	2,669		93.6	6.4	0.0	6.4
1991	41,973	38,061	3,864		90.7	9.2	0.1	9.3
1992	41,930	36,747	4,833		87.6	11.5	0.8	12.4
1993	41,890	36,260	5,011		86.6	12.0	1.5	13.4
1994	41,862	35,764	5,357	741	85.4	12.8	1.8	14.6
1995	41,853	35,442	5,589	822	84.7	13.4	2.0	15.3
1996	41,840	35,240	5,694	906	84.2	13.6	2.2	15.8
1997	41,854	35,029	5,789	1,037	83.7	13.8	2.5	16.3
1998	41,827	34,806	5,919	1,102	83.2	14.2	2.6	16.8
1999	41,829	34,408	6,243	1,178	82.3	14.9	2.8	17.7
2000	41,827	30,941	8,543	2,342	74.0	20.4	5.6	26.0
2001	41,817	29,327	9,736	2,754	70.1	23.3	6.6	29.9
2002	41,800	27,940	10,939	2,921	66.8	26.2	7.0	33.2
2003	41,789	25,826	12,799	3,164	61.8	30.6	7.6	38.2
2004	41,764	24,524	13,819	3,421	58.7	33.1	8.2	41.3

Source: DERZHKOMZEM (various years).

4 IMPACTS ON AGRICULTURAL PERFORMANCE

Changes in land use patterns wrought by land reform have totally changed the face of Ukrainian agriculture: From agriculture with predominant concentration of production in collective farms it has evolved into agriculture characterized by clear dominance of individual farms. Changes in land use patterns affect production through the contribution of individual and corporate farms to gross agricultural output (GAO; see **Figure 4.1**). Against the backdrop of generally declining agricultural production, the share of the individual sector increased from less than 30% of GAO in 1990 to 65-70% in 2003-2004. The share of corporate farms correspondingly shrank from 70% to about 30% of GAO (**Figure 4.2**).

Figure 4.1: Gross agricultural output by farm type 1990-2004 (million hrivny in constant 2000 prices): Corporate farms (bottom layer), household plots (middle layer), peasant farms (top layer)

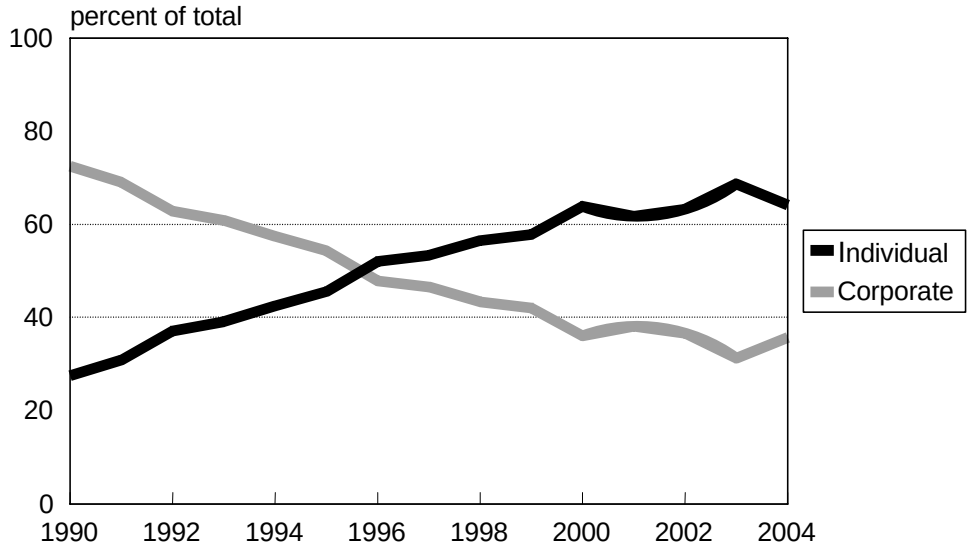


Source: AGUKRAINE, 2004.

The changes in the composition of GAO have been gradual and cumulative over the entire period of reform since 1990: There are no discernible jumps in 1992 and 1999 that can be associated with the two reform waves. The individual sector overtook the corporate sector by share of GAO in 1996, between the two reform markers of 1992 and 1999. Within the individual sector, the main

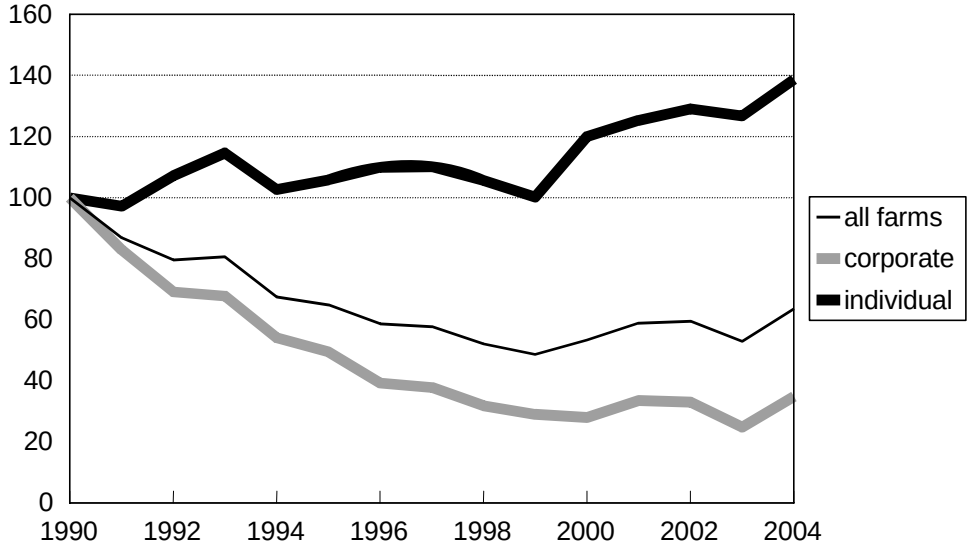
contribution to agricultural production is from household plots, not peasant farms, as they also control much more land (33% versus 8%, as noted above).

Figure 4.2: Shares of corporate and individual farms in GAO 1990-2004 (percent)



Source: AGUKRAINE, 2004.

Figure 4.3: Change in GAO for individual and corporate farms 1990-2004 (percent of 1990)



Source: AGUKRAINE, 2004.

The growing share of individual farms in agricultural production also reflects differences in performance between individual and corporate farms. In 1999 agricultural output from all farms stood at 50% of its 1990 level. After that year, production made a spectacular recovery, as it grew by 30% (in constant prices) between 1999 and 2004 (**Figure 4.3**, thin black curve). While corporate farms had dropped by 2000 to 30% of the 1990 level and remained roughly unchanged after that, the agricultural output of the individual sector in contrast remained

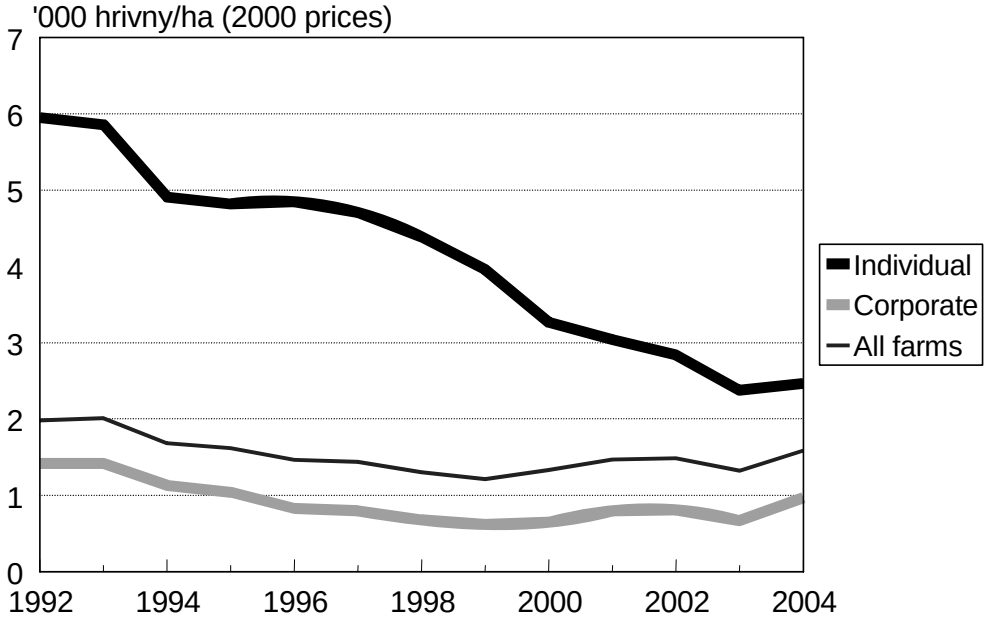
unchanged during the first decade 1990-99 and then increased by 40% between 1999 and 2004 (**Figure 4.3**, thick gray and black curves for corporate and individual farms, respectively).Although the second-wave reforms have had a particularly beneficial effect on the performance of individual farms, they also have had some impact in the corporate sector. The decline in output of corporate farms stopped in 2000 and the number of unprofitable corporate farms dropped from almost 100% in 1997-99 to around 40% in 2000-2004 (although the absolute losses continued to climb). Many interpreted the sudden improvement in farm performance as a result of the turnaround in government policies. Some believed that an important page had been turned in agricultural policy that would allow development of agriculture and rural areas to go forward (ASLUND, 2002; OECD, 2003).

4.1 Partial productivity of land and labor

GAO growth is only one, albeit very important, dimension of agricultural performance. Productivity is another dimension that plays a central role in determining competitiveness. In this section we consider two partial measures of productivity based on national-level data: Partial productivity of agricultural land (output per hectare) and partial productivity of agricultural labor (output per worker).

Partial productivity of land is calculated as the ratio of gross agricultural output (GAO) in constant (2000) prices to agricultural land. The land productivity decreased over time from 2,000 hrivny/ha in 1992 to 1,200 hrivny/ha in 1999, and then recovered to about 1,500 hrivny/ha in 2000-2004 (thin curve in **Figure 4.4**). As in previous instances, it is tempting to attribute this productivity improvement to the second-wave reforms begun in 1999.

Figure 4.4: Partial productivity of land for individual and corporate farms 1992-2004 (‘000 hrivny/ha in constant prices)



Source: Authors’ calculations based on AGUKRAINE, 2004.

Table 4.1: Gross agricultural output and land productivity for farms of different types*

Year	GAO (2000 prices), million hrivny			Productivity, '000 hrivny/ha		
	Corporate farms	Household plots	Peasant farms	Corporate farms	Individual farms	Peasant farms
1990	75,682	28,779		1.92	10.77	
1991	62,684	27,978		1.65	7.15	
1992	52,264	30,845		1.42	5.95	
1993	51,335	32,986		1.42	5.86	
1994	40,446	29,550	389	1.13	4.91	0.52
1995	36,905	30,454	458	1.04	4.82	0.56
1996	29,366	31,618	366	0.83	4.85	0.40
1997	28,091	31,671	510	0.80	4.71	0.49
1998	23,645	30,387	436	0.68	4.39	0.40
1999	21,383	28,806	547	0.62	3.96	0.46
2000	20,095	34,539	1,056	0.65	3.27	0.45
2001	23,449	36,046	1,902	0.80	3.04	0.69
2002	22,770	37,166	2,170	0.81	2.84	0.74
2003	17,318	36,484	1,465	0.67	2.38	0.46
2004	23,742	39,930	2,585	0.97	2.47	0.76

Source: GAO from AGUKRAINE, 2004.

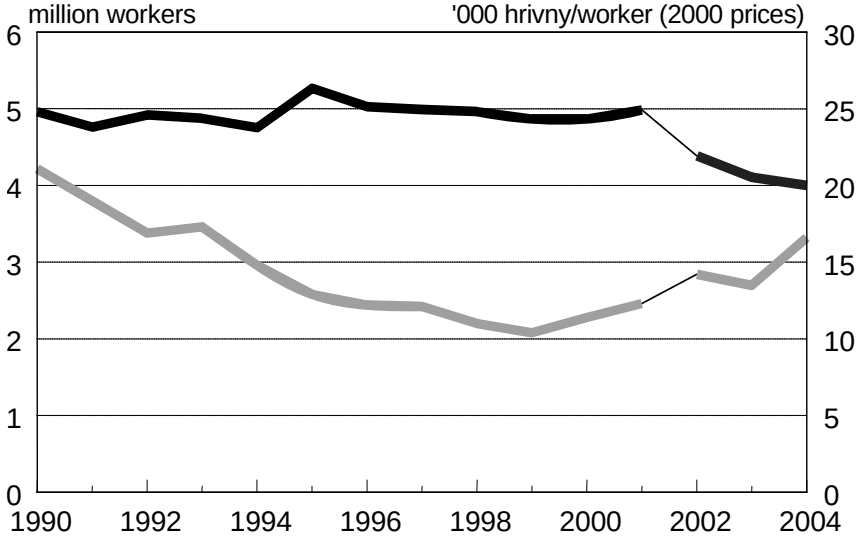
Notes: * Agricultural land for productivity calculations from **Table 3.3**.

GAO and agricultural land data are available since 1992 for farms of the three main organizational types: Corporate farms, household plots, and peasant farms. The partial productivity of land calculated from these data is presented in **Table 4.1**. **Figure 4.4** shows the land productivity for the period 1992-2004 for corporate farms (gray curve) and individual farms (thick black curve), aggregating household plots and peasant farms into one series. Although the land productivity of individual farms decreased over time as they acquired more land (a decreasing returns to scale effect), it remained consistently higher than the land productivity of corporate farms. The gap between the two series is very substantial: The mean productivity for individual farms for the period 1992-2004 is around 4,000 hrivny/ha, whereas the mean productivity for corporate farms is less than 1,000 hrivny/ha. It is interesting to note that the land productivity of peasant farms taken on their own is very low, about 50% of the productivity of corporate farms (see **Table 4.1**). This may be attributed to problems with statistical data for the new sector of peasant farms.

The partial productivity of agricultural labor (ALP) is calculated as the ratio of GAO (in hrivny) to an estimated number of workers employed in agriculture. No full labor data are available for individual and corporate farms separately, so that it is only possible to calculate ALP for all farms in aggregate. Unfortunately the methodology of agricultural labor statistics was changed in 2001 and the data for 2002-2004 are inconsistent with the previous time series for 1990-2001. **Figure 4.5** shows the agricultural labor series (black curve) spliced from two

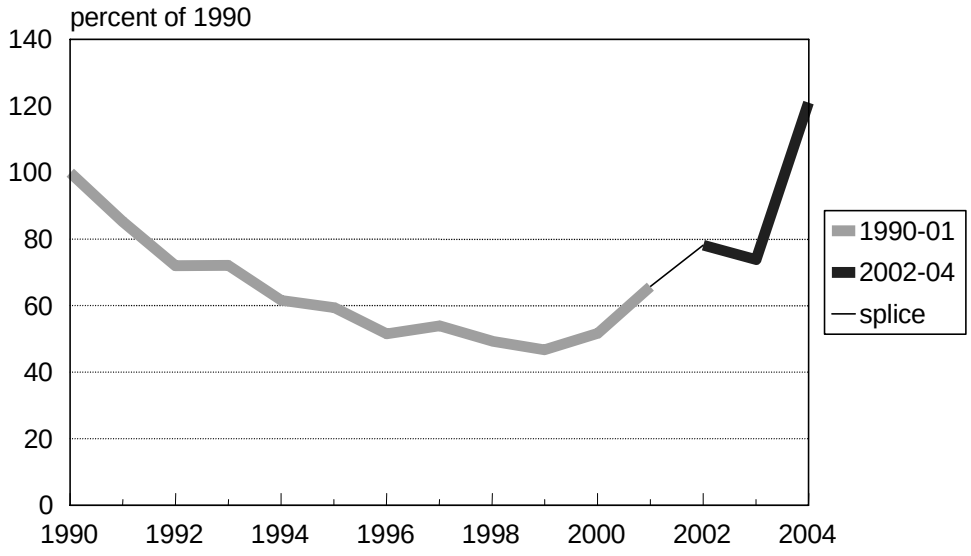
disjoint sections at 2001. The agricultural labor series based on the old methodology is fairly constant at about 5 million workers for 1990-2001. The labor productivity estimates based on the old labor series (gray curve) decline from 1990 to 1999 and then turn upward. The productivity estimates for 2002-2004 follow an even stronger upward trend, because the new labor series shows a decline in agricultural employment after 2002 compared with constant employment up to 2001. The ALP calculations again seem to suggest that the 1999 second-wave reform has produced certain productivity improvements.

Figure 4.5: Agricultural labor (black curve, million workers) and partial productivity of agricultural labor (gray curve, '000 hrivny/ worker in constant prices) 1990-2004



Source: AGUKRAINE, 2004.

Figure 4.6: Agricultural labor productivity in corporate farms 1990-2004 (percent of 1990)



Source: Authors' calculations.

Though it is impossible to calculate ALP for farms of different types, the Ukrainian agricultural yearbook for 2004 (pp. 49-50) presents some information on labor productivity for corporate farms. Unfortunately neither the calculation details nor the underlying labor data are given. It is reasonable to assume that the labor data used in these productivity calculations for corporate farms suffer from the same change of methodology in 2001 that affects the national data in **Figure 4.5**. The labor productivity of corporate farms reproduced in **Figure 4.6** is therefore spliced from two time series: 1990-2001 based on old labor methodology and 2002-2004 based on new methodology. The new methodology with its sharp downward adjustment of labor statistics produced a steeply rising productivity segment in 2002-2004. Yet even if we ignore this latest segment, the consistent series based on old labor methodology (1990-2001) still shows a clear upturn in 1999, essentially repeating the national picture from **Figure 4.5**.

5 UKRAINIAN AGRICULTURE IN COMPARATIVE PERSPECTIVE

The watershed changes in farm structure and performance in Ukraine precipitated by the 1999 Presidential Decree require a rethinking of the results of agricultural reform in Ukraine. On the one hand, Ukraine has always been "Little Russia". But the structure of farming in Ukraine has now moved sharply away from the Russian model of large corporate farms toward agriculture dominated by individual farms. This structure resembles more that in Moldova than in Russia. On the other hand, Ukraine – especially since the "Orange Revolution" of December 2004 – has outward looking aspirations pointing in the direction of the European Union. In this section we accordingly compare Ukraine with Russia, Moldova, and some new EU members from Central Eastern Europe. The comparison is essentially limited to a small subset of variables and is only intended to give preliminary indications.

5.1 Ukraine, Moldova, and Russia

Ukraine, Moldova, and Russia pursued similar reform paths until 1998-99, when Ukraine and Moldova embarked on their own separate strategies and began to convert paper land shares into physical plots. In Ukraine the breakthrough came with the December 1999 Presidential Decree, whereas Moldova achieved its political and institutional breakthrough with the launching in 1998 of its USAID-sponsored National Land Program. In both countries the new course of action was a response to a political crisis caused by the mounting debt of the traditional collective farms (CSAKI et al., 2001). The governments of Moldova and Ukraine addressed the farm "debt crisis" by strengthening the family farm sector through distribution of land and other assets in physical form to rural residents.

Table 5.1: Selected measures of reform outcomes: Ukraine, Moldova, and Russia

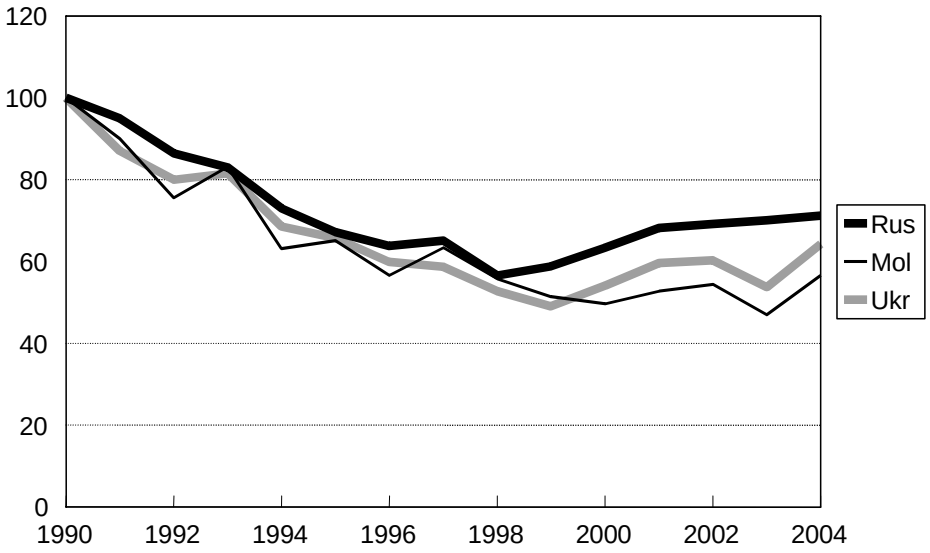
	2003			1990		
	Ukraine	**Moldova**	**Russia**	**Ukraine**	**Moldova**	**Russia**
Land in individual use, %	38	42	16	7	9	2
Share of individual farms in GAO, %	70	70	60	27	18	24
Share of agricultural labor, %	23	43	11	23	39	15
Share of agriculture in GDP, %	12	18	5	22	30	15

Sources: AGUKRAINE, 2004; AGRUSSIA, 2004; AGMOLDOVA, 2004; LERMAN et al., 2004.

These policies moved the structure of Ukrainian and Moldovan agriculture away from the Russian model with its predominance of large corporate farms toward an agrarian structure with a significant and growing individual farm sector. Land in individual use and the share of individual farms in GAO in Ukraine and Moldova differ markedly from these indicators in Russia. Ukraine and Moldova today have 40% of agricultural land in individual use compared with only 16% in Russia (**Table 5.1**). The share of individual farms in gross agricultural output (GAO) is also higher in Ukraine and Moldova: 70% to Russia's 60%.

Comparison of agricultural growth during the entire period 1990-2004 shows that GAO experienced similar declines in all three countries until 1998 (**Figure 5.1**). of the ruble and the changes in relative prices in the wake of the 1998 financia Agricultural recovery began in 1998 in Russia, 1999 in Ukraine, and 2000 in Moldova. While in Russia agricultural recovery was probably driven by the devaluation l crisis, the resumption of agricultural growth in Ukraine and Moldova appears to be linked with the adoption of new reform strategies in these countries. The 1999 Presidential Decree in Ukraine and the 1998 National Land Program in Moldova both accelerated the transition from corporate to individual agriculture. Agricultural recovery in Ukraine and Moldova is thus consistent with theoretical considerations that associate definite performance advantages with individual farming.

Figure 5.1: Gross agricultural output: Ukraine, Moldova, and Russia 1990-2004 (percent of 1990)



Source: AGUKRAINE, 2004; AGMOLDOVA, 2004; AGRUSSIA, 2004.

All three countries became much less agrarian since 1990 when characterized by the share of agriculture in GDP (**Table 5.1**). Agricultural employment, on the other hand, has proven much stickier. The share of agricultural labor in Russia decreased between 1990 and 2003 much less than the share of agriculture in GDP, while the share of agricultural labor in Ukraine practically did not change and in Moldova it even increased slightly. The difference in agricultural labor behavior between

Russia on the one hand and Ukraine and Moldova on the other is probably also attributable to individualization of agriculture: The larger individual agriculture in Ukraine and Moldova acts as a "labor sink" for rural residents, offsetting the effect of other factors that tend to reduce agricultural employment (as in Russia).

5.2 Ukraine and the new EU members

It is part of the most people's thinking on Ukraine that agricultural performance there is worse than in the CEE countries. We compare Ukrainian performance with that of the new EU members – Poland, Czech Republic, Slovakia, and Hungary using figures from World Bank's World Development Indicators databases and FAOSTAT. The raw data on partial agricultural productivity are indeed worse in Ukraine (**Table 5.2**), which also lags by growth of crop yields (**Table 5.3**).

Table 5.2: Selected comparative economic indicators for Ukraine and the new EU members

	Ukraine	Hungary	Czech Rep.	Slovak Rep.	Poland
GDP per capita, 2004 (US$ at PPP)	6,317	16,639	19,381	14,519	12,881
Agriculture value added per worker, 2003 (2000 US$)	1,400	3,991	4,444	n.a.	1,397
Cereal yield, average 2001-03 (tons/ha)	2.4	4.0	4.3	3.8	n.a.
Sun flower seed yield, average, 2001-03 (tons/ha)	1.2	1.8	2.2	2.0	n.a.
Rural population (% of total, 2003)	33	34	26	42	38
Food exports (% of merchandise exports, 2002)	13	7	3	4	8
Employment in agriculture (% of total, 2001)	20	6	5	7	19
Agriculture value added, (% of GDP, 2002)	15	4	4	4	3

Source: WDI, 2006.

Table 5.3: Changes in crop yields in Ukraine and the new EU members between the average for 1992-94 and the average for 2001-03 (percent)

Country	Cereals	Coarse grain	Oil crops	Sunflower seeds	Potatoes	Vege-tables	Index of crop yields*
Czech Rep.	3.1	3.7	-4.5	-1.1	8.1	14.6	3.8
Hungary	10.9	25.3	10.2	12.1	53.6	70.0	18.2
Poland	18.7	21.9	16.5	--	12.6	14.2	16.2
Slovakia	-8.2	-0.7	6.5	3.7	10.7	-16.7	-7.0
Ukraine	-18.4	-16.0	5.9	0.2	-9.2	-3.5	-13.1

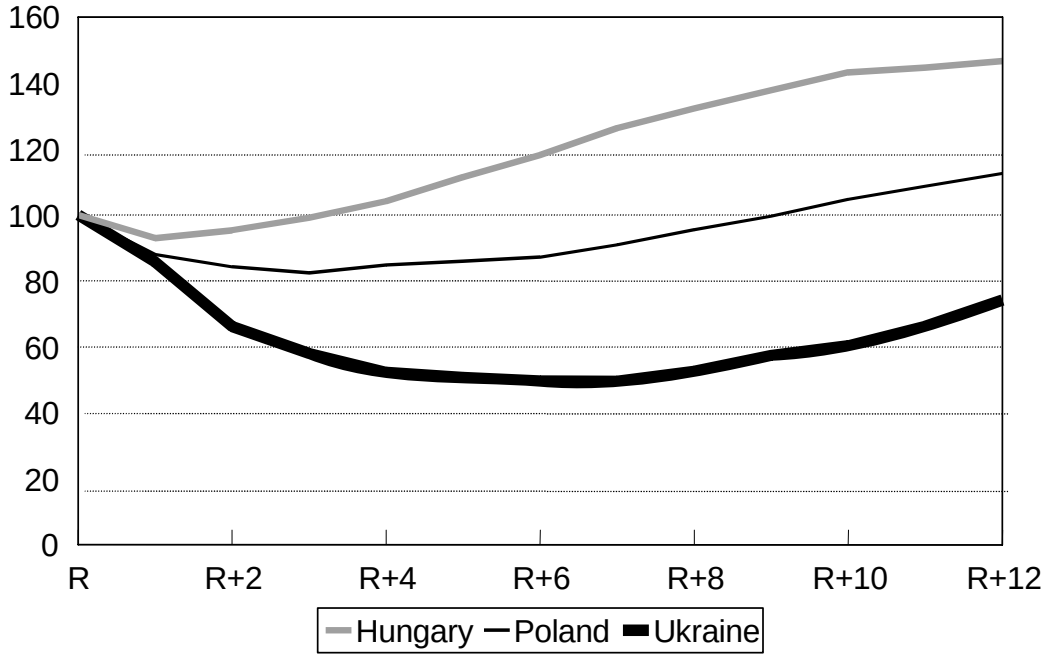
Source: FAOSTAT, 2006.

Notes: * Average of the yields for five major crops: Cereals, sunflower seeds, other oil crops, potatoes, and vegetables, weighted by 2003 harvested area.

Instead of looking at absolute values, which are influenced by differences in initial conditions across countries, it is advisable to focus on index numbers representing rates of change over time. The behavior of index numbers is free from the effect of initial conditions and better reflects the impact of reform. In comparing the index numbers (such as GDP or GAO in percent of some base year) across different countries we need to make an adjustment for the different starting point of reforms in CEE and CIS. For the CEE countries we assume that the reforms started in 1990, whereas for CIS we take 1992 as the starting year for reforms (thus, on the time axis, R=1990 for CEE and R=1992 for CIS).

Figure 5.2 shows the GDP index (in percent of GDP in year R) for Ukraine and two new EU members from CEE: Hungary and Poland. The GDP index is commonly used as a measure of a country's overall economic performance. The two CEE reform-minded countries (a) dropped less and (b) began to recover earlier than Ukraine. When assessed by the World Bank Agrarian Policy Reform Index (CSAKI, KRAY, 2005), Hungary and Poland are judged to be much more reform-oriented than Ukraine. The GDP curves in **Figure 5.2** thus clearly illustrate the impact of reforms.

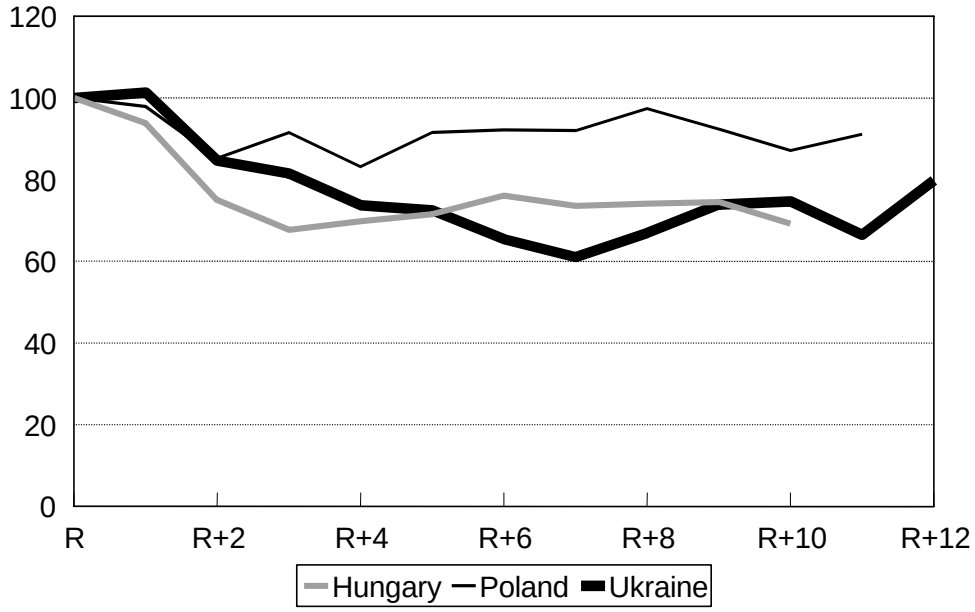
Figure 5.2: GDP for Ukraine, Hungary, and Poland during 12 years since the start of reforms (in percent of R, where R=1990 for Hungary and Poland, R=1992 for Ukraine)



Source: LERMAN et al., 2004.

The corresponding diagram for GAO (a measure of agricultural performance) is shown in **Figure 5.3**. Poland's GAO remained fairly stable over time, perhaps because Poland with its traditionally individualized agriculture did not have to apply the same painful land reform measures as its "collectivized" neighbors. Hungary's GAO at first dropped, obviously due to the initial shock of transition, and then began recover in R+3 as the reforms kicked in. In contrast to the two CEE countries, Ukraine's agriculture continued its downward slide until R+7. Recovery in Ukraine begins in 1999 – either as a result of the 1998 "financial crisis", as in Russia, or (more hopefully) due to the second round of reform. Comparison of **Figure 5.2** (GDP) and **Figure 5.3** (GAO) seems to suggest that the macroeconomic reforms were stronger, more profound, and more far reaching than agricultural reforms (judging by their impact in the two figures).

Figure 5.3: Gross agricultural output for Ukraine, Hungary, and Poland since the start of reforms



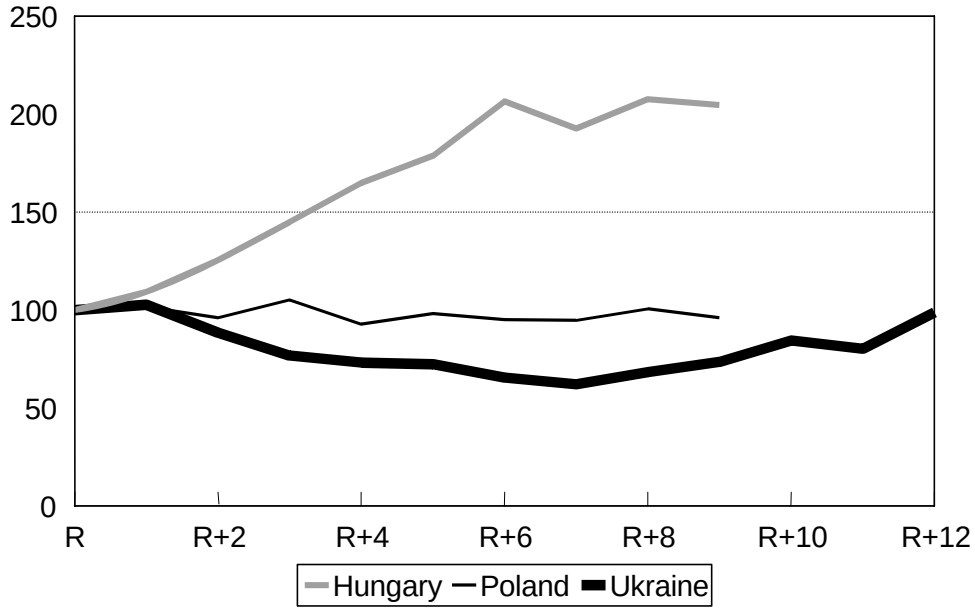
Source: LERMAN et al., 2004.

Note: In percent of R, where R=1990 for Hungary and Poland, R=1992 for Ukraine.

In **Chapter 4** we have used GAO per agricultural worker as a measure of labor productivity. **Figure 5.4** shows the agricultural labor productivity (ALP) for the three countries.[5] There was no change in agricultural labor productivity in Poland (for the same reasons as for GAO), a steep increase in Hungary (up to R+6, due to extreme labor shedding), and a steady decline in Ukraine (up to R+7). The pattern up to R+7 already provides an excellent illustration of the

[5] The cross-country comparisons in **Figures 5.2-5.4** are based on respective national statistics summarized in LERMAN et al. (2004).

Figure 5.4: Agricultural labor productivity for Ukraine, Hungary, and Poland since the start of reforms (in percent of R, where R=1990 for Hungary and Poland, R=1992 for Ukraine)



Source: LERMAN et al., 2004.

differential impact of reforms across countries, but the picture becomes even clearer for R+8 (2000) and later in Ukraine: The 1999 reforms are producing a noticeable increase in agricultural labor productivity (but see the detailed discussion in **Chapter 4**).

We conclude from these comparisons that Ukraine declined more and recovered less than the CEE countries during the 15 years of transition. This is probably a reflection of the lagging and sometimes halfhearted reforms in Ukraine. Recent years (after R+7 = 1999) show a clear upward trend by the three main indicators, and the outlook for future is thus quite optimistic.

PART II

ANALYSIS OF SURVEY DATA

The following chapters present the findings of the questionnaire-based survey conducted in the winter of 2005 with the objective of gaining additional insights on the progress and impacts of land reform. This part is organized around the following topics:

6. Survey design
7. Farm reorganization
8. Land and land markets
9. The business environment
10. Rural social sphere
11. Farm production and sales
12. Credit and investment
13. Human capital
14. Farm productivity
15. Rural family incomes

Each topic is analyzed in a comparative framework for farms of different organizational forms – corporate farms, peasant farms, and household plots.

All tables and figures in Chapters 6-15 are based on the results of the 2005 FAO survey.

6 SURVEY DESIGN

Five levels are relevant to the monitoring of changes in agricultural and land policy in Ukraine: (1) the central government level, (2) the regional authority level, (3) the corporate farm level, (4) the peasant farm level, and (5) the rural household level. The record of central government policies has been well elucidated in recent publications, and the present study focuses accordingly on levels (2), (3), (4) and (5), i.e., the regional authorities and the three components of the farming structure in Ukraine. The views of the regional authorities were explored through a series of semi-structured interviews conducted with district-level agricultural officials. The information about corporate farms, peasant farms, and rural households was collected through a questionnaire-based survey of three interrelated samples of respondents.

The survey was carried out in eight provinces (oblasts) across the country: Ivano-Frankivsk, L'viv, Rivno (west), Vinnitsa, Chernigov, Mikolaev (center), Sumy, Poltava (east). The oblast selection procedure involved cluster analysis based on 6 variables (2003 values). The procedure grouped the 24 oblasts in Ukraine (excluding Crimea) into 4 (unequal) clusters and two oblasts were then selected (arbitrarily) from each cluster for a total of 8 sample oblasts (see map in **Figure 6.1**).

The following 6 variables were used for clustering:

1) Share of agricultural land in individual use (importance of individual agriculture);
2) Share of agricultural output produced by individual sector (importance of individual agriculture);
3) Share of national agricultural output produced by oblast (agrarian nature);
4) Share of national individual farming output produced by oblast (agrarian nature);
5) Share of rural employment as a proxy for agricultural employment (agrarian nature);
6) Share of agricultural land distributed in shares as a proxy for land "privatization" (measure of land reform since 2000).

These 6 variables represented two groups of oblast characteristics: The agrarian nature of the oblast and the progress of land reform since 2000. Variables 3-5

were basically measures of the agrarian nature of the oblasts, whereas variables 1-2 and 6 were related to land and policy reform on the oblast level as measures of farm individualization and land privatization.

Table 6.1 characterizes the four clusters based on the mean values of the variables. The clusters show sufficient substantive differences to be used as a basis for representative sample selection. The two oblasts selected from each cluster for inclusion in the survey are shown in bold letters.

A look at the map in **Figure 6.1** might create the impression that the survey ignored most of the eastern oblasts. In fact, **Table 6.1** shows that the six eastern provinces not included in the survey are classified in clusters 1 (Zaporozhska, Lugansk), 2 (Dnepropetrovsk, Donetsk, Khar'kov) and 3 (Kherson) and are therefore represented (at least from statistical considerations) by other oblasts participating in the survey. Oblast selection decisions were inevitably influenced by travel cost considerations, which gave preference to cluster representatives closer to the center.

Table 6.1: The clustering of 24 oblasts by agrarian and reform-related variables

	Oblasts	Main location	Individuali-zation of agriculture (1), (2)	Agrarian role (3), (4), (5)	Land privatization (since 2000) (6)
1	Zaporozhska, Lugansk, **Mikolaev, Sumy,** Kirovohrad (Crimea)	East	Low	Low	High
2	**Vinnitsa,** Kiev, Cherkassy, Dnepropetrovsk, Donetsk, **Poltava,** Khar'kov, Odessa	Center/East	Low	Medium	High
3	Volyn', Zhitomir, **Rivno,** Ternopil', Kherson, Khmel'nitskii, **Chernigov,** Chernovtsy	West	Medium	Medium	High
4	**L'viv, Ivano-Frankivsk,** Zakarpatska	West – "New Lands"	High	High	Low

Note: The specific variables are identified by numbers in parentheses; the oblasts included in the survey are shown in bold letters.

The first stage of the sampling procedure ended with the selection of 8 oblasts based on cluster analysis. **The second stage** involved random selection of raions (districts), roughly in proportion to the actual number of raions in each oblast: 3 raions per oblast in Ivano-Frankivsk, Rivno, and Sumy; 4 raions per oblast in L'viv, Chernigov, and Mikolaev; 5 raions per oblast in Vinnitsa and Poltava. A total of 31 raions were thus randomly selected in the 8 oblasts. **The third stage**

included random selection of villages in each raion. The target number of villages was around 25% of the total number of villages acting as management centers for large corporate farms in each raion. Approximately 6-7 such villages were selected in each raion (closer to 5 in Ivano-Frankivsk) for a total of 208 villages in the entire sample. **The fourth stage** involved random selection of individual respondents in each village:

a) One large corporate farm was selected in each village and all the corporate farm managers (208 in number) were interviewed.

b) Four households were selected at random in each village hosting a corporate farm for a total of 852 rural households.

c) Ten peasant farms were selected at random in each raion (irrespective of the number of villages selected). In raions with fewer than 10 peasant farms, all peasant farms were surveyed. This selection procedure gave 310 peasant farms.

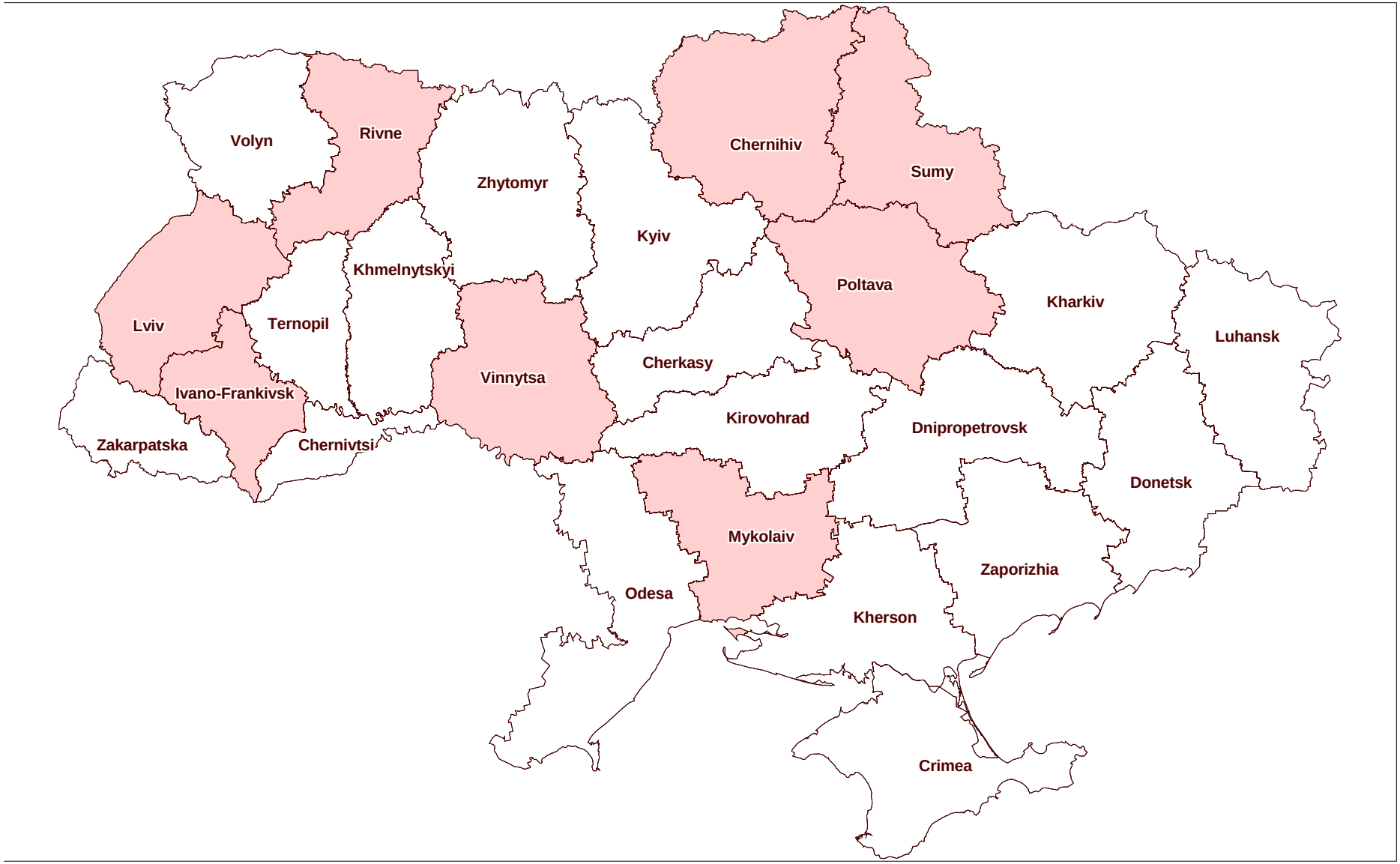
The total sample included about 1,400 respondents. The sample structure is summarized in **Table 6.2**.

Table 6.2: Sample structure (number of respondents)

Oblast	Raions	Corporate farms	Peasant farms	Households	Total respondents
1. Chernigov	4	26	40	106	172
2. Sumy	3	22	30	92	144
3. Poltava	5	30	48	124	202
4. Vinnitsa	5	33	51	123	207
5. Ivano-Frankivsk	3	21	28	97	146
6. L'viv	4	26	39	99	164
7. Rivno	3	23	33	99	155
8. Mikolaev	4	27	41	112	180
Total	31	208	310	852	1,370

The representativeness of the survey was checked by comparing the distribution of Ukrainian farms by size in the sample with the official data published for the first time in 2005 by the Department of Statistics in Kiev. The survey-based distribution is shown in **Figure 16.10** in the last chapter in this volume (the thick black curve marked 2005). The "official" distribution was constructed by combining information from two sources. The first source was AGUKRAINE (2006), where Table 1.30 gives the number and land area of some 58,000 corporate and peasant farms by size groups ranging from less than 5 hectares to more than 10,000 hectares. The second source was HOUSEHOLDS (2006), where Table 1.2 gives the number and land area of some 5.8 million households plots by size groups ranging from less than 0.50 hectares to more than 10 hectares. The "official" distribution curve was virtually identical to the sample curve in **Figure 16.10**, which provided strong evidence in support of the representativeness of the survey sample.

Figure 6.1: Map of Ukraine showing the eight sample oblasts for the 2005 FAO survey



7 FARM REORGANIZATION

The reforms of 1999-2000 were designed to change the Ukrainian farm structure through reorganization of existing corporate farms (mostly CAEs) and accelerated creation of peasant farms. The rationale for this change was the need to bring the organization of Ukrainian agriculture more in line with the prevailing practice in market economies, where family farms are the dominant organizational form and production cooperatives (i.e., CAEs) hardly exist among the corporate farms. It was hoped that this type of farm reorganization would help to eliminate the inefficiency that plagued the traditional socialist agriculture.

The formal reorganization goals were achieved. There are no CAEs in the survey, and agricultural production cooperatives (the form closest to the traditional collective farm) account for only 8% of the sample. The corporate farms in the survey are represented by new legal organizational forms with market-sounding names. The corporate farms are mainly organized as limited-liability companies or partnerships (39% of all respondents), followed in similar numbers by private lease enterprises (34%). Joint stock companies occur much less frequently in the survey (9%). The distribution of corporate farms of different organizational forms in the survey is shown in Table **7.1**.

Peasant farms, as distinct from corporate farms, exist in a single organizational form. The 2003 Law of Peasant Farms requires incorporation of peasant farms as legal bodies. There is general compliance with this legal requirement among the peasant farms surveyed, but some still continue as unincorporated physical bodies – probably a carryover from the pre-2003 period, when incorporation was optional. Thus, 78% of the peasant farms surveyed are organized as legal bodies and only 22% are physical bodies (**Table 7.1**).

Table 7.1: Organizational forms among corporate and peasant farms in the survey

Corporate farms	Percent of respondents	Peasant farms	Percent of respondents
All corporate farms surveyed	100	All peasant farms surveyed	100
Limited liability companies and partnerships	39	Legal bodies	78
Private lease enterprises	34	Physical bodies	22
Joint stock companies (JSC)	9		
Agricultural production cooperatives	8		
State enterprises	7		
Other	3		

Peasant farms are generally organized by a small number of family members or partners. The number of members in peasant farms ranges from 1 to 32 with median of just 2 and mean of 3.6. There is practically no difference in the number of members for peasant farms organized as legal or physical bodies. Corporate farms, on the other hand, show a much wider range: Here the number of members ("founding shareholders") ranges from 1 to 1,600 with median of 8 and mean of 127. **Fully 16% of corporate farms surveyed are single-shareholder farms and 31% have from 1 to 3 shareholders.** Farms with more than 500 shareholders constitute 10% of the sample. There is a certain relationship between the number of members and the organizational form of the corporate farm: Private enterprises and limited-liability partnerships generally have a significantly smaller number of members than joint stock companies and agricultural cooperatives (**Table 7.2**).

Table 7.2: Number of members in farms of different organizational forms

	Mean	Median	Interquartile range**	Min-max range
Peasant farms	3.6	2	1-4	1-32
Corporate farms	127	8	3-103	1-1,600
Private enterprises and limited liability companies	90*	6*	2-28	1-1,600
Joint stock companies and cooperatives	278*	104*	12-434	1-1,200

Notes: * Differences between the two groups of farms significant at $p = 0.01$ by standard tests.
** The interquartile range brackets 50% of all observations.

7.1 Creation time and mode

The creation of corporate farms in the sample shows a single sharp peak in 2000 (**Figure 7.1**). The three years 1999-2001 associated with the start of the second-wave reform account for the creation of 52% of the corporate farms surveyed. Prior to 1999 the creation rates ran below 5% of the sample farms per year, and they dropped roughly to the same level after 2001.

Peasant farms are a new type of farm in Ukraine that practically did not exist before 1992. Unlike the pattern observed for corporate farms, there were two distinct peaks of peasant farm creation in the survey: The first wave in 1992-93 (36%) and the second wave in 2000, immediately after the December 1999 presidential decree (13%). In each of the other years after 1993 the farm creation rate was 3%-5% of the sample (**Figure 7.2**). The dual peaks observed in the survey are consistent with the national picture presented in **Figure 3.2**, which shows two waves in the process of creation of peasant farms: The first wave in 1991-93 and then the second wave in 1999-2001.

Most corporate farms in the survey (nearly 80%) were created through reorganization of a former CAE, either in one-to-one restructuring or as a result of the splitting of the former farm into several fragments (**Table 7.3A**). Only 19% of

respondents characterized their enterprises as new farms. Among peasant farms the situation is reversed: Fully 65% were organized as a new farm, while 23% were created through reorganization of a former CAE, including fragmentation (when the collective farm split into a number of new entities) or liquidation (**Table 7.3B**).

Figure 7.1: Creation of corporate farms over time in the survey

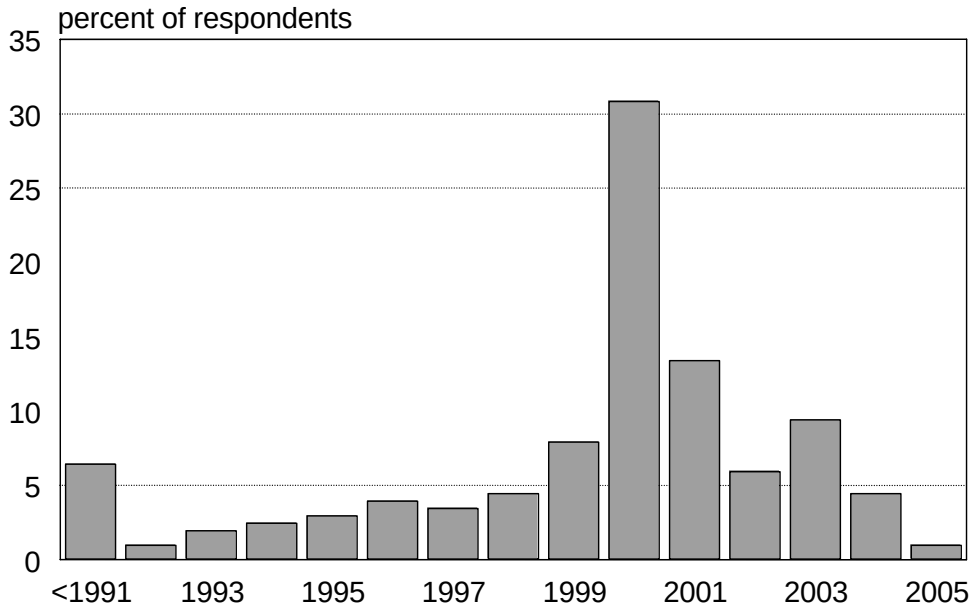
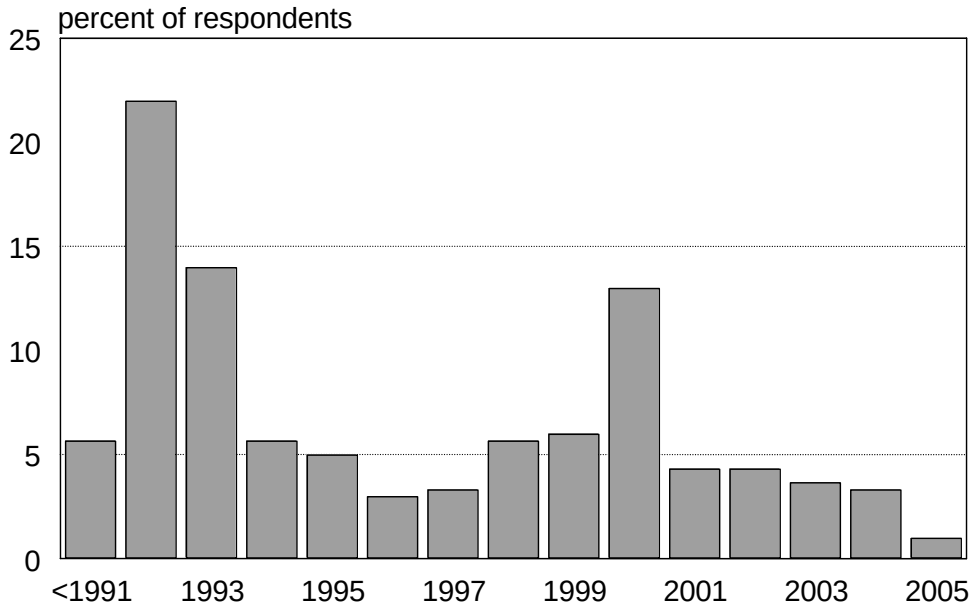


Figure 7.2: Creation of peasant farms over time in the survey



There is a fairly clear relationship between the creation time and the creation mode, especially for peasant farms. In the pre-1999 period peasant farms were mostly created as new entities (77%) and the rate of farm creation through reorganization of collectives was relatively low (**Table 7.3B**). The situation

reversed in the post-1999 period: Here a much higher percentage of peasant farms than in the previous period were created through reorganization of former collectives (30% compared with 19% in the pre-1999 period), although new farm creation also continued at a high rate. The differences are less sharply pronounced for corporate farms, yet we see that one-to-one reorganization was the dominant form for the pre-1999 period, while new farm creation and fragmentation became more prominent in the post-1999 period (**Table 7.3A**).

Table 7.3: Creation modes of corporate and peasant farms (percent of respondents)

	All farms	Pre-1999	Post-1999
A. Corporate farms			
New farm	19	15	20
Created through reorganization of collective farm	79		
One-to-one reorganization	60	69	55
Collective farm split into several new farms	15	13	17
Collective farm liquidated	4	4	7
Created through reorganization of peasant farm	1		
Other	1		
B. Peasant farms			
New farm	65	77	61
Created through reorganization of collective farm	23	19	30
Separated from reorganizing collective farm	8		
Collective farm split into several new farms	9		
Collective farm liquidated	6		
Created through reorganization of peasant farm	5	4	9
Other	7		

7.2 Disposition of land and asset shares

The driver for farm reorganization is the distribution of land and farm assets in kind based on previously assigned paper shares. The emphasis on distribution in kind is the new feature that distinguishes the 1999-2000 reform from the first-wave reforms begun in 1992, when the main efforts focused on the assignment of paper certificates of entitlement. The new policy has been largely successful in accomplishing the distribution of land plots to the rural population. Thus, households report receiving more than 80% of their land entitlement in physical form, whereas farmers have received practically their entire entitlement (96%). The distribution of non-land farm assets has been much less sweeping (**Table 7.4**), but, as with land, farmers report having received a larger share of their allocation than households.

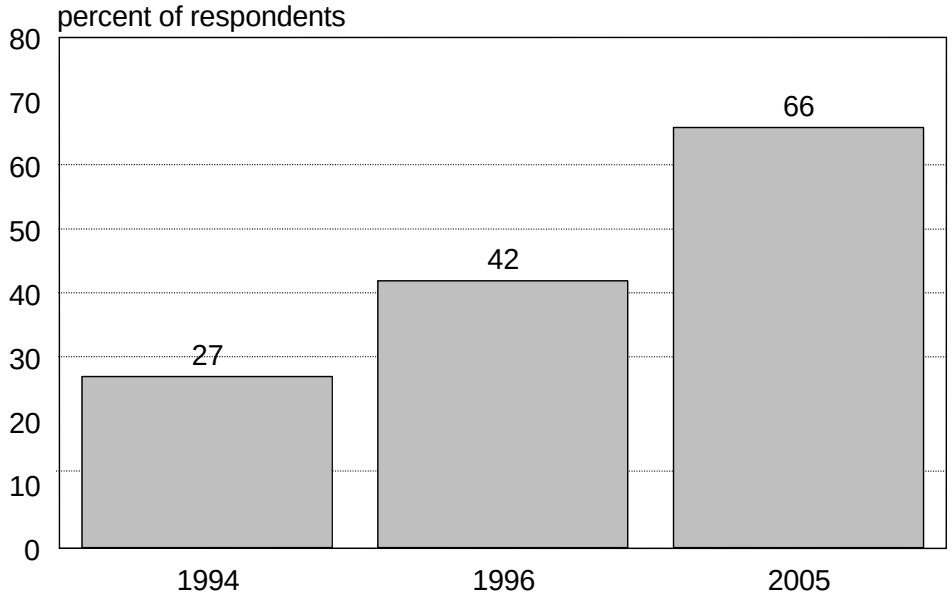
Two-thirds of the rural households reported that they had received their land shares at least in the form of paper certificates and more than half had received them in the form of a physical plot (**Table 7.4**). To get a sense of progress over time it may be

useful to compare these share-distribution results for 2005 with the corresponding data from earlier surveys in Ukraine. Thus, the percentage of corporate-farm employees that had received land shares in the form of paper certificates was 27% in the 1994 World Bank survey, going up to 42 in the 1996 World Bank survey (**Figure 7.3**). Among farm managers in the 1996 World Bank survey, 29% reported that the land shares had been officially registered with the district authorities, and nobody even thought about actual distribution of land plots against shares. **The numbers observed in previous surveys are substantially below the 66% of respondents who report holding land shares in the 2005 FAO survey.**

Table 7.4: Distribution of land and assets as reported by households and farmers

	Households		Farmers	
	Land	**Assets**	**Land**	**Assets**
Received shares, % respondents	66	28	45	21
Received in kind, % respondents	53	15	43	14
Allocated	2,911 ha (*n*=560)	1,983,000 hrvn (*n*=217)	1,087 ha (*n*=139)	1,068,000 hrvn (*n*=59)
Received in kind	2,397 ha (*n*=451)	710,000 hrvn (*n*=126)	1,046 ha (*n*=133)	789,000 hrvn (*n*=44)
Received as % of allocated	82	36	96	74
Disposition, %				
Own use	19	36	93	96
Lease to corporate farm	66	42	--	--
Lease to farmer/private individual	13	15	7	2
Other	2	7	0	2

Figure 7.3: Progress with distribution of land share certificated to rural households over time: World Bank surveys 1994, 1996 and FAO survey 2005



Farmers report that they have predominantly kept the land and the assets received during reorganization for their own use (**Table 7.4**). **Households**, on the other hand, **mainly lease out the land and the assets to the local corporate farms, and keep only a relatively small portion for own use** (19% of land, 36% of farm assets). This finding is consistent with the answers of farm managers, who report that their corporate farms lease 91% of the land shares and 78% of the asset shares distributed to the rural population during reorganization (**Table 7.5**). In the opinion of the managers, own use of land and asset shares by the rural population is negligible.

Table 7.5: Disposition of land and asset shares as reported by managers

	Land shares (% of total shares)	Asset shares (% of total shares)
Invested in corporate equity	4	14
Leased to corporate farms	91	78
Sold to corporate farm	0	3
Own use	4	3
Other	1	1
Number of farms reporting	148 farms	108 farms
Total number of shares	71,000 shares	57,300 shares

In terms of relations between corporate farms and shareowners, **there is a clear preference on the part of the rural population for leasing their shares, not investing in corporate equity** (**Table 7.5**). There is, however, a difference in the pattern observed for land shares and asset shares: A much higher percentage of shareholders invest asset shares in equity or even sell their asset shares to the corporate farm.

Table 7.6: Forms of payment by the corporate farm to landowners for leased land

	Percent of farm managers* (*n*=208)
Agreed annual payment in cash	36
Agreed annual payment in kind	64
Provision of services to household plot	22
Share of profit (in cash or in kind)	16
Other	0

Note: * Add up to more than 100 because multiple answers are allowed.

The leasing arrangements with the corporate farm are usually formalized in a lease contract. This is reported by 71% of farm managers; another 20% report that the leasing arrangements are part of the farm charter. In terms of payoffs to landowners, the most popular form is payment in kind, either as commodities or in the form of farm services to the household plot (**Table 7.6**). Fully 70% of farm managers report that they compensate lessors either by fixed annual payments in kind or by provision of farm services. Despite the prevalence of in-kind arrangements, the practice of fixed cash payments is not negligible: It is

reported by 36% of farm managers (sometimes as a supplement to in-kind payments).

7.3 Changing employment structure

Second-wave reforms have brought a dramatic change in the employment structure of the rural population. In 1996, 67% of the adult population (in the ages between 18 and 60) worked in the local farm enterprise (1996, WORLD BANK SURVEY). In 2005, only 21% of the adults report that their main employment is with the corporate farm (**Table 7.7**). Among seniors older than 60, employment by the local corporate farm dropped from 9% in 1996 to practically zero. Close to 30% of adults report work on the family farm (i.e., the household plot) as their main occupation. Among seniors this group encompasses 62% of respondents. The secondary job (for those who have it) is practically always work on the family farm.

Table 7.7: Occupation structure of family members

	All family members (*n*=2963)	**Adults (18-60) (*n*=1900)**	**Seniors (>60) (*n*=503)**
Work on the family farm	29	28	62
Work on a corporate farm	14	21	0
Self-employed outside agriculture	4	6	0
Hired worker outside agriculture	17	27	1
Student	14	6	0
Other (incl. unemployed)	22	12	37

Table 7.8 shows the distribution of family members by primary and secondary occupation. The dominant occupation on the family farm (as both the main and the secondary job) is supplemented with significant off-farm occupation (mainly employment in industry). Self-employed activities outside agriculture are highly undeveloped.

Table 7.8: Primary and secondary occupation among household members

	Head of household		**Spouse**		**Other members**	
	Primary	**Secondary**	**Primary**	**Secondary**	**Primary**	**Secondary**
Family farm	44	49	42	50	15	47
Other farm	20	2	20	3	8	1
Self-employed off-farm	3	0	3	1	6	1
Hired off-farm	33	10	35	8	71	9
No secondary occupation	--	39	--	38	--	42
Total	100	100	100	100	100	100

The impression of reduced dependence on the local corporate farm is strengthened by the responses of the heads of households, who were asked to characterize their relations with the former collective. **Fully two-thirds of respondents have no**

relations with the corporate farm. One-third work at the corporate farm or are (passive) shareholders (**Table 7.9**). These findings are consistent with the prevailing opinion among Ukrainian scholars and officials that "only one-third of the able-bodied rural population work in corporate farms."

Table 7.9: Relations of heads of households with the local corporate farm

	Percent of respondents
No relations with corporate farm	68
Permanently employed by corporate farm	17
Temporary employment by corporate farm	5
Shareholder of corporate farm	10
Total	100

The proportion of respondents reporting no relation with the local corporate farm is slightly higher than in the entire sample for the over 60 age group and somewhat lower than in the entire sample in the 45-60 age group (**Table 7.10**). The differences are significant by the chi-square test (given the large sample), but visually the relationship with age is not very pronounced.

Table 7.10: Age distribution of respondents reporting no relation with the local corporate farm

Age group	Respondents reporting no relations with enterprise, %	All respondents in the survey, %
<16	--	--
16-25	0.7	0.8
25-45	28.3	28.8
45-60	**34.1**	**38.6**
>60	**36.9**	**31.8**
Total	100	100

The occupation structure for those with and without relations with the local corporate farm is shown in **Table 7.11** for heads of households and their spouses. Among those who have no relation with the local farm a higher percentage work on the family farm and in nonagricultural occupation (mainly as hired workers). The difference in nonagricultural employment is more pronounced for the spouse: **The spouses appear to be the main contributors to employment diversification in families that have disengaged from the local corporate farm.**

Table 7.11: Occupation structures in families with and without relations with the local corporate farm

	Head of household		Spouse	
	No relation with corporate farm	Rest of sample	No relation with corporate farm	Rest of sample
Work on the family farm	51	42	39	35
Other agricultural employment	6	25	9	21
Nonagricultural employment	25	18	28	12
Other (incl. unemployed)	18	15	23	22

7.4 "Agroholdings" in Ukraine

In a recent discussion of the post-2000 recovery in Ukraine, ASLUND (2002) has noted:

> Big new businessmen are going into agriculture with a vengeance, and commercial banks are happy to provide loans to farms, as they perceive this as profitable and secure business.

The view of "big new businessmen going into agriculture" is reminiscent of certain developments that are taking place in Russia, where investors with interests primarily outside agriculture (financial institutions, energy companies, input manufacturers and suppliers) purchase failing collective farms and accumulate huge holdings by leasing land shares from thousands of individual rural landowners. The super-large farming structures created in this way are provisionally called "agroholdings".[6] Taking the cue from Aslund, we tried to find evidence for the emergence of similar structures in Ukraine.

One of the characteristics of an "agroholding" is the existence of a large stockholder that controls all (or at least the majority of) the equity in the corporation. The managers' questionnaire accordingly contained a subset of questions intended to elicit the existence of large stockholders as evidence of "agroholdings". One-quarter of the corporate-farm managers (50 out of 208) reported the existence of a single investor controlling more than 50% of the farm's equity capital (**Table 7.12**). However, most of these investors (37) were physical persons (individuals), and only 13 were legal persons (corporations). These 13 are potential instances of farms that belong to a larger corporate organization, or in other words an "agroholding".

Among managers of the 50 farms with a majority stockholder, more than one-third (19 respondents) indicate that the large investor stepped in with the purpose of securing a raw material base or expanding the market for own products. A similar contingent of respondents (20 out of 50) suggest that the investor was

[6] For a discussion of the agroholding phenomenon in Russia see RYLKO, JOLLY (2005).

attracted by profitability (or potential profitability) of agriculture. **Land accumulation or land ownership is not viewed by managers as a motive for investment in their farms.** Considerations of securing the raw material base or expanding the market for products are also among common reason for the creation of agroholdings in Russia. Contrary to the situation in Ukraine, land definitely plays a role in the creation of Russian agroholdings, while farm profitability is not mentioned explicitly as a relevant factor in Russia.

Table 7.12: Characteristics of the majority stockholder (number of respondents)

Individual	*n*=37	Corporation	*n*=13
Worker or pensioner	1	Input supplier	2
Manager or specialist	27	Processor	3
Outsider	8	Trader	--
Other	1	Diversified agriculture	4
		Non-agricultural business	2
		Other	2

One-quarter of the managers in this category indicate that the entry of a large stockholder has led to some new investments on the farm. More than 40% of respondents, however, do not believe that the development has had any effect on farm operations or farm performance.

The key question is, do farms in this category demonstrate any performance advantages? The number of such farms in the sample is too small to make any firm conclusions. Meanwhile we can only say that the potential "agroholding" members (i.e., the 13 farms with a corporate majority stockholder) do not show a greater tendency for radical internal reorganization (as measured by the creation of independent subdivisions inside the farm) than the average. The issue of "agroholdings" in Ukraine deserves further study with the aim of establishing if such organizations exist at all in this country.

8 LAND AND LAND MARKETS

National-level statistics record a massive shift of agricultural land from corporate to individual farms (see **Part I**). We now use survey data to examine the impact of these changes on farm sizes and especially on the development of land markets, which in theory provide a medium for the transfer of land from less efficient to more efficient land owners.

8.1 Farm sizes

There are huge gaps in size between the three main categories of farms: Corporate farms, peasant farms, and household plots. Corporate farms are an order of magnitude larger than peasant farms, which in turn are an order of magnitude larger than household plots (**Table 8.1**). The interquartile ranges (i.e., the range of sizes bracketing 50% of all farms) do not overlap for the three farm types (**Figure 8.1**). We thus conclude that if there is some overlap in sizes between different categories, it involves less than 25% of farms in each group.

Table 8.1: Size distribution characteristics for farms of different types

	Household plots (*n*=850)	**Peasant farms (*n*=309)**	**Corporate farms (*n*=207)**
Mean size	1.7	146	1,711
Median size	0.6	35.4	1,360
Interquartile range:			
Lower limit	0.3	18.5	500
Upper limit	1.2	80.6	2,200
Lower 10%	0.2	8	190
Upper 10%	3.0	251	3930
Mode	<1	50-500	1000-2000
Farms at mode	72%	31%	30%

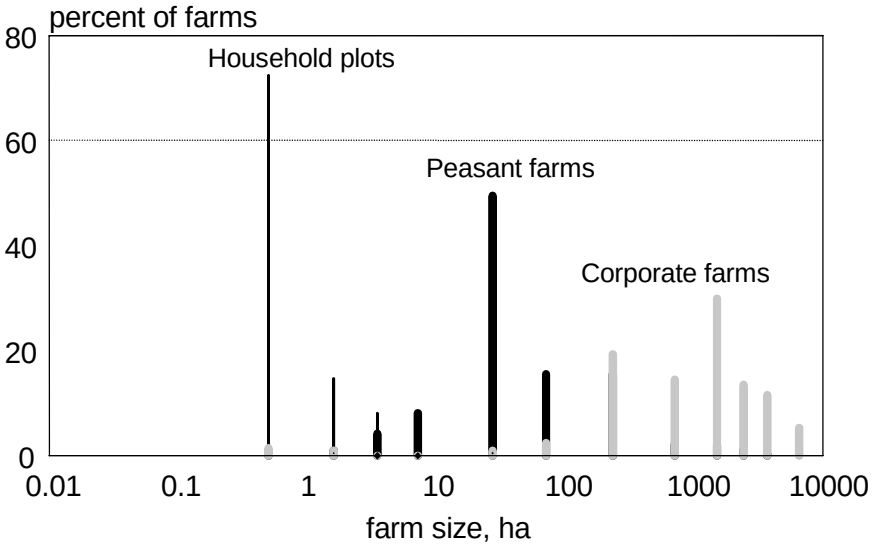
Figure 8.2 shows the clear separation of the size distributions for farms of different types: The mode for household plots falls below 1 hectare (72% of respondents), the mode for peasant farms is between 10 and 100 hectares (65% of farms), while 95% of corporate farms are larger than 100 hectares, with 43% falling between 1000-3000 hectares. There is an overlap between the three size distributions, but it is minimal.

8.2 Land in household plots

In the interest of comparability with sizes of corporate and peasant farms, the size data for household plots in **Table 8.1** and **Figures 8.1, 8.2** reflect the land actually used by the family for farming. The survey shows that households lease out nearly two-thirds of their land and the land used for farming (1.67 hectares on average) is just a small part (36%) of the family's total land holdings (**Figure 8.3**).

Figure 8.1: Median size and interquartile range for farms of different types: Household plots, peasant farms, and corporate farms

Figure 8.2: Size distribution of farms of different types: Household plots, peasant farms, and corporate farms



More than half the respondents lease out at least some of their land; leasing in is marginal and there is virtually complete dichotomy between leasing in and leasing out: Only 10 respondents (1%) report both leasing in and leasing out. On

the other hand, 45% of household plots neither lease out nor lease in and farm their entire owned land (**Table 8.2**). Families who lease out land start off with much larger holdings than families who farm their entire (or almost entire) owned land (6.2 hectares compared with 2.0 hectares on average). There are no other significant differences between the families in these two groups (same family size, same age structure). The few families who lease in land cultivate much larger holdings than families in either of the two other groups (nearly 16 hectares compared with 1-2 hectares, respectively). These families are also larger with significantly younger heads of household and spouses (**Table 8.2**). In terms of the ownership structure of their holdings, they use a much smaller share of owned land than households in the other two categories. The absolute area of owned land is around 2 hectares, roughly the same as for the other rural households, and the entire difference in holdings (16 hectares compared with 1-2 hectares) is attributable to the leased component.

Figure 8.3: Allocation of land holdings by rural households (percent of average holding of 4.6 ha in 2004)

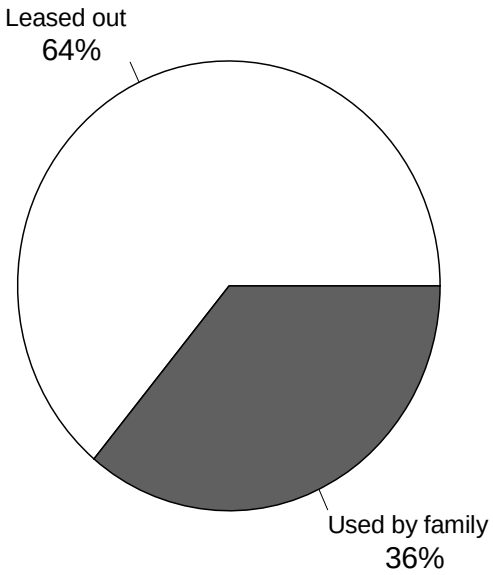


Table 8.2: Three cohorts of rural families with different land leasing strategies: Those who farm their entire owned land, those who lease out, and those who lease in

	Farm all owned land	Lease out	Lease in
Number of respondents	382	436	24
Percent of respondents	45%	51%	3%
Available, ha	2.0	6.2	15.7
Used, ha	1.8	0.8	15.6
Percent owned land	91%	92%	14%
Wish to enlarge, ha	0.7	0.2	8.4
Family members	3.4	3.5	4.2
Age of head of household	52	54	46
Age of spouse	46 (*n*=353)	49 (*n*=411)	46

Table 8.3 summarizes the main reasons given by respondents for leaving some of their land uncultivated. Here the respondents include those who lease out land and those among others who cultivate only part of their available holdings. Shortage of purchased inputs and land quality do not appear to be a significant obstacle. Lack of machinery and working capital, as well as low profitability are cited among the main reasons. Labor shortages are also an important obstacle, which is consistent with the observation in **Table 8.2** that smaller families lease out land, while larger families lease in.

Table 8.3: Reasons for not cultivating the entire available land in household plots

	Percent of respondents with some uncultivated land (*n*=510)
Not enough labor	**33**
Not enough machinery	**26**
Not enough fuel	6
Not enough fertilizer and other inputs	6
No cash, working capital	**19**
Poor land	6
Not profitable	**22**
Other	10

Table 8.4: Holdings of rural families 1990-2004

Year	Ave holdings, ha	Total, %	Own, %	Use rights from the state, %	Leased, %
1990	1.0	100	83	16	1
1995	1.3	100	86	13	1
1998	2.2	100	85	12	3
2004	4.6	100	84	7	9

The two waves of land reform in Ukraine have had a significant impact on the land available to rural families. The average land holdings increased from 1 hectare in 1990 to 2.2 hectares at the end of the first-wave reforms (1998) and further to 4.6 hectares during the second-wave reforms. Despite the increase of holdings between 1990 and 2004, the ownership structure has remained steady (**Table 8.4**): More than 80% of the holdings is land owned by the family (in all years), while land in use rights from the state – a carry-over from the pre-privatization era – decreases and the component of leased land – presumably leased from other individuals and enterprises – increases. The continuing presence of a significant component of land in use rights from the state indicates delay in the implementation of the legal provisions for the transfer of household plots into private ownership or alternatively signing of formal lease contracts with the state for this land.

8.3 Land in peasant farms

The holdings of peasant farmers typically consist of two components: The peasant farm proper acquired through special administrative procedure (including conversion of land shares into a physical plot) and the household plot that has been in the family since the early 1990s or even before that. The average peasant farm is 144 hectares, while the average household plot in this group of respondents is 2.8 hectares, so that its contribution to total holdings is negligible. While the small household plot is mostly owned land, the peasant farm on the other hand is mostly leased land, with only 18% represented by family owned land (**Table 8.5**). A small proportion of land in peasant farms is still reported in use rights from the state, although legally this component is required to be converted into leased land. In peasant farms, as in household plots of the rural population, the reality on the ground has not caught up with the legal requirements.

Table 8.5: Holdings of peasant farmers

	Ave plot size, ha	Total, %	Own, %	Use rights, %	Leased, %
Peasant farm *n*=309	144	100	18	8	74
Household plot *n*=208	2.8	100	98	1	1

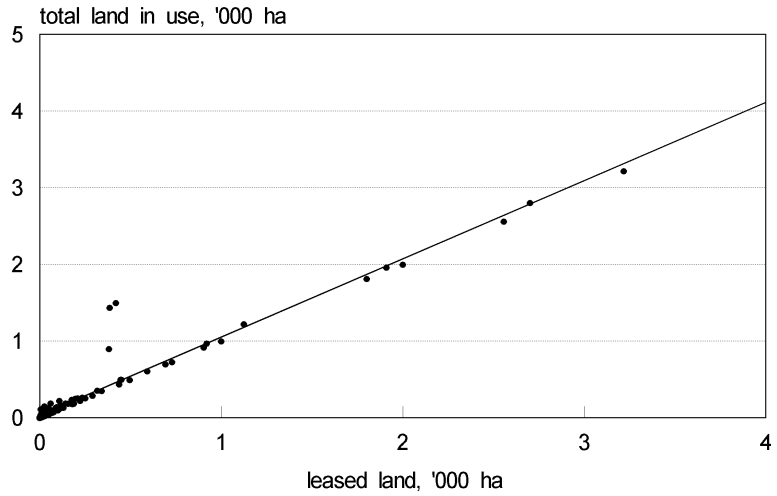
Table 8.6: Effect of leasing on farm size

	Percent of respondents	Farm size, ha	Owned, %	Use rights, %	Leased, %
Farms with leased land (*n*=163)	53	227*	12	4	84
Farms without leased land (*n*=143)	47	53*	61	39	0
All sample (*n*=309)	100	144	18	8	74

Note: * Difference significant by *t*-test (p=0.000).

Peasant farms, unlike household plots, use all the available land and do not lease anything out. On the contrary, more than half the farms report leasing in land, and the average size of these "lessee farms" is much larger than the size of farms without leased land (**Table 8.6**). In this respect, we observe a repetition of the same pattern as for household plots: Those who lease in land achieve much larger farm sizes than those who do not. Growth in farm size is again entirely attributable to the leased component: Regression analysis shows that one hectare of additional leased land produces a one hectare increase in farm size (regression coefficient 1.02, R^2=0.94). **Figure 8.4** demonstrates this tight linear relationship between farm size and leased land (the vertical axis is total farm size, the horizontal axis is the leased land component, in hectares).

Figure 8.4: Total land in use vs. leased land in peasant farms



8.4 Land in corporate farms

The average corporate farm in the survey manages 1,711 hectares of agricultural land. Most of this land is leased: Land owned by the corporate farm as a legal entity is less than 7% of the total. The structure of sources from which corporate farms lease land is shown in Table 8.7.

Table 8.7: Structure of sources of leased land for corporate farms

Source	Percent of leased land
Members (shareholders)	42
Of which: Work in the corporate farm	16
Other private individuals	47
Of which: Work in the corporate farm	8
State, municipality, regional government	6
Other corporate farms	3
Other sources	2
Total leased land	100

The main sources for land leasing are individuals: Members and shareholders of the corporate farm as well as other individual landowners in the area. Individual lessors account for almost 90% of the land leased by corporate farms. The remainder comes from the state and from other marginal sources. It is interesting to note that in the present situation only a small minority of the shareholders and other lessors actually work in the corporate farm: Most shareholders and lessors appear to be passive landowners who entrust their land to the corporate farm without demanding in return the security of a wage job on the farm.

8.5 Plans for farm enlargement

Rural families generally do not utilize all their land and only a small percentage augment their holdings by leasing in. Accordingly, only 9% of respondents among household plot operators wish to enlarge their land, more than doubling the plot size from 3.5 hectares to 7.8 hectares. Peasant farmers, on the other hand, utilize all the land that they have: There is practically no unutilized land and no leasing out among peasant farmers in the survey. Accordingly, 35% of peasant farmers desire to enlarge their holdings, adding 178 hectares to their current 182 hectares. Among corporate farm managers, fully 38% indicate that they wish to enlarge their farms by about 50%: From 1,950 ha to 2,930 ha.

Table 8.8: Potential sources for acquiring land for farm enlargement (multiple answers allowed)

	Households	Farmers	Corporate farm managers
Lease from state/municipality	34	39	35
Lease from corporate farm	12	13	22
Lease from private individual	17	28	44
Lease land shares from individuals	15	26	46
Buy land	29	12	10

Possible sources of additional land as reported by the three cohorts of respondents are shown in **Table 8.8**. A major source for all respondents is leasing additional land from the state. Remarkably, nearly 30% of household plot operators think they will be able to buy more land for their plot, whereas peasant farmers and farm managers are much less optimistic with regard to the possibility of buying land. Farmers and even more so farm mangers expect to rely more on leasing from private individuals (either in the form of physical plots or land shares).

Table 8.9: Profiles of farming families wishing to enlarge their farm

	Households		Peasant farms	
	Wish to enlarge	No	Wish to enlarge	No
Percent of respondents	9	91	35	65
Land holdings, ha	3.5*	4.9*	178	126
Family size	4.1*	3.6*	4	4
Age head of household	45*	53*	47*	49*
Age spouse	41*	48*	43*	47*

Note: * Differences statistically significant at $p = 0.1$.

The profiles of farming families (both those operating household plots and peasant farms) who wish to enlarge their farms are compared in **Table 8.9** with the profiles of families who are satisfied with their present land holdings. In those cases when the respondent wishes to enlarge the family farm, both the head of household and the spouse are younger than among those who do not desire more

land. This is of course consistent with the need to ensure sufficient human capital for a larger farm. Another component of human capital – family size – is statistically significant among household plot operators, where the wish to enlarge is associated with larger families, but not among peasant farmers. Similarly, differences in physical capital as manifested in smaller land holdings drive the desire to enlarge the farm among household plot operators, but not among peasant farmers (for corporate farms, the differences in farm size between those intending to enlarge and the rest are not statistically significant either).

8.6 Lease payments and lease term

While rural households primarily lease out land, peasant farmers and corporate farms primarily lease in land. **Table 8.10** summarizes the information on land leasing transactions of both kinds as reported by the three groups of respondents.

Table 8.10: Frequencies and average size of land leasing transactions

	Lease in		Lease out	
	Percent of respondents	**Average size, ha**	**Percent of respondents**	**Average size, ha**
Households	4	9.9	**52**	5.4
Peasant farms	**53**	190	4	11.5
Corporate farms	**100**	1,580	8	170

Lease payments could be estimated with a fair degree of reliability using information on the predominant transactions for farms of different types (i.e., leasing in for peasant farms and corporate farms; leasing out for households). The median lease payment is 90-95 hrivny per hectare per year (**Table 8.11**). The mean lease payment is 110-125 hrivny per hectare per year, and as always it is more sensitive to outliers than the median.

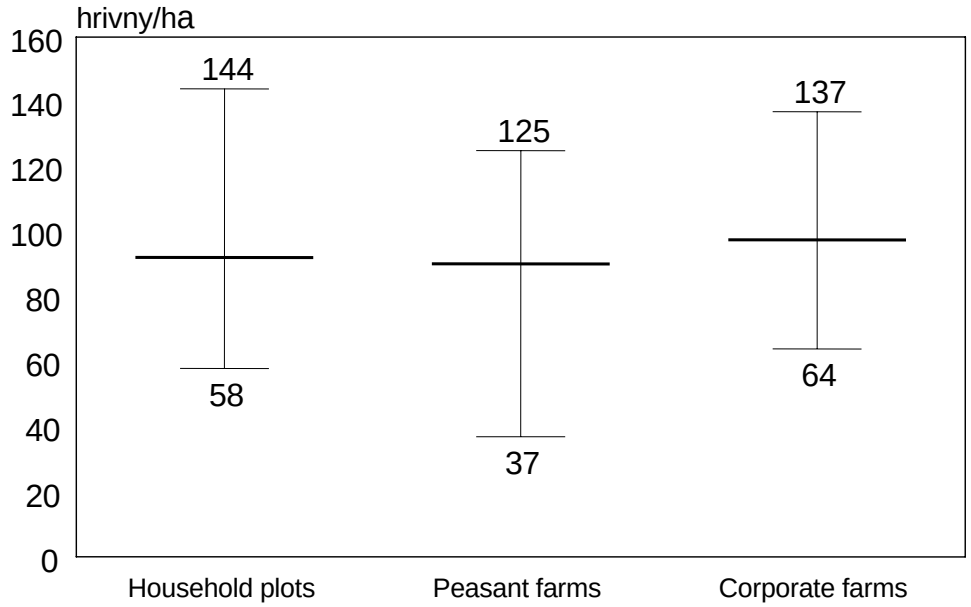
Table 8.11: Lease payments for farms of different types

	Households (lease out)	**Peasant farms (lease in)**	**Corporate farms (lease in)**
% leasing	52	53	100
Average leased, ha	5.4	190	1,580
Payment, hrivny/ha			
Mean	125	109	126
Median	92	90	95

One would normally expect corporate farms to exercise their market power in local land markets, driving the payments to their lessors to substantially lower levels. No such phenomenon is observed in the survey: The lease payments reported by corporate farms are not less than for the other groups of respondents. It is actually peasant farmers who appear to pay somewhat less, but the differences are not statistically significant (**Figure 8.5**).

Lease payments add about 9% to the cash income of families that lease out land (see **Chapter 15**). This is neither negligible nor very important: The contribution of lease payments to household well-being is at best marginal. Land leasing certainly cannot be regarded as a safety net for the rural population.

Figure 8.5: Median lease payments for farms of different types: Household plots, peasant farms, and corporate farms



The estimated lease payments show considerable regional variability, ranging from around 60 hrivny per hectare per year in Chernigov to around 200 hrivny per hectare and higher in Vinnitsa and L'viv. The ranking of the oblasts by lease payments is generally consistent for the three types of farms, with some exceptions (**Table 8.12**). However, we do not observe a particularly strong correlation with the administratively prescribed normative land prices. This is surprising, because the normative prices are supposed to reflect the productivity of soil in each oblast and can thus be expected to be positively associated with lease payments across regions. It is quite possible that the low correlation is a reflection of the inadequacy of the normative prices as judged by market agents.

The lease term is predominantly 3-5 years for farms of all types (**Table 8.13**). Corporate farms do not report leasing for terms shorter than 1 year or longer than 10 years. Peasant farms also lease seldom for very short terms, but they report fairly frequent leasing for terms longer than 10 years (14% of respondents). Short-term leasing for less than 1 year is characteristic of household plots only.

Table 8.12: Lease payments and normative land prices across Ukraine's oblasts

Oblast	Lease payments			Normative land price	
	Households (lease out)	Peasant farms (lease in)	Corporate farms (lease in)	Categories	Hrivny/ha
L'viv	High	High	High	*Low*	6,860
Vinnitsa	High	High	High	*High*	10,205
Poltava	Medium	Medium	High	*High*	9,525
Rivno	Medium	Medium	Low	*Medium*	8,322
Sumy	Medium	Medium	Medium	*Medium*	7,706
Mikolaev	Medium	Low	High	*Medium*	7,348
Chernigov	Low	Low	Low	*Low*	6,572
Ivano-Frankivsk	Low	Low	High	*Low*	6,996

Notes: Categorization of lease payments:
High – 150 hrivny/ha and higher.
Medium – 100-150 hrivny/ha.
Low – less than 100 hrivny/ha.

Table 8.13: Lease term for farms of different types

	Households (lease out)	Peasant farms (lease in)	Corporate farms (lease in)
<1 year	16	3	0
1-3	13	13	15
3-5	**42**	**53**	**65**
5-10	19	17	19
>10 years	10	14	1

8.7 Buying and selling of land

Contrary to the active development of markets for leasing, buying and selling of land is still a rare phenomenon in Ukraine. Practically nobody in the survey reported selling land (less than 0.5%); among peasant farmers 17 respondents (5.5%) report buying land during the last 5 years (compared with only 1.4% for households). Peasant farmers who bought land appear to have larger farms with a higher share of owned land compared with those who did not buy land (**Table 8.14**; the differences are not significant, however, as the number of buyers is too small). Buying, like leasing, has a positive impact on farm sizes and the overall impression is that land market transactions are conducive to farm enlargement.

There is still considerable resistance to the very notion of buying and selling land among the rural population. The resistance is particularly strong among managers of corporate farms and household plot operators. Half the respondents in these two categories expressed negative opinion of the possibility of conducting buy-and-sell transactions in agricultural land (**Table 8.15**). Among peasant

farmers, on the other hand, the percentage of respondents with a positive view of buy-and-sell transactions is higher than the percentage of those with a negative view. This is another manifestation of the greater demand of peasant farmers for additional land.

Table 8.14: Farm size and ownership structure for peasant farmers who bought land in the last five years

	Percent of respondents	Farm size, ha	% of owned land
Bought land	5.5	189	24
Did not buy land	94.5	142	17
All sample	100	144	18

Table 8.15: Opinions concerning buying and selling of agricultural land (percent of respondents)

	Managers of corporate farms	Peasant farmers	Household plot operators
Positive: Support buying and selling of land	33	45	31
Negative: Object to buying and selling of land	46	43	53
Undecided	21	12	16

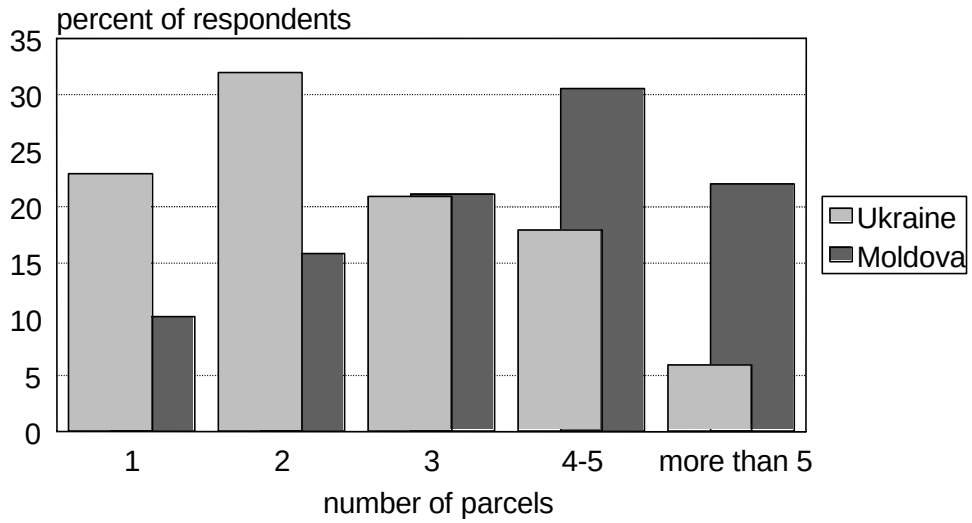
8.8 Land fragmentation

The 2005 FAO survey provided information that could inform the discussions on land fragmentation and land consolidation among Ukrainian policy makers. According to the survey findings, the land holdings of the average rural household (4.6 hectares) are divided into 2.7 parcels. The highest percentage of households surveyed (32%) report two parcels – one around the house (the traditional household plot) and the other parcels in the fields at the village perimeter (**Figure 8.6**). Another 44% of households are evenly divided between those with 1 parcel and those with 3 parcels; the remaining 24% report 4 parcels and more. In Georgia, for comparison, the average household has 2.4 parcels of land, very close to the corresponding number in Ukraine (2.7 parcels), whereas in Moldova the average household has 4 parcels, and fully 53% of households report 4 parcels and more – compared to only 24% in Ukraine (MOLDOVA, 2005). The fragmentation of household plots is thus much more pronounced in Moldova than in Ukraine (see **Figure 8.6**).

The land holdings in Ukraine generally increase with the increase in the number of parcels, but the positive correlation is very weak (although statistically significant). The average size of a land parcel definitely decreases with the increase in the number of parcels held (**Table 8.16**). Although land fragmentation is not dramatic among rural households in Ukraine, consolidation programs would have

a certain (but probably very slight) effect on about 25% of the households with 4 parcels and more.

Figure 8.6: Distribution of the number of parcels in household plots: Ukraine and Moldova



Source: FAO 2005 survey for Ukraine; World Bank 2003 survey for Moldova (see MOLDOVA, 2005).

Table 8.16: Number of parcels and land holdings for household plots in Ukraine

Number of parcels	Frequency of respondents, %	Land holdings, ha,		Average parcel size, ha
		Mean	Median	
1	23	3.0	0.6	3.0
2	32	4.8	3.5	2.4
3	21	5.1	2.9	1.7
4-5	18	5.6	3.8	1.3
more than 5	6	5.0	3.1	0.7
Coefficient of correlation with number of parcels		+0.097		−0.203

Across the sample oblasts, fragmentation is most pronounced in Ivano-Frankivsk (3.9 parcels per household, compared with 2.7 in the entire sample) and least pronounced in Mikolaev (1.8 parcels per households). In Chernigov and Rivno the average number of parcels per households is somewhat above the average (3.1 parcels), whereas in Poltava, Vinnitsa, and Sumy it is below the average (2.3-2.6 parcels per household). In L'viv the number of parcels per household matches the sample average (2.7). The regional variability of fragmentation (**Table 8.17**) should be taken into consideration in any discussion of land consolidation programs, as only Ivano-Frankivsk appears to have some potential for benefits from consolidation of fragmented plots.

Table 8.17: Fragmentation of household plots across sample oblasts

Oblast	Average number of parcels per household
Ivano-Frankivsk	3.9
Rivno	3.1
Chernigov	3.1
L'viv	2.7
Sumy	2.6
Vinnitsa	2.5
Poltava	2.3
Mikolaev	1.8
Average for the entire sample	**2.7**

Peasant farms, as distinct from household plots, consist on average of 2.6 parcels (in addition, farmers have another parcel that represents their household plot). Fully 60% of respondents report holdings in 1 or 2 parcels and about 25% of the farmers have 4 parcels or more. The fragmentation of land in peasant farms is thus very close to that in household plots. In peasant farms, however, a greater number of parcels is a reflection of the farmers' willingness to lease in land from other owners (such as household plots): The average share of leased land increases from 49% in single-parcel farms to 65% in farms cultivating 4 parcels or more.

9 THE BUSINESS ENVIRONMENT

Land reform and farm restructuring are both necessary but not sufficient for overall improvement of productivity and efficiency. In addition to changes in these two dimensions, farms require an environment with functioning market services to support their daily operations. In this chapter we discuss the survey findings that relate to changes in the business environment, including development of market channels for the supply of farm inputs. Market channels for product sales are discussed in **Chapter 11**.

9.1 Changes in farm environment

Representatives of the individual sector – peasant farmers and heads of rural households – are much more positive in their evaluation of the overall effect of the changes associated with the second-wave reforms since 2000. Only 18% of corporate farm managers indicate that the changes have had a positive effect on farm operations, compared with around 30% for individual farmers (**Table 9.1**).

Table 9.1: Effect of changes since 2000 (percent of respondents)

	Managers	Peasant farmers	Households
Positive	18	30	27
No effect	20	27	35
Negative	37	31	25
Don't know	25	12	13

Table 9.2: Changes in production variables since 2000 as reported by corporate farm managers

	Decrease	Increase	No change	Don't know
Total number of workers	64	13	14	9
Workers in livestock production	59	7	13	21
Workers in crop production	64	9	14	13
Administrative staff	69	6	15	10
Farm production	43	30	13	14
Farm profit	40	30	13	17

Corporate farm managers may be less than enthusiastic about the changes since 2000 because they are witnessing labor force shrinkage, reduction of output, and erosion of farm profits (**Table 9.2**). The decrease in the number of workers, and especially decrease in the administrative staff, may be objectively a good sign,

as it acts to alleviate over-employment in agriculture and may potentially increase the productivity of labor. Yet from the manager's point of view this is obviously a depressing situation, with growth changing to attrition or at best entrenchment.

The unfavorable situation with farm production notwithstanding, farm managers give quite positive assessments of the changes in the behavior variables among farm workers. Nearly 40% of managers report that the traditionally problematic behavioral attributes, such as work discipline, motivation, theft and pilfering, or drinking, are all better today than in the past (**Table 9.3**). In contrast, only 20% of managers are of the opinion that there has been deterioration in the behavioral variables.

Table 9.3: Changes in behavioral variables since 2000 as reported by corporate farm managers

	Better	Worse	No change	Don't know
Work discipline	38	23	24	15
Motivation	38	22	19	21
Theft and pilfering	39	18	21	22
Drinking on the job	39	14	23	24

Changes in the external business environment have not been all bad either (**Table 9.4)**. Managers feel less dependent on the directives of the regional authorities: They now have more freedom in making economic and business decisions than before 2000. Access to credit is also reported to have improved (though marginally), which probably indicates that credit is not a major problem for corporate farms. The reason for this is not necessarily objective improvement in the system of rural financial institutions: This may be due to persistence of soft-budget constraints and writeoffs at the regional level, reinforced by special relations cultivated by farm managers with officials. On the other hand, access to purchased inputs and options for sale of farm products are worse now than before 2000. The tax burden has also increased in the opinion of most managers.

Table 9.4: Changes in the outside business environment since 2000 as reported by corporate farm managers

	Better	Worse	No change	Don't know
Freedom in making business decisions	53	11	19	17
Access to credit	38	32	17	14
Access to purchased inputs	31	44	13	12
Possibilities for sale of farm products	20	37	19	14
Importance of barter transactions	17	47	20	16
Tax burden	51	14	22	13

Access to purchased inputs was explored in more detail in the survey by asking the respondents – both managers and peasant farmers – to indicate if they were

actually buying all that they needed in a list of 15 specific inputs. **Table 9.5** presents the frequency scores averaged over all 15 inputs and also the frequency scores for a subset of 8 inputs that were perceived as high-priority inputs (these are inputs identified as needed by more than 50% of respondents). About 20% of respondents in both categories cannot buy the inputs that they need. When the answers are restricted to high-priority inputs, the percentage of respondents who cannot buy what they need drops to 12-15%. Around 80% of both managers and peasant farmers manage to buy inputs, and roughly half of this number actually buy all that they need. There are no sharp differences in the patterns of access to inputs for managers and peasant farmers. Among peasant farmers, however, the proportion of those who are able to buy all that they need (without restrictions) is somewhat higher than among farm managers. This is another reflection of the greater optimism and perhaps aggressiveness of peasant farmers compared with farm managers.

Table 9.5: Access to purchased inputs: Corporate farm managers and peasant farmers*

	All inputs (15)		Inputs perceived as high priority (8)	
	Managers	**Farmers**	**Managers**	**Farmers**
Buy all we need	37	44	43	48
Buy subject to constraints	42	35	44	36
Cannot buy needed input	21	21	12	15

Note: * Frequency scores averaged over inputs for respondents reporting that they need the specific input (in percent). Unique answer required in each category for each input.

Table 9.6: Supply channels for farm inputs: Corporate farm managers and peasant farmers*

	All inputs (15)		High priority inputs (8)	
	Managers	**Farmers**	**Managers**	**Farmers**
State suppliers	16	14	18	15
Commercial suppliers	44	36	58	50
Private individuals	8	13	10	17
Own production	4	3	4	3
Other farms	5	7	6	9
Other sources	1	1	1	2

Note: * Frequency scores averaged over inputs for respondents reporting that they need the specific input (in percent). Multiple answers allowed for each input.

Private trade – commercial suppliers and private individuals – are the main channel for farm inputs among managers and peasant farmers alike (**Table 9.6**). State suppliers continue to play an important role, but they are now far behind the commercial trade channels. Moreover, the role of state suppliers has declined dramatically over time: In the 1996 World Bank survey 60% of peasant farmers reported purchasing inputs through state-owned channels, compared with around 15% in 2005. The reliance on private trade is particularly pronounced for the

group of 8 high-priority inputs. Peasant farms tend to rely more than corporate farms on purchase of inputs from other farms. In general, other farms are a significant source of three kinds of inputs: Seeds and seedlings, young animals, and mechanized field works ("custom farming"). This is true for both corporate farms and peasant farms. In addition, peasant farms rely heavily on other farms for the purchase of machinery and equipment, often second-hand.

Table 9.7 demonstrates the changing roles of state and commercial suppliers during the last decade. The responses of both corporate farm managers and peasant farmers in two surveys separated by more than 10 years – the 1994 World Bank survey and the 2005 FAO survey – reveal a sharp decrease in the importance of state supply channels and a sharp rise in the importance of commercial suppliers. The reliance on other corporate farms as a source of inputs also declined dramatically over time. In 1994, the state and corporate farms dominated the markets for farm inputs in Ukraine; by 2005 the private commercial sector had captured the leading role among supply channels.

Table 9.7: Changing role of main supply channels: 1994 and 2005

	Managers		Farmers	
	1994 WB survey	2005 FAO survey	1994 WB survey	2005 FAO survey
All inputs (15)				
State channels	45	16	42	14
Commercial suppliers	7	44	14	36
Other farms	49	5	22	7
High priority inputs (8)				
State channels	65	18	61	15
Commercial suppliers	7	58	19	50
Other farms	56	6	29	9

9.2 Access to farm machinery

Availability of farm machinery is reported with fairly high frequency among all farm types in the survey (**Table 9.8**). Availability among corporate farms is practically universal; peasant farms are not far behind; and even among household plots 70% report some machinery and around 50% report tractors or light machinery (such as plows, tillers, and seeders). Vehicles, and especially trucks, are comparatively less accessible to household plots and peasant farms.

Table 9.8: Availability of farm machinery (percent of respondents)

	Corporate farms	Peasant farms	Household plots
Any farm machinery	95%	89%	70%
Heavy machinery	94	85	49
Light machinery	92	83	57
Vehicles	91	52	19

Note: Heavy machinery – tractors, harvester, combines; light machinery – plows, tillers, seeders, trailers, etc.; vehicles – trucks, cars.

Corporate farms report the largest average number of units of machinery per farm. They are followed at a considerable distance by peasant farms, and household plots trail far behind with only three pieces of machinery on average (**Table 9.9**). Across all farm types, heavy machinery (tractors, harvesters) account for about one-third of the total machinery count, with light machinery making up another 40%-60%. The number of vehicles is relatively small in all farms. It is notable that the share of tractors and harvesters in household plots is roughly the same as in other farms. Nevertheless, judging by average unit costs, corporate farms employ larger and more expensive machinery than peasant farms (**Table 9.9**).

Table 9.9: Average number of machinery units and value of machinery for respondents with any machinery (balanced sample)

	Corporate farms (*n* =155)	Peasant farms (*n* = 213)	Household plots (*n* = 599)
Number of units	67	11	3
Heavy machinery	32%	32%	31%
Light machinery	43%	53%	58%
Vehicles	25%	15%	11%
Value, hrivny	903,000	94,000	--
Average value per unit	13,500	8,500	--

Corporate and peasant farms use primarily own machinery, which is supplemented with some rental equipment (**Table 9.10**). Corporate farms rent more readily than peasant farms, among which only 12% report using rented machinery. Most of the rented equipment originates from private sources: Access to state leasing programs is virtually nonexistent in the survey. Contrary to peasant farms, household plot operators show a very high willingness to rent or share equipment with others. Own farm machinery accounts for only 37% of the total machine count among household plots, and fully 50% is rented for farm use as needed (**Table 9.11**). These findings provide a definite indication of the existence of machinery rental markets, which clearly act to alleviate machinery constraints among farms of all types.

Table 9.10: Sources of farm machinery in corporate and peasant farms (percent of respondents, averaged over all types of farm machinery)

	Corporate farms	Peasant farms
Owned	65	88
Rented	35	12

Table 9.11: Sources of farm machinery in household plots

	Percent of machinery units reported
Owned by the family	37
Owned jointly with others	13
Rented as needed	50

9.3 New role for regional authorities

Interviews with more than 40 raion-level agricultural officials in four oblasts (Poltava, Rivno, Sumy, Chernigov) essentially confirmed the picture that emerges from the survey. The main conclusion is that regional authorities no longer intervene in farm production decisions. Contrary to anecdotal rumors, they do not persuade the producers to increase the livestock herd. In the best market-oriented tradition, the raion officials maintain that livestock production is bound to pick up once the relative prices improve. In those rare cases when the regional department of agriculture makes business recommendations concerning a potentially profitable commodity (e.g., rape seed) or product mix, the local farms do not necessarily follow this advice.

The new role of the raion officials is to provide market information and advisory services to the farms. They distribute copies of new legal documents and regulations; identify the best suppliers of fuel and fertilizer; provide information on input prices; organize professional seminars on farm management, accounting, and finance. They do not intervene in the contractual negotiations between the producers and the suppliers; nor do they act as guarantors for credit. Thus, in one of the raions the local authorities acted as facilitators in integration of fertilizer shipments from the suppliers to several local producers. The purchase terms, however, were negotiated directly by the producers, who prepaid the shipment without any guarantee from the authorities. To the extent that raion officials issue specific guidelines or directives, these relate to legally binding provision of labor law or contract law and are intended to prevent decisions that might break the law.

Raion authorities have no influence over the allocation of agricultural credit. These issues are handled directly by the commercial banks, which lend against collateral (mainly livestock, grain, machinery, or future harvest) at 18-21% annual interest rates. The interest rates are considered exorbitant, and producers always try to be admitted into various subsidized interest rate schemes. Consistent with responses in the main survey, the interviewees indicated that the access to credit had improved significantly in recent years as many of the "new farms" began to accumulate a decent credit history.

10 RURAL SOCIAL SPHERE

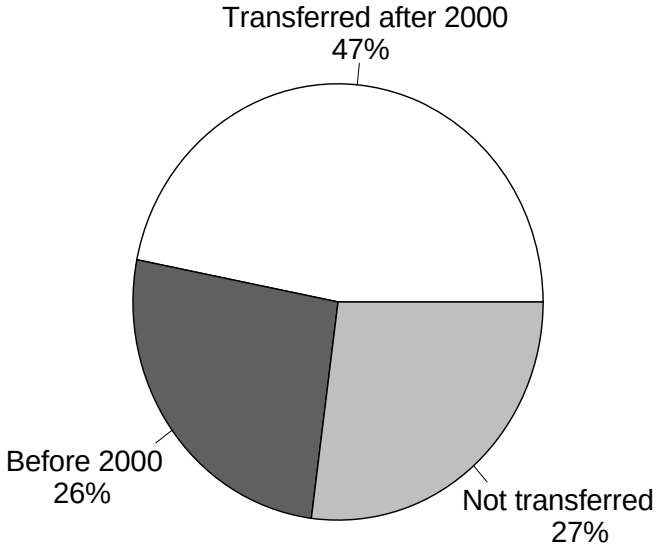
During the Soviet era, large-scale farm enterprises were directly entrusted with maintaining the entire range of social services in the village. The village council was almost totally dependent for its budget on the local farm enterprise. The farm enterprise took over the functions normally fulfilled by local government, building roads, supplying water, gas, and electricity, and providing housing. It traditionally provided access to a comprehensive range of services and benefits for its members and employees, as well as for other rural workers, including teachers, doctors, postal employees, etc., who in fact were on the state payroll and not employed directly by the farm. These social services ranged from daily necessities, such as house maintenance and repairs, heating fuel, and various consumer goods at subsidized prices, to culture and recreation, such as clubs and sports facilities. School buildings, clinics, shops, and other public facilities in the village were maintained and often built by the farm enterprise, with or without reimbursement from the government. The budget for all these benefits and services came from the operating revenues of the farm enterprise, and the farms in effect combined production functions with overall responsibility for social services in rural areas.

The reform agenda attempted to focus the large-scale farms on business and profits, which necessitated relinquishing their responsibility for rural social services. As part of their reorganization, farm enterprises were required to shed their social assets and transfer the responsibility for the social service infrastructure to local councils. Initially, this process moved very slowly and haltingly, because the government failed to provide local councils with the requisite budgets. As late as 1998, a World Bank study found that reorganized farm enterprises continued to provide a wide range of social services and benefits to the rural population (LERMAN, CSAKI, 2000).

The situation seems to have changed quite radically since 2000. Fully 73% of farm managers surveyed reported that their social assets had been transferred to the local municipality. Of these, only 26% of farm enterprises had transferred their social assets prior to 2000; the remaining 47% transferred the social assets more recently (**Figure 10.1**). These findings are consistent with the results of the 1998 World Bank survey, where only about 20% of farm enterprises had transferred their social assets to the village council prior to 1998 (see reference in previous note).

The social assets were universally transferred to the local municipality or the state free of charge. Among those 27% who did not transfer their assets, one-third claim that the municipality has no budget and thus cannot accept the responsibility, while the remaining two-thirds regard the free transfer of social assets as an economically unacceptable option and prefer to continue maintaining the social infrastructure themselves.

Figure 10.1: Transfer of social assets from corporate farm to local council



Support of household plots has always been a traditional social function of large-scale farm enterprises. It is virtually impossible to imagine production on small household plots without assistance from the farm enterprise with mechanized field works (plowing, harvesting), with farm inputs, and with marketing of farm products. Given the importance of the household plot as a source of income for rural families, the availability of this support is often more than enough to explain why rural workers stay on the corporate farm despite low salaries and persistent wage arrears. In the 2005 survey, 84% of farm managers reported that they regularly provided support with household plot production to their workers and other rural residents in the village. This level of support is practically unchanged since before 2000 (see reference in previous note).

The support with the household plot is no longer free, however. Survey estimates indicate that farm managers spend 57,000 hrivny per enterprise per year on household plot support. Of this amount, 43,000 hrivny, or 76%, is reimbursed by the household (generally in the form of labor input or farm products) and the net cost to the farm enterprise is only 14,000 hrivny, or 24% of the total. This net amount equals about 0.5% of the total annual expenditure of the average farm. Since there are around 700 households per farm enterprise in the survey, the net cost per household is a mere 20 hrivny per year.

The structure of support to rural households in the average enterprise is shown in **Figure 10.2**. Assistance with household plot cultivation using machinery and

operators from the farm enterprise is the largest item, accounting for 42% of the total. Support with farm inputs and sale of farm products accounts for an additional 30%.

Figure 10.2: Structure of support extended by corporate farm to rural households (in percent of total support expenditure of 57,000 hrivny per year per corporate farm)

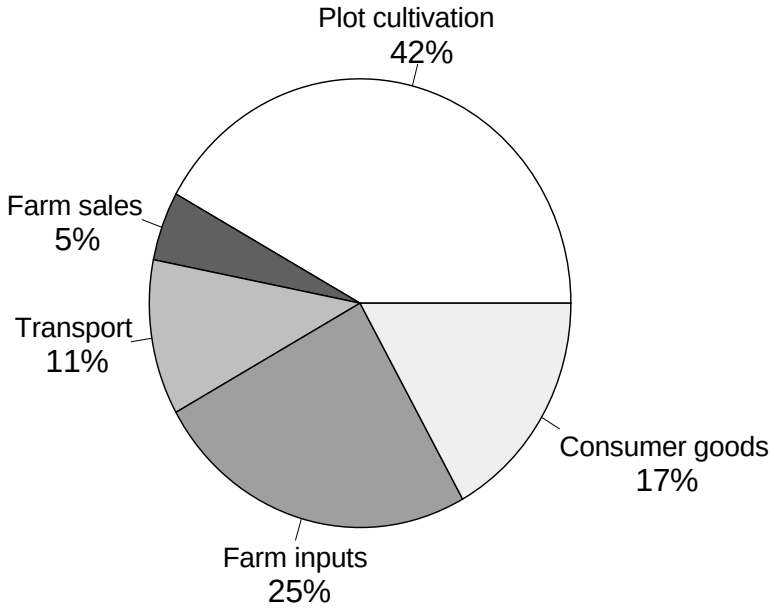


Table 10.1: Services provided by farm enterprises to the rural population: Responses of farm managers, household members, and peasant farmers (percent of respondents)

	Managers*	Household members	Peasant farmers
Farm services			
Assistance with plot cultivation	94	47	23
Transport	53	18	10
Feed, seeds	35	20	5
Veterinary services	22	22	5
Machinery maintenance and repairs	15	10	10
Fuel	7	9	8
Fertilizers, plant-protection chemicals	6	15	6
Assistance with sale of farm products	8	8	3
Consumer services			
Subsidized school services	29	9	4
Stipends to students	10	7	2
Housing construction and repairs	10	7	3
Subsidized consumer services	9	8	3
Medical care	10	13	7

Note: * Percent of those who report providing services to the rural population (n = 175, 84% of the full sample).

Table 10.1 presents an inventory of services provided by farm enterprises to the rural population. The first column is based on the responses of corporate farm managers; the other two columns are based on the responses of heads of rural households and peasant farmers. Assistance with household plot cultivation and provision of transport services are the two most important items according to farm managers. Farm inputs, including veterinary services and machinery maintenance, are also provided by most farm enterprises. Among non-farm consumer services, support to schools remains the only significant item. Comparison of the responses in the last two columns shows that employee households generally enjoy a much higher level of support from the farm enterprise than peasant farmers.

11 FARM PRODUCTION AND SALES

The commercial farms in Ukraine – both corporate and peasant farms – mainly concentrate on primary agriculture (crops, livestock, orchards and vineyards), with relatively little diversification into nonagricultural activities (**Table 11.1**). This is especially true of peasant farms, where only 13% report any non-agricultural activities. Non-agricultural activities are almost always in addition to primary agriculture.

Table 11.1: Diversification between agricultural and non-agricultural activities (percent of farms)

	Corporate farms (*n*=208)	Peasant farms (*n*=310)
Only agricultural activities	74	87
One non-agricultural activity	15	11
Two non-agricultural activities	6	1
More than two non-agricultural activities	5	1

Primary agriculture typically involves diversified crop and livestock production (**Table 11.2**). Alongside these mixed farms, a significant proportion of farms specialize in crop production, without any livestock, especially among peasant farms. The reverse specialization – livestock without any crops – is negligible. The main non-agricultural activities for both corporate and peasant farms include input supply, product marketing, and provision of mechanized field services (custom farming). Processing is quite widespread among corporate farms, but much less for peasant farms. The low emphasis on livestock and processing among peasant farms apparently points to reluctance or inability to expand into capital-intensive activities.

Table 11.2: Activity mix in corporate and peasant farms (percent of respondents in multiple answers)

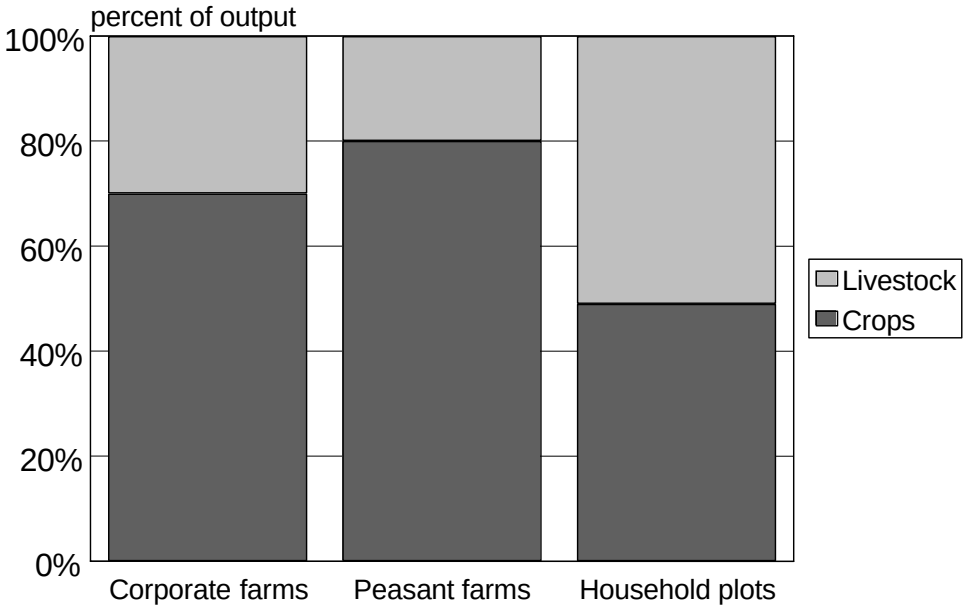
	Corporate farms (*n*=208)	Peasant farms (*n*=310)
Crops and livestock	67	43
Crops, no livestock	30	55
Livestock, no crops	1	1
Vineyards, orchards	9	3
Farm machinery, mechanized services	9	7
Input supply and marketing	12	5
Processing	13	3
Transportation services	5	1

Given the differences in crop/livestock specialization, peasant farms have more crops in their product mix than corporate farms (**Table 11.3**). Household plots, on the other hand, continue to produce the perfectly balanced mix of crop and livestock products that traditionally characterized Ukrainian and Russian agriculture during the Soviet period. The differences in product mix are illustrated in **Figure 11.1**.

Table 11.3: Product mix in farms of different types (averages per farm)

	Corporate farms	Peasant farms	Household plots
Value of production, hrvn	2,240,000	118,000	5,700
Crops, %	70	80	49
Livestock, %	30	20	51

Figure 11.1: Crop-livestock production mix in farms of different types: Corporate farms, peasant farms, and household plots

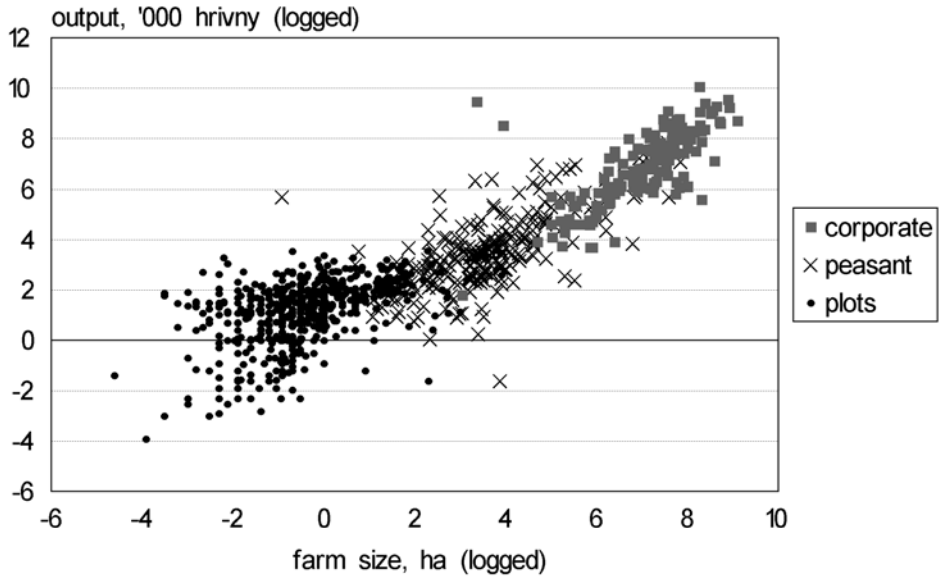


The crop bias in commercial farms persists since before the second-wave reforms, but there has been a definite convergence of product mix since 1998: In the 1998 World Bank survey the product mix gap between corporate and peasant farms was much larger, with crop production accounting for 60% of output in corporate farms and 90% in peasant farms. Since that time corporate farms have increased the share of crop production, while peasant farms have reduced it. The shift of peasant farms toward livestock production may reflect capital accumulation in this sector as a result of generally favorable performance since 1998.

The order-of-magnitude differences in value of production across farms of different types (millions of hrivny for corporate farm, hundreds of thousands for peasant farms, and thousands for household plots; see **Table 11.3**) are clearly related to differences in land areas cultivated by these farms. Thus, corporate

farms control on average 1,700 hectares of agricultural land compared with 150 hectares in peasant farms and 1.7 hectares in household plots. **Figure 11.2** shows that the value of production increases with the area of farmland (in log-log coordinates). Land on its own explains 78% of the variability in the value of production. The effect of other scale factors (such as labor, machinery, and livestock) will be examined in **Chapter 14** dealing with productivity. Among corporate farms, mixed producers are significantly larger (by both the value of production and the available land) than those specializing in crops only; among peasant farms the scale differences between mixed and crop-specialized farms are not statistically significant.

Figure 11.2: Value of production vs. farm size for farms of all types (in logged variables)



11.1 Cropping pattern

In farms of all types cereals – primarily wheat and barley – are the main crops in terms of land use (**Table 11.4**). There is practically no difference in the cropping pattern of corporate and peasant farms. Household plots show two distinctive features: Here the share of land cropped to cereals is lower (40% compared to 60%-70% in corporate and peasant farms) and the share of land under potatoes and vegetables is much higher (nearly 30% compared with less than 5% in corporate and peasant farms). These differences in the cropping pattern are also reflected in the frequency of farms that produce different crops: Cereals are

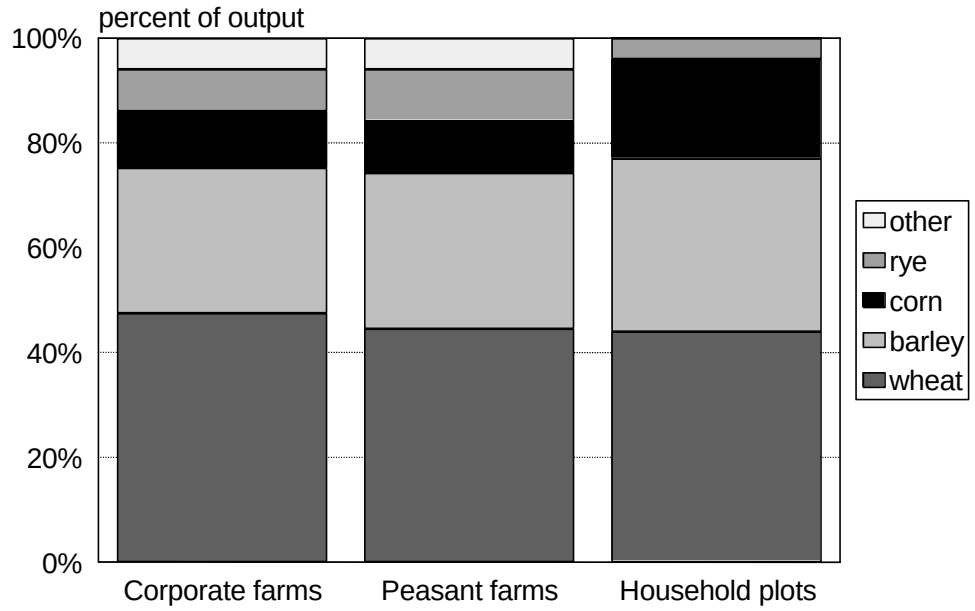
produced by 90% of corporate and peasant farms and by only 50% of household plots; potatoes and vegetables, on the other hand, are produced by 90% of household plots and only 20% of corporate farms (among peasant farms 50% produce potatoes and vegetables).

Figure 11.3 shows the detailed structure of the component of land cropped to cereals. It is practically identical in corporate and peasant farms. Household plots allocate to wheat and barley roughly the same share of their land under cereals as the commercial farms, but they have very little rye and much more corn than the commercial farms.

Table 11.4: Cropping structure in farms of different types

	Corporate farms	Peasant farms	Household plots
Wheat	32	27	17
Barley	18	18	13
Other cereals	17	15	10
Cereals (all combined)	67	60	40
Buckwheat	3	3	1
Sunflower and oil seeds	9	10	7
Sugar beet	5	7	3
Potatoes and vegetables	2	5	29
Grapes and fruits	2	1	2
Feed crops	13	14	19
Total cropped per farm	1,157	114	1.51

Figure 11.3: Cropping structure of land under cereals in farms of different types



11.2 Livestock

As noted previously in the context of **Table 11.2**, farms do not specialize in livestock (with very rare exceptions): Livestock production is typically always mixed with crop production in Ukraine. There are striking differences in the patterns of livestock production across farms of different types (**Table 11.5**). Practically all households keep some livestock, although the average "herd" is very small: 1.6 standard head. Farmers are the other extreme of the livestock scale, with less than half the respondents reporting any animals. The average herd, however, is much larger than in households: Close to 50 standard head. Finally, among corporate farms, two-thirds have livestock, with the herd averaging 500 standard head. The frequency of poultry among households and peasant farms generally repeats the livestock frequency, with flocks averaging 25 birds in households and 260 birds in peasant farms that report poultry. Among corporate farms, only 4% report poultry, but the scale of poultry operations is huge, with 26,000 birds on average in those few farms that have poultry.

Table 11.5: Livestock in farms of different types

	Corporate farms	Peasant farms	Households
Keep livestock, %	67	44	94
Keep poultry, %	4	37	87
Animals, st head	500	47	1.6
Poultry, birds	26,000	260	25

Feed from own production plays an important role for livestock in farms of all types (**Table 11.6**). In fact, corporate farms rely almost entirely on own feed, with very little outside purchases. Peasant farms and households purchase concentrated feed and hay in small quantities, but they also rely on communal pastures and hay meadows for as much as 30%-40% of their feed. The use of communal pastures is more widespread among the households (**Table 11.7**), which also end up paying less per head of grazing cattle than peasant farmers.

Table 11.6: Source of feed (structure of feed quantity in % for those with livestock)

	Corporate farms	Peasant farms	Households
Communal pastures	--	17	30
Communal hay meadows	--	10	9
Feed from own production	93	53	43
Purchased coarse feed	3	8	12
Purchased concentrated feed	4	12	6
Total feed	100	100	100

Table 11.7: Use of communal pastures by peasant farms and households

		Peasant farms	Households
Use, % of those with animals		41	61
Payment per head in 2004, hrivny –	Mean	26*	15*
	Median	15#	10#

Notes: * Difference statistically significant by *t*-test, $p = 0.05$.

Difference statistical significant by Wilcoxon test, $p = 0.1$.

A substantial proportion of managers and peasant farmers with livestock express their intention to increase livestock production (**Table 11.8**). Households, on the other hand, are not very keen on expanding their already high share of livestock. There seems to be some correlation between feed availability and the expressed intention to increase livestock production. This is evident from the comparison of lines 1 and 2 in **Table 11.8**: The percentage of respondents with enough feed who want to increase their herd (line 2) is substantially higher than the percentage of those who want to increase their herd in the sample (line 2). Freedom to decide on herd size and composition also seems to be positively related with the decision to expand, but only for corporate farm managers: The percentage of managers in line 3 is higher than in line 1.

Table 11.8: Intention to expand livestock production in relation to feed availability and freedom of decision (percent of respondents with livestock)

	Corporate farms	Peasant farms	Households
1. Want to expand livestock production	**66**	**54**	**18**
Feed availability:			
Less than optimal	26	13	38
Optimal for existing animals	54	62	47
Enough to increase the herd	17	20	6
2. Enough feed to increase and want to increase	**88**	**70**	**34**
Free to decide on herd size	67	81	--
3. Free to decide and want to expand	**77**	**55**	--

What determines the intention to increase livestock production? Following the cue of **Table 11.8**, we used a simple logistic model to check how the existing herd, feed availability, and freedom of decision vis-à-vis regional authorities affect the intention to increase livestock production in corporate farms. The results are summarized in **Table 11.9**. While the number of animals does not have a significant effect on the decision to enlarge livestock production, feed availability and freedom of choice are both significant constraints: Respondents with sufficient feed who feel that they are not coerced by the regional authorities are more likely to show an inclination toward greater livestock production. This is consistent with the view expressed by raion officials that the corporate farms

will increase livestock production when they are ready, without any intervention from the authorities.

For peasant farms all the coefficients in this model were statistically not significant. This basically means that a different set of factors determines the decision of peasant farmers to expand livestock production. Alternative regression models were tried, including milk yields (as a measure of performance in livestock enterprises) or a profitability score equal to the number of livestock products reported to be profitable. The coefficients of these profitability proxies are positive and statistically significant (when they are included separately in the logistic regression), which suggests that peasant farmers attach more importance to profitability considerations than other factors. Unfortunately the inclusion of these profitability variables halves the number of valid observations used in model estimation and makes the model less robust.

In general, livestock appears to have a negative impact on farm profitability. Corporate farms that keep livestock achieve average profit margins of 8% of sales, compared to 23% for farms without livestock (the difference, however, is not statistically significant). Since livestock is not profitable in corporate farms, it is not surprising that profitability is not a major consideration in the decision to keep livestock.

Table 11.9: Factors affecting the intention to increase livestock production in corporate farms*

Explanatory variable	Type of variable	Estimated coefficient	Pr > Wald chi-sq	Estimated odds ratio	Type 3 effect
Number of animals	Continuous, standard head	0.65×10^{-3}	0.1605	1.0	0.1604
Feed availability**	Transformed to binary: 1=enough for a larger herd 0=not quite enough (optimal for existing herd and less)	2.39 (1 vs. 0)	0.0254	10.9	0.0254
Freedom of decision**	Ternary: 0=uncertain 1=free to decide 2=not free to decide	1.72 (0 vs. 2) 1.64 (1 vs. 2)	0.0338 0.0015	5.6 5.2	0.0050

Notes: * Logistic regression modeling with dependent variable representing yes/no answers to the question "Do you intend to increase livestock production?".

** Significant at 5%.

11.3 Sales and on-farm consumption

Corporate farms and peasant farms sell around 60% of their output (mainly for cash, not barter), while the share of output sold in household plots is 20% (**Table 11.10**). The remainder is used as intermediate inputs in farm production, stored for future uses, or consumed by the members (i.e., the family in case of peasant farms and household plots, or the village households in case of corporate farms). This justifies the designation "commercial producers" for corporate and peasant farms, as distinct from the "subsistence oriented" household plots. It is noteworthy that among peasant farmers there is a sharp difference between the commercial orientation of the peasant farm proper (where sales constitute 64% of output) and the subsistence orientation of the traditional household plot that the farmers still cultivate (where sales are a mere 19% of output). Peasant farmers, like the rest of the rural population, use the products from their household plot mainly for family consumption, while it is the commercial peasant farm that drives the sales.

Table 11.10: Distribution of farm output by uses

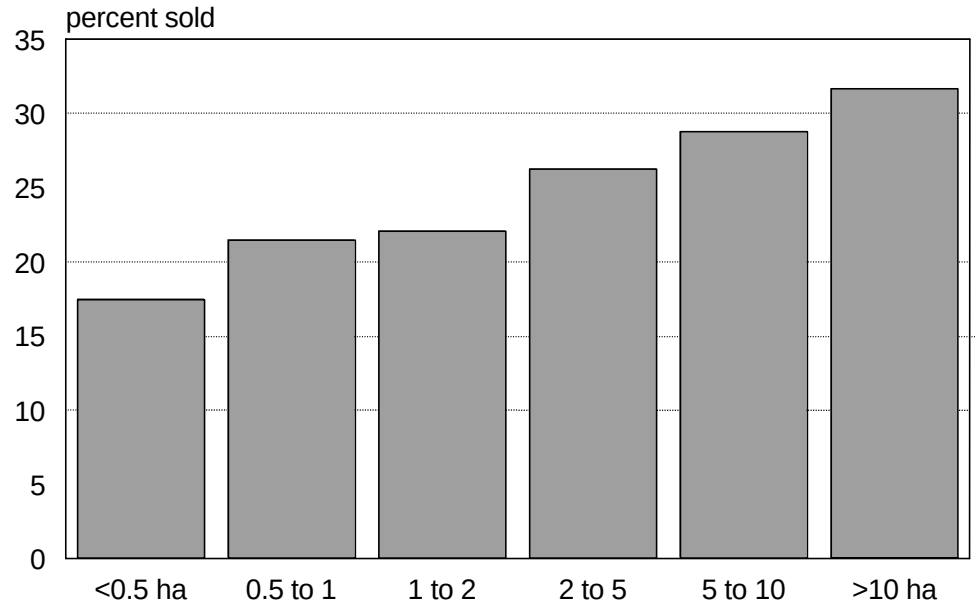
	Corporate farms	Peasant farms	Household plots	Household plot in peasant farms
Sold (cash and barter)	57	64	21	19
Intermediate inputs	19	16	23	14
Stored	14	11	7	6
Consumed for subsistence	10	9	48	62

Table 11.11: Share of output sold by household plots

Share of output sold	Percent of household plots	Percent of peasant farms
No sales	38	15
1-10% sold	18	1
10-20%	12	5
20-30%	10	5
30-40%	6	4
40-50%	6	10
More than 50% sold	10	60

The stigma of subsistence farming attached to household plots is not entirely justified. Fully 62% of household plots in the survey report some farm sales and 10% sell more than half their output. The percentage of sellers in the 2005 FAO survey is practically the same as in the 1996 World Bank survey. **Table 11.11** shows the distribution of household plots by sales. The distribution of peasant farms shown in the same table is of course shifted to much higher commercialization levels, with 60% of peasant farmers selling more than half their output.

Figure 11.4: Share of output sold as a function of farm size



Among household plots, the share of output sold clearly increases with plot size (**Figure 11.4**). Household plots of up to 1 hectare sell less than 20% of their output, while plots larger than 5 hectares sell around 30% of output (the differences across categories are statistically significant). This is consistent with the patterns of sales versus consumption observed for other transition countries. The level of commercialization is generally observed to increase with farm size: Larger farms produce a marketable surplus, while very small farms need everything they produce to feed the family. Looking at it from a different angle, we observe that the average size of "sellers" (i.e., household plots reporting any sales of farm products) is 2.1 hectares compared with 1.1 hectares for "non-sellers" (i.e., households without any farm sales).

Table 11.12: Sales channels (percent of sales)

	Corporate farms	Peasant farms	Household plots
State procurement	15	13	10
Privatized processors	21	19	21
Private traders, processors	38	40	34
Marketplace	9	17	34
Sold to workers	14	8	--
Other	3	3	1
Total	100	100	100

Sales revenue is derived primarily from sale of agricultural products. Corporate farms derive 8% of their sales revenue from processing and non-agricultural activities, while the corresponding percentage for peasant farms (and household plots) is around 1%. This is a reflection of the greater diversification of production activities in corporate farms (see **Table 11.1**). Reflecting the differences in agricultural product mix (**Table 11.2**), corporate and peasant farms sell mainly crops,

while household plot sales are more biased toward livestock. Livestock products account for 70% of sales revenue in household plots compared with 25% in corporate and peasant farms.

All farms sell mainly through private channels, including commercial traders and privatized processors (**Table 11.12**). The pattern of sales channels is fairly similar for all producers. Among the notable differences is the significantly higher share of direct sales by household plots to consumers in the marketplace. Corporate farms direct a relatively large share of sales to their workers and the village population, while peasant farms, similarly to household plots, sell relatively more in the marketplace.

12 CREDIT AND INVESTMENT

Credit, and especially working capital financing, is conventionally regarded as one of the major factors for normal functioning of farmers everywhere in the world, and especially in the imperfect market environment of CIS countries. In this chapter we examine the survey evidence on the availability and use of credit by managers of corporate farms, peasant farmers, and farming households in Ukraine.

12.1 Use of credit

There are large differences in both the frequency and the level of borrowing between the three cohorts of agricultural producers (**Table 12.1**). One-third of the farmers surveyed and more than two-thirds of managers have debt. Among farming households, on the other hand, only 15% have any debt. The level of outstanding debt in corporate farms is around 1.5 million hrivny; peasant farms carry around 50,000 hrivny in debt; while household debt is an order of magnitude less (around 2,000 hrivny).

Table 12.1 Outstanding debt and new borrowing in the survey

	Corporate farms (*n*=208)	**Peasant farms (*n*=310)**	**Households (*n*=852)**
Farms with debt, %	71	33	15
Amount of outstanding debt, hrivny	1,564,000	46,200	2,300
Farms that borrowed in 2004, %	56	24	n.a.
Amount borrowed in 2004, hrivny	1,200,000	52,000	n.a.
Sources (multiple answers)			
Relatives		29	37
Other private individuals		27	29
Banks		58	35
Other sources		Less than 10	Less than 10

Both corporate and peasant farms have a perception of significant access to credit (**Table 12.2**): 63% of corporate farm managers and 34% of peasant farmers report that they actually borrow. Recalculated in relation to respondents reporting that they need credit, these numbers indicate that 71% of corporate farms and 42% of peasant farms that need credit in fact manage to borrow (at least partially). Corporate farms apparently enjoy better access to credit than peasant farms. This conclusion is strengthened by the observation that among peasant farmers 45% need credit, but cannot borrow, while the corresponding percentage among corporate farms is 26%.

Table 12.2: Perceived credit situation (percent of respondents)

	Farmers (*n*=310)	Managers (*n*=187)
Do not need credit	19	11
Borrow all that is needed	24	38
Borrow less than needed because of restrictions	10	25
Need credit, but cannot borrow	45	26

12.2 Sources of credit

Table 12.1 shows that banks today are a very important source of borrowing in the individual sector (farmers and rural households). Although the incidence of borrowing is relatively low among rural households (only 15%), more than one-third of them actually report bank loans. Formal credit is thus gradually replacing informal borrowing from relatives and other private individuals among peasant farmers and households. The state has practically disappeared as a source of credit for peasant farms: The State Farmers Support Fund no longer supports credit for peasant farmers. In contrast, 15% of peasant farmers cited the Support Fund as their source for borrowing in the 1992 World Bank survey, whereas in the 1994 World Bank survey 24% of peasant farmers borrowed through the Support Fund and 40% used it as a guarantor for bank loans.

Table 12.3: Structure of debt and uses of credit

Structure of debt, %	Managers	Farmers	Why did you borrow in 2004 (multiple answers)	Managers, %	Farmers, %
Fuel and power	8	3	Purchase inputs	87	76
Other inputs (working capital)	47	19	Buy livestock	4	7
Banks	29	57	Long-term investments	9	7
Overdue wages	1	2	Repay loans	3	1
Taxes	2	4	Pay wages	7	0
Pensions and social deductions	0	5	Other	5	7
Other creditors	12	11			
Total	100	100			

Detailed information on the structure and uses of debt is available only for the major borrowers, namely corporate farms and peasant farms. **Table 12.3** suggests that both **banks and input suppliers are the main sources of credit** for corporate farms and peasant farmers. Banks appear to be more important for peasant farmers, while supplier credit is more prominent among corporate farms. This may be a reflection of the better networking of farm managers within the existing economic establishment. Among both farmers and managers, more than three-quarters of the respondents indicate that the new credit raised in 2004 went to purchase inputs (**Table 12.3**). Contrary to popular belief, **wage arrears or debt**

for taxes and social deductions do not appear to be a problem for either peasant farms or corporate farms.

Another common claim in all CIS countries is that commodity credit from regional authorities, suppliers, and marketers is an important source of funds in agriculture. In fact, **commodity credit or credit in kind plays a marginal role in the survey**. Among peasant farmers, commodity credit is truly negligible. Only 17 of 310 respondents (5%) report receiving any commodity credit. This is primarily fertilizer, which is reported by 4% of the respondents (36 ton of fertilizer or 31,000 hrivny per farmer). Farmers receive the fertilizer and the other commodity credits from marketers (both state and private). Regional authorities do not deliver any commodity credits to peasant farmers. For all peasant farmers who borrowed in 2004 (n= 75), commodity credit added 3,000 hrivny to average monetary credit of 49,000 hrivny.

Corporate farm managers report receiving commodity credits with somewhat higher frequencies (16%). Fuel is the main commodity credit for corporate farms (11% of managers), followed by fertilizer and plant-protection chemicals (9% and 6%, respectively). Marketers are the main source of commodity credit, although fuel also comes from input suppliers and even from regional authorities (**Table 12.4**). Regional authorities have absolutely no role in any of the commodity credits other than fuel. Despite its higher frequency, commodity credit makes a miniscule contribution to the total borrowing in corporate farms: For all corporate farms that borrowed in 2004 (n = 116), commodity credit added 20,000 hrivny to the average credit of 1.2 million hrivny per farm.

Table 12.4: Commodity credits in corporate farms (percent)

	Percent of recipient farms	Sources of commodity credit			
		State marketers	Private marketers	Input suppliers	Regional authorities
Fertilizer	9	4	4	1	--
Chemicals	6	1.5	3	1.5	--
Fuel	11	2	3	4	2
Seeds	3	--	3	--	--
Other	5	3	1	1	
All commodity credits	16				

The corporate farms also receive larger quantities of commodity credits than peasant farmers. This is quite understandable given the much larger size of corporate farms (see **Chapter 8**). **Table 12.5** lists the average quantities and values of commodity credits in corporate farms and peasant farms (the averages are calculated for the farms that report receiving the specific commodity credit). The credit term appears to be slightly more advantageous for corporate farms: 8-9 months compared with 6-7 for peasant farms. Unfortunately, the small number of observations makes it impossible to test this difference for statistical significance.

Table 12.5: Quantities and values of commodity credits for corporate farms and peasant farms (averages for farms receiving the specific credit)

	Corporate farms			Peasant farms		
	Ton	Hrivny	Months	Ton	Hrivny	Months
Fertilizer	110	118,000	9	36	31,000	7
Chemicals	19	85,000	8	--	--	--
Fuel	91	210,000	9	24	40,000	6

12.3 Interest rates and credit terms

Agricultural producers face interest rates of around 19% annually, with half the respondents reporting annual interest rates in a tight range between 17% and 21% (**Table 12.6**). These survey findings are consistent with the information obtained in a series of interviews with regional officials, who indicate interest rates of "18-21%, sometimes as high as 25%". There is practically no difference between the interest rates paid by peasant farmers and corporate farms. Contrary to some anecdotal evidence, peasant farms do not have to pay more for credit. The credit term is also practically the same for both categories of producers (**Table 12.6**): loans are typically for 12 months, although among farmers 10% report loans for 24 or 36 months (practically no such "medium-term" loans are reported for corporate farms). The credit term appears to have shortened significantly over time, in parallel with the petering out of the State Farmers Support Fund. In the 1992 World Bank survey around 30% of the farmers obtained long-term loans (for terms longer than 3 years), while in the 1994 World Bank survey 25% of the loans were for periods of 2 to 5 years.

Table 12.6: Interest rates and credit term among farmers and managers who borrowed in 2004

	Farmers (24% borrowed in 2004)		Managers (55% borrowed in 2004)	
	Mean, '000 hrivny	Median, '000 hrivny	Mean, '000 hrivny	Median, '000 hrivny
Amount borrowed in 2004	49	18	1,206	200
Interest rate (annual)	19	19	19	20
Term, months	14	12	12	12

As we shall see below in the discussion of obstacles to borrowing, the respondents generally complain that the interest rates are too high and the credit term too short (see **Table 12.11**). A possible explanation of the dissatisfaction with the prevailing interest rates and credit terms was obtained from a separate question that explored the future credit needs of farmers and households (**Table 12.7**). The respondents indicated than an acceptable interest rate for future borrowing would be 8% (compared with 19% that they actually pay) and that credit was needed for a term of 3 to 4 years (compared with 1 year at present). Under these conditions, the

respondents would be willing to borrow amounts several times larger than what they currently owe (compare **Table 12.7** with **Table 12.1**).

Table 12.7: Acceptable interest rate and term for future borrowing

	Farmers	Households
Need credit next year	55%	21%
Amount, hrivny	181,400	19,400
Term, months	46	39
Annual interest rate, %	8	8

Given inflation rates of around 9% in 2004, the real cost of agricultural borrowing in Ukraine is 9-10% annually, which is quite high by world standards. On the other hand, the interest rates that farmers would like to pay (8%) are in fact equivalent to zero (or even negative) real interest, which is of course not attainable economically.

12.4 Level of indebtedness

The level of indebtedness is not particularly high for both corporate and peasant farms, with mean debt running at around 6-7 months of sales (**Table 12.8**). In other words, the entire farm debt can be paid off with 6-7 months of sales revenue. A rule of thumb suggests that with indebtedness at less than 12 months of sales there is generally no cause for concern. For corporate farms, the situation in 2005 appears to be a significant improvement compared with 1998, when debt-to-sales ratios were around 2 years (1998, WORLD BANK SURVEY) and farm indebtedness was correspondingly a major concern. Of course, debt is repaid from net profits, not from gross sales revenue. A previous World Bank study of farm debt in CIS (CSAKI, LERMAN, SOTNIKOV, 2001) identified the lack of profitability as one of the main reasons for high indebtedness. In the present survey, we did not detect any statistically significant relationship between the volume of debt and profit (see the discussion of debt and profitability in a separate section below).

Table 12.8: Indebtedness of agricultural producers in relation to sales (credit-months)*

	Farmers (*n*=65)	Managers (*n*=119)
Sales, hrivny	68,000	1,950,000
Debt, hrivny	42,000	1,020,000
Debt to sales ratio	7.4 months	6.3 months

Note: * Calculation based on a subsample with both debt and sales observations.

Both managers and farmers are prompt with their payments and lax with collections (**Table 12.9**). Supplier bills are generally paid on time, but collection of accounts receivable may be a potential problem, especially for corporate farms, where only 25% of managers report that customer debt is collected on time. Overall, however, **nonpayments do not appear to be a serious problem**. Among farmers, only 22% report any accounts receivable; among corporate farms accounts receivable are reported by two-thirds of the respondents. The

structure of receivables looks quite normal by market standards, with private traders exceeding state procurement by a significant margin (**Table 12.10**). For comparison, in the 1992 World Bank survey, state procurement accounted for 71% of accounts receivable and private trade for 6%.

Table 12.9: Timeliness of payments and collections: Managers and farmers (percent of respondents providing answers)

	Payment		Collection	
	Managers	**Farmers**	**Managers**	**Farmers**
On time	60	81	25	47
Delay 1-2 months	24	16	38	31
Delay 3-6 months	11	1	19	9
Delay longer than 6 months	5	2	17	13

Table 12.10: Structure of accounts receivable

	Farmers, % (*n*=68)	**Managers, % (*n*=136)**
Processors	36	24
Private traders	24	33
State procurement	16	7
State budget	2	13
Local government	0	2
For services to enterprises and farms	4	11
Other	18	11
Total account receivable	100	100

12.5 Obstacles to borrowing

Around 80% of respondents among both farmers and managers complain of some obstacles to borrowing (**Table 12.11**). The overall ranking of the perceived obstacles is almost the same for farmers and managers. Further analysis shows that there are practically no differences between the perceptions of those who actually borrowed in 2004 and those who did not borrow. High interest rates, short credit terms, and lack of collateral are the three main factors most often identified as obstacles to access to credit. These factors consistently recur as obstacles to borrowing in all surveys in Ukraine and other CIS countries. It is curious to note that the interest rate and the credit term are practically the same for those who complain about high interest rates and short-term loans as they are for the rest of the respondents.

Table 12.11: Perceived obstacles to borrowing (percent of respondents identifying each obstacle)

	Farmers (*n*=310)	Managers (*n*=208)
Outstanding debt	1	12
High interest rate	57	51
Credit term too short	26	28
Lack of collateral	23	19
Complex application procedures	18	17
Banks ration credit	16	15
High risk of default	12	19
No accessible banks for agriculture	12	6
Shortage of information on borrowing	5	1
Poor credit history	2	2
Other	3	1
Any obstacles	80	76

One of the factors on which farmers and managers clearly differ is the importance of outstanding debt as a barrier to borrowing: Farmers do not attach any importance to this factor, whereas managers of corporate farms rank it as moderately important (**Table 12.11**). This may be attributable to different indebted-ness of corporate and peasant farms: While peasant farms have relatively little debt and therefore outstanding obligations are not a deterrent to further borrowing, corporate farms are much more highly indebted and their outstanding debt may influence access to new credit. Factors such as absence of banks for agriculture or lack of credit-related information are not viewed as very important by either managers or farmers. Another bogey of credit markets in CIS – complex application procedures – is perceived as only moderately important in Ukraine. This factor, however, is assigned greater importance among farmers (but not managers!) who actually borrowed in 2004: One-third of this subgroup of respondents rank complexity of application procedure as an important obstacle to borrowing (compared to 18% overall).

Poor credit history, a universally important factor for both borrowers and lenders in market economies, has a very low ranking in our survey (**Table 12.11**). This result is consistent with a recent study of Russian corporate farms (SUBBOTIN, 2005), where credit history was not found to be a statistically significant determinant of access to credit. It may be that the whole notion of credit history is still too strange and exotic for the financial system in all CIS countries, and the agents (whether lenders or borrowers) are unable to assess its true role in default.

Interviews with regional officials shed some light on the structure of rural banking. The large commercial banks (Aval', Prominvestbank, Privatbank, Praveksbank) have a fairly wide network across the country, with 3-6 branches in each raion. Of these, 2-4 branches work directly with agricultural producers. Borrowers are

free to choose their favorite bank and to negotiate loan contracts directly with bank officers. Raion authorities may act in an advisory role to the producers and sometimes also to the banks in the loan negotiation stage.

12.6 Collateral

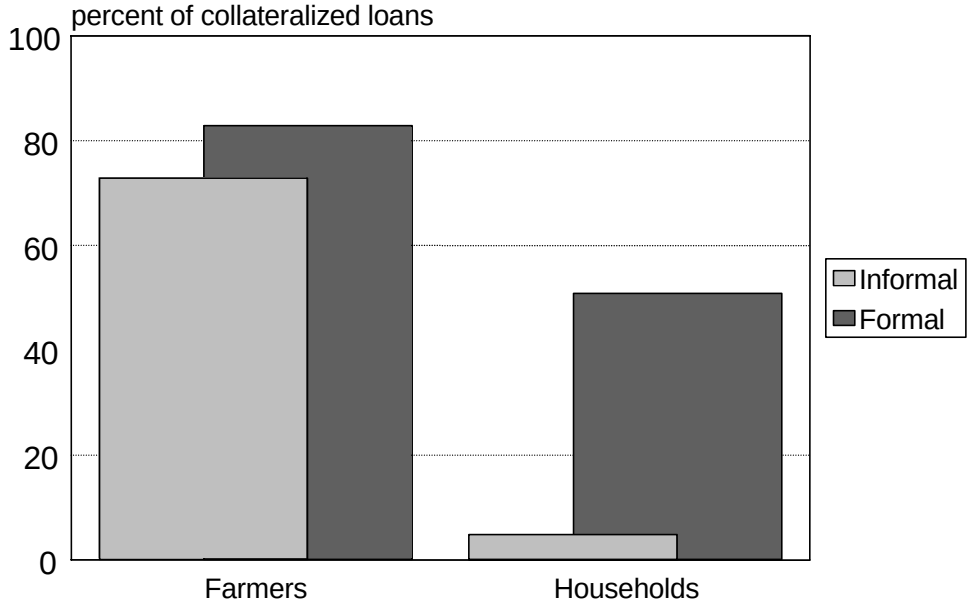
Collateral for credit is widely used by farmers and managers, much less so by households (**Table 12.12**). This may reflect the higher reliance of the households on informal borrowing from relatives and private individuals (**Table 12.2**). Indeed, **Figure 12.1** shows that rural households borrow from informal sources virtually without collateral, while 50% of those borrowing from banks have to collateralize their loans. Among peasant farmers, formal borrowing also requires collateral in a higher proportion of cases than informal borrowing, although the gap is not as pronounced as for households.

Table 12.12: Use of collateral

	Managers	Farmers	Households
Collateral? Yes			
All sample	75	53	4
Those who borrowed in 2004	96	73	23
What kind of collateral?(multiple answers)			
Land	10	12	0
Animals	48	12	20
Machinery	52	51	10
Crops in the field	54	23	0
Buildings	12	37	27
Enterprise guarantee	1	2	13
State guarantee	1	1	0
Private guarantee	--	3	7
Other	3	2	27
Number of different kinds of collateral:			
1	43	50	77
2	38	31	13
3	17	6	--
Will you agree to use land as collateral if no other option?	n.a.	36	24

Farm machinery and crops in the field are the main forms of collateral reported by managers and farmers. Livestock is a popular collateral with corporate farms and households, but not with peasant farmers, who generally have very little livestock. Buildings are widely used as collateral by households (who probably mortgage the family home) and also by peasant farmers. Land is used very seldom, and the individual landowners (peasant farmers and households) are not particularly enthusiastic about the option of mortgaging land in the future. In this respect, the situation did not change in 2000.

Figure 12.1: Use of collateral for formal and informal credit by peasant farms and rural households



Lack or insufficiency of collateral was perceived as one of the three main obstacles to borrowing (**Table 12.11**). In reality, however, collateral users among farm managers are equally distributed between those who perceive collateral as a difficulty and the rest. The situation is even more curious among peasant farmers: Here 87% of those who complain about collateral being a difficulty actually offer collateral to the lenders, while only 66% among the non-complainers do that. Perhaps another indication that collateral is not really a problem is provided by the fact that 55% of managers and 37% of peasant farmers use more than one kind of collateral.

12.7 Taxes and banking

Managers and farmers interact with the tax authorities on a monthly basis (**Table 12.13**). This close scrutiny by the tax authorities has led regional officials to comment in their interviews that today tax inspectors (as well as health and sanitary inspectors) are the only organs of government capable of influencing decisions in agriculture or imposing their demands on producers.

Systematic bookkeeping and conduct of financial transactions through bank accounts are naturally one of the attributes that minimize friction with tax authorities. All corporate farms have bookkeeping and 98% report that they have bank accounts. Among peasant farmers 89% have bookkeeping and 71% have bank accounts (68% report both). Bookkeeping in peasant farms is handled primarily by the farmer himself or by a member of the family (46% and 23% of respondents, respectively). A professional bookkeeper or an accounting firm are hired by less than one-third of the respondents.

Table 12.13: Frequency of tax reporting

	Managers (*n*=208)	Farmers (*n*=310)
Monthly	81	52
Quarterly	14	32
Semi-annually	0	0
Annually	1	4
Other	--	--
No reply	3	12

Despite the widespread practice of keeping bank accounts, a fairly high proportion of farmers (30%-40%) do not use their bank account for making payments or collecting receivables (**Table 12.14**). This is generally explained by the farmer's reliance on cash or barter transactions (17% of all farmers in the survey) or by the fact that their customers or suppliers do not use banks (5%; see **Figure 12.2**). Corporate farms, on the other hand, conduct most of their transactions through bank accounts. Overall **we do not find evidence of a massive shift to an extra-bank cash economy**, as is often claimed for CIS countries.

Figure 12.2: Use of bank account by peasant farmers

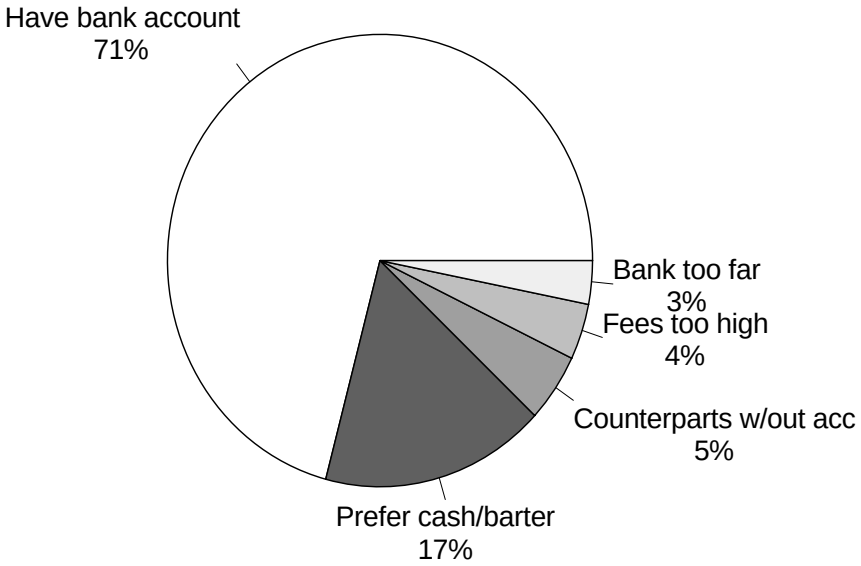


Table 12.14: How often do you use your bank account for payments or collections? (percent of respondents)

	Payments		Collections	
	Managers (*n*=208)	Farmers (*n*=310)	Managers (*n*=208)	Farmers (*n*=310)
Everything through the bank	64	25	55	23
More than half through the bank	23	24	24	20
Less than half through the bank	6	16	9	15
Do not use banks for payments/collections	7	35	12	42

12.8 Investment plans

The majority of respondents in all three cohorts have plans for investment in the near future. Two-thirds of commercial producers (corporate farms and peasant farms) plan to invest in production assets, with purchase of farm machinery and livestock at the top of the list of priorities (**Table 12.15**). The frequency of potential farm investments among rural households is lower (they also tend to focus on machinery and livestock). Instead they are evenly divided between those planning farm investments and those planning consumption investments (i.e., build a house, buy a car, buy household durables). The overall investment plans are summarized in **Figure 12.3**. Common wisdom tells us that widespread investment plans are typically a sign of optimism and expectations of economic security. In this sense, the results in **Table 12.15** and **Figure 12.3** are most encouraging for rural Ukraine.

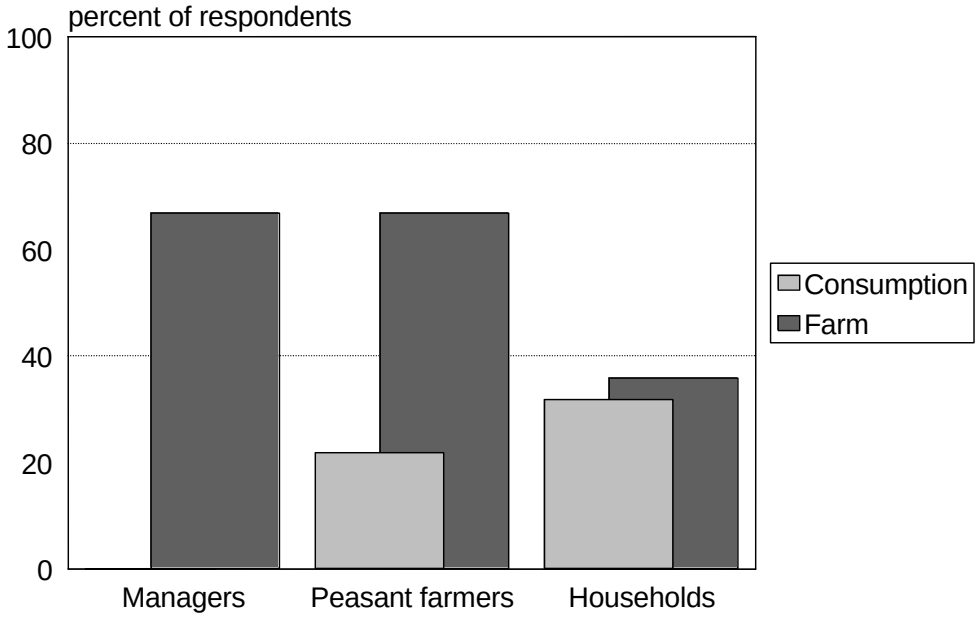
Table 12.15: Investment plans among managers, farmers, and rural households (percent of respondents in multiple answers)

	Managers	Farmers	Rural households
Farm investment			
Purchase farm machinery	60	54	10
Purchase livestock	32	22	25
Erect farm buildings	17	17	8
Plant orchards or vineyards	6	5	3
Acquire processing equipment	13	9	2
Other farm investments	12	9	3
Any farm investment	**67**	**67**	**36**
Consumption investment			
Build a house	n.a.	9	6
Buy a car	n.a	8	6
Buy consumer durables	n.a.	7	21
Other	n.a.	2	2
Any consumption investment	**n.a.**	**22**	**32**
Any investment	**67**	**72**	**56**

The estimated cost of future farm investments is 33% of sales revenue for corporate farms and 53% of sales revenue for peasant farms. By all standards, these are very ambitious investment plans. The high degree of optimism concerning future investment is also clearly seen from the comparison of estimated future costs and actual investments in 2004 (**Table 12.16**). The percentage of respondents planning to invest in the future is much higher than the percentage of those who actually invested in 2004; the total estimated investment costs in the entire sample are 5 to 8 times the actual amounts invested in 2004 by all the respondents. Farmers generally appear to be much more optimistic in their investment plans

than farm managers, probably because of lack of experience. Rural households also give very high estimates of their investment plans, which reach 110% of total household income (both farm and consumption investment).

Figure 12.3: Plans for farm investment and consumption investment as reported by different categories of respondents



Managers and peasant farmers plan to finance their investment with a mix of own funds (savings) and bank credit (**Table 12.17**). Rural households, on the other hand, intend to rely mainly on family savings, with little access to bank loans. In general, informal loans from relatives are mentioned by very few respondents among peasant farmers and households as an option for financing investments. Managers list leasing as one of the options for financing investment (primarily for machinery, but also for livestock and processing equipment). The expectations to finance future investments with bank credit are on the whole consistent for the three categories of respondents with the observed frequency of borrowing in the sample (see **Table 12.1**).

Table 12.16: Actual and planned investments for managers and peasant farmers

	Actual farm investment 2004	Planned farm investment	Planned to actual, times
Respondents, %			
Managers	30	61	2
Farmers	12	64	5
Amount, mln hrivny			
Managers	21	102	4.9
Farmers	3.6	27.5	7.6

Note: Percent of respondents represents those who provided answers on actual investment in 2004 and on planned farm investment in the future; amounts (in million hrivny) are totals summed over the entire sample.

Table 12.17: Sources for financing planned investment (percent of respondents across all investment options)

	Own funds/savings	Bank credit	Loans from relatives	Other loans
Managers (*n*=208)	35	38	--	17*
Farmers (*n*=310)	39	35	7	2
Households (*n*=852)	43	12	4	2

Note: * Includes 12% leasing.

12.9 Profit and debt in corporate farms

Corporate farms participating in the survey provided profit and loss information based on annual financial reports. Given the partial response of the respondents to financial questions, profit analysis could be conducted for at most 142 out of 208 farms surveyed. Of these, 70% are profitable (positive gross profit) and 30% are loss-makers. This constitutes a dramatic improvement compared with the situation in 1997, when 84% of farms surveyed reported losses (1998, WORLD BANK SURVEY). The increase in the frequency of profitable farms was accompanied by a marked increase in profitability levels (**Table 12.18**). The overall profit margin in the sample (the ratio of gross profit to sales) increased from a loss of −24% in 1997 to a profit of +12% in 2005. The profit margin of the profitable farms as a subgroup rose from 11% in 1997 to 25% in 2005.

Table 12.18: Profitability of corporate farms in 2005 compared with 1997*

	Percent of farms		Profit margin, % of sales	
	2005	1997	2005	1997
All farms	100	100	+12	−24
Farms reporting profits	70	16	+25	+11
Farms reporting losses	30	84	−21	−39

Note: * Data for 1997 are from the 1997 World Bank survey.

There does not seem to be any relationship between profitability and the reorganization mode or reorganization time of the corporate farms. The ratio of 70% profitable farms to 30% loss-makers observed in the entire sample persists both among the new reorganized structures (i.e., farms created as new organizations or through the splitting of former collectives) and the legacy structures (i.e., farms that are one-to-one successors of former collectives). The same ratio is also obtained for corporate farms created before and after 1999. The "new wave" farms are thus not doing any better than their older counterparts, and the improved profitability is a general feature of the economic system. Nor is there a relationship between profitability and farm size: Although the average size for the group of profitable farms is somewhat larger than for the loss-makers (2,000 hectares compared with 1,700 hectares), the difference is not statistically significant ($p = 0.25$). The lack of relationship between profitability and farm size is clearly demonstrated in **Figure 12.4**, where profit margins remain steady at the average level of 12% regardless of the land area.

Figure 12.4: Profit margin vs. land in use for corporate farms

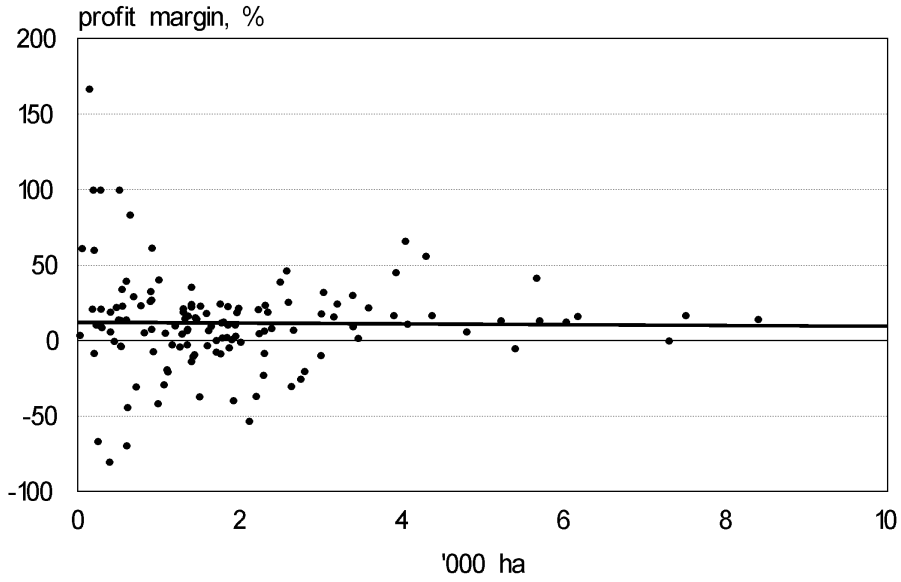


Table 12.19: Debt and profitability

	Mean profit, '000 hrivny	Mean profit margin, %	Non-profitable farms, %
Farms without debt	690*	24*	27
Farms with debt	270*	9*	30

Note: * Differences statistically significant at $p = 0.10$.

Farms reporting debt on the whole have lower levels of both profit and profitability than farms without debt (**Table 12.19**). This statistically significant difference in profits cannot be attributed to size effects, as farms in both debt categories control 1,600-1,800 hectares of land. Regression analysis, however, does not reveal any statistically significant relationship between the volume of debt and profit (or profit margin). Nor is there a significant difference in the frequency of non-profitable farms between those with and without debt: The same proportion of 30% of loss-making farms is observed in both debt categories. To the extent that there is some relationship between profitability and debt, it is apparently very weak (especially due to the small number of observations in our sample).

13 HUMAN CAPITAL

Human capital is one of the essential production inputs. Two dimensions need to be considered in analyzing human capital: The quantitative dimension, which characterizes the labor inputs by the number of people employed or the number of work days spent on the job; and the qualitative dimension, which characterizes the education, the skills, and the age structure of the labor resources. In this chapter we review both the quality and the quantity of labor in the farms surveyed.

13.1 Quality of human capital

For peasant farms and household plots fairly detailed information is available about the individual family members and we can assess the entire pool of human capital available in these units. In corporate farms, human capital information is available only for the manager; with respect to other members or workers we only have overall information on labor inputs to the farm.

Table 13.1: Profiles of peasant farmer families and rural households

	Peasant farmers	Rural households
Family size*	4.0	3.5
Age of head*	48	53
Age of spouse*	45.6	47.4
Average family age*	37	43
Dependents: <16	14%	15%
>60	9%	19%
Education – head		
Higher	52	21
Vocational	34	40
Secondary	12	24
Elementary	2	15
Education – spouse		
Higher	33	21
Vocational	47	39
Secondary	15	29
Elementary	5	11
Education score for head and spouse* (1=lowest, 4=highest)	3.2	2.6

Note: * Difference statistically significant at $p < 0.1$.

Peasant farmers and their families are definitely younger than rural families operating household plots, with a lower share of over 60s (**Table 13.1**). Farmer and spouse have higher educational attainments than their counterparts operating

household plots. Larger family size, younger age composition, and higher educational attainments all combine in aggregate to produce a larger pool of human capital for families of peasant farmers compared with other rural households.

Figure 13.1: Educational attainment for respondents of different categories (mean score from 1=lowest to 4=highest)

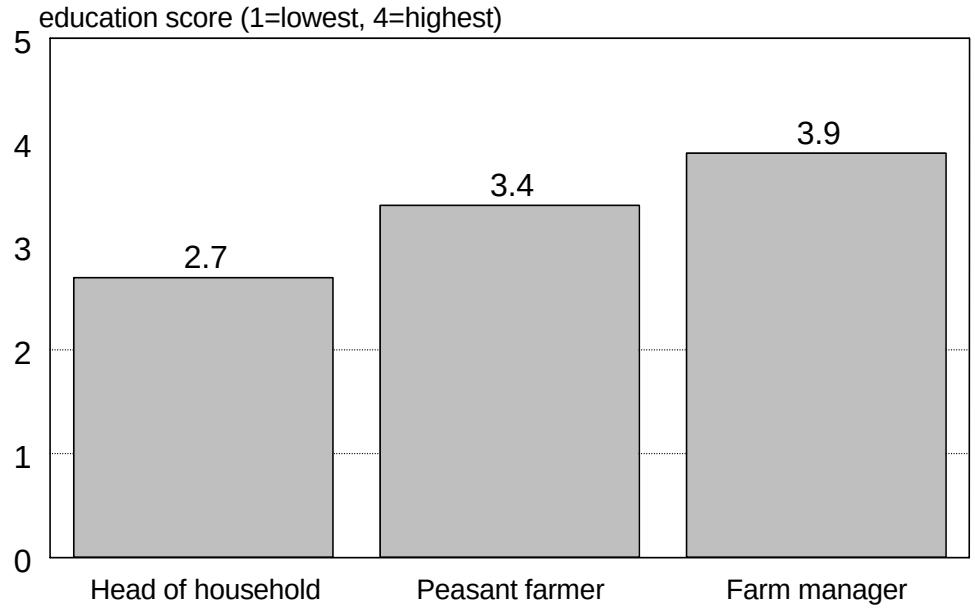


Table 13.2: Experience record: Managers and peasant farmers

	Farm managers	Peasant farmers
Education score (1=lowest, 4=highest)	3.9	3.4
Years in agriculture	23	14
Years in present occupation	8	8
Previous occupation:		
Farm manager, farm chief specialist	55	21
Non-managerial job on a corporate farm	28	41
Peasant farmer	1	--
Regional agricultural official	2	2
Managerial job outside primary agriculture	2	3
Hired worker outside agriculture	6	20
Self-employed outside agriculture	4	6
Student	1	4
Other	1	3
Total	100	100

The educational attainment of corporate farm managers is even higher than that of farmers (**Figure 13.1**; the ordinal ranking by educational attainment managers > farmers > heads of households is statistically significant by the Bonferroni test).

In this cohort, 87% of respondents report higher education. The manager's average age is 48, like the farmer's age, and the manager has 23 years of experience in agriculture. The managers' agricultural record is much longer than that of the peasant farmers, who have 14 years of experience in agriculture. Both corporate farm managers and peasant farmers have been for around 8 years in their present occupation (for peasant farmers this is counted since the creation of their farm

Most farm managers previously held a top managerial position in a corporate farm and another 30% came from a non-managerial position in a corporate farm (**Table 13.2**). In total, 84% of farm managers have experience in primary agriculture. Among peasant farmers, on the other hand, only 62% came to farming with direct agricultural experience and a relatively high percentage (20%) had worked as rank-and-file hired employees outside agriculture. No doubt, most peasant farmers have relevant experience for their new occupation, but their agricultural record is clearly less than that of corporate farm managers.

13.2 Employment diversification

Peasant farmers work primarily on the family farm and only 12% are hired off-farm (**Table 13.3**). It is the spouse who is generally the source of income diversification in peasant farmer families, with 21% of spouses holding hired jobs and another 5% reporting self-employment outside the household. Heads of rural households and their spouses diversify to a much greater extent: Less than half list the family farm as their main occupation and fully 40% have an off-farm job as their main occupation. The occupation profile is largely identical for heads of rural households and their spouses (**Table 13.3**). The secondary occupation for all respondents is mainly the family farm (**Table 13.4**). There is clearly a stronger tendency among rural households to hold a secondary job than among peasant farmers: Around half the respondents in rural households report a secondary occupation, compared to 30% in peasant farmer families.

Table 13.3: Occupation profile of peasant farmers and rural households: Main job

	Peasant farmers		Rural households	
	Head (*n*=309)	**Spouse (*n*=288)**	**Head (*n*=852)**	**Spouse (*n*=676)**
Family farm	85	67	44	41
Another farm	11	8	20	20
Self-employed (non-ag)	1	5	3	3
Hired (non-ag)	1	13	17	20
Not employed	2	7	16	16
Total	100	100	100	100

In terms of time allocation people tend to report that they work full time on the main job (90% of peasant farmers and their spouses; 70% of respondents in rural households). In reporting the time allocation to the secondary job the respondents

in all cohorts are evenly split between "full time" and "less than half time". About 15% of the people surveyed in effect report that they put more than 1.5 full work days into their main and secondary jobs combined. Another 10-15% work more than one day but less than 1.5 days in their various occupations. Among heads of rural households, work on the family plots averages 8.6 hours per day for 295 days a year. Those who also work in the corporate farm (20% of respondents) devote "only" 7.6 hours per day to their household plot for 301 days a year (compared to 247 days that they give to the corporate farm).

Table 13.4: Occupation profile of peasant farmers and rural households: Secondary job

	Peasant farmers		Rural households	
	Head (*n*=309)	**Spouse (*n*=288)**	**Head (*n*=852)**	**Spouse (*n*=676)**
Family farm	20	27	49	50
Another farm	1	1	2	3
Self-employed (non-ag)	2	0	0	1
Hired (non-ag)	2	1	1	0
Not employed	75	71	48	46
Total	100	100	100	100

13.3 Farm labor

The average corporate farm in the survey employs between 120 and 130 permanent workers, of which more than 80% are in agricultural production (**Table 13.5**). In addition to the core permanent labor, corporate farms employ some seasonal labor, also primarily in agricultural production. On average, the seasonal labor adds about 16% to the permanent labor force. Corporate farms report on average 250,000 man-hours per year, or 31,500 work days. Given the average number of workers, this represents around 240-250 work days per person.

Table 13.5: Labor in corporate farms

	Number of workers per farm (*n*=204)	**Percent**
Administrative staff	16	13
Agricultural production	101	81
Other (incl. processing, social sphere)	7	6
Total permanent workers	124	100
Seasonal	20	+16%

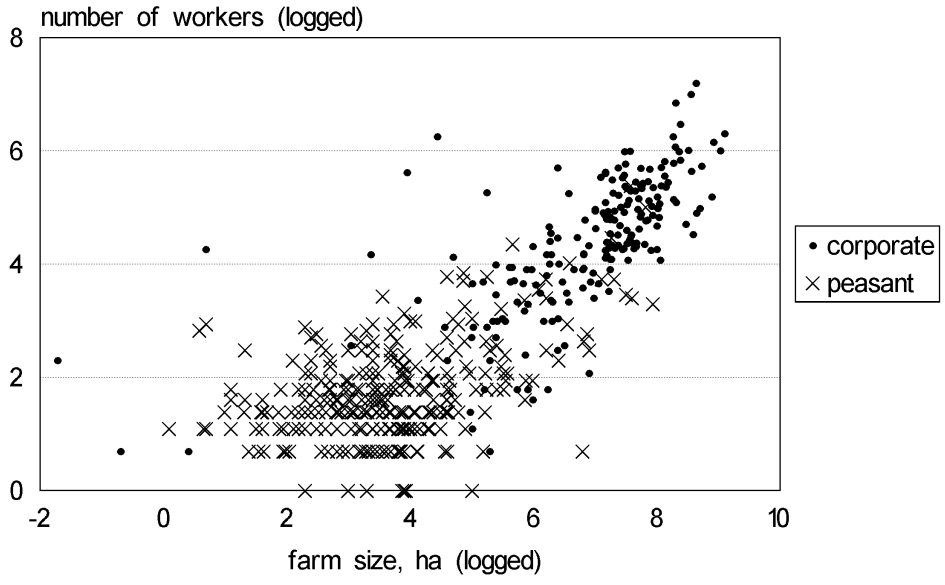
Peasant farms employ on average less than 9 people, of which 3 are family members. Virtually all peasant farms report work inputs from family members, but only 57% of peasant farms surveyed engage hired labor. The average time input of the family members is more than 300 work days a year, whereas hired workers are engaged on average for 160 days a year (**Table 13.6**). As a result, the family members contribute 55% of the total labor input, whereas hired workers

contribute 45%. The average number of days per worker per year in peasant farms is 224. The overall average is somewhat less than the average number of work days estimated above for corporate farms. However, family members work much more than the average for corporate farms, while hired workers are employed on peasant farms for substantially shorter periods of time during the year than in corporate farms.

Table 13.6: Labor in peasant farms

	Workers		Work days		Work days per worker per year
	Number (*n*=305)	Percent	Average per farm (*n*=199)	Structure, percent	
Farmer	1.0	11	387	20	387
Family and relatives	2.3	26	703	35	306
Hired workers	5.5	63	884	45	161
Total	8.8	100	1974	100	224

Figure 13.2: Labor vs. land in corporate and peasant farms (in logged variables)



The differences in the number of employed in corporate and peasant farms are mainly attributable to differences in farm size. **Figure 13.2** shows the relationship between the total number of workers and the land used in corporate and peasant farms (in logged variables). Land explains 67% of the variability in labor. On

average, the farms in the sample employ one worker for 5-10 hectares. Peasant farms employ more labor per hectare than corporate farms (**Table 13.7**). This is consistent with the general view of individual farms as a "labor sink" for the rural population.

Table 13.7: Labor intensity in corporate and peasant farms (workers per hectare)

	Mean	Median	Interquartile range
Corporate farms (*n*=201)	0.19	0.08	0.05-0.12
Peasant farms (*n*=303)	0.28	0.14	0.06-0.32
All sample	0.24	0.10	0.05-0.22

13.4 Demand for farm labor

Labor shortages do not appear to be a serious problem among the farms surveyed. About 40% of respondents in both corporate and peasant farms complain that they face shortages of labor (**Table 13.8**). The differences in the total number of workers between farms with and without labor shortages are not very big, although overall it is farms with a larger labor force that complain of shortages (the difference is significant only for peasant farms). It is noteworthy that farm managers generally do not feel they have surplus labor. Only 2% of respondents indicate that there are redundancies on the farm, while 51% are of the opinion that their labor force is "just right".

Table 13.8: Labor shortages and demand for labor in corporate and peasant farms

	Peasant farms	Corporate farms
Farms experiencing shortages, %	36	44
Total number of workers	8.8	142
Farms reporting labor shortage	10.0*	144
Farms without labor shortage	8.1*	140
Workers needed	6.7	33

Note: * Difference significant at $p = 0.1$.

Table 13.9: What labor is needed

	Peasant farms		Corporate farms	
	Experiencing shortage, %	Workers needed*	Experiencing shortage, %	Workers needed*
Farms experiencing shortage	36	6.7	44	33
Of these:				
Skilled labor	52	1.6	63	11
Unskilled labor	66	5.1	48	21
Both skilled and unskilled labor	21	--	32	--

Note: * Compare to total work force of 10 in peasant farms and 144 in corporate farms (see **Table 13.8**).

Most peasant farms experience shortage of unskilled manual labor, whereas most corporate farms need more skilled labor (machine operators, farm specialists). The number of unskilled workers needed, however, is greater than the number of skilled workers for farms of both types (**Table 13.9**)

Table 13.10: Farms experiencing labor shortages: Obstacles to hiring needed labor (percent of those with labor shortages)

	Corporate farms	Peasant farms
Pay not competitive	38	26
No money to pay		6
No supply of labor (qualification, age, motivation to work)	42	30
No workers without bad habits	15	33
No housing	5	5
Total	100	100

Non-competitive low pay is an important factor in the inability to hire, but the main obstacle seems to be labor supply difficulties (**Table 13.10**). There is lack of sufficiently qualified labor, there are problems with the age structure of labor, and finally people simply have no motivation to work (they register at the labor exchange, but do not accept farm jobs). In the labor supply category respondents identify "bad habits" (i.e., drinking, unreliability) as a special problem. Peasant farmers are much more sensitive to this problem than corporate farm managers.

14 FARM PRODUCTIVITY

Productivity is the output produced per unit of resource used, and it is accordingly a measure of the efficiency with which producers use available resources. Productivity measures are at the core of the discussion of the impact of reforms in transition countries, as efficiency improvement was the main motivation for the shift from the centrally controlled socialist economy to the market economy.

We distinguish between partial productivity measures, when output is measured in relation to a single input (land, labor, machines) and total factor productivity (TFP), when output is measured in relation to a whole bundle of inputs used. In partial productivity measures the resource inputs are typically in physical units (hectares of land, number of workers, number of tractors or harvesters), whereas in TFP the different inputs are aggregated into a single bundle in money units. Aggregate output (the sum total of commodities produced) is also expressed in units of value, whereas specific commodity outputs (wheat, milk, etc.) may be expressed in physical units for productivity calculations (mainly partial productivity). When both output and input are expressed in money units, the productivity is calculated as the value of output per unit of input costs (hrivny of output per hrivny of input). When output is expressed in money units and inputs are expressed in physical units, the productivity is calculated as value of output per physical unit of input (hrivny per hectare, hrivny per worker). When both output and input are expressed in physical units, the result is a partial productivity measure usually called yield (kg of wheat per hectare of land, kg of milk per cow).

In this chapter we use the survey data to calculate various productivity measures of corporate and individual farms. Our prior hypothesis, suggested by the available literature and theory, is that individual farms achieve higher TFP than corporate farms.

14.1 Partial productivity measures

Calculation in physical units: Commodity yields

Yields expressed in physical units of output per physical unit of (a single) input provide the most basic and yet the crudest measure of productivity. Milk yields (in kg per cow per year) reported by respondents are lower for corporate farms than for individual farms (**Table 14.1**). The differences in milk yields within the individual sector, i.e., between peasant farms and household plots, are not statistically significant.

Table 14.1: Milk yields by farm type

	Mean	Median
Corporate farms (*n*=113)	2,609	2,555
Peasant farms (*n*=96)	3,775	3,600
Household plots (*n*=555)	3,725	3,580

Note: Statistically significant differences in means and medians (p = 0.00 by Anova and Wilcoxon tests) between corporate farms and individual farms (peasant farms and household plots combined). Differences between individual farms are not statistically significant.

Table 14.2: Crop yields in farms of different types (centner/ha)

	National yields	Corporate farms	Peasant farms	Household plots
Cereals (all)	*28.3*	28.2	27.4	40.4$^{\wedge\&}$
Wheat	*31.7*	31.1	30.0	36.6$^{\wedge\&}$
Barley	*24.6*	26.1$^{*\#}$	23.4$^{*\#}$	45.1$^{\wedge\&}$
Corn (grain)	*38.6*	40.7	36.7	47.0
Rye	*22.2*	23.7	25.1	--
Buckwheat	*7.6*	10.3$^{\#}$	12.1$^{\#}$	--
Technical crops				
Sunflower	*8.9*	11.5	11.6	--
Other oils	*14.0*	13.6	14.5	--
Sugar beet	*238.3*	239.7*	196.6*	273.0$^{\wedge}$
Horticulture				
Potatoes	*133.4*	111.8*	156.8*	139.0$^{\#}$
Vegetables	*148.7*	148.7$^{\#}$	127.2$^{\#}$	66.6$^{\wedge\&}$
Grapes	*45.2*	19.2$^{\#}$	75.6$^{\#}$	53.6
Fruits	*58.1*	--	137.6	65.4$^{\wedge\&}$
Feed crops				
Feed roots	*282.2*	271.0	1171.4	246.4
Silos corn	*145.5*	155.4	--	--
Grasses, hay	*87.2*	50.5	54.6	80.6$^{\wedge\&}$

Notes: Double dash: Mean not calculated because less than 10% of respondents produce the commodity.

Differences between corporate and peasant farms:

* Significant by t-test with unequal variances (p< 0.1).

$^{\#}$ Significant by Wilcoxon test (p < 0.1).

Differences between household plots and peasant farms:

$^{\wedge}$ Significant by t-test with unequal variances (p< 0.1).

$^{\&}$ Significant by Wilcoxon test (p < 0.1).

The picture with crop yields is less clear, already because we are dealing with a fairly wide range of commodities. The actual yields (in centners/ha) are given in **Table 14.2** for farms of all three types. Visual comparison with the national average yields taken from AGUKRAINE (2004) shows that the sample means are quite reliable. **Table 14.3** presents the results of the pairwise comparisons of mean (and also median) yields for farms of different types: Corporate farms

compared with peasant farms, corporate farms compared with household plots, and household plots compared with peasant farms. Inequalities are shown in the table for those cases when the differences in yields are statistically significant (at least by one of the two statistical tests used: The parametric *t*-test for means and the nonparametric Wilcoxon test for medians).

Table 14.3: Pairwise differences in crop yields

	Peasant farms and corporate farms	Household plots (HH) and peasant farms	Household plots (HH) and corporate farms
Cereals (all)		HH > farmers *#	HH > corporate *
Wheat		HH > farmers *#	HH > corporate *
Barley	Corporate > farmers *#	HH > farmers *#	HH > corporate *#
Corn (grain)			
Rye		n.a.	n.a.
Buckwheat	Farmers>corporate #	n.a.	n.a.
Sunflower		n.a.	n.a.
Other oils		n.a.	n.a.
Sugar beet	Corporate > farmers *	HH > farmers *	
Potatoes	Farmers > corporate *	Farmers > HH #	HH > corporate *
Vegetables	Corporate > farmers #	Farmers > HH *#	Corporate > HH *#
Grapes	Farmers > corporate #		HH > corporate *#
Fruits	n.a.	HH > farmers *#	n.a.
Feed roots			
Silos corn	n.a.	n.a.	n.a.
Grasses, hay		HH > farmers #	HH > corporate #

Notes: Blank cells – differences not statistically significant at $p = 0.1$; n.a. – mean yields not calculated because less than 10% of respondents produce the commodity.

* Significant by *t*-test with unequal variances ($p < 0.1$).

\# Significant by Wilcoxon test ($p < 0.1$).

Table 14.4 summarizes the pairwise comparisons from **Table 14.3**. Judging overall ("by majority"), household plots seem to be doing better than both corporate and peasant farms. In 6 out of 10 (or respectively 11) cases household plots achieve higher yields than corporate or peasant farms. In 3 more cases in either comparison category the differences in yields are not statistically significant. The yields achieved by household plots are lower only in 1 case compared with corporate farms and 2 cases compared with peasant farms. The picture between farmers and enterprises, on the other hand, is very mixed. It seems that corporate and peasant farms overall achieve comparable crop yields.

Table 14.4: Summary of pairwise comparisons of crop yields for farms of different types

	Peasant farms vs corporate farms	Household plots vs peasant farms	Household plots vs corporate farms
Higher yields in farms of first type	3	6	6
Lower yields in farms of first type	3	2	1
No significant difference	8	3	3

Intuitively, one would expect the large corporate farms and commercial farmers to have an advantage in scale crops, such as cereals, while household plots are usually hypothesized to have a yield advantage in horticultural crops (potatoes and vegetables). This is definitely not the situation that we observe in **Table 14.3**. Household plots achieve outstanding results in wheat and barley, significantly better than corporate or peasant farms. On the other hand, household plots seem to lose their advantage in crops that are grown practically by everyone. Thus, potatoes and vegetables are produced by 85-95% of household plots in the survey, compared with 20% among corporate farms and 50% among peasant farms. We may speculate that when a relatively small number of respondents choose to produce a particular commodity (e.g., cereals among household plots, horticultural crops among corporate and peasant farms), a positive selection effect ensures that these producers achieve higher yields.

Calculation using aggregated value of output

The partial productivity measures in this category are calculated as value of output per hectare of land (partial productivity of agricultural land) and value of output per worker (partial productivity of agricultural labor).

Our prior hypothesis is that individual farms (household plots and peasant farms combined) achieve higher productivity of land and lower productivity of labor than corporate farms. Higher productivity of land is usually attributed to greater incentives in the individual form of organization, while lower productivity of labor is associated with the tendency of individual farms to absorb labor (the "labor sink" effect of individual farms).

We expect the three organizational forms to be ranked by output per hectare in the order household plots > peasant farms > corporate farms. The actual results for the productivity of land in farms of different types are presented in **Table 14.5**. Household plots outperform both peasant farms and corporate farms by partial productivity of land (parametric *t*-test for means, nonparametric Wilcoxon test for medians). The differences between enterprises and farmers are not statistically significant (both tests). The survey thus produces the ranking household plots > peasant farms ≈ corporate farms by partial productivity of land.

Table 14.5: Partial productivity of land and labor in farms of different types

	Land productivity, '000 hrivny/ha		Labor productivity, '000 hrivny/worker	
	Mean	**Median**	**Mean**	**Median**
Corporate farms	4.4	0.9	17.4	12.5
Peasant farms	4.8	1.0	11.7	5.9
Household plots	11.8	5.0	--	--
All sample farms	8.8	2.3	14.0	8.1

Partial productivity of agricultural labor was calculated only for corporate and peasant farms, as the number of farm workers could not be reliably estimated for household plots. While the productivity of land is comparable for corporate and peasant farms, the productivity of labor (**Table 14.5**) is significantly higher for corporate farms (as expected). This is consistent with the "labor sink" effect of individual farms observed in **Chapter 13**, where peasant farms were shown to employ nearly 30 workers per 100 hectares compared with less than 20 workers per 100 hectares for corporate farms (see **Table 13.7**).

The partial productivity of land decreases with farm size (**Table 14.6**). The decrease is particularly strong for the small household plots and it levels out for the larger peasant farms and corporate farms. Yet for these larger farms also the size coefficient is negative and statistically significant. Thus, in a regression framework, large farms have significantly lower land productivity than smaller farms even when the comparison excludes household plots and is restricted to peasant farms and corporate farms only. The partial productivity of labor, on the other hand, increases with farm size, rising significantly from the smaller peasant farms to the larger corporate farms.

Table 14.6: Regression coefficients for land productivity and labor productivity versus farm size

	All three farms types	Household plots only	Peasant and corporate farms
Land productivity	−0.292	−0.508	−0.092
Labor productivity	--	--	+0.265

Note: All coefficients statistically significant at $p < 0.01$.

Figure 14. 1: Output per hectare as a function of farm size (in logged variables)

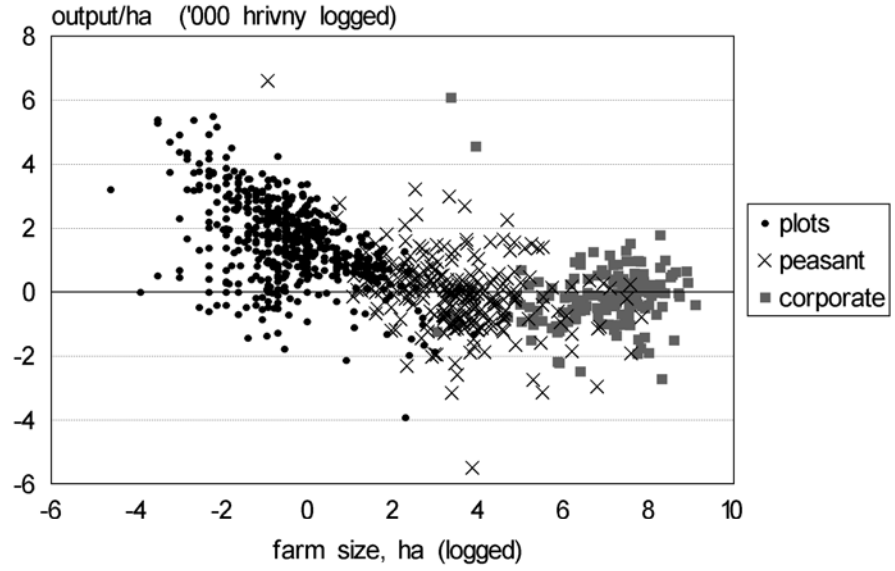


Figure 14.1 shows the output per hectare as a function of size for all three farm types. It visually demonstrates the results of **Table 14.5**, where household plots > peasant farms ≈ corporate farms. On average household plots have higher land productivity than peasant and corporate farms, but the regression results in **Table 14.6** show that land productivity decreases with size also in the subsample of peasant and corporate farms.

14.2 Total factor productivity (TFP)

The two partial productivity measures for land and labor do not give a consistent picture: Individual farms have a higher productivity of land and a lower productivity of labor. This ambiguity can be resolved by switching from partial productivity measures (each calculated for a single input) to total factor productivity (TFP), which is calculated as the ratio of the aggregated value of output to the aggregated cost of input use. The theoretical formula for the aggregated cost of input use calls for multiplying the quantity of each input by its market price and summing all the input cost components. This is a truly formidable undertaking in most cases, and a naïve method equates input costs to production costs as reported in the farm's financial statements. The ratio of sales to costs is a TFP proxy that provides a strictly accounting measure of productivity and is in fact equivalent to profit margin.

Nevertheless, the accounting valuation biases can be avoided even in the absence of market prices for valuing the cost of inputs (such as the price of land). A theoretically more sound approach is to determine TFP by estimating a production function and then using the estimated input coefficients as the weights to calculate the value of the bundle of inputs. The ratio of the observed output to the estimated bundle of inputs is the TFP. This measure does not use accounting data and does not require knowledge of market prices.

In principle, the production function should be estimated for all the relevant inputs. In farm surveys, however, the proliferation of missing values dramatically reduces the number of valid cases that can be used for estimation as the number of inputs is increased. The problem is especially acute because the standard Cobb-Douglas production function is estimated in logarithms, which are undefined whenever the corresponding input is zero. In total, there are 518 observations of corporate and peasant farms in the survey database. Of these 507 observations have valid data on agricultural land and agricultural labor, but only 399 cases have data for the value of production – the dependent variable in production function estimation. This maximum number of observations (399) is actually available for estimating two-input production functions with land and labor as the only inputs. However, the number of valid observations is reduced from 399 to 371 if in addition to land and labor we also include farm machinery, to 302 if we add fertilizers to the list of inputs, and to 283 if both fertilizers and diesel fuel are included. Thus, with merely 5 inputs – land, labor, machinery, fertilizer, and diesel fuel – we lose 30% of the potential number of observations (399). Data shrinkage is even more dramatic if we include the number of animals as an input: Production function estimation using land, labor, farm machinery and animals is based on as few as 207 observations.

In the general economic literature, TFP is typically calculated assuming two inputs: Capital and labor. We have decided to follow the same approach from considerations of data availability and reliability. In our estimations labor is taken as the physical number of agricultural workers reported in the survey (in preferences to salaries) and capital is proxied by two physical variables: Agricultural land (in hectares) and the aggregated number of pieces of farm machinery (in preference to the highly uncertain balance sheet value of machinery). The livestock herd was excluded from the capital component because of the large number of farms without animals. We thus estimated the production function with three inputs: labor, land, and farm machinery. A separate estimation was additionally carried out for the subgroup of farms with animals. The physical variables were judged to be much more reliable and consistent than the accounting figures reported for other factors of production, such as the cost of purchased inputs and the value of fixed assets (especially for individual farms).

Accounting-based TFP

The survey provided fairly detailed accounting information on production costs for both corporate and peasant farms. Corporate farms reported the production costs from their profit-and-loss statement (which also provided the gross profit for profit margin calculations in **Table 12.18**). Total production costs in corporate farms included the cost of material inputs, labor costs, depreciation, and other costs. Peasant farmers, on the other hand, reconstructed mainly their material costs (including lease payments and taxes), but did not show labor costs or depreciation. To achieve comparability of the cost figures, the costs for corporate farms were adjusted to reflect only the cost of material inputs plus other costs.

Table 14.7: TFP estimated by ratio of output to accounting costs

	Peasant farms	Corporate farms*
Value of output/production costs	1.51 (*n* = 223)	1.29 (*n* = 122)
Sales revenue/production costs	1.53 (*n* = 248)	1.22 (*n* = 143)
Calculated from profit margin:		
12% (**Table 12.18**)		1.14
15% (weighted average, *n* = 132)		1.18

Note: * Costs for corporate farms do not include depreciation and labor.

Table 14.7 presents the accounting-based TFP proxies calculated using these costs and two output variables: The value of production and the sales revenue. The results are weighted averages, obtained by taking the ratio of the sum total of outputs to sum total of input costs in the entire sample (the number of observations for each sum is shown in parentheses). The accounting TFP is somewhat higher for peasant farms than for corporate farms. However, there is no way to decide if the difference is significant, because weighted averages do not lend themselves to statistical significance testing.[7]

Production function approach: TFP by dummy variable estimation

Differences in TFP between categories of farms can be captured by estimating appropriate production functions with a dummy variable for different farm types. If the dummy coefficient for type A farms is found to be greater than for type B farms, this implies that type A farms produce a greater value of output at any given bundle of inputs and essentially means that type A farms have higher TFP than type B farms. This procedure enables us to assess *differences* in TFP without actually calculating the TFP in *absolute values*.

A three-input Cobb-Douglas production function, relating the aggregated value of output to agricultural land, agricultural labor, and the number of farm machinery, was estimated on 371 observations from the survey dataset classified into corporate and peasant farms (**Table 14.8**, Model 1). Another model (Model 2)

[7] Accounting-based TFP measures have been previously calculated in several studies for other transition countries. For a calculation of TFP as the ratio of output to the reported cost of inputs see DUDWICK et al. (2005).

was estimated with the number of animals also included in the capital component, but at the cost of using a much smaller sample of observations (207 farms with a nonzero herd).

Table 14.8: Estimation of Cobb-Douglas production function for corporate and peasant farms

Dependent variable: Value of output ('000 hrivny, logged)	Model 1: Labor, land, machinery*	Model 2: Labor, land, machinery, animals**
Explanatory variables:		
Labor (workers, logged)	0.542	0.548
Land (ha, logged)	0.512	0.367
Farm machinery (pieces, logged)	0.175	0.067
Livestock (standard head, logged)	--	0.187
Farm type (dummy): Corporate relative to peasant farms	−0.249	−0.318
R^2	0.815	0.848
Number of observations	371	207

Notes: * All coefficients significant at $p = 0.05$. Farm dummy marginally significant with $p = 0.18$.

** Labor, land, and livestock significant at $p = 0.05$; farm machinery ($p = 0.54$) and farm type ($p = 0.24$) not significant.

In the three-input production function (Model 1), labor, land, and farm machinery have a highly significant positive impact on the value of production. In the four-input production function with livestock (Model 2), land and labor remain highly significant, but livestock takes over from farm machinery as the third significant factor of production in farms that have animals. The farm type dummy has a negative coefficient in both models (and in models with many other combinations of inputs that we have tried). This coefficient is only marginally significant (at $p = 0.20$) in Model 1 and not statistically significant by any acceptable measure in Model 2. Nevertheless, its consistently negative sign provides an indication that, for every given bundle of inputs, corporate farms achieve a lower value of output than peasant farms.[8] However, even without drawing this (statistically weak) conclusion in favor of the performance of peasant farms, we can definitely say that the results do not support the inherited socialist conviction regarding the superiority of large farm enterprises: The statistical analysis shows that corporate farms certainly do not outperform peasant farms. The performance of large corporate farms at best is comparable to the performance of the much smaller peasant farms.

[8] The mathematics of the Cobb-Douglas production function translates the negative dummy variable coefficient of −0.249 in Model 1 into a difference of 22% in output between corporate farms and peasant farms for each bundle of inputs ($1 - \exp(-0.249) = 1 - 0.78 = 0.22$). For Model 2 the difference is 27%.

Production function approach: TFP calculated from factor shares

The estimated production function provides another technique for calculating the TFP in absolute values for different groups of farms. As we move from the relatively small peasant farms to the large corporate farms, the agricultural product increases, but so do the labor force, the land endowment, and the machinery pool (see **Chapters 13, 8, 9**). The production function is a mathematical relationship that links the increase in agricultural product with the increase in aggregated input use. The inputs are aggregated by applying the weights (or factor shares) from the corresponding production function to specific values of the inputs. TFP is calculated as the aggregated value of output divided by the aggregated value of inputs. In this sense it is similar to the standard partial productivity measures, in which the aggregated value of output is divided by the quantity of a single input (land or labor).

Table 14.9 presents the estimated production function coefficients and the weights used in TFP calculations (to calculate the weights the regression coefficients are divided by the sum of the coefficients). Model A corresponds to Model 1 in **Table 14.8**, but without the farm type dummy. This is a three-input production function estimated for the pooled sample of corporate and peasant farms (n = 371 observations). Model B corresponds to Model 2 in **Table 14.8**, but it is also a three-input model with labor, land, and livestock: Farm machinery has been omitted from the regression because its coefficient is not statistically significant. In both three-input production functions agricultural land accounts for nearly 50% of input use and labor for around 40% (see the columns for input weights in **Table 14.9**). The third factor (machinery or livestock) accounts for less than 15% of input use. The aggregated value of inputs is obtained for each observation as the sum of the relevant inputs (labor, land, machinery or labor, land, livestock) multiplied by the respective weights from **Table 14.9**. The TFP is then calculated for each observation as the ratio of the value of output to the aggregated value of inputs.

Table 14.9: Regression coefficients and input weights in alternative production functions

	Model A: Labor, land, machinery	Model A weights	Model B: Labor, land, livestock	Model B weights
Labor	0.511	0.44	0.538	0.50
Land	0.488	0.42	0.403	0.37
Farm machinery	0.168	0.14	--	--
Livestock	--	--	0.142	0.13
Sum of coefficients	1.167	1.00	1.083	1.00
R^2	0.814		0.843	
Number of observations	371		215	

Note: The estimated coefficients are significantly different from zero ($p < 0.01$); all sums of coefficients significantly greater than 1.

The mean and median TFP values obtained by this method for corporate and peasant farms are presented in **Table 14.10**. The numbers are very close for the two categories and the differences between farms of different types are not statistically significant. This result is fully consistent with the previous observation that the dummy variable coefficient did not produce a statistically significant shift in production functions between corporate and peasant farms. The TFP calculations do not provide positive evidence in support of our hypothesis that individual (peasant) farms are more productive than corporate farms. On the other hand, these results establish convincingly that corporate farms are not better than peasant farms, and both farm types should be allowed to evolve on a level playing field.

Table 14.10: TFP ('000 hrivny per aggregated unit of inputs)

	Mean		Median	
	Peasant farms	**Corporate farms**	**Peasant farms**	**Corporate farms**
Model A: Labor, land, machinery	2.70	2.46	1.64	1.85
Model B: Labor, land, animals	2.97	3.01	1.92	2.21

Note: None of the pairwise differences in TFP are statistically significant.

Regression of TFP on farm size as a continuous variable (measured in hectares of agricultural land) failed to detect any statistically significant relationship either. TFP was found to be at the same average level for farms of all sizes. These results are somewhat surprising, because they contradict some recent findings for both Moldova (MOLDOVA, 2005) and the United States (AHEARN et al., 2002), where smaller farms achieved higher TFP than larger farms, providing an indication of diseconomies of size. Our conclusions for Ukraine are limited to a more modest conclusion, namely that we do not observe economies of size operating among Ukrainian farms.

15 RURAL FAMILY INCOMES

Two distinct categories of rural families are represented in the survey – families of peasant farmers operating an independent family farm outside collective or corporate frameworks, and other rural families operating a traditional household plot in addition to wage employment or reliance on social insurance. We will refer to the first category as farmer families (or in short farmers) and to the second category as employee families (or in short employees), although many of them are just pensioners (i.e., former employees).

15.1 Structure of family income

Farmers earn much more than employees both per family and per capita (**Table 15.1**). The numbers in **Table 15.1** reflect cash income, and do not include the value of own farm products consumed by the household, but the inclusion of own consumption (see estimation in Section 15.2) will not close the huge gap. For farmers most of the income is from farm sales and a very small share comes from salaries and pensions. Employees, on the other hand, rely to a much greater extent on salaries and pensions and less on farm sales.

Table 15.1: Structure of family income (in percent)*

	Farmers (n=267)	Employees (n=827)*
Sales of farm products	87	31
Sale of services	2	2
Non-farm income (business and property)	0	4
Salaries	7	41
Social transfers	3	21
Remittances from relatives	0	1
Sale of assets	1	0
Other	0	0
Total income, %	100	100
Total income, hrivny	54,500	9,750
Per capita income, hrivny	15,300	3,100
Land used, ha	113	1.7

Note: * Based on weighted average amounts by sources of income.

Another component that differentiates farmers from employees is income from property (i.e., lease payments for land, dividend payments for asset shares, etc.) and entrepreneurial activity. For employees this component accounts for 4.2% of family income, whereas for farmers it is practically zero. Since farmers do not lease out land (see **Chapter 8**), this basically means that they do not engage in

any off-farm business activity either, devoting all their time and efforts to the family farm. Employees, on the other hand, willingly lease out land (mainly their land shares) and thus earn some income from lease payments. For the subset of employee families that lease out land, lease payments contribute 6.4% of total family income compared to 4.2% for all families (in a weighted average calculation).[9] We thus conclude that on average lease payments make a relatively small contribution to income even among families that lease out land.

In general, the share of lease payments in family income for employee households increases with the area of land controlled by the family and with the proportion of that area leased out to others. The relationship, however, is nonlinear and to obtain a satisfactory linear regression (with both coefficients statistically significant and R^2 =0.25) we need to use the logarithm of the share of lease payments as the dependent variable.

15.2 Value of consumption of own products

Table 15.1 gives the structure of cash income by sources as reported in the survey. It includes income from sales, wage income, pensions, and other cash receipts. It does not include the value of own farm products consumed by the family. This value can be regarded as additional non-cash income enjoyed by the family: Consumption of own farm products replaces cash expenditure on food purchases. Imputed income includes the estimated value of consumption of own products as well as cash earnings from outside sources.

Estimation of the value of consumption of own farm products from survey data is a notoriously difficult undertaking when no special diaries are filled in. The estimation requires aggregation of many variables, and proliferation of missing values is a major problem preventing consistent calculations for the full sample. Instead of the conventional case-by-case calculation, we have roughly estimated the value of consumption of own farm products by multiplying the average value of output by the average proportion retained on the farm for the use of the family. The rough estimates range from nearly 5,000 hrivny a year for employee families to 10,000 hrivny a year for farmer families (the higher value of consumption for farmer families is consistent with the perception of a higher standard of living – see **Table 15.4** and **Figure 15.4**). The value of own consumption thus adds nearly 50% to the cash income of employee families and 20% to that of farmer families (**Table 15.2**). Based on these estimates, the value of own consumption of farm products is 32% of imputed income for employee families and 16% for farmer families. The structure of imputed income, including the value of own consumption of farm products, is shown in **Figure 15.1**. The figure clearly shows

[9] Taking the actual lease payments received by employee families from a different set of questions and calculating the ratio of lease payments to total family income for each case, we obtain 9% and 5% respectively for the mean and the median contribution of leasing to income in the subsample of respondents reporting lease payments (n = 360).

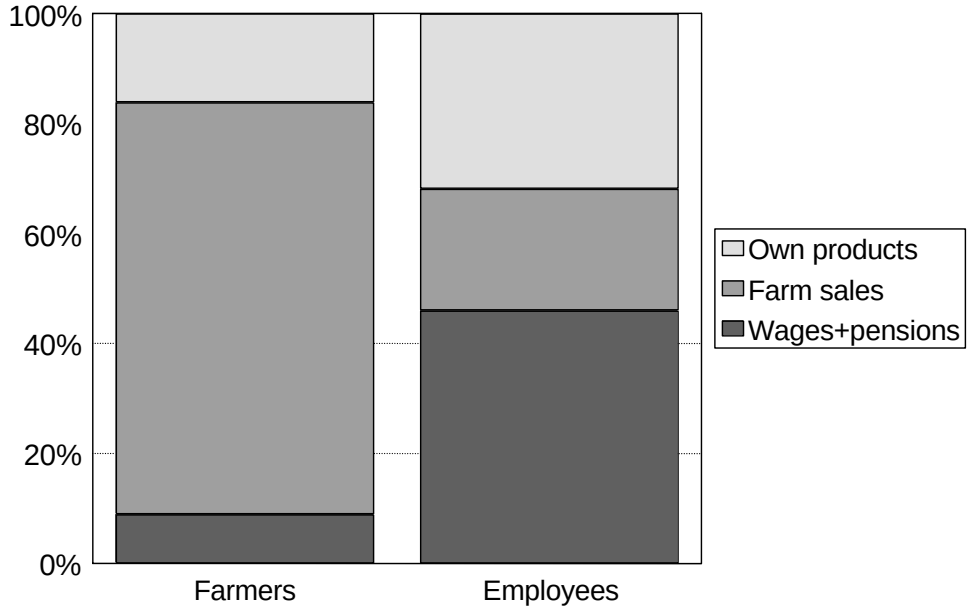
the main differences in the share of farm sales, value of own consumption, and income from other external sources (mainly wages and pensions) between farmers and employees: Farm sales are the dominant component of farmers' income even after imputing the value of own products, whereas in employee families wages, pensions, and the value of own products are more important than sales.

Table 15.2: Estimating the imputed income (in hrivny)

	Farmers	Employees
Cash income	54,500	9,750
Value of output*	30,000	5,700
Percent of output consumed on farm	35	80
Estimated value of consumption of own farm products	10,500	4,600
Imputed income	65,000	14,350

Note: * Median for farmers, mean for employees. This choice is justified because of the much higher variability for farmers, where the coefficient of variation is 243% compared with only 97% for employees.

Figure 15.1: Structure of imputed family income (including value of own products consumed) for peasant farmers and rural employees



15.3 Determinants of family income

The absolute difference in cash family income observed in **Table 15.1** is largely an outcome of the difference in farm sizes: 113 ha for farmers, 1.7 ha for employees. Regression analysis shows that family income increases with farm size (**Table 15.3**, first column), and land on its own explains nearly 23% of the variability in cash family income. Other statistically significant determinants of income in **Table 15.3** include family size (i.e., the number of family members), the age of the family head, and the average age of all family members (which includes children and older pensioners). Income naturally increases with family size and decreases with the age of the family head. The average age of family

members has a positive effect on income due to the contribution of pensions that the older family members receive. Beyond these quantitative determinants we also observe a certain farm type effect: Farmer families earn more than employee families adjusted for land and other factors. The type dummy has a significant coefficient and makes an additional (albeit small) contribution to explanatory power (**Table 15.3**).

Table 15.3: Determinants of family income[#]

	Total income	Farm income	Non-farm income
Constant	8.577*	8.487*	7.802*
Land (logged)	0.139*	0.323*	0.026
Family size	0.150*	0.054	0.171*
Age of head of family	-0.012*	-0.023*	-0.004
Average age of family members	0.009*	0.005	0.009*
Farm type: Farmers relative to employees	0.507*	0.770*	-0.051
R-square	0.274	0.463	0.064
N	1080	790	952

Notes: [#] Dependent variable: Logged income (excluding the value of own consumption).
[*] Significantly different from zero at p= 0.1.

The last two columns in **Table 15.3** separate total cash income into farm income (sales of farm products) and non-farm income (salaries, pensions, leasing income, etc.). We note that the relationship between farm income and land is much stronger (a higher regression coefficient) and much tighter (higher R^2) than for total income. On the other hand, family size and number of pensioners (as reflected in the average age) are not statistically significant as determinants of farm income. The farm type effect is the same as for total income: Farm income is higher for farmer families than for employee families (controlling for the other factors). In contrast, non-farm income is not sensitive to farm size or the age of the family head (the corresponding regression coefficients in **Table 15.3** are not statistically significant), but it strongly depends on family size and on the average age of the family members. It does not depend on farm type, however: The behavior of non-farm income is statistically the same for farmers and employees.

Data grouped by logged farm size categories show a clear increase of total cash income, and especially farm income, with the increase of farm size (**Figure 15.2**). The share of farm income increases from 17% in the smallest farms to more than 70% of total income in the largest. Not only total income increases: Income per capita also increases with farm size (**Figure 15.3**), rising quite dramatically from less than 5,000 hrivny per capita for households with up to 1-2 hectares to 20,000 hrivny and much more for farms larger than 50 hectares.

Figure 15.2: Farm and non-farm cash income as a function of farm size (in logged hectares) for families of peasant farmers and rural employees

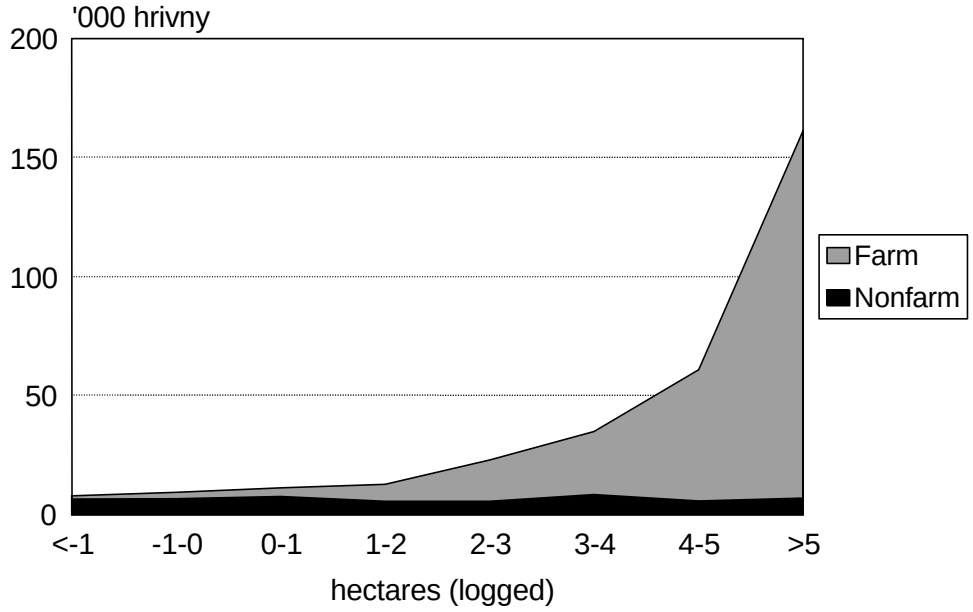
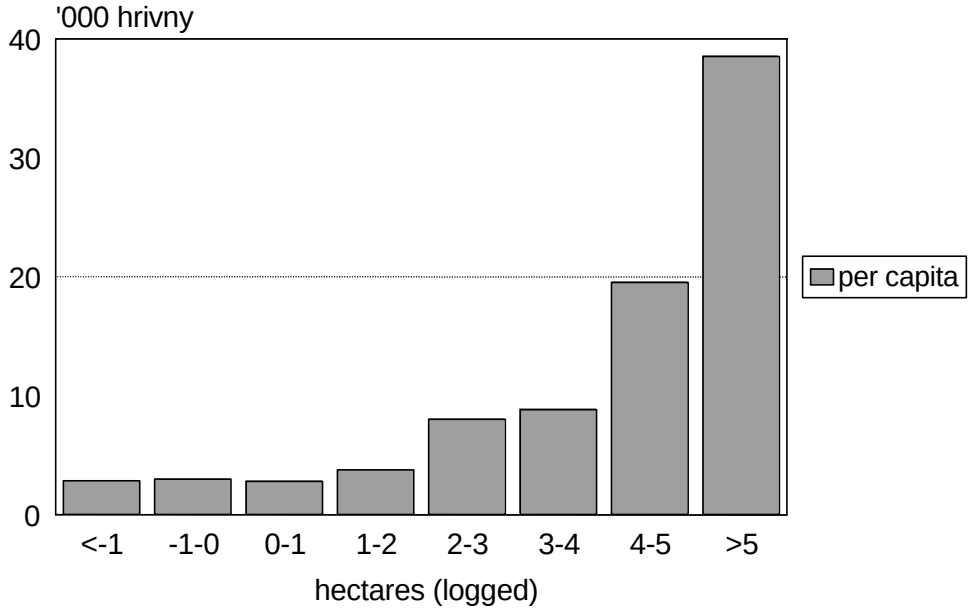


Figure 15.3: Per capita cash income as a function of farm size (in logged hectares) for families of peasant farmers and rural employees



15.4 Incomes and well-being

In addition to quantitative information on family incomes, the survey explored the families' perception of well-being through qualitative questions that classified the perceived standard of living into three levels: Low, when family income allows nothing beyond food and daily necessities; medium, when family income is sufficient for food, daily necessities, clothing, and other consumption needs; and comfortable, when in addition to the consumption needs the family can

afford to purchase durables and in general does not experience material difficulties. The qualitative perception of well-being is consistent with quantitative income estimates: Family income increases from low to comfortable level of well-being for both farmers and employees (**Table 15.4**).

Table 15.4: Well-being and income ('000 hrivny)

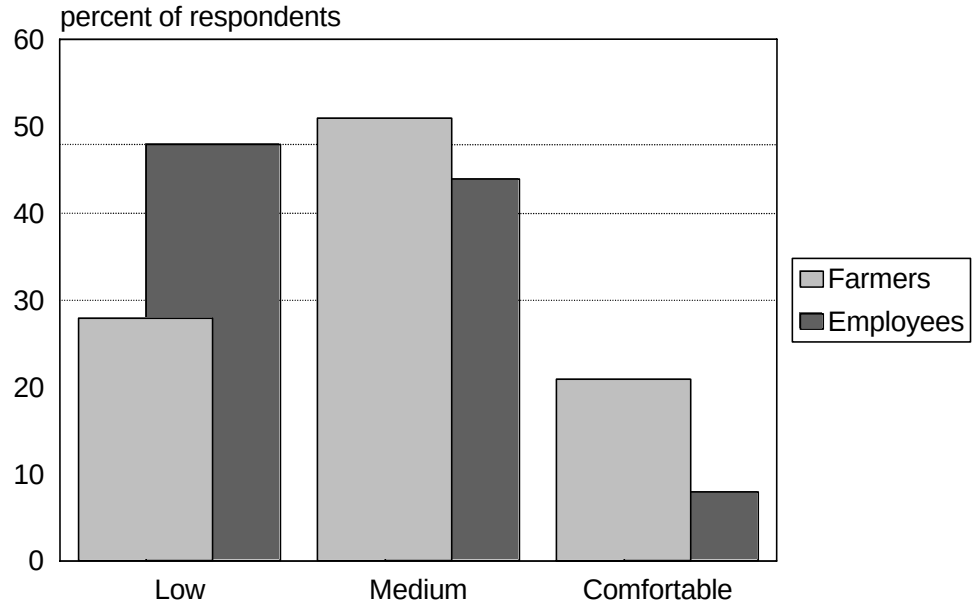
Level of well-being	Farmer families*	Employee families**
1. Low (not more than food and daily necessities)	26,500	7,500
2. Medium (daily necessities, clothing, etc.)	58,000	10,300
3. Comfortable (able to purchase durables)	84,000	16,800

Notes: * Statistically significant pairwise differences ($p = 0.1$): 1-3.

** All pairwise differences statistically significant ($p = 0.1$).

Farmers' families achieve a higher (perceived) well-being than the families of other rural households (**Table 15.5, Figure 15.4**). Thus, the frequency of respondents reporting a comfortable standard of living is substantially higher among farmers than among employees; and conversely, the frequency of respondents reporting a low standard of living (just sufficient to meet the daily needs) is substantially higher among employee families. This is consistent with the observation that farmer families enjoy higher incomes than employee families (**Table 15.4**; also see **Table 15.1**).

Figure 15.4: Perceived level of well-being for families of peasant farmers and rural employees



We have previously noted that family income increases with farm size. It is therefore not surprising that family well-being also increases with the area of land used (or in case of employee families, also with the area of owned land). Households reporting a low level of well-being command significantly less land than households reporting a comfortable level of well-being (**Table 15.6**).

Table 15.5: Perceived well-being among farmers and employees (percent of respondents)

Level of well-being	Farmers (*n*=309)	Employees (*n*=848)
1. Low (not more than food and daily necessities)	**28**	**48**
2. Medium (daily necessities, clothing, etc.)	51	44
3. Comfortable (able to purchase durables)	**21**	**8**

Table 15.6: Standard of living and family income increase with land area used (farm size, ha)

Level of well-being	Farmers, ha*	Employees, ha used**	Employees, ha owned#
1. Low (not more than food and daily necessities)	61	1.45	3.73
2. Medium (daily necessities, clothing, etc.)	106	1.42	4.56
3. Comfortable (able to purchase durables)	326	4.21	4.53

Notes: * Statistically significant differences ($p = 0.10$): 1-3, 2-3.
** Statistically significant differences ($p = 0.10$): 1-3, 2-3.
# Statistically significant differences ($p = 0.10$): 1-2.

Figure 15.5: Estimated probability of achieving a given standard of living as a function of farm size for families of peasant farmers

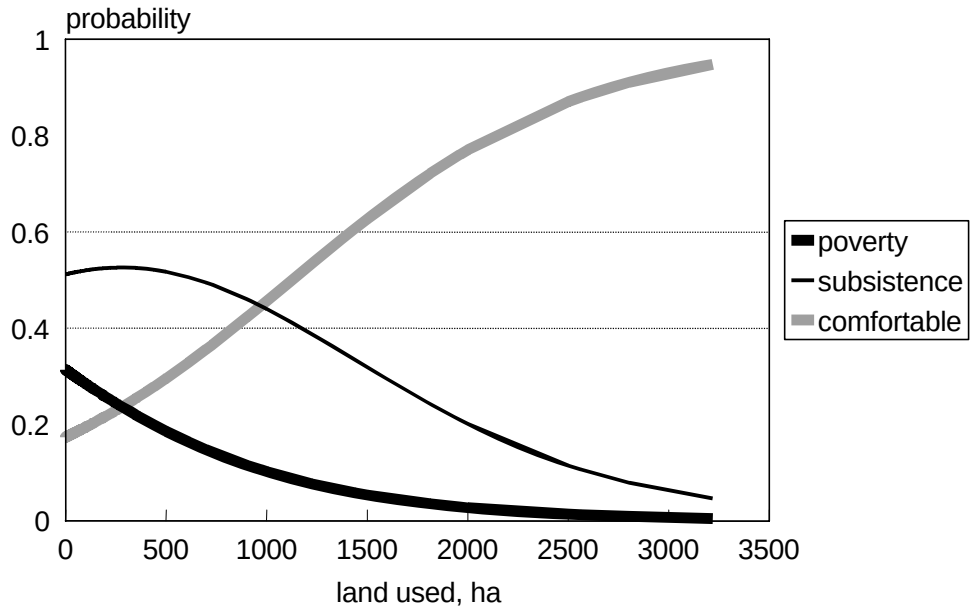
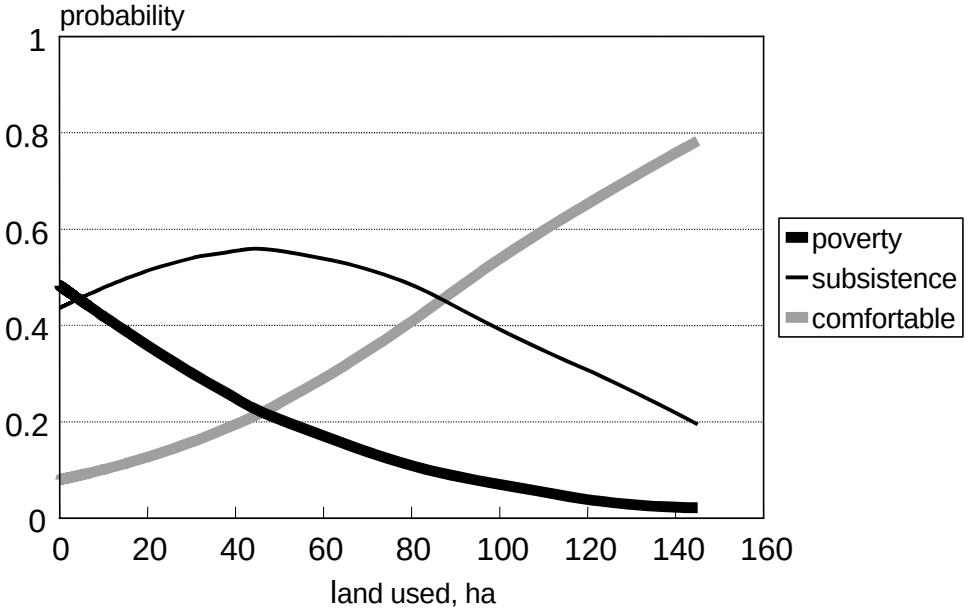


Figure 15.6: Estimated probability of achieving a given standard of living as a function of plot size for families of rural employees and pensioners



Multinomial logistic regression shows that the probability of having a higher standard of living (well-being level 3, gray curves in **Figures 15.5, 15.6**) increases with the area of land used, while the probability of having the lowest standard of living (well-being level 1, thick black curves in **Figures 15.5, 15.6**) decreases rapidly with farm size. This pattern is observed both for farmers and employee families in the survey.

15.5 Income sufficiency

The quantitative information on family income from the survey was reinforced with qualitative information on perceived family well-being. In addition to the findings based on well-being results, we tried to assess directly to what extent available income is sufficient to meet family expenditures. This assessment was based on the following question: "How much money do you think you need to make per month for your family to live normally?"

The first two lines in **Table 15.7** show the annual cash income and the annual needs estimated for matched samples in each category of families. The annual family needs were obtained by adjusting the monthly information from the survey to an annual basis, to match the scale for income. Farmer families are in a better situation than employee families: The gap between annual needs and annual income is smaller for farmers than for employees (judging by both the mean and the median).

Table 15.7: Income sufficiency assessment: Annual income compared with annual needs (matched samples)

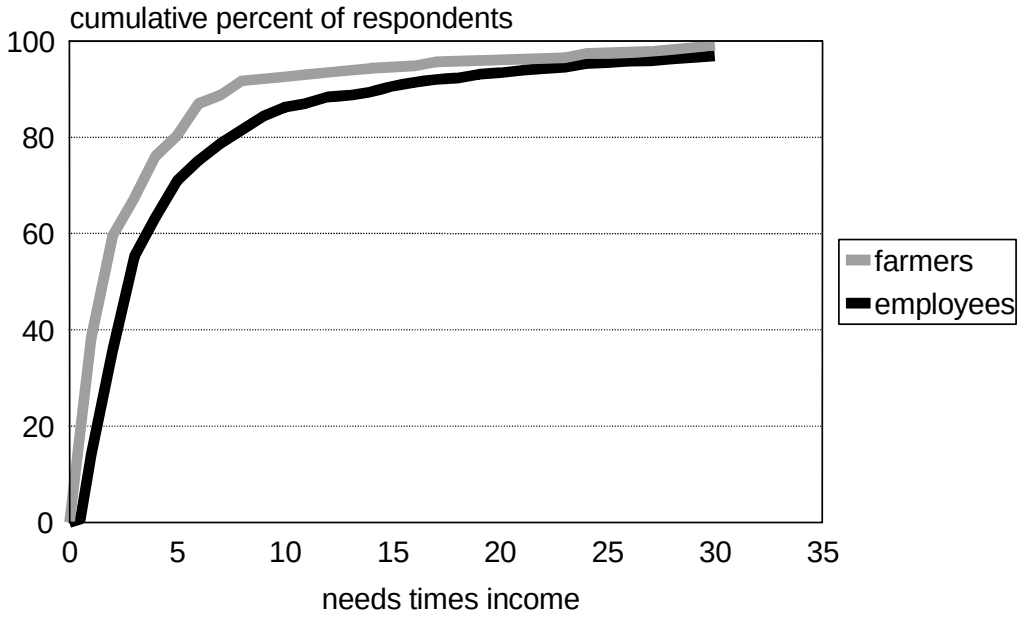
	Farmers (*n*=230)		Employees (*n*=755)	
	Mean	**Median**	**Mean**	**Median**
Annual income, hrivny	58,300	20,000	9,700	8,000
Annual needs, hrivny	57,600	48,000	32,300	24,000
Needs-to-income ratio	4.8	1.9	6.7	3.1

Using matched samples of annual income and annual needs, we have calculated an income insufficiency measure as the ratio of needs to income for each case. The mean and the median values of the needs-to-income ratio for the cases in the survey are shown in the last line in **Table 15.7**, where the numbers show by what factor needs exceed available income. If the needs-to-income ratio is less than 1, income is more than sufficient to cover the needs. If needs-to-income ratio is around 1, needs are commensurate with income. If needs-to-income ratio is greater than 1, the actual income is insufficient to cover the family needs, and the insufficiency of income increases as needs-to-income ratio grows. Among farmers, 28% have needs-to-income ratio of up to 1 (i.e., income sufficient to meet the needs), whereas among employees the corresponding group is only 6% of respondents. Needs are more than double the income for 45% of the farmers and for fully 73% of the employee families (**Table 15.8**).

Table 15.8: Distribution of income insufficiency ratio (percent of respondents)

	Farmers	Employees
Income sufficient to cover needs	28	6
Income insufficiency between 1 and 2	27	21
Income insufficiency greater than 2	45	73

Figure 15.7: Cumulative distribution of income sufficiency for families of peasant farmers and rural employees



The cumulative distributions of the income insufficiency measure (needs times income) are shown in **Figure 15.7** for farmers and employee. The distribution of income insufficiency for employee families is entirely to the right of the distribution for farmer families. This means that at every frequency level, employee families are characterized by higher income insufficiency than farmers. This seems to be consistent with the previous comparison of well-being levels for farmers and employees.

* * *

Peasant farmers earn more than other rural households in absolute terms, they report a substantially higher standard of living, and their family needs are more closely satisfied by their income. Yet despite the relatively lucrative financial situation the dichotomy of peasant farmers and rural employees appears almost solidly frozen: Only 4% of respondents are planning to become peasant farmers within the next 2-3 years. These few are mainly motivated by hopes of a better future for their children, prospects for higher income, and independence. The remaining 96% have no plans to become peasant farmers despite better financial prospects. They are primarily deterred by lack of capital, risk aversion, as well as age and poor health. Concerns about access to inputs and lack of enthusiasm on the part of other family members to continue with farming activities are also cited as obstacles.

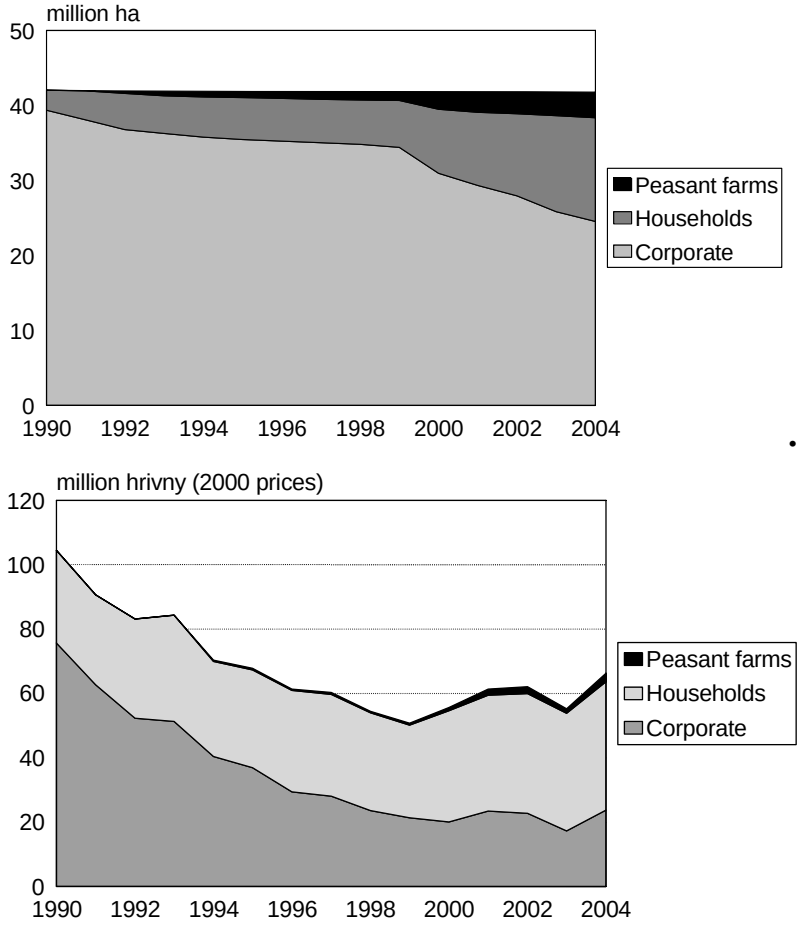
Regardless of the relative success of peasant farming, the survey paints a bleak picture of the future of the Ukrainian village. Around 50% of respondents (both peasant farmers and rural employees) would like to see their children leave the village. Around 15% would like their children to stay in the village but go into business instead of farming. Farming as a future occupation of the children is envisaged by only 24% of peasant farmers and as few as 8% of other rural residents. The Ukrainian village is in the danger of being left without a continuing generation of farmers.

16 CONCLUSIONS

1 The 1999 Presidential Decree proved to be a true watershed for land ownership and farm holdings in Ukraine

Following the 1999 land reform nearly 7 million rural residents became owners of physical land plots, not just paper shares, and about 70% of agricultural land (80% of arable land is now physically owned by rural individuals). Two-thirds of the rural households surveyed in 2005 received their land shares at least in the form of paper certificates and more than half received them in the form of a physical plot. These share assignment rates are substantially higher than in previous surveys (1994, 1996).

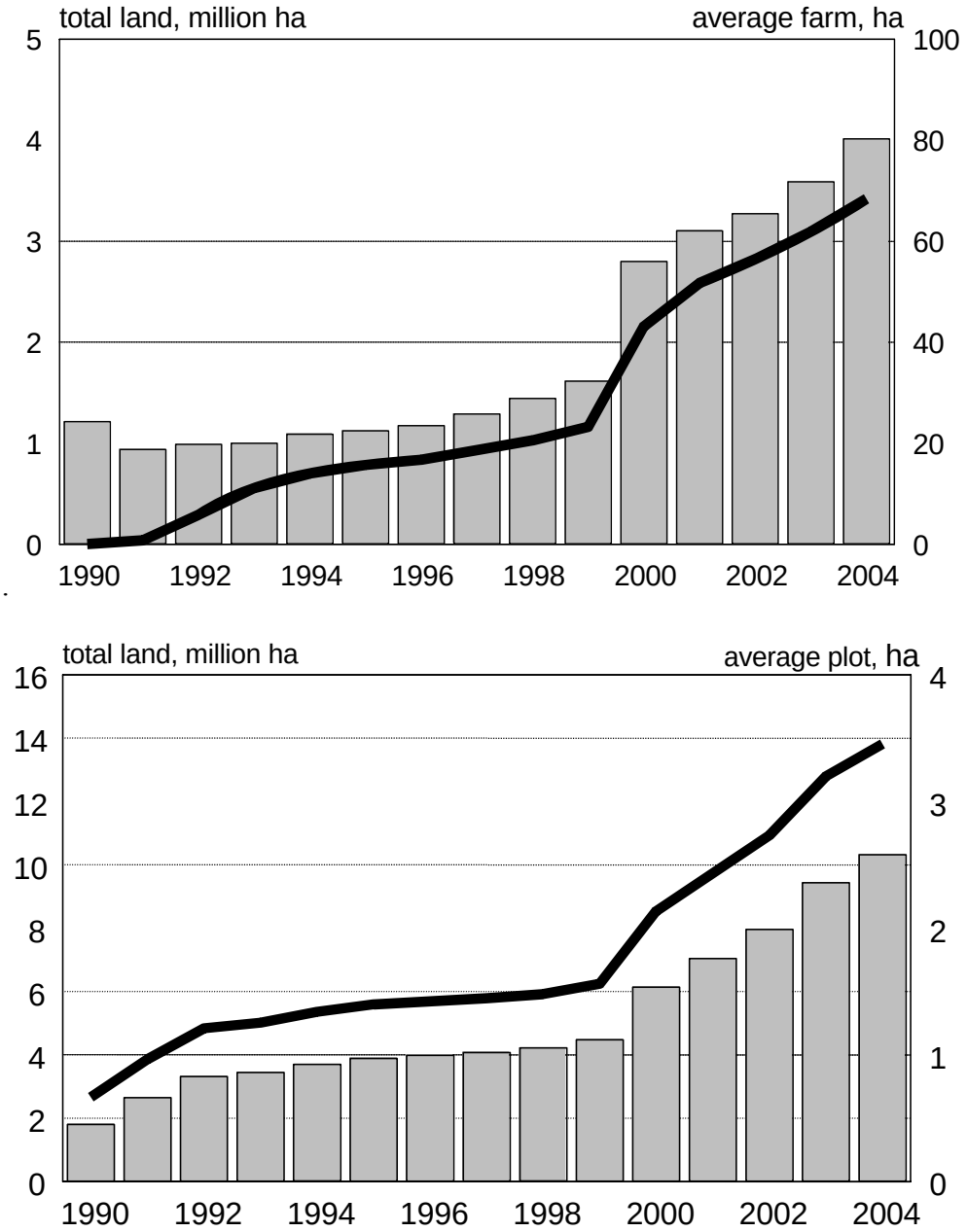
Figure 16.1: Agricultural land (top panel) and gross agricultural product in constant prices (bottom panel) by farm type in Ukraine, 1990-2004



Source: AGUKRAINE, 2004.

The 1999 decree has dramatically changed the face of Ukrainian agriculture (see **Figure 16.1**). From agriculture with predominant concentration of production in collective farms it has evolved into agriculture characterized by the clear dominance of individual farms. The individual sector (consisting of the traditional household plots and the independent peasant farms that began to emerge after 1992) controls today more than 40% of agricultural land, contributing 70% of agricultural output. Within the individual sector, the main contribution to agricultural production is from household plots, not peasant farms, as they also control much more land (33% versus 8%).

Figure 16.2: Average size (bars) and total agricultural land (curve) in peasant farms (top panel) and in household plots (bottom panel)

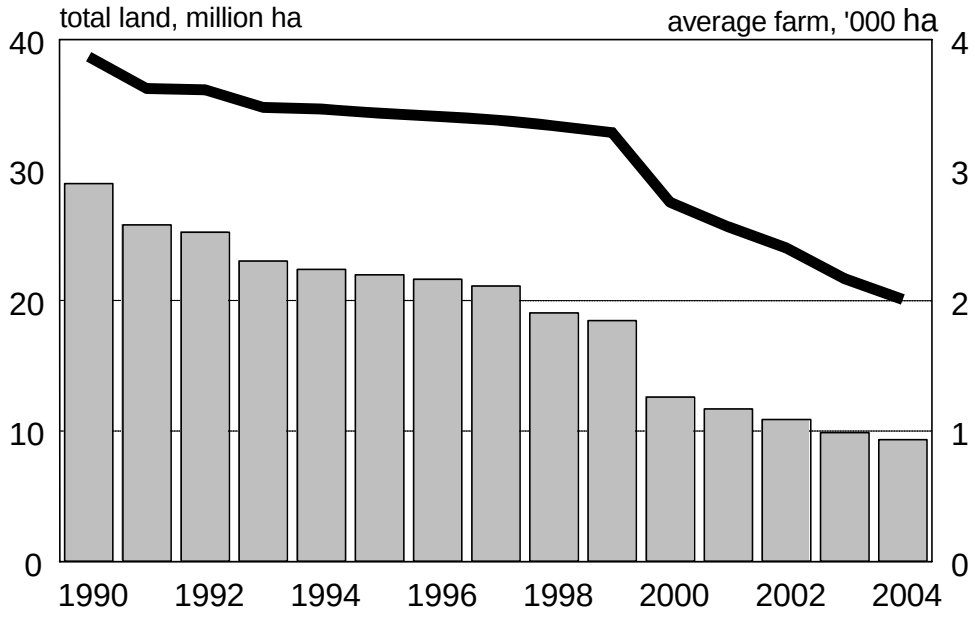


Source: AGUKRAINE, 2004.

The size of holdings in the individual sector has increased remarkably as a result of the 1999 reform. The average size of a family (peasant) farm increased from 25-30 ha in 1998 to 70-80 ha in 2003-2004. The share of peasant farms in agricultural land doubled from 2-3% in 1995-99 to 6% in 2000 and continued to rise to 8% in 2003-2004. The average size of household plots grew from about 1 hectare in 1998 to 2.5 hectares in 2004 as their share in agricultural land increased from 15% to 35% (**Figure 16.2**). The substantial increase in total land cultivated in household plots and their average size since 2000 is the direct outcome of the 1999 Presidential Decree, which made it possible for many rural residents to take their land share out of the former collective and use it to augment the traditional household plot (instead of establishing a peasant farm, as originally envisaged).

The increase of landholding in the individual sector has been complemented by a decrease in the landholding in corporate farms as well as an increase in the number of corporate farms. The average size of a corporate farm in Ukraine has fallen from 3,000 ha in 1990 to 2,000 ha in 1998 to 1,000 ha in 2004 (**Figure 16.3**). Collective agricultural enterprises (CAE), the new organizational form that dominated the farm structure in Ukraine between 1992 and 1999, completely disappeared after 1999. Corporate farms are now mainly represented by limited liability companies and private lease enterprises (the latter accounting for almost 25% of the total number of corporate farms in Ukraine). While the number of shareholders in corporate farms ranges from 1 to 1,600, fully 16% are single-shareholder entities and 31% have from 1 to 3 shareholders only.

Figure 16.3: Average size (bars) and total agricultural land (curve) in corporate farms



Source: DERZHKOMZEM.

Despite these changes, there remain important differences in the size distribution of farms in Ukraine and in market economies. First, the average size a household farm in Ukraine is much smaller than the average family farm in market economies (130 hectares in land-rich U.S., 20 hectares in EU-15). However, it would be erroneous to conclude that small household farms have little place in market agriculture. In a number of EU countries a significant portion of farmland is in holdings under 5 ha. Considered in this context, the 33% of land area in Ukraine farmed in small holdings does not look extraordinary. Such countries as Greece, Italy, and some of the new EU countries also have a high portion of land in small household farms (**Table 16.1**).

Table 16.1: Portion of agricultural land in farms with holdings of less than 5 ha in selected European countries

Country	Percent of land	Country	Percent of land
EU-15	5.2	New EU members	
Greece	29.2	Romania	38.0
Italy	18.8	Lithuania	30.0
Portugal	13.8	Poland	19.5
Spain	5.5	Latvia	4.0

Source: EU 2002; EC 2004.

Second, the average size of a corporate farm in Ukraine (around 1000 ha) is still quite a bit larger than the average size of farms in the EU and the United States (see above). Even non-family corporate farms in land rich United States (about 0.3% of farms using 1.0% of land in farms) are on average only 533 ha in size (USDA/NASS, 2004). Though there has been an impressive fall in the average size of corporate farms in Ukraine particularly since 1999, there is still some way to go in order that the size of Ukrainian corporate farms be consistent with farm sizes in market economies.

2 Land policies now differentiate Ukraine from Russia…

Ukraine and Russia pursued similar reform paths until 1999, when Ukraine embarked on its own unique strategy and began to convert paper land shares into physical plots. This strategy in effect brought Ukraine's farm structure closer to that of Moldova than Russia, and today Ukraine has 40% of agricultural land in individual use compared with only 16% in Russia. The share of individual farms in gross agricultural output (GAO) is also higher in Ukraine: 70% to Russia's 60%. Agricultural employment, on the other hand, has proven much stickier: The share of agricultural labor in Ukraine practically did not change between 1990 and 2003, probably because its larger individual agriculture acts as a "labor sink" for rural residents, offsetting the effect of other factors that tend to reduce agricultural employment (as in Russia; see **Table 16.2**)

Table 16.2: Selected measures of reform outcomes: Ukraine and Russia

	2003		1990	
	Ukraine	**Russia**	**Ukraine**	**Russia**
Land in individual use, %	38	16	7	2
Share of individual farms in GAO, %	70	60	27	24
Share of agricultural labor, %	23	11	23	15
Share of agriculture in GDP, %	12	5	22	15

Sources: See **Table 5.1**.

3 …and are important because they are a key factor in determining family incomes and subjective well-being

Family income increases with farm size, and land on its own explains nearly 23% of the variability in cash family income. Data grouped by logged farm size categories show a clear increase of total cash income, and especially farm income, with the increase of farm size (**Figure 16.4**). The share of farm income increases from 17% in the smallest farms to more than 70% of total income in the largest. Not only total income increases: Income per capita also increases with farm size (**Figure 16.4**), rising quite dramatically from less than 5,000 hrivny per capita for households with 1-2 hectares to 20,000 hrivny and much more for farms larger than 50 hectares. Because of the farm size effect, families of peasant farmers enjoy much higher incomes than other rural households (54,500 hrivny for farmers, 9,750 hrivny for employee households).

Table 16.3: Perceived well-being among farmers and employees (percent of respondents)

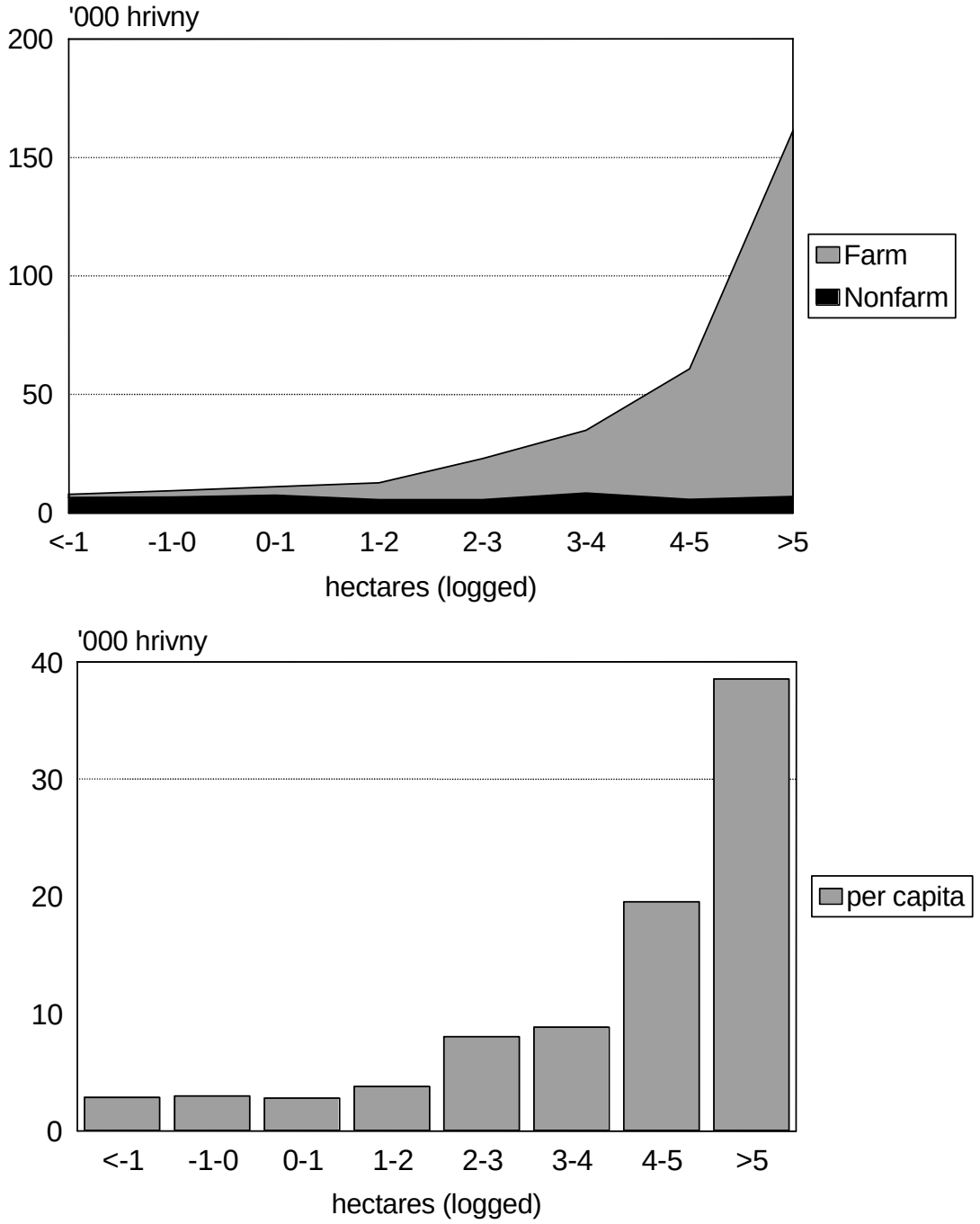
Level of well-being	**Farmers (*n*=309)**	**Employees (*n*=848)**
1. Low (not more than food and daily necessities)	**28**	**48**
2. Medium (daily necessities, clothing, etc.)	51	44
3. Comfortable (able to purchase durables)	**21**	**8**

Source: FAO Farm Survey, 2005.

The families' perception of well-being was explored through qualitative questions that classified the perceived standard of living into three levels: Low, when family income allows nothing beyond food and daily necessities; medium, when family income is sufficient for food, daily necessities, clothing, and other consumption needs; and comfortable, when in addition to the consumption needs the family can afford to purchase durables and in general does not experience material difficulties. Farmers' families achieve a higher (perceived) well-being than the families of other rural households (characterized as employees; **Table 16.3**). The frequency of respondents reporting a comfortable standard of living is substantially higher among farmers than among employees; and conversely, the frequency of respondents reporting a low standard of living (just sufficient to meet the daily needs) is substantially higher among employee families. This is consistent with the observation that farmer families enjoy higher incomes than employee families.

Family well-being, like family income, also increases with the area of land. Households reporting a low level of well-being command significantly less land than households reporting a comfortable level of well-being (**Table 16.4**).

Figure 16.4: Family income (left panel) and per capita income (right panel) versus farm size for individual farms (households and peasant farms)



Source: FAO Farm Survey, 2005.

Note: Farm size is in logged hectares, i.e., -1 stands for 0.4 ha, 0 for 1 ha, 2 for 2.5 ha, 2 for 7 ha, 4 for 55 ha, 5 for 150 ha.

Table 16.4: Standard of living and family income increase with land area used (farm size, ha)*

Level of well-being	Farmers, ha used	Employees, ha used	Employees, ha owned
1. Low (not more than food and daily necessities)	61	1.45	3.73
2. Medium (daily necessities, clothing, etc.)	106	1.4	4.56
3. Comfortable (able to purchase durables)	326	4.21	4.53

Source: FAO Farm Survey, 2005.

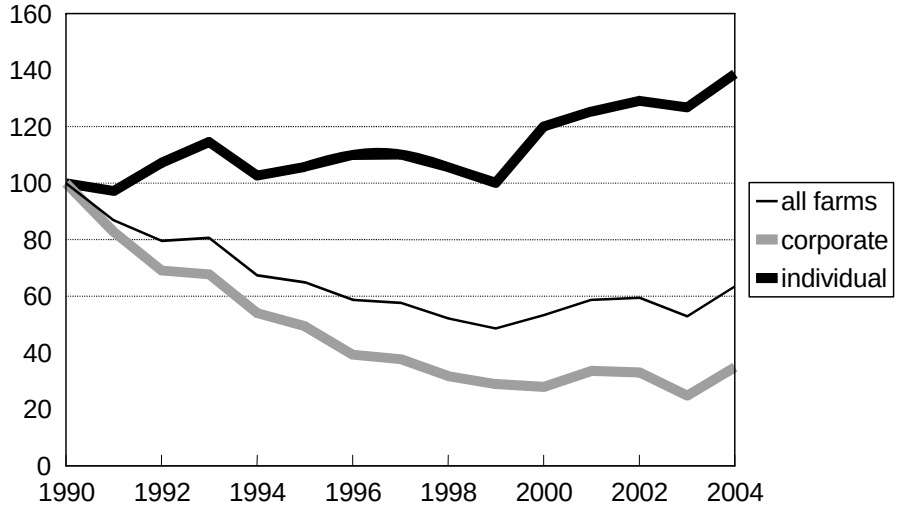
Note: * Statistically significant differences ($p = 0.10$): 1-3, 2-3 for farmers and employees based on land used; 1-2 for employees based on land owned.

4 There has been a spectacular recovery of agricultural production after 2000, primarily due to growth in individual farms

Overall, the agricultural output from both individual and corporate farms made a spectacular recovery since 1999, growing by 30% in constant prices (**Figure 16.5**, thin black curve). The decline in 2003 was a temporary setback associated with severe drought.

GAO in the individual sector grew by 45% during this period, whereas the corporate farm sector grew by only 11% from 1999 to 2004 (**Figure 16.5**, thick curves). Although the post-1999 reforms have had a particularly beneficial effect on the performance of individual farms, they also have had some impact in the corporate sector. The decline in output of corporate farms stopped in 2000 and the number of unprofitable corporate farms dropped from almost 100% in 1997-99 to around 40% in 2000-2004 (although the absolute losses continued to climb). Many interpreted the sudden improvement in farm performance as a result of the turnaround in government policies. Some believed that an important page had been turned in agricultural policy that would allow development of agriculture and rural areas to go forward.

Figure 16.5: Gross agricultural product (GAO) by farm type 1990-2004 (in percent of 1990)



Source: AGUKRAINE, 2004.

5 The move toward private farming has brought many features of normal market-oriented agriculture to Ukraine

a. The portion of the rural population connected to the corporate farm in Ukrainian rural areas has fallen considerably.

The reforms following the 1999 decree have brought a dramatic change in the employment structure of the rural population. In 1996, 67% of the adult population (in the ages between 18 and 60) worked in the local farm enterprise. In 2005, only 21% of the adults report that their main employment is with the corporate farm. When heads of households were asked to characterize their relations with the former collective fully two-thirds of respondents reported no relations with the corporate farm. One-third work on the corporate farm or are (passive) shareholders (**Table 16.5**). These findings are consistent with the prevailing opinion among Ukrainian scholars and officials that "only one-third of the able-bodied rural population work in corporate farms."

Table 16.5: Relations of heads of households with the local corporate farm

	% of respondents
No relations with corporate farm	68
Permanently employed by corporate farm	17
Temporary employment by corporate farm	5
Shareholder of corporate farm	10
Total	100

Source: FAO Farm Survey, 2005.

b. Household plots and corporate farms are more and more connected by paid service relations

The support for the household plot is no longer free, however. Survey estimates indicate that farm managers spend 57,000 hrivny per enterprise per year on household plot support. Of this amount, 76%, is reimbursed by the household (generally in the form of labor input or farm products) and the net cost to the farm enterprise is only 24% of the total. This net amount equals about 0.5% of the total annual expenditure of the average farm. Since there are around 700 households per farm enterprise in the survey, the net cost per household is a mere 20 hrivny per year.

Table 16.6 presents an inventory of services provided by farm enterprises to the rural population. The first column is based on the responses of corporate farm managers; the other two columns are based on the responses of heads of rural households and peasant farmers. Assistance with household plot cultivation and provision of transport services are the two most important items according to farm managers.

Table 16.6: Services provided by farm enterprises to the rural population: Responses of farm managers, household members, and peasant farmers (percent of respondents)

	Managers*	Household members	Peasant farmers
Assistance with plot cultivation	94	47	23
Transport	53	18	10
Feed, seeds	35	20	5
Veterinary services	22	22	5
Machinery maintenance and repairs	15	10	10
Fuel	7	9	8
Fertilizers, plant-protection chemicals	6	15	6
Assistance with sale of farm products	8	8	3

Source: FAO Farm Survey, 2005.

Note: * Percent of those who report providing services to the rural population (84% of the full sample).

c. Most social services have now been transferred to local governments

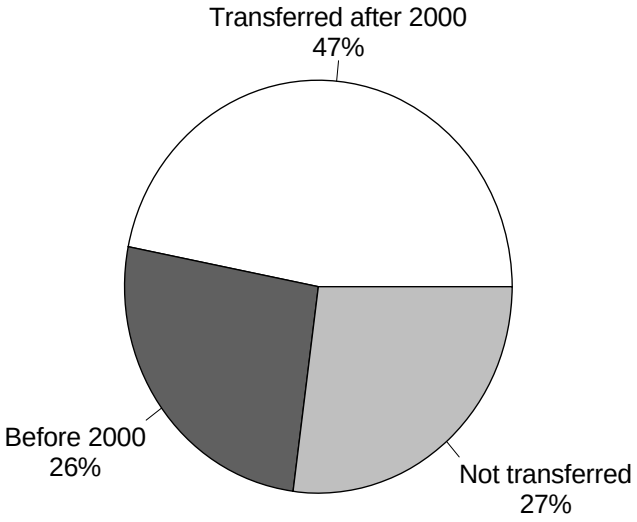
During the Soviet era, large farm enterprises were directly entrusted with maintaining the entire range of social services in the village. The farm enterprise took over the functions normally fulfilled by local government, building roads, supplying water, gas, and electricity, and providing housing. It traditionally provided access to a comprehensive range of services and benefits for its members and employees, and also for other rural workers, including teachers, doctors, postal employees, etc., who in fact were on state payroll and not employed directly by the farm. These social services ranged from daily necessities, such as house maintenance and repairs, heating fuel, or various goods at subsidized prices, to culture and recreation, such as clubs and sports facilities. School buildings, clinics, shops, and other public facilities in the village were maintained and often built by the farm enterprise, with or without reimbursement from the government. The budget for all these benefits and services came from the operating revenues of the farm enterprise, and the farms in effect combined production functions with overall responsibility for social services in the rural areas.

The reform agenda attempted to focus the large-scale farms on business and profits, which necessitated relinquishing their responsibility for rural social services. As part of their reorganization, farm enterprises were required to shed their social assets and transfer the responsibility for the social service infrastructure to the local councils. Initially, this process moved very slowly and haltingly, because the government failed to provide the local councils with the requisite budgets. As late as 1998, a World Bank study found that reorganized farm enterprises

continued to provide a wide range of social services and benefits to the rural population. The situation seems to have changed quite radically since 2000. Fully 73% of farm managers surveyed in 2005 reported that their social assets had been transferred to the local municipality. Of these, only 26% of farm enterprises had transferred their social assets prior to 2000; the remaining 47% transferred the social assets more recently (**Figure 16.6**).

The social assets were universally transferred to the local municipality or the state free of charge. Among the 27% of farm managers who did not transfer their assets, one-third claim that the municipality has no budget and thus cannot accept the responsibility, while the remaining two-thirds regard the free transfer of social assets as an economically unacceptable option and prefer to continue maintaining the social infrastructure themselves.

Figure 16.6: Transfer of social assets from corporate farms to the local council (percent of respondents)



Source: FAO Farm Survey, 2005.

d. Agricultural inputs are widely available and utilized for all types of farms…

Purchased inputs, machinery, land, and credit are the four main factors of production for farms everywhere. Purchased inputs such as fertilizer and plant protection agents are now largely purchased through commercial suppliers in Ukraine both by corporate and peasant farms. Farm machinery services are widely available either through ownership or through leasing services. Land leasing is widely employed for redistributing land from households to large corporate and peasant farms. Commercial credit is now widely available and utilized by farms.

Purchased inputs: Private trade – commercial suppliers and private individuals – are the main channel for farm inputs among managers and peasant farmers alike (**Table 16.7**). State suppliers continue to play an important role, but they are now far behind the commercial trade channels. Moreover, the role of state suppliers has declined dramatically over time: In the 1996 World Bank survey 60% of

peasant farmers reported purchasing inputs through state-owned channels, compared with around 15% in 2005. The reliance on private trade is particularly pronounced for the group of 8 high-priority inputs. Peasant farms tend to rely more than corporate farms on purchase of inputs from other farms. In general, other farms are a significant source of three kinds of inputs: Seeds and seedlings, young animals, and mechanized field works ("custom farming"). This is true for both corporate farms and peasant farms. In addition, peasant farms rely heavily on other farms for the purchase of machinery and equipment, often second-hand.

Table 16.7: Supply channels for farm inputs: Corporate farm managers and peasant farmers (percent of respondents)*

	All inputs (15)		High priority inputs (8)	
	Managers	**Farmers**	**Managers**	**Farmers**
State suppliers	16	14	18	15
Commercial suppliers	44	36	58	50
Private individuals	8	13	10	17
Own production	4	3	4	3
Other farms	5	7	6	9
Other sources	1	1	1	2

Source: FAO Farm Survey, 2005.

Note: * Frequency scores averaged over inputs for respondents reporting that they need the specific input (in percent). Multiple answers allowed for each input.

Table 16.8 demonstrates the changing roles of state and commercial suppliers during the last decade. The responses of both corporate farm managers and peasant farmers in two surveys separated by more than 10 years – the 1994 World Bank survey and the 2005 FAO survey – reveal a sharp decrease in the importance of state supply channels and a sharp rise in the importance of commercial suppliers. The reliance on other corporate farms as a source of inputs also declined dramatically over time. In 1994, the state and corporate farms dominated the markets for farm inputs in Ukraine; by 2005 the private commercial sector had captured the leading role among supply channels.

Table 16.8: Changing role of main supply channels: 1994 and 2005 (percent of respondents)

	Managers		Farmers	
	1994 WB survey	**2005 FAO survey**	**1994 WB survey**	**2005 FAO survey**
All inputs (15)				
State channels	45	16	42	14
Commercial suppliers	7	44	14	36
Other farms	49	5	22	7
High priority inputs (8)				
State channels	65	18	61	15
Commercial suppliers	7	58	19	50
Other farms	56	6	29	9

Source: FAO Farm Survey, 2005.

Access to purchased inputs was explored in more detail in the survey by asking the respondents – both managers and peasant farmers – to indicate if they were actually buying all that they needed in a list of 15 specific inputs. About 20% of respondents in both categories cannot buy the inputs that they need. When the answers are restricted to high-priority inputs (these are inputs identified as needed by more than 50% of respondents), the percentage of respondents who cannot buy what they need drops to 12-15%.

Farm machinery services: Availability of farm machinery is reported with fairly high frequency among all farm types (**Table 16.9**). Availability among corporate farms is practically universal; peasant farms are not far behind; and even among household plots 70% report some machinery and around 50% report tractors or light machinery (such as plows, tillers, and seeders). Vehicles, and especially trucks, are comparatively less accessible to household plots and peasant farms.

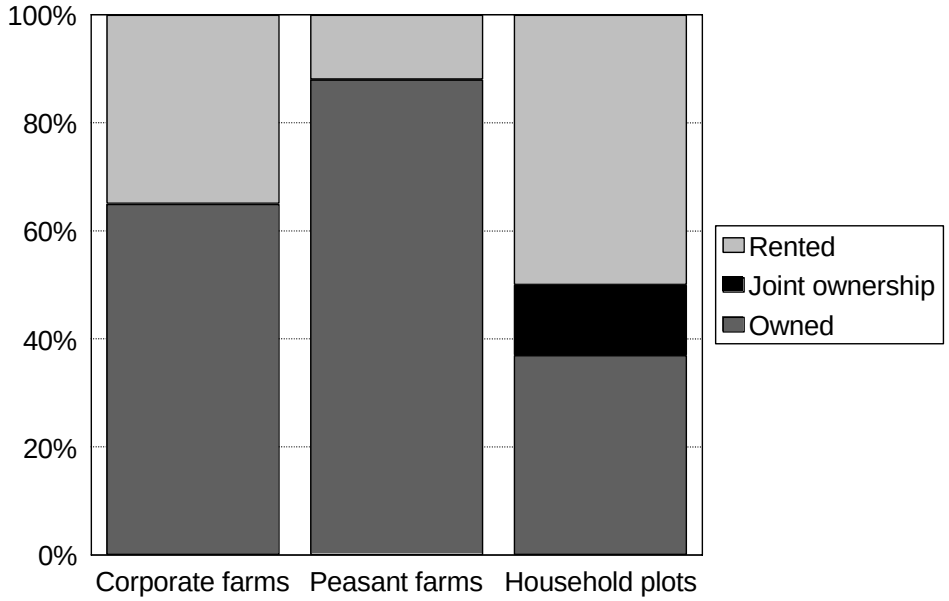
Table 16.9: Availability of farm machinery (percent of respondents reporting machinery)

	Corporate farms	Peasant farms	Household plots
Any farm machinery	95	89	70
Heavy machinery	94	85	49
Light machinery	92	83	57
Vehicles	91	52	19

Source: FAO Farm Survey, 2005.

Note: Heavy machinery – tractors, harvester, combines; light machinery – plows, tillers, seeders, trailers, etc.; vehicles – trucks, cars.

Figure 16.7: Sources of machinery by farm type (percent of respondents for corporate and peasant farms; percent of machinery units reported for household plots)



Source: FAO Farm Survey, 2005.

Corporate and peasant farms use primarily own machinery, which is supplemented with some rental equipment (**Figure 16.7**). Most of the rented equipment originates from private sources: Access to state leasing programs is virtually nonexistent in the survey. Contrary to peasant farms, household plot operators show a very high willingness to rent or share equipment with others. Own farm machinery accounts for only 37% of the total machine count among household plots, and fully 50% is rented for farm use as needed. These findings provide a definite indication of the existence of machinery rental markets, which clearly act to alleviate machinery constraints among farms of all types.

Land leasing is widespread among farms of all types in Ukraine. In household plots the land used for farming is just 36% of the family's total land holdings and the rest is leased out. Peasant farmers, unlike household plot operators, use all the available land and do not lease anything out. On the contrary, they lease in to augment their owned land. Of the 140 hectares in an average peasant farm, only 18% is owned land, while the remaining 82% is leased from other landowners or from the state. For comparison, the land used for farming in household plots (2.8 hectares on average) is 98% owned (**Table 16.10**). Corporate farms, unlike peasant farms and household plots, have very little own land and they rely primarily on land leased from individuals (members, shareholders, and other rural landowners).

Table 16.10: Sources of land used in peasant farms and household plots

	Ave plot size, ha	Total, %	Owned land, %	Leased land, %
Peasant farm	144	100	18	82
Household plot	2.8	100	98	2

Source: FAO Farm Survey, 2005.

Peasant farmers rely on land leasing markets to increase the size of their farms. More than half the peasant farmers surveyed lease in land, and the average size of these "lessee farms" is much larger than the size of farms without leased land (**Table 16.11**). Growth in farm size is entirely attributable to the leased component: One hectare of additional leased land produces a one hectare increase in farm size.

Table 16.11: Effect of leasing on farm size

	Percent of respondents	Farm size, ha
Farms with leased land	53	227*
Farms without leased land	47	53*
All sample	100	144

Source: FAO Farm Survey, 2005.

Note: * Difference significant by *t*-test (p=0.000).

In corporate farms most land is leased, and land owned by the corporate farm as a legal entity is less than 7% of the total of 1,711 hectares. Land is primarily leased from shareholders and other private individuals, who account for almost 90% of the land leased by corporate farms. (**Table 16.12**). Only a small minority

of the shareholders and other lessors actually work in the corporate farm: Most shareholders and lessors appear to be passive landowners who entrust their land to the corporate farm without demanding in return the security of a wage job on the farm.

Table 16.12: Structure of sources of leased land for corporate farms

Source	Percent of leased land
Members (shareholders)	42
Of which: Work in the corporate farm	16
Other private individuals	47
Of which: Work in the corporate farm	8
State, municipality, regional government	6
Other sources	5
Total leased land	100

Source: FAO Farm Survey, 2005.

While the participation rates in land lease markets are quite high, the market for buying and selling of land is still hopelessly undeveloped: Nobody in the survey reported selling land and only 5% of peasant farmers reported buying land in the last 5 years.

Commercial credit: Both corporate and peasant farms have a perception of significant access to credit. Fully 63% of corporate farm managers and 34% of peasant farmers report that they actually borrow (rural households borrow much less frequently – only 15% of respondents). In relation to respondents reporting that they need credit (**Table 16.13**), these numbers indicate that 71% of corporate farms and 42% of peasant farms that need credit in fact manage to borrow (at least partially). Corporate farms apparently enjoy better access to credit than peasant farms. This conclusion is strengthened by the observation that among peasant farmers 45% need credit, but cannot borrow, while the corresponding percentage among corporate farms is 26%.

Table 16.13: Perceived credit situation

	Farmers, %	Managers, %
Do not need credit	19	11
Borrow all that is needed	24	38
Borrow less than needed because of restrictions	10	25
Need credit, but cannot borrow	45	26

Source: FAO Farm Survey, 2005.

Access to credit has improved over time. Managers of corporate farms indicated that the credit situation today was better than before 2000, while among peasant farmers the percentage of respondents who could not borrow all that they needed dropped from 90% in 1994 to 55% in 2005. The percentage of peasant farmers using credit steadily increased from 15% in 1992 to 20% in 1994 and now to 33% in 2005. The respondents' view of improved access to credit was confirmed in separate interviews with regional officials.

Banks and input suppliers are the main sources of credit for both corporate and peasant farms. Commodity credit or credit in kind plays a marginal role in the survey, while wage arrears or debt for taxes and social deductions do not appear to be a problem. The state has practically disappeared as a source of credit for peasant farms. Formal credit is gradually replacing informal borrowing from relatives and others in the individual sector.

Agricultural producers typically borrow for 12 months at annual interest rates of around 19%. Given inflation rates of around 9% in 2004, the real cost of agricultural borrowing in Ukraine is 9-10% annually, which is quite high by world standards. The respondents generally complained that the interest rates were too high and the credit term too short: An acceptable interest rate for future borrowing would be 8% with credit term of 3 to 4 years. These acceptable interest rates are equivalent to zero (or even negative) real interest, which is not attainable economically.

Borrowing from the banks naturally requires collateral, which most corporate and peasant farms manage to provide. Lack or insufficiency of collateral was perceived as one of the three main obstacles to borrowing (after high interest rates and short credit term).

Contrary to the situation in the past, the level of indebtedness is not particularly high: The average farm debt can be paid off with 6-7 months of sales revenue. For corporate farms, the situation in 2005 appears to be a significant improvement compared with 1998, when debt-to-sales ratios were around 2 years and farm indebtedness was a major concern. Farm profitability has also improved signify-cantly since 1998, but farms with debt still have lower levels of profitability than farms without debt.

6 Despite many positive changes, Ukraine still faces appreciable challenges

a. Families in rural areas have little non-farm income

It is widely recognized that a key factor for ensuring higher well-being for rural families in developing and developed countries is increasing household participation in off-farm employment. For instance, an average farm in the United States from 1999 to 2003 earned 85-95% of its income from off-farm sources, up from 50% in 1960.[10] Even the largest U.S. farms (with sales over $500,000 per year) earned only 80% of income from farming activities in this period (USDA/ERS, 2006).

In Ukraine, on the other hand, rural households – families of both peasant farmers and rural employees – earn very little income from off-farm sources. **Table 16.14**

[10] Off-farm income includes employment earnings, other business activities, investments, and transfer payments.

shows that peasant farmers and farm employees receive only 13% and 28% of household cash income from non-farm sources.

Table 16.14: Structure of family cash income (in percent)*

	Farmers	Employees
Sales of farm products	87	31
Sale of services	2	2
Non-farm income (business and property)	0	4
Salaries	7	41
Social transfers	3	21
Remittances from relatives	0	1
Sale of assets	1	0
Other	0	0
Total income, %	100	100
Total income, hrivny	54,500	9,750
Per capita income, hrivny	15,300	3,100
Land used, ha	113	1.7

Source: FAO Farm Survey, 2005.

Note: * Based on weighted average amounts by sources of income.

Table 16.15: Diversification between agricultural and non-agricultural activities (percent of farms)

	Corporate farms	Peasant farms
Only agricultural activities	74	87
One non-agricultural activity	15	11
Two non-agricultural activities	6	1
More than two non-agricultural activities	5	1

Source: FAO Farm Survey, 2005.

Commercial farms in Ukraine – both corporate and peasant farms – mainly concentrate on primary agriculture (crops, livestock, orchards and vineyards), with relatively little diversification into non-agricultural activities (**Table 16.15**). This is especially true of peasant farms, where only 13% report any non-agricultural activities. Non-agricultural activities are almost always in addition to primary agriculture. **The paucity of off-farm employment opportunities in rural areas is perhaps the greatest hindrance to raising rural incomes.**

b. Ukrainian producers have significant problems of competitiveness compared with agriculture in the new EU countries

Crop yields in Ukraine lag significantly behind those in the countries of the European Union. Agricultural performance in Ukraine as measured by physical crop and livestock yields is generally worse than in the countries of the European Union. Ukrainian yields range between 20% and 70% of those of the EU-15 countries (**Table 16.16**). Ukrainian yields are also low compared to the new EU members (Poland, Czech Republic, Slovakia, and Hungary). Ukrainian yields are lower than the yields in these countries for each crop indicated in

Table 16.16 except grapes. Ukraine lags behind the new EU members also in growth of yields between 1992-94 and 2001-03 (**Figure 16.8**).

Table 16.16: Yields in Ukraine compared with EU-15

Crop	Ukrainian yields in percent of EU-15 yields (EU-15=100*)	Rank relative to new EU members** (5=bottom)
Barley	49	5
Cereals, total	45	5
Coarse grain, total	42	5
Grapes	61	4
Maize	40	5
Potatoes	31	5
Sugar beets	33	5
Sunflower seed	67	5
Tomatoes	19	5
Wheat	46	5

Source: FAOSTAT, 2006.

Notes: * EU-15 yields are averages for 2001-03.

** Includes Hungary, Poland, Czech Republic, and Slovakia.

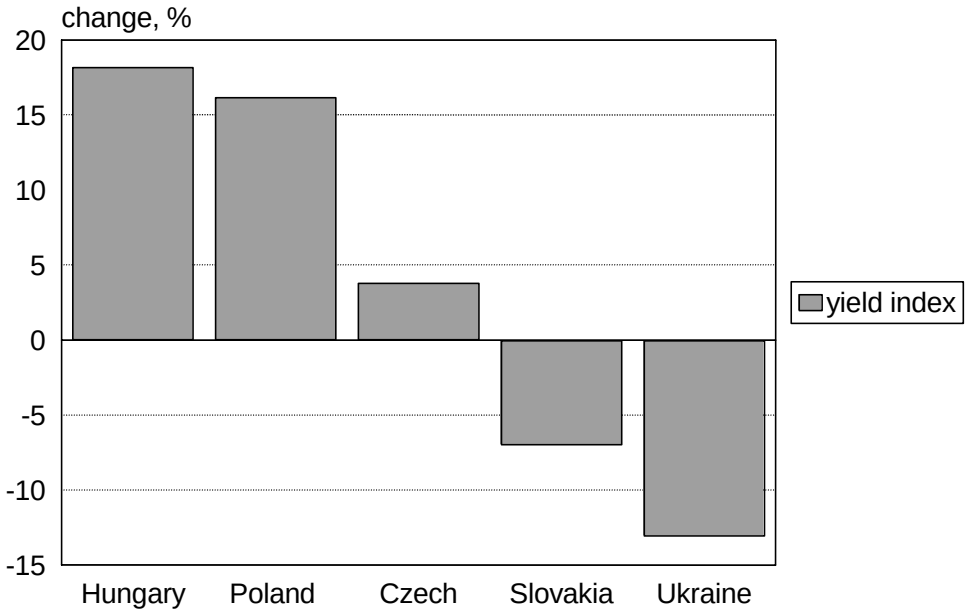
Three-fifths of agricultural land is still in corporate farms, which have significantly lower land productivity than household farms. Yields expressed in physical units of output per physical unit of (a single) input, such as land, provide the most basic and yet the crudest measure of productivity. The detailed picture with crop yields is not particularly clear, because we are dealing with a wide range of commodities. To bring out the general patterns, **Table 16.17** summarizes the pairwise yield comparisons across a wide range of different crops for the three farms types covered by the survey. Judging overall ("by majority"), household plots seem to be doing better than both corporate and peasant farms in crop production. In 6 out of 10 (or respectively 11) cases household plots achieve higher yields than corporate or peasant farms. In 3 more cases in either comparison category the differences in yields are not statistically significant. The yields achieved by household plots are lower only in 1 case compared with corporate farms and 2 cases compared with peasant farms. The picture between farmers and enterprises, on the other hand, is very mixed. It seems that corporate and peasant farms overall achieve comparable crop yields.

Table 16.17: Summary of pairwise comparisons of crop yields for farms of different types

	Corporate and peasant farms	Household plots and peasant farms	Household plots and corporate farms
Higher yields in hh plots	3	6	6
Lower yields in hh plots	3	2	1
No significant difference	8	3	3

Source: FAO Farm Survey, 2005.

Figure 16.8: Changes in crop yield index in the new EU members and Ukraine between the average for 1992-94 and the average for 2001-03 (percent)



Source: FAOSTAT, 2006.

Note: The yield index is a weighted average of the yields for five major crops – cereals, sunflower seeds, other oil crops, potatoes, and vegetables

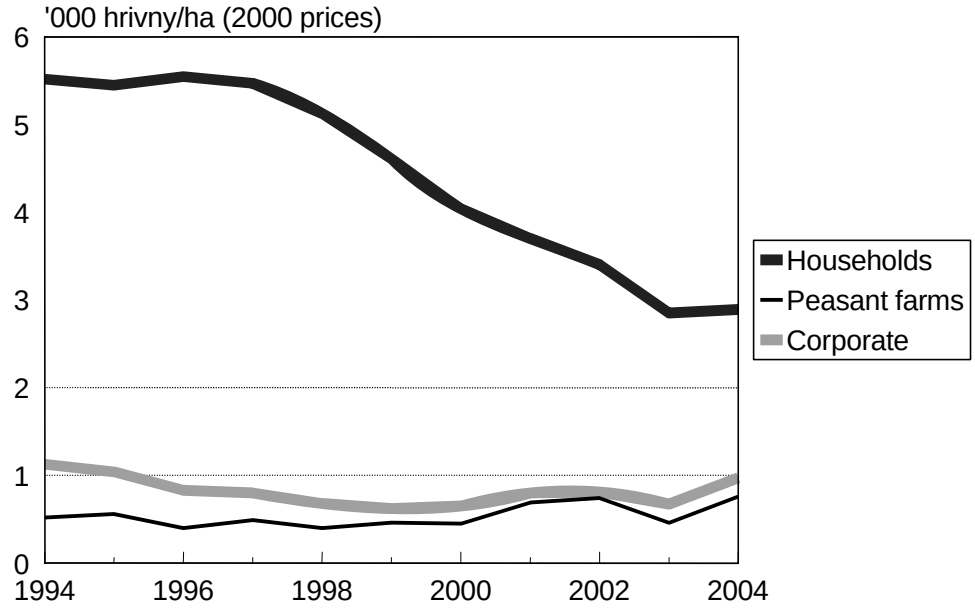
Intuitively, one would expect the large corporate farms and commercial farmers to have an advantage in scale crops, such as cereals, while household plots are usually hypothesized to have a yield advantage in horticultural crops (potatoes and vegetables). This is definitely not the situation that we observe in the survey. Household plots achieve outstanding results in wheat and barley, significantly better than corporate or peasant farms. On the other hand, household plots seem to lose their advantage in crops that are grown practically by everyone. Thus, potatoes and vegetables are produced by 85-95% of household plots in the survey, compared with 20% among corporate farms and 50% among peasant farms. We may speculate that when a relatively small number of respondents choose to produce a particular commodity (e.g., cereals among household plots, horticultural crops among corporate and peasant farms), a positive selection effect ensures that these producers achieve higher yields.

In livestock production, milk yields (in kg per cow per year) reported in the 2005 FAO survey are significantly lower for corporate farms than for individual farms (2,600 kg per cow per year for corporate farms compared with 3,700 kg for peasant farms and household plots combined; the differences in milk yields within the individual sector are not statistically significant).

Figure 16.9 shows the partial productivity of land for the period 1994-2004 for corporate farms, peasant farms and household farms. The partial productivity of land is calculated as the ratio of the value of production (in constant prices) to

land used. Although the land productivity of household farms decreased over time as they acquired more land (a decreasing returns to scale effect), it remained consistently higher than the land productivity of corporate and peasant farms. The gap between the two series is very substantial: The mean productivity for household plots for the period 1994-2004 is around 4,000 hrivny/ha, whereas the mean productivity for corporate farms and peasant farms is less than 1,000 hrivny/ha. It is interesting to note that the land productivity of peasant farms taken on their own is much lower than the productivity of household plots – the other component of the individual sector. It is even lower than the productivity of corporate farms, although we observe definite convergence between corporate and peasant farms during this period, as land productivity of peasant farms rises from 60% of the productivity of corporate in 1994-1999 to over 80% in 2000-2004. The newly created peasant farms presumably need time to adapt to external conditions and start performing on a par with other farm types. A similar comparative pattern is observed in Russia, where household plots are more productive than either corporate or peasant farms, whereas the latter two farm types are often statistically indistinguishable by their productivity results.[11]

Figure 16.9: Partial productivity of land by farm type 1994-2004 (in constant prices)



Source: AGUKRAINE, 2004.

Profitability of corporate farms has improved, but many are still unprofitable. Corporate farms participating in the survey provided profit and loss information based on annual financial reports. Given the partial response of the respondents to financial questions, profit analysis could be conducted for at most 142 out of 208

[11] These results for Russia emerge from a recent BASIS/CRSP study using a 2003 survey of farms of different organizational forms. The corresponding findings are forthcoming in BROCK et al. (2007).

farms surveyed. Of these, 70% are profitable (positive gross profit) and 30% are loss-makers. This constitutes a dramatic improvement compared with the situation in 1997, when 84% of farms surveyed reported losses (1998, WORLD BANK SURVEY). The increase in the frequency of profitable farms was accompanied by a marked increase in profitability levels (**Table 16.18**). The overall profit margin in the sample (the ratio of gross profit to sales) increased from a loss of −24% in 1997 to a profit of +12% in 2005. The profit margin of the profitable farms as a subgroup rose from 11% in 1997 to 25% in 2005.

Table 16.18: Profitability of corporate farms in 2005 compared with 1997

	Percent of farms		Profit margin, % of sales	
	2005	**1997**	**2005**	**1997**
All farms	100	100	+12	−24
Farms reporting profits	70	16	+25	+11
Farms reporting losses	30	84	−21	−39

Source: FAO Farm Survey, 2005; WORLD BANK SURVEY, 1997.

There does not seem to be any relationship between profitability and the reorganization mode or reorganization time of the corporate farms. The ratio of 70% profitable farms to 30% loss-makers observed in the entire sample persists both among the new reorganized structures (i.e., farms created as new organizations or through the splitting of former collectives) and the legacy structures (i.e., farms that are one-to-one successors of former collectives). The same ratio is also obtained for corporate farms created before and after 1999. The "new wave" farms are thus not doing any better than their older counterparts, and the improved profitability is a general feature of the economic system. Nor is there a relationship between profitability and farm size: Although the average size for the group of profitable farms is somewhat larger than for the loss-makers (2,000 hectares compared with 1,700 hectares), the difference is not statistically significant ($p = 0.25$).

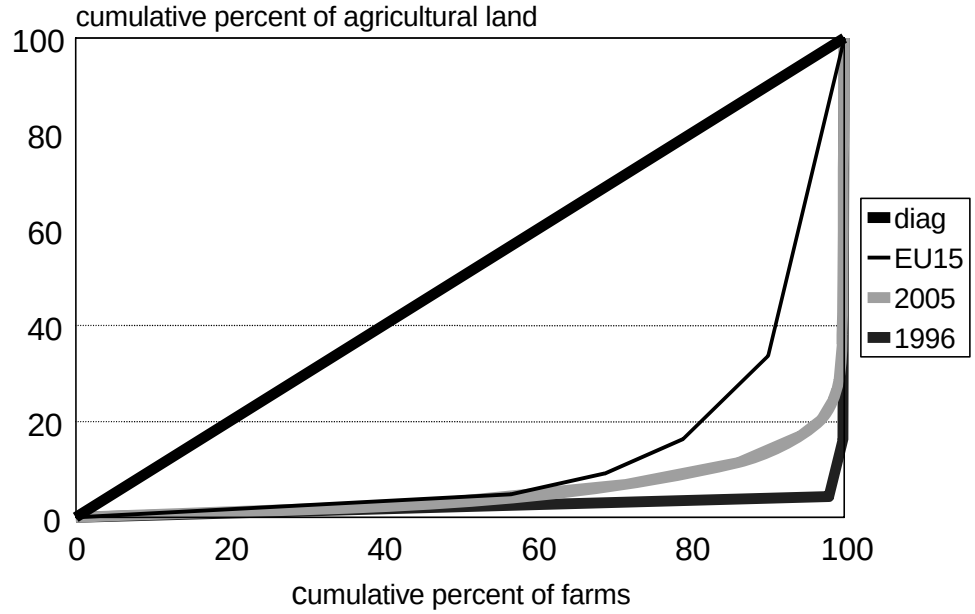
c. There is still a strong duality of farm structure in Ukraine. Though the duality is not as severe as in Soviet times, the lack of mid-sized farms is an obstacle to the development of internationally competitive agriculture.

Large gaps in size between farms of different types are still observed in Ukraine: The mean size in the 2005 survey is 1,700 hectares for corporate farms, 140 hectares for peasant farms, and 1.7 hectares for household plots. The corporate farms, although shrinking rapidly, are still much larger than in market economies (500-600 hectares per corporate farm in the U.S.), while the household plots, although definitely growing, are still much smaller than the average family farm in market economies (130 hectares in land-rich U.S., 20 hectares in EU-15). The size gaps perpetuate the strong duality of farm structure that characterized Soviet agriculture and create a farm size distribution that is neither reasonable nor effective by the benchmark of market agriculture.

The 1999 decree was instrumental in decreasing the duality of land holding in Ukraine, primarily through adding land to small holding agriculture and increasing the portion of total land they farm. **Figure 16.10** illustrates the degree of inequality in the size distribution of agricultural land in the EU-15 and Ukraine in 1996 and 2005. In this figure the horizontal axis indicates the cumulative percent of farms, the vertical axis the cumulative percent of land. The diagonal line illustrates a situation of complete equality in which each farm occupies an identical portion of total land. Along the diagonal 10 percent of farms occupy 10 percent of agricultural land, 20 percent of farms occupy 20 percent of land, and so on. Inequality in the distribution of farm land is shown by the bowing out of the curve. The most severely bowed out line (Ukraine, 1996) illustrates a situation where about 97 percent of farms hold only 5 percent of land and 3 percent of farms hold 95 percent of land.

Figure 16.10 demonstrates the profound changes in land concentration in Ukraine between 1996 and 2006 due to the 1999 decree. By 2005, 90% of farms held 15% percent of land (up from 2% in 1996), while 3% percent of largest farms held 40% of land (down from 96% in 1996). Agricultural land holdings shifted significantly from large to small farms between 1996 and 2005. The distribution of land holding in Ukraine in 2005, however, is still far from the distribution in the EU-15, which represents distribution of land in market economies. In the EU-15, 90% of farms held 33% of land (compared to 15% in Ukraine in 2005), while 3% of largest farms held about 10% of land (compared to 40% in Ukraine). This is a far more equitable distribution of land than in Ukraine, even in 2005.

Figure 16.10: Distribution of agricultural land in farm holdings in Ukraine and EU-15



Source: 1996 from statistical yearbooks; 2005 from FAO survey data adjusted to national proportions; EU-15 from EU 2004.

The reason why the size distribution of land is so important is that experience of market economies has shown that the most viable farms in market circumstances are neither the small household farms under 5 ha, nor the large corporate farms of 1,000 ha or more. The most viable farms in a market environment are mid-sized farms of between 15 ha and 300 ha. The average size of a farm in the EU-15 is around 20 ha, while in the United States the average size is 130 ha. Ukraine lacks a large contingent of mid-sized farms, precisely the kind of farms that market agriculture has shown are competitive in world markets.

d. Still, a bleak picture for the future of the Ukrainian village…

Regardless of the relative success of peasant farming, the survey paints a bleak picture of the future of the Ukrainian village. Around 50% of respondents (both peasant farmers and rural employees) would like to see their children leave the village. Around 15% would like their children to stay in the village but go into business instead of farming. Farming as a future occupation of the children is envisaged by only 24% of peasant farmers and as few as 8% of other rural residents. The Ukrainian village is in the danger of being left without a continuing generation of farmers.

REFERENCES

AGMOLDOVA (2004): Agriculture of Moldova 2004, *Statistical Yearbook*, Chisinau, Department of Statistics and Sociology.

AGUKRAINE (2004): Agriculture of Ukraine 2003, *Statistical Yearbook*, Kiev, State Statistics Committee of Ukraine.

AGUKRAINE (2006): Agriculture of Ukraine 2005, *Statistical Yearbook*, Kiev, State Statistics Committee of Ukraine.

AGRUSSIA (2004): Agriculture in Russia 2004, *Statistical Yearbook*, Moscow, Rosstat.

AHEARN, M., YEE, J., HUFFMAN, W. (2002): The effect of contracting and consolidation on farm productivity, paper presented at the Economics of Contracting in Agriculture Workshop, Annapolis, MD (July).

ASLUND, A. (2002): Why has Ukraine returned to economic growth?, *Institute for Economic Research and Policy Consulting in Ukraine Working Papers No. 15*, July.

BROCK, G., GRAZHDANINOVA, M., LERMAN, Z., UZUN, V. (2007): Technical efficiency in Russian agriculture, in: LERMAN, Z. (ed.): Russia's Agriculture in Transition: Factor Markets and Constraints on Growth, Lanham, MD, Lexington Books.

CSAKI C., KRAY, H. (2005): The agrarian economies of CEE and CIS: An update on status and progress in 2004, *ECSSD Working Paper No. 40*, World Bank, Washington, DC.

CSAKI, C., LERMAN, Z. (2001): Farm restructuring and land reform in Ukraine: Policies to revive the agricultural sector, *Policy Studies No. 15: Agricultural Reform in Ukraine*, Kiev, International Center for Policy Studies, January.

CSAKI, C., LERMAN, Z., SOTNIKOV, S. (2001): Farm debt in the CIS: A multi-country study of the major causes and proposed solutions, *World Bank Discussion Paper 424*, Washington, DC, World Bank.

DECREE (1999): Presidential Decree No. 1529/99 "On immediate measures to accelerate the reforms in the agricultural sector", December 3.

DERZHKOMZEM (various years). Naličie zemel' i raspredelenie ich po zemlepol'zovateljam, sobstvennikam zemli i ugodii, *Statistical Yearbook*, Kiev, State Land Committee.

DUDWICK, N., FOCK, K., SEDIK, D. (2005): A stock-taking of land reform and farm restructuring in Bulgaria, Moldova, Azerbaijan, and Kazakhstan, *Draft analytical report*, Washington, DC, World Bank, February.

EC (2002): Agricultural situation in the Candidate Countries: *Country Reports* <[http://europa.eu.int/comm/agriculture/external/enlarge/publi/index_en.htm>.

EU (2004): Agriculture in the European Union: Statistical and Economic Information 2003, Brussels, European Union, Directorate-General for Agriculture.

FAOSTAT (2006): <http://faostat.fao.org/>.

HOUSEHOLDS (2006): Main agricultural characteristics of households in rural areas in 2005, *Statistical Bulletin*, Kiev, State Statistics Committee of Ukraine.

LAW (1993). Law of Ukraine on amendments and additions to some legislative acts of Ukraine, Article 3, May 5.

LERMAN, Z., BROOKS, K., CSAKI, C. (1994): Land reform and farm restructuring in Ukraine, *World Bank Discussion Paper 270*, Washington, DC, World Bank.

LERMAN, Z., BROOKS, K., CSAKI, C. (1995): Restructuring of traditional farms and new land relations in Ukraine, *Agricultural Economics*, *13:* 27-37.

LERMAN, Z., CSAKI, C. (1997): Land reform in Ukraine: The first five years, *World Bank Discussion Paper 317*, Washington, DC, World Bank.

LERMAN, Z., CSAKI, C. (2000): Ukraine: Review of farm restructuring experience, *World Bank Technical Paper 459*, Washington, DC, World Bank.

LERMAN, Z., CSAKI, C., FEDER, G. (2004): Agriculture in transition: Land policies and evolving farm structures in Post-Soviet Countries, Lanham, MD, Lexington Books.

MOLDOVA (2005): Moldova agricultural policy notes: Agricultural land, *Draft analytical report*, Washington, DC, World Bank.

OECD (2003): Achieving Ukraine's agricultural potential: Stimulating agricultural growth and improving rural life, Paris, October.

RYLKO D., JOLLY, R. (2005): Russia's new agricultural operators: Their emergence, growth, and impact, *Comparative Economic Studies*, *47(1):* 115-126.

SEDIK, D. (2004): Mission pillars: The failures of rural finance in Ukraine, in: MACEY, D., PYLE W., WEGREN, S. (eds.): Building Market Institutions in Post-Communist Agriculture: Land, Credit and Assistance, Lanham, MD, Lexington Books, pp. 107-128.

SEDIK, D., SEPEROVICH, N., PUGACHEV, N., CHAPKO, I., KOBUTA, I., NOGA, V., ZHYGADLO, V. (2000): Farm debt in the CIS: A multi-country study of major causes and proposed solutions, *Environmentally and Socially Sustainable Development Working Paper 28*, Washington, DC, World Bank.

SHMIDT, R., PUGACHOV, M. (2000): Reforming the agricultural sector of Ukraine [in Ukrainian and English], Kiev, Yunivest Marketing.

USDA/ERS (2004): Agricultural income and finance outlook 2004, *AIS 82*, Washington, DC, U.S. Department of Agriculture, Economic Research Service, November.

USDA/ERS (2006): Economic well-being of farm households, *Economic Brief Number 7*, Washington, DC, U.S. Department of Agriculture, Economic Research Service.

USDA/NASS (2004): 2002 Census of agriculture, Washington, DC, U.S. Department of Agriculture, < www.usda.gov/nass>.

VON CRAMON-TAUBADEL, S. (2003): The situation on Ukraine's grain market: Crisis! What crisis?, *Institute for Economic Research and Policy Consulting in Ukraine Working Papers no. T9*, September.

VON CRAMON-TAUBADEL, S., ZORYA, S. (eds.) (2001): Policies and agricultural development in Ukraine, Aachen, Shaker Verlag.

WDI (2006): World development indicators, World Bank, Washington, DC, 2006.

INDEX

Studies on the Agricultural and Food Sector in Central and Eastern Europe
edited by Leibniz Institute of Agricultural Development in Central and Eastern Europe (IAMO)
ISSN 1436-221X

Vol. 1 **The Importance of Institutions for the Transition in Central and Eastern Europe with Emphasis on Agricultural and Food Industry**
ed. by Klaus Frohberg and Witold-Roger Poganietz
1998, 137 pages, ISBN 3-8175-0258-3

Vol. 2 **The Significance of Politics and Institutions for the Design and Formation of Agricultural Policies**
ed. by Klaus Frohberg and Peter Weingarten
1999, 254 pages, ISBN 3-8175-0289-3

Vol. 3 **Food Processing and Distribution in Transition Countries. Problems and Perspectives**
ed. by Monika Hartmann and Jürgen Wandel
1999, 349 pages, ISBN 3-8175-0293-1

Vol. 4 **Die private Nachfrage nach Nahrungsmitteln im Transformations-prozeß Tschechiens und Polens**
Stephan Brosig (PhD)
2000, 171 Seiten, ISBN 3-8175-0319-9

Vol. 5 **Integrating Estonia into the EU: Quantitative Analysis of the Agricultural and Food Sector**
Achim Fock (PhD)
2000, 286 pages, ISBN 3-8175-0320-2

Vol. 6 **Competitiveness of Agricultural Enterprises and Farm Activities in Transition Countries**
ed. by Peter Tillack and Frauke Pirscher
2000, 216 pages, ISBN 3-8175-0322-9

Vol. 7 **Конкурентоспособность сельскохозяйственных предприятий и фермерской деятельности в странах переходного периода**
под редакцией Петера Тиллака и Фрауке Пиршер
2000, 253 страницы, ISBN 3-8175-0324-5

Vol. 8 **Perspectives on Agriculture in Transition: Analytical Issues, Modelling Approaches, and Case Study Results**
ed. by Witold-Roger Poganietz, Alberto Zezza, Klaus Frohberg and Kostas G. Stamoulis
2000, 433 pages, ISBN 3-8175-0323-7

Vol. 9 **Land Ownership, Land Markets and their Influence on the Efficiency of Agricultural Production in Central and Eastern Europe**
ed. by Peter Tillack and Eberhard Schulze
2000, 485 pages, ISBN 3-8175-0325-3

Vol. 10 **Landwirtschaft und Industrie in Russland – der Transformations-prozeß in der Ernährungsindustrie**
Jürgen Wandel (PhD)
2000, 361 Seiten, ISBN 3-8175-0334-2

Vol. 11 **Food Consumption in Russia. An Econometric Analysis Based on Household Data**
Karin Elsner (PhD)
2001, 256 pages, ISBN 3-8175-0335-0

Vol. 12 **Alexander Wasiljewitsch Tschajanow – die Tragödie eines großen Agrarökonomen**
hrsg. u. übers. von Eberhard Schulze
2001, 192 Seiten, ISBN 3-8175-0342-3

Vol. 13 **Analysis of Food Consumption in Central and Eastern Europe: Relevance and Empirical Methods**
ed. by Stephan Brosig and Monika Hartmann
2001, 253 pages, ISBN 3-8175-0349-0

Vol. 14 **Wettbewerbsprozesse und Firmenwachstum in der Transformation am Beispiel der polnischen Fleischindustrie**
Agata Pieniadz (PhD)
2002, 291 Seiten, ISBN 3-8175-0360-1

Vol. 15 **Agricultural Enterprises in Transition: Parallels and Divergences in Eastern Germany, Poland and Hungary**
ed. by Ludger Hinners-Tobrägel and Jürgen Heinrich
2002, 455 pages, ISBN 3-8175-0366-0

Vol. 16 **Agricultural Technology and Economic Development of Central and Eastern Europe. Results of the Workshop in Halle, 2nd – 3rd July 2001**
ed. by Peter Tillack and Ulrich Fiege
2002, 160 pages, ISBN 3-86037-199-1

Vol. 17 **Региональные аспекты аграрных преобразований: политика, реструктуризация, рыночная адаптация**
под редакцией Петера Тиллака и Виталия Зиновчука
2003, 236 страницы, ISBN 3-928466-55-0

Vol. 18 **Alexander Vasilievich Chayanov – the Tragedy of an Outstanding Agricultural Economist**
ed. by Eberhard Schulze
2003, 188 pages, ISBN 3-86037-201-7

Vol. 19 **Development of Agricultural Market and Trade Policies in the CEE Candidate Countries**
by the Network of Independent Agricultural Experts in the CEE Candidate Countries
2003, 72 pages, ISBN 3-86037-212-2

Vol. 20 **Large Farm Management**
ed. by Alfons Balmann and Alexej Lissitsa
2003, 396 pages, ISBN 3-86037-213-0

Vol. 21 **Success and Failures of Transition – the Russian Agriculture between Fall and Resurrection**
ed. by Eberhard Schulze, Elke Knappe, Eugenia Serova, Peter Wehrheim
2003, 521 pages, ISBN 3-9809270-1-6

Vol. 22 **Subsistence Agriculture in Central and Eastern Europe: How to Break the Vicious Circle?**
ed. by Steffen Abele and Klaus Frohberg
2003, 233 pages, ISBN 3-9809270-2-4

Vol. 23 **Pfadabhängigkeiten und Effizienz der Betriebsstrukturen in der ukrainischen Landwirtschaft – Eine theoretische und empirische Analyse**
Andriy Nedoborovskyy (PhD)
2004, 197 Seiten, ISBN 3-86037-216-5

Vol. 24 **Nichtmonetäre Transaktionen in der ukrainischen Landwirtschaft: Determinanten, Spezifika und Folgen**
Olena Dolud (PhD)
2004, 190 Seiten, ISBN 3-9809270-3-2

Vol. 25 **The Role of Agriculture in Central and Eastern European Rural Development: Engine of Change or Social Buffer?**
ed. by Martin Petrick and Peter Weingarten
2004, 426 pages, ISBN 3-9809270-4-0

Vol. 26 **Credit rationing of Polish farm households – A theoretical and empirical analysis**
Martin Petrick (PhD)
2004, 254 pages, ISBN 3-9809270-6-7

Vol. 27 **Drei Jahrhunderte Agrarwissenschaft in Russland: Von 1700 bis zur Gegenwart**
Alexander Alexandrowitsch Nikonow und Eberhard Schulze
2004, 232 Seiten, ISBN 3-9809270-8-3

Vol. 28 **Russlands Weg vom Plan zum Markt: Sektorale Trends und regionale Spezifika**
Peter Voigt (PhD)
2004, 270 Seiten, ISBN 3-9809270-9-1

Vol. 29 **Auswirkungen des Transformationsprozesses auf die sozio-ökonomischen Funktionen ukrainischer Landwirtschaftsunternehmen**
Helga Biesold (PhD)
2004 182 Seiten, ISBN 3-938584-00-9

Vol. 30 **Agricultural policies and farm structures – agent-based modelling and application to EU-policy reform**
Kathrin Happe (PhD)
2004, 291 pages, ISBN 3-938584-01-7

Vol. 31 **How effective is the invisible hand? Agricultural and Food Markets in Central and Eastern Europe**
ed. by Stephan Brosig and Heinrich Hockmann
2005, 361 pages, ISBN 3-938584-03-3

Vol. 32 **Erfolgsfaktoren von landwirtschaftlichen Unternehmen mit Marktfruchtanbau in Sachsen-Anhalt**
Kirsti Dautzenberg (PhD)
2005, 161 Seiten, ISBN 3-938584-06-8

Vol. 33 **Agriculture in the Face of Changing Markets, Institutions and Policies: Challenges and Strategies**
ed. by Jarmila Curtiss, Alfons Balmann, Kirsti Dautzenberg, Kathrin Happe
2006, 544 pages, ISBN 3-938584-10-6

Vol. 34 **Making rural households' livelihoods more resilient – The importance of social capital and the underlying social networks**
ed. by Gertrud Buchenrieder and Thomas Dufhues
2006, 106 pages, ISBN 3-938584-13-0

Vol. 35 **Außerlandwirtschaftliche Diversifikation im Transformationsprozess. Diversifikationsentscheidungen und -strategien ländlicher Haushalte in Slowenien und Mazedonien**
Judith Möllers (PhD)
2006, 323 Seiten, ISBN 3-938584-14-9

Vol. 36 **Accessing rural finance – The rural financial market in Northern Vietnam**
Thomas Dufhues (PhD)
2007, 166 Seiten, ISBN 3-938584-16-5

Vol. 37 **Страхование посевов в Казахстане: Анализ возможностей эффективного управления рисками**
Раушан Бокушева, Олаф Хайдельбах, Талгат Кусайынов
2007, 82 Seiten, ISBN 3-938584-17-3

Vol. 38 **Rethinking agricultural reform in Ukraine**
Zvi Lerman, David Sedik, Nikolai Pugachov, Aleksandr Goncharuk
2007, 167 Seiten, ISBN 3-938584-18-1