LAND REFORM IN UKRAINE
AND EMERGENCE OF NEW PRIVATE FARMS

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SUMMARY

1. Introduction

Ukraine is one of the most dynamically changing agricultural countries in the world. It has become the continent's largest producer and exporter of corn, and the second largest producer of sunflower seeds and sunflower oil. From 2000 to 2010, the average annual growth rate of agricultural production in Ukraine was about 2%, indicating good production performance after the implementation of the reform. The main factor behind the drastic changes in agricultural production is the Land Reform that started in 1991.

Generally speaking land reform aims to create more equitable rural society through land redistribution. The Agricultural Reform in Japan which was conducted after the Second World War, had the objective to create homogeneous rural society by changing agricultural structure through reallocating agricultural land. Land Reform in Ukraine also aimed to reallocate agricultural land, but not from individual to individual, but from state to individual. At the same time, Ukraine Land Reform had the intension to contribute to the switch of economic system from planned economy to market economy. Because of twofold objectives that the Ukraine Land Reform had, it can be said that the Reform had different kind of difficulty from the reform Japan had.

2. Purpose of the research

This research focuses on the farmers' response to the Land Reform in Ukraine. It aims to offer a farm level evaluation of Agricultural Land Reform in Ukraine, by discussing changes in behavior of private farms in the process of the Land Reform. For this purpose, first the process of the Land Reform implementation was examined. Second,

based on the field survey in one area, this paper investigates how private farms changed their operating land size under the current institutional framework on agricultural land. Third, also based on the information collected through the survey, the paper tries to discuss whether new type of farming units were emerging, by examining land use, crop selection, production cost structure, revenues and income of private farms as well as their attributes.

3. Methodology of the research

The paper focuses on private farms. In current Ukrainian agriculture farming units can be classified into three organizational categories: agricultural enterprises (or corporate farms), and individual farms consist of private households and private farms. Agricultural enterprises are considered to be relatively large farms that have replaced the traditional collective and state farms. Individual farms consist of private farms and private households, and the major difference between them lies in the size and purpose of their activities. Private farms are commercially oriented, whereas private households are operated mainly for home consumption. In order to examine the appearance of market oriented farming units, it is appropriate to discuss changes in behavior of private farms. It should be noted however that the share of private farms in total agricultural production in Ukraine was just 7 percent in 2013.

The targeted study area of this research is Zhytomyr oblast, .one of the major agrarian oblasts of Ukraine. An initial questionnaire survey was conducted in 2010, followed by another survey. The survey had interviews with 50 private farmers in 2011-2013. All farmers in the study were members of the Zhytomyr Farmers Association established in 1995.

Zhytomyr oblast was selected for the research not only because of direct assistance from the Zhytomyr Farmers Association in the data collection process, but also because the oblast is similar to other areas in terms of land fertility and climate, as well as farming methods. Some parts of the oblast fall within the Chernobyl Zone, however, the study area is located far away from that zone and agricultural practices are conducted on the common countrywide basis.

Based on the literature review on the Land Reform in Ukraine especially on micro level impact, this paper reveals that academic literatures have extensively covered the progress of the reform and its impact on the performance of agriculture. However, researches on farmers' response to the reform at the micro level have not been well accumulated. This study provides in-depth empirical data from the respondents' point of view to contribute to the literature on land reform.

4. Land tenure changes of studied private farmers

Before starting the analysis on land tenure changes based on filed survey, the process of land reform implementation in Ukraine is described comprehensively with the history and the current status of the land reform. The process of the reform is clarified by classifying its evolution into three stages, identifying the typology of the farms, and finally, discussing the land moratorium in Ukraine. The Land reform in Ukraine is the long process and still not completed. Especially land market with the transaction of land ownership is not formulated as is indicated by the word of Land Moratorium.

Based on this institutional framework, the land tenure changes of surveyed private farms is examined. First, information on the profile of the interviewed farmers has to be explained. The average family size of the surveyed farmers was four persons (a typical

Ukrainian family with two children). The average age of the farm head was around 42 years, indicating the general aging trend of farmers in the country. Round three fourth of the farmers considered farming a full-time occupation. As for farmlands operated by farmers, they ranged from 6 to 50 ha. The total operated agricultural land in the sample comprised 1,138 hectares, with the average holdings of the studied farmers being 22.8 hectares.

The land tenure status of the studied farmers was associated with land size changes, resulting in three types of farms: expanding (n=15), maintaining (n=26), and shrinking farms (n=9). Among the three categories, the average starting land size, as well as land size in 2013 was the highest for expanding farms. No changes were observed for maintaining farms, whereas the land size of shrinking farms dropped to almost two- thirds. Actually, the size of privately owned land (privatized land) for shrinking farms did not change, but rented-in land decreased in size. For expanding farms the size of their own land almost doubled, while that of their rented-in land increased by one-half. However, agricultural development is constrained by the sensitive issue of private land ownership. The absence of land market has prevented the use of land as collateral, thus severely limiting the availability of credit. The Rada (Ukrainian Parliament) implemented Moratorium on the sale and purchase of agricultural land (in force until January 2016) owing to concerns over land speculation. Reform in this area is now more likely to focus on land leasing.

According to the survey, 4 of 15 expanding farmers increased their land size by renting in extra land. The remaining 11 expanded by registering partners in the farm. This could be considered an alternative farm enlargement method. The registered partner receives the land plot free of charge from the State Reserve. Moreover, he will not only

have a right to share in the profit of the farm, instead of receiving a salary, but also to bear some of the responsibilities and expenses of the farm. In general, this type of land transfers could be considered a viable employment option in rural areas with an accompanying "land bonus."

Besides, the paper examines the determinant factors on land rent. A large variation in rental level among rent tenancy contracts of studied farmers was observed and in order to identify factors affecting the rental level, regression analysis for rent function was conducted with the rental per hectare being the dependent variable. The result indicates that rental tended to be higher for the land plots with long-term contract period (1 for 10 years contract, which was dummy variable) and for potentially fertile and high-yielding lands of former kolkhoz (1 for lands of former kolkhoz, which was dummy variable), even if such land would be far away from the tenant's farm. All kolkhozes lands are located outside the village area, but most of the expanding farmers in the study were willing to look for land preferably from lands of former kolkhoz with 10 years rent contract, even at a distance from the farm and at the higher negotiated level of rental.

5. Attributes of expanding farms and their economic performance

Some points regarding the profile of farmers interviewed deserve mention. First, the heads of expanding farms were much younger (35 years on average) than those of non-expanding farms, with an average age of 47 years. Second, the distribution of farmers by education showed that most of them were well educated. However, the expanding farmers had higher educational level (degree) compared to non-expanding farmers (including maintaining and shrinking farms). Moreover, 87% of expanding farmers also had international farming experience, participated in different agriculture-related training

programs, and took various farming-related courses, all of which definitely had a positive influence on the farms' operation strategy.

Grouping the surveyed private farms by land size change allowed us to observe an interesting feature of crop selection among the groups of studied farms in the sample. Expanding farmers in 2000 were using 92% of their land area for growing grain crops, such as wheat, barley and rye. The similar tendency was observed for non-expanding farmers, who used their lands mostly for grain crops. However, in 2010 the situation changed. Expanding farmers started introduction of new crops, such as soy and vegetables, and the area under the grain crops decreased up to 37%. Non-expanding farmers also diversified their crops with soy, vegetables and potato, but the share of new crops was not very much significant as for expanding farmers.

The reasons behind that changes in crop selections of expanding private farms were many including the consideration of crop rotation, risk management and so on. But profitability seems to be the most important factor. This is consistent with the changes in farm gate price indexes observed in the survey. Through the analysis on farm gate price index by commodity for 2000-2010 for studied farmers, it was observed that the expanded group of farmers tended to select more profitable crops. For example, the price index for vegetables (446) and potato (412) were almost double comparing to that of wheat (234), rye (173), and barley (324). In other words, the main factor behind the farmers' selection of specific crops was the favorable price change of those crops. In addition, it should be mentioned that there is one more important reason behind the crop diversification of studied farmers. Crops such as vegetables and soy were used by farmers for further processing and for direct marketing through different channels. It was favorable for expanding private farms to use more land for those products.

One related thing should be added. In general outlook, the share of grain crops in the crop selection in overall Zhytomyr oblast among different organizational farming enterprises, including private farmers, was still significant.

In order to examine the yield determination of the main grain crop selecting the case of wheat, multiple regression analysis was conducted. From the estimation result, it was found that the major factors contributing to yield productivity of wheat for both 2000 and 2010 periods were labor input and fertilizer input. Seeds input was also considered to be significant. It is probably that farmers in 2010 were using more high quality seeds (hybrids), which had high yield potential, meeting European standards, calibrated and sprayed with preparations against diseases and pests and with better potential for high crop productivity, compared to 2000. Furthermore, the regression coefficient for herbicide is also significant and has a positive sign, but the magnitude is much larger for 2000 compared to 2010. This is probably due to the predominant use of herbicides by studied farmers in 2010 compared to 2000, causing a relatively heavier dependence on these factors for 2000. On the other hand, the nature of herbicide input may imply the contribution of other factors such as performance of available farm machinery, labor management during herbicides spraying etc.

The average cost at constant price of 2010 per farm and per hectare for all studied farmers was higher in the beginning of farm operation in 2000, compared to 2010. It included inputs such as seed, fertilizer, chemicals, fuel, machine rent, land rent, and other farms' expenses. Depreciation and labor cost of family and partner were not included, then the production cost would be underestimated, especially for expanding farms. The input level of expanding farms including current input, labor, and machine is obviously

higher compared with non-expanding farms.

The average gross agricultural income per hectare in 2000 was not much different among studied groups of farmers. However, the value of the average gross income per hectare in 2010 almost doubled for all crops and significantly contributed expanding group of farmers, who had the strongest footing in the production of potato, soy and vegetables.

In 2000 the highest level of annual income for expanding farmers among other groups of studied farmers was achieved due to higher crops' yields. In 2010 it was positively contributed by the profit from agriculture related business (its share was 27% in total income for expanding farms). For maintaining and shrinking farms with agriculture related business the total farmers' income in 2010 increased for 19% and 21% respectively comparing to 2000. Farmers with agriculture related business were involved in vegetable processing, such as making pickles, drying/freezing vegetables, making homemade food for sale, making animal feed (mostly from soy), and flour production (selling flour or using it for bakery). Studied farmers distribute their produce independently or by group mostly through their own channels of distribution or through markets (village market, town markets, etc.).

Concerning the cost and return, expanding farmers had the highest revenue per hectare and per farm among studied farmers in the sample for both 2000 and 2010.

6. Conclusion

Considering all points presented, the study suggests that implementation of

Agricultural Land Reform in Ukraine did cause the emergence of market-oriented farming units (in our case, expanding private farmers) at the farm level. New types of farming units are appearing. They can expand farm size if necessary, combine farming with agriculture related business activities, with developed professional and business skills. They can adjust more quickly to changes in market, and probably they will create market-oriented agriculture commonly promoted in most of the world nowadays. Land Reform in Ukraine has been creating the environment for the appearance of new farming units.

Of course, this research was based on the survey with limited number of private farmers in one selected area of Ukraine. The findings of this paper may not be generalized to the whole country because of the relatively few number in one particular area. However, this research serves as a springboard for further studies dedicated to the ongoing process of the land reform in Ukraine and in-depth empirical data will be definitely needed for the progress of research on Land Reform.

Concerning the Land Reform, it is desirable to abolish the Land Moratorium, in an appropriate time in the near future, when Ukraine overcome the present difficulty. The conditions for creating the land market which allows to transact land ownership is now being fulfilled.

日本語要旨

１．　背景

ウクライナは世界の中で農業がダイナミックに変化しつつある国のひとつである。2000 年から 2010 年にかけての農業生産実質成長率は年 2%を超えている。農地改革後の混乱からの回復ということを考慮してもなお高パフォーマンスを示しているとみてよい。近年ではウクライナはヨーロッパ大陸で最大のトウモロコシ生産国（かつ最大の輸出国）となっている。農業生産に大きな変化をもたらした要因は 1991 年に始まった社会主義からの離脱を含む農地改革である。

通常、農地改革は農地の再配分を通じてより公平な土地所有を作り出すことを目的とする。戦後日本における農地改革も、戦前におけるいびつな農地所有構造を変えることで不平等をなくし、均質的な農村社会を作ることを目指したものであった。ウクライナの土地改革も農地の再配分を行うものであったが、再配分は個人から個人へ再配分するものではなく、国家から個人への再配分であった。同時に、ウクライナの土地改革は、社会主義計画経済における農業を市場経済下の農業へと移行させる意図を有していた。そういった二重の役割を期待されていたが故に、ウクライナの農地改革は、日本の農地改革とは違った難しさを抱えていたということができるであろう。

２．研究の目的

本研究は農地改革に農民がどう対応したかを議論するものである。農地改革を通じて、社会主義経済下における農業から市場経済下の農業への移行がどう進行しているかを、個人農の行動の変化から議論する。言い換えれば、本論文では個人農の経営の変化に着目しながら、ウクライナの農地改革のひとつの側面を農家レベルから評価するものである。

作業としては以下の 3 つに分かれる。第 1 に、ウクライナの農地改革のプロセスを分析し、ウクライナの農地改革の特徴や課題を整理する。第 2 に、現行の土地制度（特にモラトリウムという名称で土地所有権の売買が禁止されているが土地の貸借は可能）のもとで個人農の経営面積規模がどう動いているのかを示す。第 3 に規模を拡大してきた個人農の属性や、その経営パフォーマンス（作物選択、土地生産性、収入と費用、農業関連ビジネスの取り込み）を、規模縮小・維持農家と比較しながら分析する。そういった作業を通じて、市場の変化に対応して経営を動かしている個人農の出現を示すことができるであろう。

３．研究の方法

本論文では個人農に焦点をあてている。土地改革以降のウクライナ農業の経営体は、大別して、農業企業、個人農、家庭菜園農家の３つに分かれる。３者ともに対応する法律で規定された経営体であるが、農業企業は集団農業が改組して生まれた巨大な経営体であり、他方で、家庭菜園農家は自給用の農業生産が主となる個人零細経営である。個人農は農業生産を専業的に行っている家族経営であり、農業における新しい経済主体の登場を見る際には個人農の経営に着目するのが適当であると判断した。ただし農業生産に占める個人農のシェアはウクライナ全体で７％（2013 年）にすぎない。

議論の材料は著者がジトーミル行政区でおこなった農家調査である。著者は農家がメンバーとなっている農業組合の支援を仰ぎながら、50 戸の個人農を 2010 年から 2013 年まで継続して調査した。ジトーミル行政区を選んだのは、農業組合の支援を得られるという調査の便宜を考えてのことであるが、この地区の農業は他の地域に比べて特殊な状況にあるわけではない。また同行政区にはチェルノブイリが位置しているが、本調査の対象地区は原発の放射能汚染地区から離れたところに位置している。

なおウクライナの土地改革について論じた文献は多いが、個人農を対象にして、事例をもとに、個人農が経営規模を拡大していく独自の方法や、規模拡大個人農の属性や経営変動を分析した文献は少ない。その点で本研究は学問的にも貢献できると考える。

４．個人農の土地経営規模変動

調査農家の属性を述べると、世帯員平均 4 名、世帯主の平均年齢 42 歳、学歴水準は中等と高等がほぼ半数であり、ウクライナの一般的な農家と同等の特徴をもつ。調査世帯の 75%が農業を主業と考えている。農家の経営面積規模は 6 ヘクタールから 50 ヘクタールの範囲にあり、2013 年の平均経営面積は 23.2 ヘクタールであった。

対象となった調査農家は、2010 年における農家の経営面積と経営開始時点の経営面積とを比較して、規模拡大農家（15 戸）、規模維持農家（26 戸）、規模縮小農家（9 戸）に分けることができる。経営面積の内訳を所有地と借入地に分けると、経営面積維持農家の内訳に変動はないが、規模縮小農家は所有面積を維持したまま借入地を減らしていた。一方で、経営規模拡大農家は借入地だけではなく、所有面積を増加させている。もちろん量的には借入地の拡大による規模の拡

大が主流なのであるが（平均増加面積の約 6 割)、土地所有面積の増加がみられる点が興味深い。モラトリウムという制度のもとで規模拡大農家が所有地を増やしているのは、土地面積を増やす代替策として、農地制度への登録者（土地所有の権利を潜在的に有する）をパートナーとして経営に組み込むという手法を使っているからである。この手法を本論文では代替的手法（alternative method）という言葉で表現しており、規模拡大農家 15 戸のうち 11 戸がこの手法を使っている。登録パートナーは経営主の親戚であったり個人農に雇用されていた者であったりするが、パートナーとしては個人農から給与をもらうわけではない。彼らは収益の一部を受け取るし、逆に費用負担を含む経営責任を有している。

土地の借入については、地代は固定よりは変動、現物よりは現金という形態が多く、5 年契約よりは 10 年の契約が多い。村外からの土地借入も多く（149 の事例のうち 134)、比較的に土地の質が高い旧コルホーズの土地も好まれている。地代水準を被説明変数にとった回帰分析の結果では、旧コルホーズの土地であったこと（ダミー変数)、農場からの距離、長期契約（10 年を 1 とするダミー変数）はすべて地代水準に有意な正の影響を与えていることが判明した。調査農家は距離があっても良質の農地を求めており、そのため、高い地代を支払っているとみなされる。

５．規模拡大農家の属性と経営

次に、規模拡大農家と規模非拡大（規模維持及び縮小）農家の属性を比較する。規模拡大農家の世帯主平均年齢は 35 歳で比較的に若く、非拡大農家のそれ(47 歳)と対照的である。教育水準の面でも大きな差異がある。拡大グループの経営主で高等教育を受けた者の割合は 9 割を超す。逆に非拡大農家のグループの経営主で高等教育を受けた者の割合は 4 割でしかない。国際的な農業研修を受けた経営主の割合も規模拡大グループで高くなっている。またすべての規模拡大農家が加工品販売等の農業関連のビジネス（日本でいうところの 6 次産業）に従事している。

作目選択についてみると、全体的には多様な作物選択を行っているが、2000 年と 2010 年では違いが明瞭である。規模拡大農家は 2000 年時点では小麦、ライ麦、大麦が中心であった（この 3 作目で全体作付面積の 92%)。この３作目の比重が高い点は 2000 年では、規模維持農家、あるいは規模縮小農家も同じであった。しかし 2010 年では、規模拡大農家は、小麦、ライ麦、大麦の作付面積を減らし（３作で 37%)、他方で、大豆、ポテト、野菜の作付面積を増やしている。非規模農家は、大豆や野菜の面積を増やしているもののそのシェアは大きくない。また小麦の作付面積はむしろ増加させており、作目選択で見る限りなお穀物

生産を中心としているといえよう。

その理由を探るために、ジトーミル地区の農作物価格指数（農家庭先価格）を作目ごとに算出してみると、2000 年を 100 とする指数でみて、野菜や大豆の価格指数は小麦やライ麦よりも高くなっている。すなわち野菜とポテトの価格指数は 2010 年でそれぞれ 446 と 412 であるが、小麦は 234、ライ麦は 173、大麦は 324 となっている。このことは調査対象個人農のうちで規模を拡大してきた農家は相対的に有利な価格の作目に転換してきたが、非拡大農家は価格変化にあまり反応しなかったことになる。また先に述べたように規模拡大農家は農家レベルでの農業関連ビジネスを導入しているが、この 6 次産業的な部分を経営に取り込むことを考慮した場合、加工販売が容易な野菜等の作物が選ばれることも作目選択の要因であったと考えられる。なおジトーミル行政区全体で見ると、特に小麦、大麦、ライ麦の作付面積が減ったわけではないことを付け加えておく。

作物別にみた収量の動きを検討してみると、全作物でヘクタールあたりの収量が改善したこと、2000 年時点でもまた 2010 年時点でも規模拡大農家の収量が非拡大農家よりも高かったことがわかる。この収量の差をもたらしている要因を探るために、小麦について収量を被説明変数とする回帰分析を、2000 年と 2010 年とで分けて行った。予想の通り、両年とも収量水準は、労働投入（ヘクタールあたり投入時間）、改良種子（ハイブリッド）の採用、化学肥料や農薬の投入量によって決まってくる。また規模変数も有意であり、収量については規模の経済があることが確認された。大規模層ほど要素投入を増やしていること、また大規模層ほどより適切な作物の輪作体系を組めることが影響していると思われる。

収量の差は当然ながら農業生産からえられる収入額の差異になって表れる。2000 年時点では単位面積あたりの収入額は 3 つのカテゴリーの農家間でほとんど差は見られなかった。しかし 2010 年には、規模拡大農家の農業収入額は経営面積維持農家に比べて 16%、経営面積縮小農家に比べて 19%も大きい。

生産費について検討すると、ここでの生産費は、家族労働費および機械の減価償却費を含まないものであるが、規模拡大農家については、要素投入が大きくなる傾向にあることから単位面積あたりの生産費も大きくなっている。たとえば、小麦の場合、2010 年時点で規模拡大農家の生産費は単位面積あたりで規模縮小農家の費用を 13%上回っている。ただし機械の費用や家族労働費用を含まないものであるため、もし両者を含めて計算すれば、規模拡大農家の単位面積あたりの費用は更に高くなるとみられる。その他の作目（ライ麦、大麦、ポテト）の 2000 年における面積あたり生産費用、あるいは先の作目に大豆と野菜を加えた部分の 2010 年の面積あたり費用は、規模拡大農家とその他の農家で大きな差は観察されない。

収入から費用を引いた部分は、減価償却費と家族およびパートナーの労働費を考慮していないためグロスの農業現金所得に近いとみなされるが、ヘクタールあたりでみて大きな差が生じている。2000 年では単位面積あたりの農業粗所得には規模拡大農家とそれ以外で大きな差はなかった。しかし 2010 年で見ると、規模拡大農家のそれは他の二つのカテゴリーの農業所得の 2 倍程度に達している。機械の保有状況に違いがあるとはいえ、大きな差が出てきているといえよう。

更に農業関連ビジネスの導入の効果がある。調査農家の関連ビジネスとは、例えば、野菜をつかったピクルスの生産と販売、野菜の直売、味つけ野菜をのせたホームメードのパンの販売、小麦粉の生産販売、野菜を使った惣菜の販売などがあげられる。この農業関連ビジネスからくる所得は、農家への聞き取りから、収入の数値と同時に収入に占める費用の比率を聞いておき、その比率を収入にかけて費用を計算することによって求めたものである。2010 年におけるこの部分の比率は、規模拡大農家について全体所得の 27%を占めており、重要な所得源泉となっている。規模拡大農家の単位面積あたりの農業所得（農業関連ビジネスからの所得を含む部分）は規模維持農家の 2.1 倍、規模縮小農家の 2.6 倍となっている。経営土地面積規模に大きな差があるため、農家あたりでみるとこの所得の違いは 4-5 倍にもなってくる。

６．結論

以上本稿では、50 戸の個人農の 10 年の動きを検討しながら、現行の土地制度の制約のもとで、市場の動向に対応することができる新しい経営体が登場しつつあることを確認した。新しい個人農は、自己の責任で規模拡大し、適切な作物を選択し、関連する農業ビジネスを導入することを厭わない経営体と結論することができよう。ただ本稿の分析はジトーミル行政区の 50 戸を対象にした調査結果を使ったものであり、本稿のファインディングスを一般化するには、調査地点や調査対象を拡大して論じる必要があろう。

土地制度との関連ではモラトリウムという激変緩和策は、ウクライナを取り巻く内外の状況をみながら、これを廃止し、適切な土地取引市場をつくることを目指すべきであろう。萌芽的には、土地所有権を売買する市場の前提となるような農業経営体はすでに登場しつつあると考える。

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Chapter 1. Introduction

1.1. Background of the Study

Ukraine began its journey as newly independent state in 1991 with a formidable task of dealing with an inefficient agricultural sector. The legacy of the Soviet agricultural policy over the past seven decades had resulted in the predominance of large-scale state and collective farms. The state intervened heavily in the management of farm operations in terms of directing what and how much to produce: allocating inputs, controlling marketing of outputs, and regulating prices and incomes.

Nowadays, Ukraine is one of the most dynamically changing agricultural countries in the world. It has become the continent's largest producer and exporter of corn, and the second largest producer of sunflower seeds and sunflower oil. From 2000 to 2010, the average annual growth rate of agricultural production in Ukraine was 2.6 %, indicating the good production performance after the implementation of the reform. The main factor behind the drastic changes in agricultural production is the implementation of Land Reform that started in 1991.

March 15, 1991 marked the beginning of Agricultural Land Reform in Ukraine. On that date, all land in the country, both agricultural and non-agricultural, became subject to reform in accordance with the resolution of the Supreme Soviet passed in December 1990, when Ukraine was still a Soviet Socialist Republic and part of the USSR. That first resolution "On Land Reform" was followed by a long list of laws and presidential decrees, and a comprehensive legal framework for the reform has gradually been created in Ukraine.

Agricultural land reform can be characterized as a complex combination of legislative,

economic, technical and organizational actions, which provide land relations development and transition to the land relations market. The main target of the reform in Ukraine was the establishment of a land market and competitive business activities in the sphere of land relations (Novakovsky, Tretiak and Dobriak, 2001).

After proclaiming independence in 1991, all land was automatically transferred from the Ukrainian SSR to the newly established country – Ukraine. Land reform became a new direction in land relations' reformation.

According to this new direction, Ukrainian land reform started with the elimination of the state monopoly on land. After a time, land was redistributed and transferred to lifetime possession/use of individuals. In practice, people who had been working in agriculture most of their lives received the right to own that land plot and to make decisions about the way of farming (to cultivate the land themselves or to lease it).

Private land ownership was implemented and thus, for the first time, the proper conditions were created for the equal development of different organizational forms of farming. Thereby, agricultural enterprises and individual farms were established as independent legal entities outside the collectivist framework. As a result, the ongoing process of the reform has totally changed the face of Ukrainian agriculture: from agriculture concentrated on production in collective farms, it has evolved into agriculture characterized by the clear dominance of different forms of private farming units.

After the 1999, 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. However, the new landowners are prohibited from selling their land because of the Moratorium that remains in force until January 2016.

The individual sector (consisting of the traditional household plots and the

independent private farms that began to emerge after 1992) according to the State Statistic Committee of Ukraine 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 private farms, as they also control much more land (33% versus 8% respectively).

The local corporate farm has lost its role as the main rural employer. Only 20% of the adults mentioned that their main employment was with the corporate farm. Two-thirds of the respondents had no relations with the corporate farm. Those who had no relation with the local corporate farm worked mainly on the family farm and in non-agricultural jobs.

Regardless of the relative success of private farming, the survey painted a bleak picture of the future of the Ukrainian village. Around 50% of the respondents (both private farmers and rural employees) wanted to see their children leave the village, while 15% wanted their children to stay in the village but to go into business instead of farming. Farming as a future occupation of the children was envisaged by only 24% of private farmers and as few as 8% of other rural residents.

It seems that Ukrainian village has been in the danger of being left without a continuing generation of farmers.

In this light, further study dedicated to the land reform 1process and an analysis of the micro level (farm level) development of new private farming units is an important topic of research in order to be able to anticipate possible changes in agriculture that might occur after the completion of the reform.

1.2. Statement of the Problem

Agricultural Land Reform that started in 1991 by transferring of land ownership and restructuring of traditional farms created opportunities for agricultural development in the country. Economically, successful reform would affect agricultural production by facilitating the rational use of rural labor and the efficient use of productive inputs. Politically, land reform was important because it affected country's stability and development.

One of the biggest achievements of Ukrainian land reform should be mentioned first. This is implementation of the private ownership of land together with a free of charge land distribution. As a result, individual sector in agriculture was developed and the number of family farms has continued to increase. The growth came in spurts, first after it was possible to get land from the Land Reserve (early 1990s), and then after the land lease market opened up in 1999 (Lerman et all, 2007). However, in recent years the growth in number of family farms across the country has slowed. More and more people have not opted to become private farmers, but strike out on their own to do agriculture on their small-scale subsidiary land plots. Some of the created private farmers could not survive for different reasons and went bankrupt. The lower than expected development of the family-farming sector in Ukraine was considered to be the crux of the problem in agriculture.

This situation was connected with two issues of the land reform in Ukraine. First, Agricultural land reform has been designed to achieve a market economy through land privatization. However, the process is incomplete and all established organizational farming entities are still in a transitional state of development. As a result, agriculture shaped by the ongoing land reform process has a temporal structure, and needs to be

stabilized in order to adjust to the market-oriented competitive agriculture commonly promoted worldwide. For this purpose, the transfer of land ownership has to be totally completed, and property rights for land have to be clearly defined and easily transferable. In other words, government has to provide a stable legislative environment for land transactions, and encourage the development of functioning markets of land and assets.

According to the State Land Committee, by 2011 nearly 90% of the State Acts (Deeds) were issued for land plots in Ukraine and transferred to private ownership, which means that transfer of land ownership can be completed in the near future. However, since 2001 Ukraine had a Moratorium on the sale and purchase of agricultural land, which was three times extended and is currently in force up to January 1, 2016. In that case, the property rights of Ukrainian landowners are considered to be limited, since they cannot buy or sell their land parcels. Furthermore, landowners cannot use their land plots as collateral, which means that agricultural producers are limited in their access to capital. The moratorium also creates obstacles for investors, especially for foreign investors, through the ban on the acquisition of agricultural land by non-residents.

It seems that land reform is challenging the existence and development of private farming. It gives private farmers only two options: to adjust and to keep the land plot, or to go bankrupt and to rent the land out. There is no other option until the ongoing land reform process will be finalized in Ukraine.

1.3. Objectives of the Study

This research aims to discuss the farmers' response to the land reform, and tries to offer the farm level evaluation of Agricultural Land Reform in Ukraine. For the purpose, the paper first discusses about the details of the process of the land reform implementation using government documents, laws, decrees, land codes and so on.

Secondly, this paper discusses the farmers' response to the reform. Particulary, the emergence of market-oriented farming units will be clarified by examining changes in landholding, land use, crop selection, production cost structure, revenues and income, introduction of agriculture related businesses, based on the field survey of 50 private farms in Zhytomyr Oblast.

Specific objectives are as follows:

1. To identify the aim, stages and methods of implementation of Agricultural land reform in Ukraine, based on the official legislative and statistical data.
2. To evaluate land tenure and land size changes caused by the reform at the farm level, based on the field data.
3. To clarify land use changes caused by the reform at the farm level, based on the field data.
4. To focus on economic results of the farmers in the process of the reform, based on the field data.

1.4. Hypothesis of the Study

In the light of the above objectives, the following hypothesis are proposed:

1. It could be assumed that at the farm level, Agricultural land reform sparked private farmers` interest in doing agriculture - to consider farming as their profession - thus leading to higher aspiration, and stimulated farms' enlargement.
2. Farm level implementation of Agricultural land reform eventually translated into increased agricultural production at the farm level.
3. Market-related incentives, such as commodity price, changed the crop selection towards more profitable direction.
4. In the process of the farm-level implementation of the reform, income of private farms increased.

1.5. Methods of the Study

The study utilized both primary and secondary data. Primary data were collected using a questionnaire survey of 50 private farmers in Zhytomyr Oblast of Ukraine.

The questionnaire survey was initially conducted in 2010 and other surveys and interviews with studied farmers followed in 2011-2013. Nine agricultural officials were interviewed, and interviews were also conducted with an agronomist, a property lawyer and a former state farm official. All data used for this study, unless otherwise indicated, utilized the 2010 data with supplementation of 2011-2013 surveys.

There were several reasons for choosing the region of Zhytomyr Oblast for the study site. The existence of a connection to some people in the region who had themselves

participated in the process of land distribution made it possible to obtain specific information on the registration of newly created private farms, to obtain more reliable farm data and information on private farmers.

With the aim of getting to know potential interviewees and to establish trust it was decided to start with participation in the meeting of the local Farm Association with the help of one farmer, who had previously participated in the survey. This provided the opportunity to meet many farmers at once, to introduce myself and to ask for assistance in the project. It also helped to get some appointments booked and partly distribute prepared questionnaires.

The first appointments with farmers resulted in free-flowing conversation, during which farmers were asked about the history of their farm, their own career and experience in farming, how they acquired land, which crops they cultivated and why, and their choice of farm machinery. After that questionnaires were distributed.

The farmers who participated in the previous study were asked similar questions, but from the point of view of changes that occurred in the process of farm`s operation and the reasons for such changes.

Additional meetings with the farmers were conducted later, during the 2011-2013 surveys, with the aim of getting supplementary data.

The time period (from the time of one`s farm establishment up to 2010) was chosen for the following reasons:

1) Land reform in Ukraine is still incomplete and it is impossible to evaluate it all.

2) Statistical information on private farmers in Ukraine is published once in five years and is connected it with the legal status of the private farmers. According to Ukrainian law, farmers do not have to submit their records directly to statistical institutions, so

statistical reviews of data from 2000 to 2010 were utilized in the study. Only information on the numbers of private farmers and their legal status is available every year, since private farms cannot be created without official registration. Other data about private farms` operations and development is part of the regional data and is drawn from different sources.

3) Land reform in Ukraine started in 1991, after Ukraine proclaimed its independence and the first farm in the sample was created in 1995. The majority of the 37 farms were created before or during 2000. Available farm data therefore gave us the opportunity to evaluate farm level changes in agriculture for the ten years period of the process of the land reform implementation, from 2000 to 2010.

During the survey, agricultural officials also were questioned about the various issues of the land reform, particularly about land redistribution of collective farms, further alienation of these lands to new owners, adjustment of distributed and alienated lands among beneficiaries.

The purposes of interviews was that longer responses from interviewees concerning the history of their farms, and the nuances of acquiring land, were preferable. Many of these activities occur in a grey-market, and it is likely that a questionnaire would not have captured this information. Also the experience of conducting research for author's previous work showed that reality is more ambiguous and diverse then the neat categories displayed in statistical yearbooks.

All farmers in the study were members of Farm Association and this factor is connected with their size. Smaller or medium private farmers needed to cooperate with each other in order to survive and make some profit, because of their limited resources and the lack of governmental support, and serious competition from the bigger agricultural enterprises.

1.6. Literature Review

In recent years, many studies have been undertaken on the issue of land reform and its impact on the performance of agriculture. However, there seems to be a lack of research on the farmers' response to the reform (micro level analysis) and publications on this topic are scarce.

In this section, the literature related to the details of the process of the land reform and farmers' response to the reform are briefly reviewed. The focus of the review is twofold. First, attention will be paid to the process of the land reform itself and second, the farm level implementation (farmers' response) of the reform will be discussed.

Literature review of Land Reform

The case for land reform is compelling. The experience of many countries shows the crucial role of land reform in providing not only a source of income, security, and status for rural residents, but also a foundation for broader rural development and political stability.

Transfer of agricultural land and assets to private ownership and the creation of more productive farms were essential components of Agricultural land reform in Ukraine. Unless strongly market-oriented farms can be established, Ukraine's agriculture will be oriented only toward the subsistence needs of producers and local markets, rather than specializing to take advantage of export opportunities.

In all Central and East European countries, including Ukraine, land reform was a key component of the overall reforms. Various land reform procedures have been chosen and

implemented. Swinnen (1997) suggests that the choice of land reform procedures was constrained by several factors. First of all, the length of Communist influence determined the land reform direction towards land restitution or land redistribution. Second, the pre-collectivization asset distribution determined the potential conflict between historical justice and social equity. Furthermore, Lerman (1999) states that nearly a century of Communism has washed away all traces of former land ownership and that very little tradition of private land ownership remained in most countries of the former USSR, including Ukraine. Voices for some form of compensation to former owners were raised only in the Baltics, in Western Ukraine, Moldova and Western Belarus. In those areas collectivization was imposed only after World War II. However, in the rest of the former USSR republics there was hardly any demand for restitution of land.

Hillman (1992) also stresses that efficiency and distributional impacts depend on the land privatization in the process of land reform implementation. According to his observations on the land reform processes some points should be mentioned:

- ✓ Restitution of farmland to former owners was the most important process of land reform (in terms of share of total agricultural land). Typically, the reform laws specified that former owners were restored the land in historical boundaries, if possible. Otherwise they received property rights to a plot of land of comparable size and quality.
- ✓ In the USSR land was restored to former owners in the Baltic countries only. Russian and Ukraine distributed land in two forms. The most important form was the distribution of collective and state farmland equally per capita among collective farm members or state farm employees in the form of paper shares or certificates. Another form was distribution for outsiders, who were not entitled to

land shares, but could receive land for private farming from a special state reserve established for this purpose (15-20% of total agricultural lands).

In Ukraine, a simple transfer of ownership to members and employees of state and collective farms could not directly create viable competitive production units. Collective and state farms had to be reconfigured as part of the privatization process. While it is sometimes argued that collective or state farms could be privatized directly as a corporate farm, there was no ready counterpart in any of the market economies for a 3,000 hectares farm with 400 owner-employees. For this reason programs of land reform and farm restructuring in Ukraine included additional mechanisms through which owners could create new farming units, either within the former farm, or by leaving the state farm. Privatization in Ukraine agriculture thus proceeded immediately to restructuring.

It is interesting to note that Japan's transition from a wartime-controlled economy was much easier than Eastern Europe's transition from central planning. Privatization was not an important issue because Japan retained the capitalist system during wartime. So there was no need to build new capitalist institutions (like financial markets) in order to shift to a market-based system. Furthermore, it was not necessary for Japanese to learn how to use the market mechanism because the controlled economy lasted only nine years, from 1937 to 1945. Ukraine, on the other hand, was under the controlled regime of the USSR for 69 years).

Many other analyses of land reform (e.g. de Janvry, 1981; Allen, 1982; Hayami, 1991) emphasize that farm restructuring has strongly affected the re-allocation of rural labor and hence rural livelihoods. Agriculture is being divided into a commercial and a subsistence sector (Csaki and Lerman, 2000), with distribution of the land as the dominant

form of land reform.

One of the defining features of farm restructuring in Ukraine compared to other Central European countries was labor management. Agricultural employment declined dramatically, sometimes up to as much as 50%, in countries such as Czech Republic, Slovakia and Hungary, where large-scale farm management laid off large numbers of workers, beyond those that voluntarily left the farms for other employment, in order to adjust to market-oriented agriculture promoted after the land reform implementation

In contrast, agricultural employment in Ukraine actually increased during the transition. Poor overall economic conditions, food security concerns, and farm management practices have constrained labor outflow in the country. Brooks et al. (1996) suggests that social services provided by former state farms, such as housing and health care, which together with poorly developed housing markets, increased the costs of moving to other sectors or regions. In other words, only a minority of rural residents could afford to finance the costs associated with moving or changing work activities. Seth et al. (1998) argues that food security concerns in some cases even induced an inflow during early transition.

Furthermore, Stiglitz (1993) notes that the labor incentive problem is more important and that unequal land distribution induces inefficient labor incentives. In other words, the more equally distributed property rights are, the better society's incentive structure is likely to be. This argument was especially relevant in countries where land reform has a strong effect on total wealth distribution and where agriculture was contributing country's economy a lot (like Ukraine).

Land reform at the end results in stronger and better-defined property rights for new landowners. However, land reform in Ukraine caused weak land rights for individuals

first, when instead of land plots, users received paper shares or certificates without identification of demarcated physical plots of land and second, the moratorium on selling and purchasing agricultural lands, which limited landowners' constitutional rights to land disposal. Thus, the turnover of agricultural lands, which constitutes the largest segment of land in Ukraine, still remains legally blocked. As a result, family farming has emerged only slowly, and large farms have little incentive to restructure (Lerman, 1999).

On June 21, 2012, according to the State Land Agency, a group of leading experts from the European Union was created in Ukraine to advice on the completion of land reform. The experts suggest that creation of stronger individual property rights and the removal of constrains on the development of individual farms would definitely increase competition for the existing farms and thereby enhance efficiency in Ukraine.

The experience of the European Union, as well as many other industrialized countries, including Japan, confirms the need for the functioning of a state bank on the land market. With the lifting of the moratorium on sales of agricultural land, the opportunity will be provided to mortgage land or the right to its lease. Experts predict that such a possibility would allow domestic producers to upgrade their financial support in 2-3 years, and then to increase production by 15 percent in five years.

However, legal settlement and a register of land, together with the emergence of a land market, have not yet been completed in Ukraine. There are ongoing debates about the ownership of land by foreigners and the need to eliminate restrictions on leasing while land markets are still underdeveloped (Csaki and Lerman, 2000).

The development of a functioning land market is seen as important (Csaki and Lerman, 2000); this is needed both for efficiency, to develop farms of an economically efficient size (Christensen and Lacroix, 1997; Csaki and Lerman, 2000), and for poverty

alleviation and rural development (Chirca and Tesliuc, 1999).

Martin Raiser, the bank's director for Ukraine, Belarus and Moldova, wrote in an opinion column published in Zerkalo Nedeli in 2011, that the incompleteness of land reform, the absence of a clear legal formulation of land ownership and land tenure rights and unambiguous interpretation of the provisions of the laws with respect to land ownership, as well as moratorium on the land sale, was of a big concern to the World Bank.

In addition, all conducted academic studies dedicated to the land reform unanimously suggested the prime importance of the completion of land reform and the resolution of the remaining issues associated with land ownership in order to advance the socio-economic development and prosperity of the country. More specifically, in the Land Administration Guidelines of the UN Economic Commission for Europe, it was suggested that land was the ultimate resource, for without it life on earth could not be sustained, and its good stewardship associated with the private ownership of land resources by farming units, was essential for market-oriented agriculture.

Mathijs and Swinnen (1996) also concluded in their study on the efficiency of land policies in Central and Eastern European agriculture that there was no single optimal land reform procedure. Instead, the efficiency of reforms depended on government information costs, on factor market imperfections, on reform implementation costs, and on the farm level implementation of the reform.

Literature review of the Farm level implementation of the reform

The task of privatizing land and restructuring farms is intrinsically complex. The pace at which it proceeds depends on a number of factors, each of which may require remedial intervention from the government. Identification of the constraints and concrete

opportunities for Government action and international support requires information on developments at the farm level.

One of the objectives and effects of the land reform from the micro-level standpoint was to break large state farms into smaller, privately owned units. Thus after the start of the transition, legal restrictions on the setting up of new businesses were generally relaxed (Earle and Sakova, 1999). A further objective of the reform has been to create an environment conducive to the establishment of new start-ups (private farms).

However, the EBRD (1999) Business Environment and Enterprise Performance Survey identified the main constraints to desirable development of the newly created start-ups as legal/regulatory barriers and the continuation of soft budget constraints. Ukraine is one of the countries with the highest soft budget constraints.

More specifically, Lerman and Csaki (2000) suggest that the main constraints to farm restructuring in Ukraine are: the level of government intervention in agriculture; inflexible bureaucratic procedures; complexity of the tax system; lack of alternative rural employment opportunities; and poor rural infrastructure.

The determinants of the establishment and development of new start-ups can be divided into economic and non-economic factors. The main economic factor is that the price of the product will exceed its average cost. The main non-economic factors are level of education, lack of operational capital (Breitschopf and Schneider, 1999), plus the family background and entrepreneurial personality, and motivation (from Jehle, 1998a).

Furthermore, Earle and Sakova (1999) identify the weak points of the establishment of the start-ups to be the lack of financial and physical capital, that is, credit, premises and equipment; and the macroeconomic environment, since stabilization affects credit availability and stable prices facilitate the making of investment decisions.

Johnson et al. (1999a) argue that the divergence of the rate of growth of the private sector in Eastern Europe and the former Soviet Union is due largely to differences in the protection of property rights and that investment decisions are strongly affected by the perceived security of property rights. The data suggest that a lack of bank finance does not prevent private sector growth and that retained earnings appear to have been enough to finance the investments that managers wanted to make. It is concluded that the most important task for policies is to stabilize the country's regulatory environment and to develop market-supporting infrastructure.

It has also been suggested (Bateman, 1999) that private farming development in the countries of former USSR, including Ukraine, has been hampered by the wrong approach. Bateman argues that it would have been better to capitalize on the experience of Japan, West Germany, and Italy after the Second World War and, more recently, China and the Asian Tigers, which accepted more government intervention in their development. In all these cases, regional and local government played a vital role, and in contrast, the reliance of the countries of former USSR on the 'invisible hand' of the market has resulted in countries that are 'too small - too weak - too isolated'.

It is interesting to note that Earle and Sakova (1999), applying a model that used 1993 data and covered six economies in transition, found that, despite large variations among countries, the determinants important for entry into self-employment were: the ability to obtain finance; family background; level of education; experience in the grey or black economy; and attitudes towards risk and self-reliance. However, another interesting conclusion from their work is that political connections inherited from the era of central planning do not influence entrepreneurship much.

Other survey data (Jehle, 1998b) suggest that at the regional level, external barriers to

rural enterprise development are motivation and quality of labor resources, lack of venture capital, finance, input supplies and a lack of cooperation between enterprises. Labor in the rural areas is poorly trained, especially the older people who constitute much of the workforce. While state support programs are in place to help overcome some of these problems, the majority of Jehle's sample of farms did not know about the programs or how to get assistance or advice. He concludes that the creation of an integrated program for rural areas is needed, covering the macroeconomic framework, regional decision-making, the improvement of technical assistance to enterprises, and a complex program of education and consultancy. Participation of local people in the integrated program is essential.

It should be added that the context of the land reform as set out by the above-mentioned academic studies comprises a wide range of issues, which have both an economic and legislative character. It is not difficult to notice that the categories of land ownership fall under land relations. It also follows that most scientists closely connect changes and developments in land relations with social and economic changes and developments.

The primary aim of this thesis is to study the process of Agricultural land reform and the farm level implementation, especially the first 20 years from the intial implementation of the reform in Ukraine. The main feature of this study that cannot be found in other works is the farm level analysis of the changes in farm operation and development in the process of the reform, based on field questionnaire survey of 50 private farmers in the study area (Zhytomyr Oblast of Ukraine). The purpose of this research is to contribute to the literature on land reform with in-depth empirical data from the respondents' point of view. Specifically, the study aimed to research peculiar features of farm management in

the process of the land reform implementation that are not apparent by examining only policies and legislation, and not based on the aggregated statistical data. The core objective of the research was to study the realities of the farms' development and operation in the process of the land reform implementation, in order to evaluate the changes which occurred.

Methodologically, the study offers an evaluative perspective on the farm level implementation of Agricultural land reform in Ukraine. However, because of the qualitative nature of the study, the findings may not be generalized due to the limited number of participants in the study.

1.7. Structure of the Dissertation

The dissertation is divided into eight chapters. The introduction to the study is presented in Chapter1. It contains the background of the study, the statement of the problem, objectives, hypothesis, method of the study, and the structure of the dissertation.

Chapter 2 describes the profile and agricultural potential of Ukraine. The description of the geographic location, soil distribution by climatic zones, population and labor force information, is followed by brief characteristics of agriculture and trade.

Chapter 3 examines the process of land reform implementation in Ukraine. It starts with the history and the current status of the land reform in Ukraine, followed by the clarification of the process of the reform by classifying the three-stage evolution, as well as identifying the farms' typology and discussing the land moratorium in Ukraine.

Chapter 4 provides a brief introduction of the study area with special attention given to studied farmers' profile.

Chapter 5 discusses the farmers' response to Agricultural land reform in Ukraine. The chapter particularly describes land tenure status, land size and tenancy conditions of studied farmers. In addition, rent function analysis is presented.

Chapter 6 analyzes agricultural production of the farmers in the process of the land reform implementation. Crop selection and agricultural technology, as well as input use and yield determinants of crop production of studied farmers are discussed. In addition, the economic results of studied farmers in the process of the reform, such as cost and return of major crops, annual income and profit estimations are presented in this chapter.

Chapter 7 is dedicated to the conclusions of the study and recommendations.

Chapter 2. Country Profile and Agricultural Potential of Ukraine

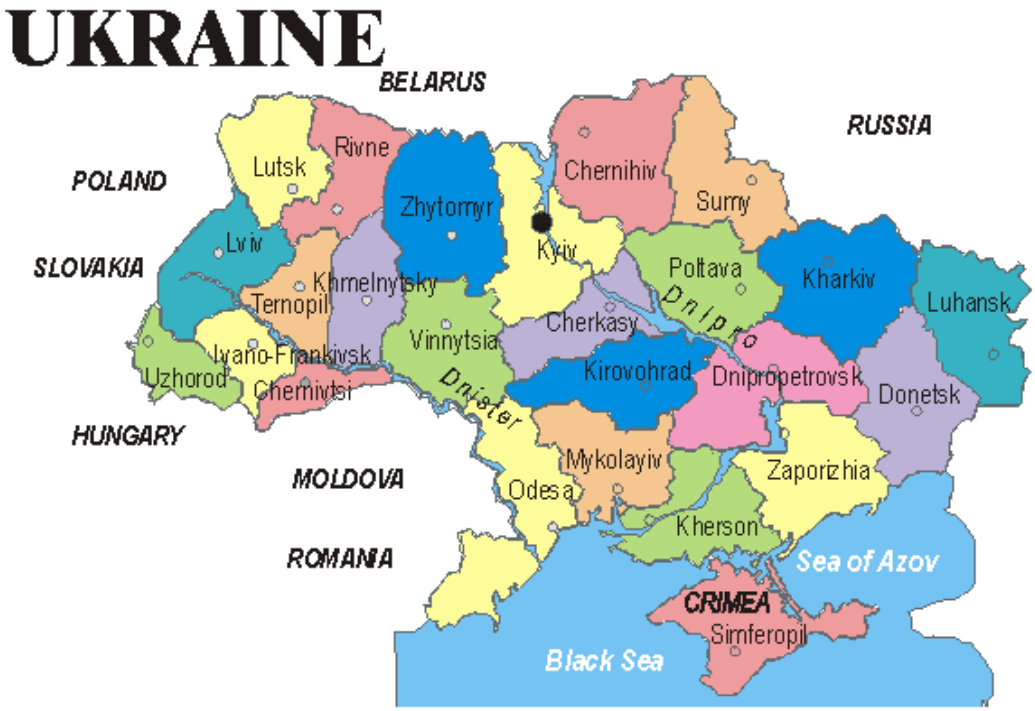

Figure 2.1. *Ukraine and its Administrative Regions*
Source: http://lesazas.org

2.1. Geographic location

On July 16, 1990 the Ukrainian Soviet declared sovereignty. August 28th, 1991 was proclaimed as the independence day of Ukraine. This was ratified by a ratio of almost nine votes to one in a referendum on December 1, and the first president was directly elected for the first time in Ukrainian history in 1991.

Ukraine is now the second largest country by area on the European continent, consisting of 24 administrative regions – "oblasts" and the Autonomous Republic of Crimea (Figure 2.1.). The map of Ukraine depicts 459 cities, 885 towns and 28,450 villages.

Ukraine has a strategic position in East Central Europe, lying on the northern shores of the Black Sea and the Sea of Azov. It borders a number of European countries, Poland, Slovakia and Hungary in the west, Belarus in the north, Moldova and Romania in the south-west and Russia in the east.

Most of its territory lies within the Great European Plain, while parts of the western regions reach into the Pannonian Plain. The southern shores of Crimea are located within a unique subtropical biome, which is separated from most of Ukraine by the range of Crimean Mountains. The highest peak is Hoverla, which is 2061 m or 6762 ft. in height.

Ukraine is split between two biomes: mixed forest towards the middle of continent and steppe towards Black Sea littoral. The western regions are located in the alpine-like country that is dominated by the Carpathian Mountains.

About 42.8 million hectares (69,4%) of the territory of Ukraine is agricultural land (Table 2.1.). Much of the country is part of the Chernozen (black earth) belt, which is incredibly fertile soil, permitting many regions to have more than 80% of land under cultivation.

The climate in Ukraine is mainly temperate-continental, without extremes of heat or cold. Summers are often cloudy and winters are sunny. The three climatic regions generally traverse the country belts oriented southwest to northeast. The forest zone is generally in the north and the steppe in the south and southeast.

The forest of Ukraine was extensively damaged during the World War II and was reduced from 40% of land area to only 12 % after the war. Forest now covers 10 million hectares, of which 85% is considered commercial. Ukraine has become a net importer of wood.

Table 2.1. *General Indicators of Ukraine, various years*

Indicators	Ukraine		
	1990	2000	2013
Total area, thousand square kilometers	603.7		
Agricultural land, million ha	-	42.8	42.8
Population, million people	51.6	49.1	45.4
Average life expectancy, years	69.3	67.9	69.3
Population density per 1 km2	86.0	82.4	77.0
Rural inhabitants, in % of total population	33.3	32.8	31.5
Agriculture in GDP, in % total value	24.4	12.0	9.8
GDP in billion U.S. dollars	185.6	31.5	136.8
GDP per capita, in U.S. dollars	3.6	0.6	3.0
Average gross salary in agriculture, U.S. dollars	-	20.6	178.8
Population employed in agriculture:			
- million people	4.8	5.5	3.5
- in % of total population	19.0	24.0	15.8
Output of the agricultural industry, billion U.S. dollars:	-	14.4	12.5
- crops		8.0	7.3
-livestock		6.4	5.2

Source: Ministry of Agricultural Policy in Ukraine, various years

2.2. Agricultural Potential of Ukraine

Ukraine is the European country with the largest surface (besides Russia), 603,700 square kilometers of which 324,780 is arable land. Ukraine is relatively open, with unprotected borders (Figure 2.2.). Only the Dnieper River and its embankments is a major, internal demarcation line. However, throughout the ages Ukraine was a territory of frequent conflicts between East and West, North and South, as its fertile lands were always highly prized by neighboring powers.

Over 60 million hectares of land, of which roughly 42.8 million are agricultural, with around 32.5 million arable hectares, provide an excellent basis for sustainable agriculture. In comparison, around 71% of Ukraine's land area is arable; in the EU and the USA this indicator is around 44–45% (according to the World Bank data). Over half of Ukraine's arable land consists of black soils (chernozem), ideally suited for field crop production. Roughly one-third of the worldwide stock of black soils is located in Ukraine.

Soils in Ukraine

The soils in Ukraine, from Northwest to Southeast can be divided into three major types: a zone of soils of sandy nature (podzolic), a central belt consisting of the fertile black earth (chernozem), and a zone of relatively salinized soils (chestnut) near the Black Sea. These soils belong to different climatic zones of Ukraine (Figure 2.3.). From an agricultural point of view the most important ones are: Polissya, Forest-Steppes and Steppes zones.

The *Polissya (*marshy woodlands) zone in the North and Northwest covers about 11 million hectares of lowlands. The soils are characterized by low humus content, high acidity, low natural fertility and a relatively short growing season. Water holding capacity is low due to sandiness, resulting in inefficient use of both rainfall and plant nutrients.

This area is characterized by cereal and industrial crop (mainly oilseed) cultivation, and animal husbandry as the main farming activities. Considerable application of fertilizer and lime is needed to reach adequate yields on these soils.

The *Forest-steppes* zone is located in the central part of Ukraine and covers about 20 million hectares of mostly flat land with insignificant area of woodlands. Here the famous black soils can be found, which are fine grained and easy to cultivate. The northern belt consists of typical deep chernozem soils. It is the most fertile part, rich in humus and more than a meter thick. However, there is a risk of frost and snow mold ("winterkill") causing crop failure, because of the continental climate of the region, which is characterized by warmer summers, colder winters and lower precipitation.

The *Steppes* zone extends further towards the South and the East, where the humus layers are not as thick. This area covers about 24 million hectares and is ideally suited for crop cultivation, mostly of winter wheat, other grains, sugar beet and sunflower, and also hosts some animal husbandry. The southern regions are warmest overall, and well suited for growing fruits, vegetables and grapes for wine, but have a risk of drought.

Along the coastlines of the Black Sea and the Sea of Azov, a rather narrow strip of chestnut soils is found, which tend to be increasingly salinized to the south as they approach the Black Sea. Chestnut soils are not as fertile as the black soil, but they are also well structured and easy to cultivate. Productivity is mainly limited by the lack of rainfall.

Population and labor force

With almost 45 million inhabitants, Ukraine's population numbers are low given its size, by comparison with France (549, 000 square kilometers, of which 183, 450 arable, 63.5 million people), Germany (357, 000 square kilometers, of which 119, 450 arable, 82.0 million people) or Poland (312, 700 square kilometers, of which 125, 390 arable,

38.3 million people), and hence has more arable land than any two of these countries together.

Due to Ukraine's relatively low average population density (77/km2, whereas France's is 108/km2, Germany's is 229/km2, and Poland's is 124/km2) (see Table 2.1.) and the temperate climate throughout its territory, the agricultural production potential implies export potential. Experts suggest that Ukraine has the capacity to produce much greater volumes of grains, oilseeds, and livestock products than its population can be expected to consume.

About 65% of the population of Ukraine is urbanized while the rest live in rural areas. The rural population has been declining over the past 20 years, at a rate of 1.2% per year. Low reproduction rate as well as an aging rural population rate suggests that the labor force in Ukraine will decline at an increasing rate in the future.

The difficulties of transition also find expression in a population decline that started in 1993 and has not stopped since, dropping from 51.5 million people at that time to 45 million in 2012 (FAOSTAT, 2013). Fertility is below reproduction level, and mortality of adult men of working age is extremely high.

Overall life expectancy is less than seventy years (ten years shorter for men), which is low for a lower middle-income country, and causes both rural and urban population decrease. High prevalence of HIV/AIDS and abuse of alcohol and drugs are major threats in this regard.

At the same time, literacy rates and education levels in Ukraine are one of the highest in the world, as shown by the Human Development Index reported by the UNDP.

The service sector is Ukraine's largest employer (around 60% of total work force, see Figure 2.5.), but the shares of manufacturing and agriculture are still substantial. These

data exclude a presumably large shadow economy, estimated by the World Bank at 55% of GDP on average over the period 1999-2007. About five million people may well be employed in the informal sector, mostly in rural areas.

A significant minority of the population of Ukraine are Russians or use Russian as their first language. Russian influence is particularly strong in the industrialized east, as well as in Crimea, an autonomous republic on the Black Sea, which was part of Russia until 1954. While Ukraine and Russia share common historical origins, the west of the country has close ties with its European neighbors, particularly Poland, and Ukrainian nationalist sentiment is strongest there.

Main characteristics of agricultural sector

Agriculture in Ukraine is traditionally of great importance for the country's economy. Even the national flag, depicting a blue sky over a yellow wheat field, reflects that importance. Until 1991 Ukraine was regarded as the "breadbasket of the Soviet Union." Over the subsequent years, agriculture was affected by the country's overall economic decay. However, a clear upward trend has been evident in the past few years, as the core conditions for high yield agriculture (the climatic and soil conditions) have remained unchanged.

During the Soviet regime, Ukrainian agriculture was organized in two centrally controlled sectors of large-scale farming. Kolkhozes were collective farms in which the members jointly owned output and all assets. Sovkhozes were state farms in which output and all assets were owned by the state. In addition to these centrally organized sectors, there was an individual subsidiary sector, such as household plots of individual kolkhoz/sovkhoz members and garden plots assigned to city workers, which significantly

contributed to rural agricultural production.

Before World War II, the differences between the sovkhozes and the kolkhozes were pronounced. Sovkhoz workers were paid fixed wages, while kolkhoz members received shares of residual income from the harvest.

The reorganization of the kolkhoz/sovkhoz sector began in 1992. Most of the farms have gone through some reorganization and have changed their titles during recent years.

Nowadays, the agricultural sector of Ukraine is characterized by the co-existence of large-scale commercial agro-enterprises that generate approximately 45% of the total agricultural output (OECD, 2011) and a large number of individual farms that emerged after collective farming was abandoned following the collapse of the USSR.

Ukraine's agriculture is primarily specialized in crop production, whose gross output value currently is more than twice the level of livestock production (according to the State Statistic Committee of Ukraine, 2013).

Central districts have the highest crop yields, particularly those situated along the northern part of the Steppes zone and the southern part of Forest steppe, where up to 85% of total land area is arable land. However, land erosion and nutrient mining are the most pronounced issues of this region.

During 1990-2000, total sown area of the main agricultural crops in Ukraine decreased significantly by about 5 million hectares, but since 2000 a stable level of around 27 million hectares has been maintained. The share of grains and in particular industrial crops increased, however, at the expense of fodder crops, reflecting a transition to crops with higher returns (Table 2.2).

Half of all arable land in Ukraine is dedicated to wheat, barley and sunflower seed (2009 data). Together with maize, which accounts for 6.4% of the total arable land, these

are the four main crops grown in Ukraine. Wheat is the single most important crop in terms of arable land, occupying 20.8% of the total area and accounting for 46.0% of the total output of cereals by volume in 2009. Other important crops in terms of cultivated area are potatoes, rapeseed and soybeans.

To date the potential productivity of the major grain crops in Ukraine is not fully utilized (Table 2.3.). For example, the average yield of wheat in Ukraine totaled an average of 3.12 ton per hectare during recent 5 seasons, which formed only 42% of the potential of the grain productivity, such as the index reached in France – 7.4 ton per hectare. As for the other grain crops, the potential of barley yield in Ukraine is realized at the level of 36% only, and maize at 49%. Thus, increasing of the grain yield is a priority goal for Ukrainian agriculture.

Following the land reform the individual sector increased remarkably in terms of agricultural production, while agricultural output in reformed agricultural enterprises (previous collective farms), has significantly reduced. The share of GAP of large-scale agricultural enterprises dropped from the level of 1990, but at the same time the level of GAP of private households increased by 40% in 2013 (Table 2.4.).

However, the livestock sector decreased sharply after the breakup of the Soviet Union and has not recovered completely (State Statistic Committee of Ukraine, 2011).

Table 2.2. *Sown Area of Main Agricultural Crops in Ukraine in 1990-2013, thsd.ha*

Year	Grain and leguminous crops	Sugar beet	Sunflower	Potato	Vegetables	Fodder crops
1990	14,583	1,607	1,636	1,429	456	11,999
1991	14,671	1,558	1,601	1,533	477	11,555
1992	13,903	1,498	1,641	1,702	500	11,707
1993	14,305	1,530	1,637	1,552	474	11,287
1994	13,527	1,485	1,784	1,532	457	11,881
1995	14,152	1,475	2,020	1,532	503	10,898
1996	13,248	1,359	2,107	1,547	476	11,026
1997	15,051	1,104	2,065	1,579	480	9,720
1998	13,718	1,017	2,531	1,513	459	9,236
1999	13,154	1,022	2,889	1,552	497	8,653
2000	13,646	856	2,943	1,629	538	7,063
2001	15,586	970	2,502	1,604	490	6,375
2002	15,448	897	2,834	1,590	479	5,858
2003	12,495	773	4,001	1,585	480	5,074
2004	15,434	732	3,521	1,556	476	4,243
2005	15,005	652	3,743	1,514	465	3,738
2006	14,515	815	3,964	1,464	469	3,277
2007	15,115	610	3,604	1,453	451	3,028
2008	15,636	380	4,306	1,413	458	2,752
2009	15,837	322	4,232	1,409	451	2,658
2010	15,090	501	4,572	1,408	462	2,599
2011	15,724	532	4,739	1,439	498	2,477
2012	15,449	458	5,194	1,440	494	2,475
2013	16,210	280	5,051	1,388	483	2,289

Source: http://ukrstat.org/

Table 2.3. *Yield of Main Agricultural Crops in Ukraine, ton per hectare, 1990-2013*

Year	Grain and leguminous crops	Sugar beet	Sunflower	Potato	Vegetables	Fodder crops
1990	3.5	27.6	1.6	11.7	14.9	4.3
1991	2.7	23.4	1.5	9.5	12.8	2.3
1992	2.8	19.4	1.3	11.9	11.0	3.2
1993	3.2	22.2	1.3	13.7	13.0	4.3
1994	2.7	19.2	0.9	10.5	11.5	1.8
1995	2.4	20.5	1.4	9.6	12.0	3.0
1996	2.0	18.3	1.1	11.9	11.2	3.1
1997	2.5	17.6	1.2	10.6	11.4	4.5
1998	2.1	17.4	0.9	10.2	12.3	2.9
1999	2.0	15.6	1.0	8.2	11.1	1.9
2000	1.9	17.7	1.2	12.2	11.2	3.8
2001	2.7	18.3	0.9	10.8	12.3	3.1
2002	2.7	18.9	1.2	10.4	12.4	3.7
2003	1.8	20.1	1.1	11.6	13.9	5.6
2004	2.8	23.8	0.9	13.3	14.9	5.8
2005	2.6	24.8	1.3	12.8	15.7	6.4
2006	2.4	28.5	1.4	13.3	17.1	4.5
2007	2.2	29.4	1.3	13.1	15.2	6.2
2008	2.5	35.6	1.5	13.9	17.4	6.4
2009	3.0	31.5	1.5	13.9	18.3	7.1
2010	2.7	27.9	1.5	13.2	17.4	7.8
2011	3.7	36.3	1.8	16.8	19.5	8.5
2012	3.1	41.1	1.7	16.1	19.9	9.0
2013	3.9	39.8	2.2	16.0	20.0	10.4

Source: http://ukrstat.org/

Table 2.4. *Index of Agricultural Production (1990=100), 1990-2013*

Year	All agricultural producers	Agricultural enterprises	Households
1990	100.0	100.0	100.0
1991	86.8	82.5	97.0
1992	79.6	69.2	104.4
1993	80.8	68.5	110.0
1994	67.5	54.1	99.2
1995	65.0	49.9	101.0
1996	58.9	39.9	104.0
1997	57.8	39.1	102.3
1998	52.2	32.6	99.1
1999	48.6	29.7	93.8
2000	53.4	29.1	111.3
2001	58.9	34.9	115.8
2002	59.6	34.1	120.3
2003	53.0	25.4	118.8
2004	63.5	36.1	128.5
2005	63.5	36.5	127.8
2006	65.1	39.6	125.9
2007	60.9	37.4	116.8
2008	71.3	50.9	119.7
2009	70.0	48.3	121.6
2010	68.9	47.2	120.6
2011	82.6	60.8	134.7
2012	79.0	56.8	131.8
2013	89.7	68.5	140.2

Note: Households in this table include private farms and private household plots of people
Source: State Statistic Committee of Ukraine, various years.

Trade

Ukraine's great advantage on the way to becoming a global agricultural power is its location at the crossroads of east and west and north and south. Its location effectively connects markets, creating efficient supply chains throughout the Black Sea, Mediterranean, Middle East, and Atlantic regions and providing food for people all over the world. The country's Black Sea harbors remain ice-free year round and provide direct access to world markets.

Ukraine has changed from being a net importer to a net exporter, becoming one of the largest suppliers of agricultural products worldwide, along with the USA, the EU, Russia, Australia, Argentina, and Canada. In 2012 Ukraine produced 5.2% of the world's barley and 2.3% of the global output of wheat. It is also the world's leading exporter of barley, with an average market share between 2000 and 2010 of 14.1%. Owing to exceptional yields in 2008 and 2009, barley exports from Ukraine reached 30.6% of the world's total in the period 2008-2010. In the following years the share of Ukraine's barley in global production and exports declined substantially since the area planted dropped from nearly 5 million hectares in 2009/10 to 3.3 million hectares in 2012/13, while the area with more profitable maize increased from 2 to 4.4 million hectares. Ukraine is also the most important producer of sunflower oil in the world, surpassing Russia in total volume of production in 2010 and accounting for 23.5% of the global output.

Ukraine's agro-food surplus increased especially after 2006, benefiting from high world prices for Ukraine's major exports. Exports received an additional boost from high output of grains and oilseeds in 2008, WTO accession the same year and a subsequent

devaluation of the hryvnia as a consequence of the financial and economic crisis. In 2011 trade surplus for these products reached US$6.4 billion (Figure 2.2.).

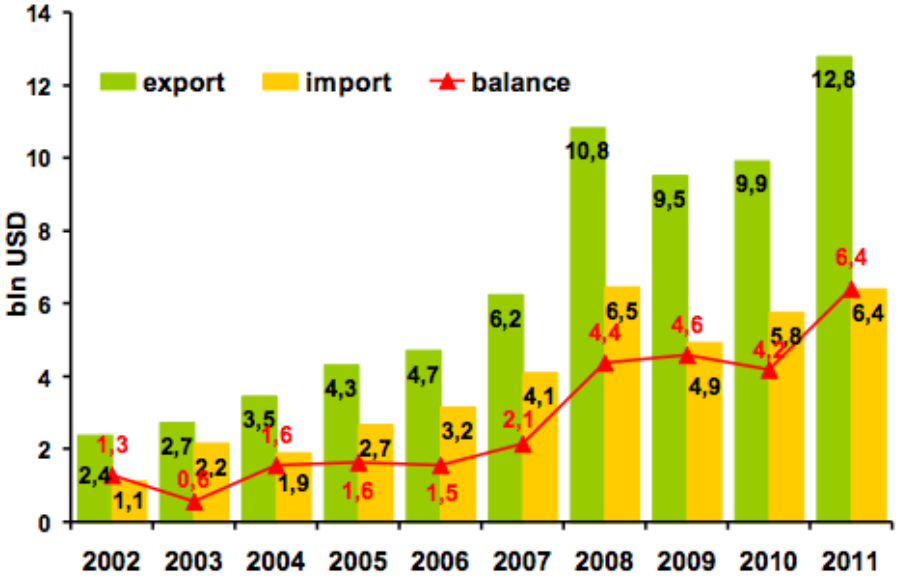

***Figure 2.2**. Ukraine's Agro-Food Trade, various years, US$ billion*
Source: State Statistic Committee of Ukraine, various years

The main agricultural exports and imports of Ukraine as measured by value of trade are shown in Tables 2.3 and 2.4. Sunflower oil accounted for over one third of the total value of agricultural and food exports of Ukraine in 2010 making it the single most important agricultural product in terms of export revenues. Other exports are more evenly distributed, with wheat, barley, rapeseed and maize playing an important role. Imports are concentrated in pork, tobacco, palm oil and poultry with shares of over 5% each in the total agricultural imports of Ukraine. Oranges and bananas together accounted for 5.8% of all imports in this group in 2010.

Table 2.5. *Ukraine's Main Agricultural Export Products, average value in 2010*

	Export value million US$	Share in agro exports %
Sunflower oil	1,658.5	36.1
Wheat	1,382.4	7.7
Barley	943.8	6.0
Rapeseed	803.4	5.1
Maize	729.8	4.5
Milk (equivalent)	533.1	3.1
Chocolate	451.5	2.0
Beverages	412.4	1.8
Total agricultural exports	9,218.7	100.0

Source: FAOSTAT, 2011

Table 2.6. *Ukraine's Main Agricultural Import Products, average value in 2010*

	Import value million US$	Share in agro imports %
Pig meat	298.1	6.4
Tobacco	269.0	5.8
Palm oil	266.3	5.7
Poultry meat	240.7	5.2
Coffee extracts	185.2	4.0
Oranges*	141.9	3.0
Bananas	130.2	2.8
Sugar and honey	115.6	2.5
Total agricultural imports	4,662.1	100.0

Note: includes tangerines and clementine.
Source: FAOSTAT, 2011

Remarks

After the USSR collapsed and Ukrainian Soviet passed the declaration of independence in 1991, Ukraine entered into a transition period of development. This period is characterized as the interval between one political regime and another, when the rules of the game were not clear either to the government, nor the public. This was a time of economic reforms, including implementation of Agricultural land reform in Ukraine.

Nowadays, Ukraine is recognized as the second most populated and the third largest area on the European Continent. It covers 603, 700 square kilometers with a population of about 45 million people.

Ukraine, which simply means borderland, is divided into 24 oblasts or provinces as well as the cities of Kiev and Sevastopol and the Crimean Autonomous Republic, into 486 districts and 9, 796 village councils.

Traditionally the country has been a substantial net exporter of food and agricultural products and it is renowned for its outstanding natural endowments suited for agriculture.

However, on its challenging path towards prosperity, Ukraine should increase its agricultural productivity and crop yields, approach world standards, establish transparent and fair rules and laws, promote investment, modernize, and bring new technologies to the industry. Clear and transparent regulations should enhance the country's overall position in global agriculture.

The country's impact on the global food scene can only be predicted to become more pronounced in the future, as the need becomes more pressing to feed and clothe nine billion people in 2050, who consume more meat and crops, particularly if authorities worldwide persist on using food crops as fuel.

Chapter 3. The Process of Agricultural Land Reform in Ukraine

3.1.Ukrainian Land Reform: Its History and Current Status

Land reform is a broad concept with diverse manifestations. Historically, it has involved consolidation of land under fewer owners or users, even under one owner (the state). Since the Second World War, land reform has tended to redistribute land to previous owners/users, or at least to strengthen the tenure of smallholders in various ways.

Since the collapse of the Soviet Union, there has been a so-called "third wave" of land reform (Wegren 2005, xiii) in the Soviet successor states, which has renewed interest in the issue of land reform.

To understand the land relations and farm structure that reform had led to, it is necessary to look back to other scientific works, dedicated to that topic. In that case, the starting point would be the collectivized agriculture inherited by independent Ukraine.

In Soviet agriculture, the state owned all land, and most agriculture, in terms of area, was conducted on collective farms (kolkhoz) or state farms (sovkhoz). There were genuine differences between state and collective farms; state farms were bigger, somewhat more specialized, fewer in number, and workers had better conditions than on collective farms (Symons, 1972). However, in general, kolkhoz and sovkhoz were much more similar than they were dissimilar. First of all, kolkhoz and sovkhoz were involved in large-scale, mechanized agriculture, with extensive use of chemical fertilizers and plant protection. Second, they possessed labor resources with problems in maintaining labor discipline. Third, both supported an extensive social infrastructure (schools, clinics, cultural centers, etc.). Finally, kolkhoz and sovkhoz allowed workers to maintain

household plots for small-scale agricultural production, although the amount of time one was allowed to work on the plots and marketing channels were strictly regulated (Swinnen and Mathijs, 1996).

Though small in area, household agriculture contributed significantly to overall Soviet agricultural production. For example, during the 1980s household agriculture contributed roughly 25%, and at times more, to total production in Soviet Ukraine (Lerman et al, 1994). Such household production was common throughout the Soviet Union.

According to Medvedev (1987), citing Soviet-wide data, much of this private production of households was focused on potatoes, vegetables and dairy products. However, this bimodal production pattern (combining large-scale farms and very small-scale household plots) has been criticized as "big tractors and many hoes," (cited in Hayami and Ruttan, 1971) and ultimately, household production came to be seen as an adaptive response to a problem that vexed the Soviet Union throughout its existence: the feeding of a growing population. It is perhaps easy nowadays to argue that collectivized agriculture was increasingly part of the problem, and the fact that the Soviet Union, though blessed with some fertile land, generally experienced unfavorable agricultural conditions, (especially compared to Western Europe and North America) should be taken into consideration. Given the short growing season and the unpredictable weather, feeding the population of the Soviet Union would have been difficult however farms were organized (Symons, 1972).

Ukraine initially proceeded very slowly with land reforms and farm restructuring. In this regard the country initially followed a reform path closer to Russian and Belarus rather than the more ambitious reform path of west countries. There was considerable resistance within the agricultural establishment, particularly among state and collective

farm chairmen, who were powerful local figures with allegiances in local administrations. Also, most farm workers, it has to be said, were ambivalent at the prospect of land reform, and many wanted the system to continue as it was (Ash, 2005).

Small steps were taken first. In the early 1990s, private ownership of land was first implemented and people gained title to their household plots, and then the first private individual farms were established and land lease was officially allowed.

For this purpose the Land Reserve was created from roughly 15% of collective and state farmland with further local government control over it. The primary purpose of the Land Reserve was to give household plots to rural residents and to give newly created private individual farmers the possibility to acquire up to 50 hectares of land in lifetime, inheritable leases. It is no longer possible now to permanently acquire land from the Land Reserve, though agricultural producers still can lease land from the Reserve on a shorter-term or long-term basis, with the right to convert the leases they received earlier into private ownership.

Also rural residents can still apply to receive some land from the Land Reserve for private households or subsidiary agriculture. Later, in 1994-1995 most state farms and all collective farms were reorganized into so-called collective farm enterprises (CAE). Hand in hand with this reorganization, farm workers received land share certificates, which entitled them to a share of farmland as a demarcated land plot, but not defined in nature. In that case, CAEs were to pay rent to land shareholders, who, if they wanted, had the notional right to exchange their share for a physical plot of land. Indeed several observers have noted that many land shares never left the farm manager's office and were not exchanged because of these bureaucracy system (Valletta and Nosick, 2002; Demyanenko, 2005). In the late 1990s, the dominant view of most observers was that

little had in fact changed on the farm, except for “changing the sign at the door” (World Bank, 2004).

The decisive step in land reform came in 1999, with a presidential decree on land reform, which was later consolidated and encoded in the Land Code of 2001. While some ambiguity appears to have been written into the text of the 1999 decree (see Allina- Pisano, 2004), this decree mandated that all land shares be converted into land title certificates (called State Acts or Deeds) to specific, demarcated plots of land, which are called pai in both Russian and Ukrainian. Simultaneously, the collective farms disappeared, and several years later agricultural land was in the private possession of rural residents with the average plot size for all of Ukraine being 4.2 hectares (Lerman et al, 2007).

This decisive period of land reform was also associated with some kind of restrictions on the land market. Most significant was a moratorium on sale and purchase of agricultural land in Ukraine. Initially intended to last until 2003, this moratorium has remained in force until January 2016. Also foreigners, as well as corporations or other business entities are not allowed to own agricultural land. Only when the moratorium on land sales is lifted, they might get the right to own agricultural land, however, the exclusion of foreign agricultural land ownership will remain unchanged unless additional legislative acts are approved.

The maximum amount of land that an individual can own is 100 hectares, though there is no limit to the amount of land a person or a business entity (even a foreign entity) may lease in. Finally, in the process of the land reform implementation, designated land use remained unchanged, which means that agricultural land must be used for agricultural purpose only. For example, it is forbidden to build a house on agricultural land.

State Committee on Land Resources (SCLR), a government body, created in the 1990s, guarantees the maintenance and enforcement of these designations, which, among other things, also maintains the land cadaster. In general, the SCLR was also given extensive power to regulate the land market, and to act as a third party in all land transactions, with the aim to ensure lease agreements are reasonably priced (Nosick and Valleta, 2002).

Thus the SCLR has developed a non-market based system for determining the value of agricultural land, based on soil fertility and other factors. One reason these restrictions were put in place and the state was given a large role in the land market is because of wide-spread fears, that speculators would drive up the price of land, trick land owners into handing over their land, and thereby acquire enormous holdings of land in private ownership (Demyanenko, 2005).

The stated purpose of most land reforms is optimization of agriculture, and improving the situation in the countryside. The aim was to make Ukrainian agricultural more efficient, by turning collective farms into business entities with a range of obligations to reach the standard of market-oriented agriculture. Moreover, there was a hope that the newly created category of farms (individual farmers) would grow and become a significant element in Ukrainian production (Johnson 1994, Hanstad 1998; Prosterman and Hanstad 2003; Demyanenko 2005; Valentinov and Nedoborovsky 2005; Lerman et al 2007).

Another consider ed purpose of the land reform was to boost rural livelihoods. In the 1990s, farms were shedding staff and/or not paying salaries, there was rising unemployment in the cities and hyperinflation in the economy. Thus expanding possibilities for subsidiary agriculture by enlarging the amount of land that could be

owned and used, gave people a real asset that they could use to face the economic crisis. As Valletta and Nosick report (2002) the provision of household plots was popular in Ukraine, and land reform was promoting subsidiary agriculture.

Finally, a great number of the beneficiaries of the distribution of collective farm land were pensioners. Pensions in Ukraine are low and not close to being able to provide adequate support. Reformers hoped that pensioners would receive a supplemental income from leasing out their land (Demyanenko, 2005; Roth and Valletta, 2006).

However, since the implementation of the land reform, the farm structure has changed to become as follows:

Corporate Farms

There is a range of different types of corporate farms from joint stock companies, and limited liability corporations to partnerships and cooperatives. The joint stock company is the most popular option for this category. Such farm enterprises may not own land, though they can lease it. According to one survey, most corporate farms are reorganized collective farms (Lerman et al, 2007). Another telling statistic is that many farm corporations have few shareholders, which is an indication that former managers have taken over (World Bank, 2004, see also Lerman et al, 2007). There are roughly 17,000 private farm enterprises in Ukraine today.

State Farms

The remnants of state farms scattered around Ukraine – 386 as of 2012 (Ukraine State Statistical Committee, 2013). This is down from 2438 in 1990. One purpose of these farms is to serve as experimental farms, though many also produce on a commercial basis.

Private Farms

This is a new category of farms, which has been growing, though at a slower rate in recent years. Private farms are legal entities, meaning that, as of the 2003 Law on Family Farms, one has to register to be a private farmer, though not all have done this. In contrast to corporate farms, private farms are allowed to own land (up to 100 hectares). Generally, private farmers own only a small portion of their farms, leasing in the rest.

Subsidiary Agriculture

Subsidiary agriculture in Ukraine today represents an evolution from the household plots allowed on collective farms during the Soviet period. Land in private households is owned, and rural residents who do not already have private household have an entitlement to receive one. A farmer practicing subsidiary agriculture does not have to register as a legal entity and does not pay tax on production. The primary purpose of subsidiary agriculture is subsistence, but surplus production is sold. The maximum size legally allowed for a household plot is 10 hectares.

As significant as land reform is in Ukraine, other agricultural reforms should also be mentioned. Most significantly the state gradually closed down state marketing and input supply channels, removed input price supports, liberalized prices and otherwise withdrew most of its extensive subsidies for agriculture. The result was that food prices dropped and input prices increased, thereby lowering terms of trade for farms.

One estimate for the entire European portion of the former Soviet Union is that agricultural terms of trade decreased by 70% (Rozelle and Swinnen, 2004). This, plus the general crisis throughout the economy, which lowered demand, particularly for meat products, contributed to a 51% decline in agricultural output between 1990 and 1999 (World Bank, 2004; See also Gorton et al 2002). A great number of farms went into debt and could not pay suppliers and workers. Only in the last several years has agricultural

production of permanent crops begun to come close to the levels in 1990, while livestock production remains lower than Soviet levels. Some subsidies do remain for grains, fruit and wine production and other areas, though subsidies for grain vary from year to year depending, at least partially, on harvest conditions.

The government has also slowly reduced international trade restrictions, though agricultural import tariffs remain relatively high by world standards, and temporary export restrictions are placed on grain. Two general themes about government agricultural policy are that: first, the government continues to intervene in markets and second, a concern for high food prices and domestic industry seems to trump concerns for farm conditions.

3.2. The Process of Implementation of the Land Reform in Ukraine

The whole process of Agricultural land reform in Ukraine was divided into three stages, based on Ukrainian legislation (time period of the issuance or amendment of the main agricultural laws, presidential decrees, Land Codes and others) and according to the transformational processes in agriculture during the reform.

The main stages of the reform are: 1) the implementation period (1991-1993), the time when reform actually started; the transformation period (1994-1999), the time when all agricultural land was transformed from the state ownership to other ownerships; and the establishment period (2000-present), the time when different kinds of agricultural entities were established, after they received agricultural land in private ownership.

Features and problems of each stage are discussed below.

First Stage: Implementation (1991-1993)

With the implementation of Agricultural land reform, Ukraine made an effort to change the agricultural system and to create more productive forms of farming, by switching from collective to individual farming. Private farms had been expected to grow to a main sub-sector of agriculture in Ukraine after some time.

The reform was designed to achieve a market economy through privatization. The characteristic feature of the Ukrainian agricultural system before the Soviet Union collapsed and before this reform was implemented, was collectivization. In general, collectivization imposed common characteristics on the Ukrainian agrarian system,

including:

1) A system of large state and collective farms;

2) Production operations that were centrally planned;

3) Planned use of inputs and controlled prices of inputs;

4) The use of collective forms of labor organization based on labor brigades;

5) Planned wage funds and centrally defined production bonuses;

6) Centrally controlled prices for farm production;

7) State monopoly of food storage, processing, distribution, and sale;

8) Restrictions on private food production;

9) The absence of a land market or land turnover;

10) State controls on land use;

11) State control and management of all agricultural finances, credit, and banking.

The necessity for deep reform in the agrarian sector of Ukraine (after the Soviet Union collapsed) flowed not only from the low economic efficiency of agricultural production, unresolved food problems and Ukraine's loss of its position as an exporter on certain international agricultural markets, but also from the critical state of agriculture as such.

Agricultural land reform in Ukraine was implemented based on private ownership over collectivization, and private farms and agricultural enterprises over kolkhozes and sovkhozes.

The 15th March 1991 marked the beginning of Agricultural land reform in Ukraine in that all land in the country (both agricultural and non-agricultural) became subject to reform in accordance with the resolution of the Supreme Soviet passed in December 1990. This first resolution, “On Land Reform,” was followed by a long list of laws, presidential

decrees, and governmental resolutions that have gradually created a comprehensive legal framework for agricultural land reform in Ukraine. In the general framework, reformation of land relations presumed the implementation of a set of institutional, functional, economic, social, legal, ecological, and other measures, aimed at the formation of new social relations connected with land use (Law on Amendments and Additions to some Laws of Ukraine, 1993).

The importance of this stage is that the State monopoly for ownership of land was eliminated and for the first time in Ukrainian history people obtained the right to own some specific plots of land. It was the first step of private land ownership in independent Ukraine. At the same time it should be mentioned that despite the implementation of the new system of land ownership in Ukraine, the traditional Soviet form of land tenure (inheritable lifetime possession of lands) had remained. The special feature of such a form of land tenure was that land could be used, leased, bequeathed, passed in inheritance, but not sold (During the USSR time, land could not be sold, because the State owned it and there was no private ownership of land. In independent Ukraine, land could not be sold, because there was a Moratorium set on selling agricultural lands from 1992 and extending up to 2016).

The aim of the first stage was to change the state ownership of land and assets, *free of charge*, to the possession and use of Ukrainian citizens and members of former kolkhozes.

The January 1992 Law on Forms of Land Ownership eliminated the monopoly of the state on ownership of land, which had been a feature of the Soviet system since 1917 and caused transformation of lands out of the State Fund into the ownership of non-state agricultural enterprises (structural reorganization of kolkhozes/sovkhozes, when

kolkhozes were transformed into collective agricultural enterprises and sovkhozes were privatized) (Figure 3.1.).

USSR time ------ > State monopoly for lands (100%)

After 1991 …… > No more State Monopoly

All agricultural lands were divided:

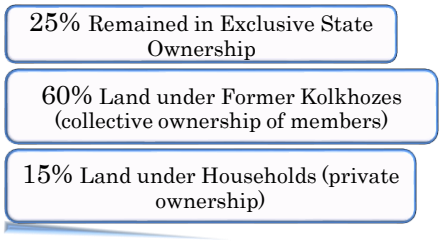

Figure 3.1. *Transformation of Lands Out of the State Fund*

Source: State Land Committee of Ukraine, 2011

Exclusive state ownership was retained for a fairly restricted list of land categories, such as:

1) Land in common use in villages and towns
2) Land used by the mining industry, transportation, communication, and defense
3) Nature reserves, recreational lands, health resorts, historical and cultural monuments
4) Forests and water bodies (except small areas up to 5ha included in the holdings of private farms)
5) Land of agricultural research and teaching institutions with their experimental stations
6) Land of state farms specializing in seed selection, elite-seed production, livestock selection and pedigree livestock breeding

7) Land of state farms specializing in hops, essential oil plants, medicinal plants

8) Land of state farms specializing in fruits and grapes.

Some of these categories of land retained for state ownership were quite understandable by universal standards, while some categories were obviously dictated by a mixture of political and economic considerations (Law on Forms of Land Ownership, 1992); for instance, grapes for the wine industry and large-scale fruit orchards were regarded as a national strategic asset. All other lands could be transferred to collective and private ownership.

The new Land Code introduced mechanisms for transferring land to private ownership in March 1992. As is shown in Table 3.1, a total of five categories of land use were set out and the size of land plot defined for each category under this new form of ownership. For instance, for a dacha, summer cottage owned by city residents, private land ownership was restricted to no more than 0.1 ha per household. Plot size for house construction was also determined for villages, settlements and cities respectively.

It is important to note that a citizen with agricultural education or a will to be involved in agricultural activities was entitled to a maximum of 2.0 ha of land and given the right to receive such land from the state. Historically, this was the first step in the creation of private farms in Ukraine, at least on paper, in that the 1992 Land Code gave the right to create a private farm on an obtained land plot. However, because the procedure for creating such private farms was not specified in the Land Code, no land was actually transferred to private farmers before 1994.

Table 3.1. *Purpose and Size of Land That Could be Transferred to Private Ownership for Households*

Land use purpose	**Land size (ha)**
Private orchards	not more than 0.12 ha
Summer cottages (dacha)	not more than 0.1 ha
Individual garages	not more than 0.01 ha
Subsidiary households	not more than 2.0 ha
Private house construction:	
in villages	max 0.25 ha
in settlements	max 0.15 ha
in towns	max 0.1 ha

Note: These non-agricultural lands and extra land area could be purchased at a certain price.

Source: Land Code of Ukraine, 1992

In addition, the 1992 Land Code severely circumscribed the rights of private landowners. Owners may not sell private land. During the moratorium, privately owned land may be alienated only to the local authorities from whom it was originally received. The moratorium applied both to land received from the State Fund and to lands obtained from the local authorities. In the latter case, the individual was to be reimbursed when land was alienated. In practice, land classified as privately owned could only be passed through inheritance during the moratorium, and the rights associated with this form of property were not different from the traditional Soviet form of land tenure called "inheritable lifetime possession".

Restrictions on private ownership of land according to the 1992 Land Code included the following:

- Moratorium on selling of privately owned land;
- Land must be used for farming;
- Land must be farmed continuously with no break of more than one year in active farming;
- Sound ecological and soil protection practices must be observed;
- Land may be leased out for a term not exceeding 50 years.

If these conditions were not met, that private land would be taken away from its owner by administrative action of local authorities.

However, mechanisms for transferring land to collective ownership were clearly introduced in the 1992 Land Code, which defined the categories of producers entitled to hold land under new forms of ownership.

Collective ownership was intended primarily for legal bodies, and the recipients of collective ownership were as follows:

- Collective agricultural enterprises
- Agricultural cooperatives
- Agricultural joint-stock societies
- Agricultural partnership
- Gardening societies

These collective lands actually belonged to the individual members of the collective, and each member, including both active and retired, was entitled to an equal share of land. Therefore, a procedure was also established for calculating the size of land share among the members of a collective, which essentially involved dividing all available land by the adult rural population (Figure 3.2.).

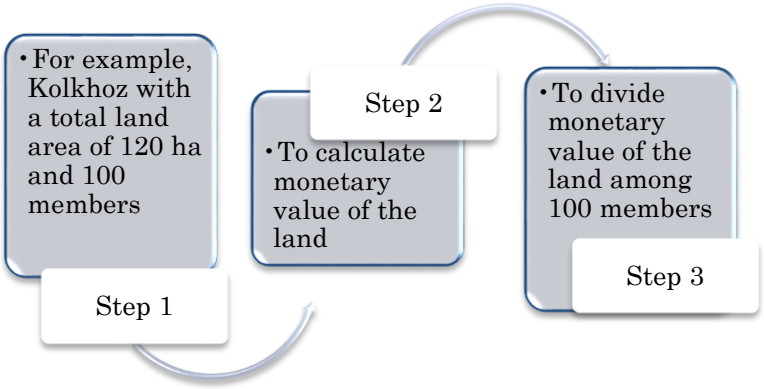

Figure 3.2. *Procedure for Calculating the Size of an Average Land Share for Members of Kolkhoz*
Source: State Land Committee of Ukraine, 2011

The 1992 Land Code did not elaborate the rights of these shareowners beyond their right to receive a physical plot of land corresponding to the share at the time of exit from the collective. This meant that physical division of collective lands could not be made.

Table 3.2 presents the area of land transferred from the State Fund to different types of farms from 1990 to 2004. It is clearly seen that for the first stage of land reform (1991-1993), no land was given to private farms and large areas were transferred to collective agricultural enterprises.

Let`s summarize the results in the first stage of agricultural land reform:

1) For the State: no more monopoly for lands, and the State Reserve was created corresponding to only 10% of lands for specified use;
2) For people: received the right for life possession of the land under their households with the right to inheritance. Paper right to become a private farmer;
3) For collective enterprises and their members: no more control-command system and all members of former kolkhozes became collective owners of all lands and assets (at least on paper).

Table 3.2. *Land Area in Ukraine by Farm Type (1,000 ha)*

Year	Total land	Agricultural enterprises	Household plots	Private farms	Private farms
1990	42.030	39.357	2.669		-
1991	41.973	38.061	3.864		-
1992	41.930	36.747	4.833		-
1993	41.890	36.260	5.011		-
1994	41.862	35.764	5.357		741
1995	41.853	35.442	5.589		822
1996	41.840	35.240	5.694		906
1997	41.854	35.029	5.789		1.037
1998	41.827	34.806	5.919		1.102
1999	41.829	34.408	6.243		1.178
2000	41.827	30.941	8.543		2.342
2001	41.817	29.327	9.736		2.754
2002	41.800	27.940	10.939		2.921
2003	41.789	25.826	12.799		3.164
2004	41.764	24.524	13.819		3.421

Source: State Land Committee of Ukraine (various years).

Second Stage: Transformation (1994-1999)

Although the privatization of land ownership was promoted in the first stage of land reform, the transformation of collective ownership and the creation of private farms could not be carried out in practice. Therefore, these issues were mainly taken up in the following stage by two presidential decrees: "On Immediate Measures for Acceleration of Land Reform in the Sphere of Agricultural Production" (№666: Nov. 10, 1994) and "Regulations for Division into Shares of Land Transferred to Collective Ownership of Agricultural Enterprises and Organizations" (№720: Aug. 8, 1995).

The 1994 decree instructed the local authorities to transfer the land used by farm enterprises from state to collective ownership, and then to expedite the division of collectively owned land into individual and private shares (Table 3.3.).

This was actually a two-stage procedure: transfer of state owned land to collective ownership, followed by transformation of undivided collective ownership into collective-shared ownership through distribution of land shares in the form of individual certificates of entitlement. Table 3.4 shows the change in average size of farms of different types.

Agricultural enterprises, which were created on the base of former kolkhozes, started to decrease in size from 1990. This was because members of such enterprises used their legal rights to obtain the land shares (certificates of entitlement) and to exit the enterprise. The size of created private farms had increased through cooperation of such people, who came together to do private farming using their lands, labor and assets, and/or through receiving the land share free of charge from the state according to the law.

Table 3.3. *Person's Right for the Land by Type of Ownership*

Type of ownership	**Person`s rights for the land**	**Supported By Document**
Collective	A person has a right to receive a land plot for free from the state as a member of the kolkhoz	No official papers for land
Collective-Shared	When a person received the land from the kolkhoz, that land was without demarcated land borders. A person has a right to use, lease and bequeath the land	Paper Certificate
Private	A person could exchange Paper Certificate to State Act or receive directly a State Act if he was not a former member of kolkhoz. This land plot demarcated borders. A person can use, lease, bequeath and sell his land plot.	State Act

Source: State Land Committee of Ukraine, 2011

Table 3.4. *Change in Average Size of Farms of Different Types, 1990-2004, ha*

Year	Agricultural enterprises	Private farms	Household plots
1990	2,900	0	0.5
1994	2,200	24	1.3
2000	1,450	57	2.1
2004	940	80	2.6

Source: Calculated from AgroUkraine 2006

The size of household plots was also increasing, as people used the right to privatize this land and in case of need could apply for some extra land from the State Reserve for purposes mentioned in Table 2.

It must be emphasized that the procedure for transfer of the land used by farm enterprise from the collective to collective-shared ownership had some special features, as follows:

1) The division of collectively owned land into shares was based on the principle of equal distribution to all beneficiaries, adjusted for land quality.
2) The land share represented the right of an individual to private ownership of an underlying plot of land, without physical demarcation of that plot in the field or even on a map.
3) The right to a land share could be sold and bought, leased, given in gift to another person, exchanged, bequeathed, or even mortgaged.
4) Land shares were thus more tradable than actual land plots, at least on paper.

Share-based privatization did not actually allocate land use rights to individuals. Rural residents received paper certificates of landownership ("land shares"), without physically getting a plot of land, and certificate holders were allowed to convert the land share into a private plot when leaving the former collective farm (Revised version in 1997, Presidential Decree №720, 1995).

Rural residents had received paper certificates confirming their entitlement to a plot of land of a specified size but in an unspecified location. The non-land assets (farm machinery, buildings, and livestock) had been divided into value-based paper shares. The collective farm (now transformed into a corporate farm) was no longer a closed entity, as

it had been during the Soviet era, and individuals were entitled to leave the collective taking their shares of land and assets with them. Yet very few corporate farms distributed land and assets in kind to the shareowners, and very few farm employees actually left corporate farms for independent farming. The land and asset shares typically remained locked in collective ownership and use.

Privatization through shareholdings did not encourage large corporate farms to change their mode of operation, in that this mode of privatization often resulted in only "changing the sign on the door." Nor did it change the government policies toward the large farms (Revised version in 1997, Presidential Decree №720, 1995).

Thus, it is clear that the 1994 presidential decree reaffirmed the fundamental right of individuals exiting with land, which was first established in the 1992 Land Code. The decree stated that every individual was free to leave the collective enterprise with a physical plot of land, and that the individual's right of private ownership would be certified by an official title.

On the other hand, the decree also set up a mechanism for internal reorganization of collective enterprises by stating that owners of land shares may voluntarily pool their shares to create various associations, partnerships, cooperatives, or other farming organizations. Their land shares could be invested in the equity capital of the enterprise, or alternatively leased to the enterprise for a definite term.

Most importantly, perhaps, according to Shulga and Kulinich (1995, p.19), it did not remove the barriers for individual members to exit from large corporate farms. Neither farm directors nor shareowners generally rendered their support or allowed other members to leave the corporate farm. Relatively unfavorable conditions for private

farmers in matters of access to capital, inputs, and markets, compared to agricultural enterprises, dissuaded most members from exiting the corporate farms. In fact, many details of the exit procedure such as allocation of land and asset shares, the method 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 (Shulga and Kulinich, 1995, pp.19-27).

The outcomes of the second stage of land reform may be summarized as follows:

1) For people: private ownership of land was created for households, and private farms were established.

2) For collective enterprises and their members: certificates were issued for the members of corporate farms to prove that they have a land plot in the former kolkhoz, but without delineation of the actual land plot in the field or even on a map; non-land assets (farm machinery, buildings and livestock) were divided into value-based paper shares.

Third Stage: Establishment (2000-present)

The land reform processes have had different impacts on the agricultural sector during the third stage. First, they led to a large diversity in organizational and legal forms of agricultural enterprises and to a substantial growth in their number. According to the State Statistics Committee of Ukraine, 73.8% of agricultural producers were individual farmers, 13.8% partnerships, 7.5% private enterprises and 1.7% cooperatives in 2010.

Second, the land ownership structure has changed significantly as well. In 1990-2010, the area of agricultural lands owned by agricultural enterprises decreased by 46.8%. As a result, the share of these enterprises in the total agricultural land area dropped from 92.1% in 1990 to 49.5% in 2010. In 1990, the portion of state agricultural enterprises in the area of agricultural lands was 23.6%, while in 2010 it went down to 2.4%. During the same period, agricultural lands owned by individuals increased from 2.7 million hectares to 15.9 million hectares (5.9 times).

Third, a particular feature of the third stage of the reform was the *issue of a State Act* on land plot, which confirmed the right of the individual to that specific land plot. After the land purchase agreement or other deed is notarized and registered by the notary in the State Register of Real Estate Transactions, the individual should do the following: apply to the State Agency of Land Resources for issuance of the State Act (Deed) on Title of Ownership to the Land Plot and registration of the title to ownership in the name of the individual. For this purpose, technical documentation for drafting the State Act (Deed) should be carried out.

In general, the procedure for the development of technical documentation and obtaining of the State Act (Deed) takes three or four months. A lot depends on the designated use and location of the land plots (Nouel, 2008).

In practice the State Act is like a passport for the land, which strictly defines borders of a land plot and gives the right to a person to use, lease, bequeath and sell the land plot in the future (after the Moratorium on selling agricultural lands will be cancelled). The State Act is recognized as the final document confirming the title of ownership to the land plot.

Fourth, this is the period when kolkhozes and sovkhozes ceased to exist. In order to define and to classify agricultural producers who were representing the agricultural sector of Ukraine after kolkhozes and sovkhozes disappeared, the following three definitions are used (according to State Committee of Land Resources):

1) *Agricultural enterprises, also called large agricultural producers* – include state enterprises, joint-stock companies and partnerships of all types, private enterprises affiliated with industrial, transportation and other spheres, organizations and scientific research institutes;

2) *Private households, also called household plots or small agricultural producers* – include individual or family households with land estates, forms of agricultural production when an individual or a family produces commodities to satisfy the family needs in food or for other purposes;

3) *Private farms, also generally considered being small in size* - a form of enterprise, using owned or rented lands and other assets. A private farmer operates the business unit to produce, sometimes process, and market agricultural commodities and is registered by the government as a farm.

In other words, the Agricultural Enterprise category includes the largest farm holdings, such as former state and collective farms, which are still struggling with post Soviet realities, and the modern and efficient corporate style holdings. Private Households are comprised of

individual and family rural households that produce food primarily for personal consumption, but also market a certain percentage of commodities to supplement family income. Last, Private Farm is very similar to private households, but is registered as a business.

Therefore, it can be said that land reform in the third stage not only changed the organizational forms of "farm enterprises" but also caused a profound impact on the individual sector, accelerating the creation of independent private farms. This process was promoted by the issuance of State Acts. The third stage was also the last period of existence of Soviet kolkhozes and sovkhozes in independent Ukraine.

The outcomes of the third stage of land reform may be summarized as follows:

1) For the State: Ukraine evolved from exclusive state ownership of land in 1990 to a mix of state and collective ownership in 1993-1995, and finally to a mix of state and private land ownership in 2000-2011.

2) For people: they received wider rights for their land plots after the exchange of paper certificates with State Acts. The number of private farmers has increased. Moreover, the individual sector (consisting of the traditional household plots and independent private farms that began to emerge after 1994) today controls more than 40% of agricultural lands, contributing 70% of agricultural output.

3) According to the State Land Committee, by 2011, nearly 90% of the State Acts were issued for land plots in Ukraine, which guaranteed the right of the person to a specific land plot in a specific area.

With the implementation of agricultural land reform, Ukraine made an effort to change the agricultural system and to create more productive forms of farming, by switching from collective to individual farming.

3.3. Land Moratorium in Ukraine

Agriculture is in the list of top prioritized industries in Ukraine. It might become a solid base for long-term development for the country if the land is used effectively and sustainably. The issue is related to the quality of land governance and functionality of the land market.

Land market performs two main functions: distribution of the land among the most productive users and distribution of the land rent among the owners. How well are these functions performed in Ukraine?

Ukraine is one of the few countries in the world with abundant resources of fertile agricultural land. With about 65% of its population living in urban areas, urban settlements and industrial cites occupy only about 4% of Ukrainian territory, while agricultural land corresponds to about 70% of the country's land resources.

Furthermore, according to the State Statistic Committee of Ukraine, nowadays, households and agricultural enterprises currently cultivate more than 36 million hectares out of 41.5 million hectares of agricultural lands. About 22 million hectares are used by agricultural enterprises, of which about 95% (19.2 million hectares) is rented primarily from individual smallholders. Most of such smallholders received land parcels free of charge (about 2-5 hectares depending on the region) during the privatization period as shares (pai) of former state or collective farms during the 1990s.

However, the property rights of Ukrainian landowners are considered to be limited as far as they cannot buy or sell their land parcels. Since 2001, Ukraine has a ban on sales of agricultural land (moratorium), in force up to January 1, 2016.

Peculiar features of the ban and its impact on agricultural sector are discussed below.

The ban on the land sales preserves the fragmentation of ownership that followed after land privatization. As a result, the land market is facing relatively high transaction cost.

According to the State Statistics Committee of Ukraine, about 75% of land is cultivated by farms above the size of 1,000 hectares. That means that each relatively large farm has to process at least 200 land lease agreements and extend them on a regular basis. If we assume that all parties in public and in private sectors spend jointly one working day per rental contract and we evaluate this time with the average wage, Ukraine is wasting more than 90 million USD every year on rental market transactions. This transaction cost is paid for both by private sector that has to employ staff for managing hundreds or thousands of rental agreements, and by the public sector that maintains an army of registry officers. This cost can be reduced considerably if the average size of land parcels would be increased and could match closer to the cultivation unit (land area of about 10 to 50 hectares).

Another issue related to the fragmentation of ownership and high transaction cost is that landowners possess a relatively low bargaining power when negotiating the rental. This causes a relatively **low rental** (about 75 USD per hectare in 2013 according to the State Agency of Land Resources), which is way below the marginal contribution of land to the value of output.

State Statistics Committee estimated that rental in Ukraine in 2013 in average was equivalent to 13% of output value, while the marginal contribution of land was above 50% (250-300 USD per hectare). However, low rental could be also interpreted as an advantage, which might stimulate agricultural producers to expand their cultivated area and to produce more crops or animal produce.

On the other hand, rental is also considered to be an important contribution to the welfare of rural residents. According to the State Statistic Committee of Ukraine, the share of rental contracts issued by retirees among the local residents in 2013 was the highest and equaled almost 53% of all issued rental contracts.

Average annual rental received by retiree was about 300 USD per land plot, which was close to three-month pension in rural areas. Thus, improvements in bargaining power of landowners and higher land rental would contribute to rural development and poverty reduction in Ukraine.

Furthermore, because of the moratorium on land sale and purchase, privately owned land plot cannot be used as collateral. This is considered to be a limiting factor for the access to capital for small agricultural producers.

In addition, the moratorium creates obstacles for investors, especially for foreign investors (ban on the acquisition of agricultural land by non-residents of Ukraine) to invest in Ukrainian agriculture.

According to the Ministry of Agricultural Policy in Ukraine, the optimal investment cost in Ukraine's agricultural land in 2013 was one of the lowest at USD 600-800 per hectare compared to the United States at USD 4,000 per hectare, and Western European level of USD 12,000 per hectare. Moreover, the only problem with investing in this profitable business of agriculture was considered to be high risk and insecurity of foreign investors due to the artificial legislative barrier of the moratorium.

At the same time, the current harvest yields in Ukraine suggest that the agro-ecological potential of 6.2 metric tons per hectare could be easily obtained under proper farm management and with the use of optimal organic technologies.

Historically, land in Ukraine was viewed as a key factor of national security and sovereignty. Nowadays, it remains one of the hottest issues in Ukraine and could trigger major confrontations both within the current government and market participants, while prompting unpredictable reactions from millions of land-owning farmers.

Since the Land Code was passed in 2001, the idea has been to make land a commodity, but up to today the issue of opening an agricultural land market is still contentious.

According to comments made in Parliament, the moratorium has been extended because of the need to pass further legislation concerning the development of an agricultural land market in Ukraine. This means that the precondition of the moratorium to be lifted is the existence of the full-fledged functioning land market in Ukraine.

The Moratorium can only be lifted if two laws are passed by Parliament: the Law on the Land Market and the Law on the Land Cadaster.

The Land Market Law will delegate how the land market will function – the rules, the regulations. The Law on Land Cadaster will focus on organizational functioning of the land cadaster, including the meters and bounds and also the single register of all land in Ukraine.

So currently, land lease is the only viable option for performing farming operations for investors and for expanding agricultural producers in Ukrainian.

3.4. Typology of Ukrainian Farms

In the course of the reform, an integral part of which was the reorganization of the so-called CAEs (collective agricultural enterprises), the structure of land ownership has significantly changed. The State monopoly ownership for land was eliminated and a new type, private ownership for land, has appeared (Figure3.3.)

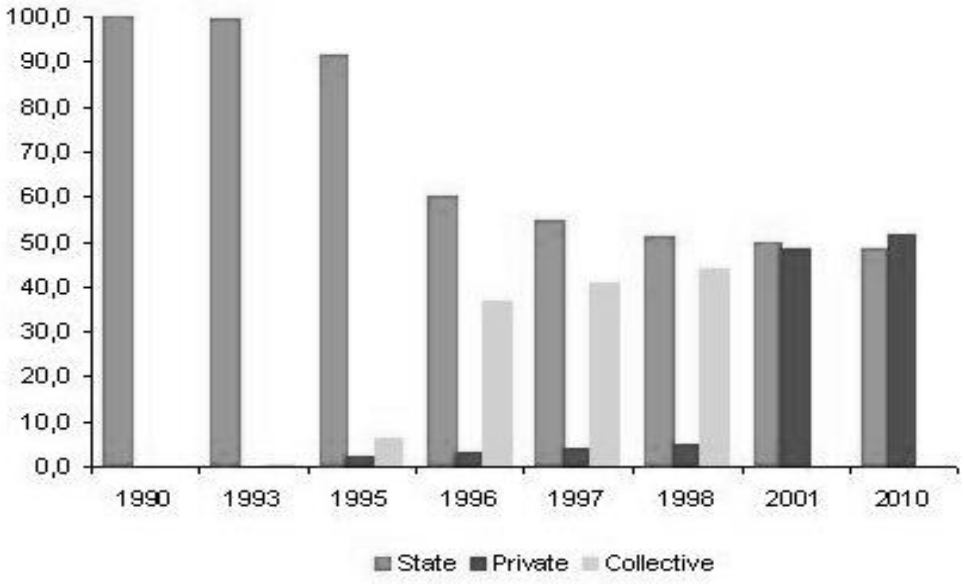

Figure 3.3. *Land Ownership Change in Ukraine in the Process of the Land Reform*

Source: Center for Land Reform Policy in Ukraine, 2011

Ukrainian farms today can be classified into two broad organizational categories: corporate farms and individual farms (the first are often called “agricultural enterprises”)

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 the land reform. 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), 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), 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.

The main organizational forms defined in Ukrainian legislation (including the new Civil Code and the Business Code adopted in January 2003) are:

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, outsiders can buy shares.

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.

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

Individual farming sector in Ukraine includes private farmers and private households. Collectively, they produce over two-thirds of total agricultural production in Ukraine (USAID, 2013). These are typical family farms and the main difference between them is one of size and commercial orientation.

Private households are generally smaller and more subsistence-oriented than private 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, private households are subject to the Law on Household Plots passed for the first time in May 2003, whereas private farms are now subject to the new Law on Private Farms, which was passed in June 2003 replacing the original law from December 1991.

Private households are treated as physical bodies, whereas private farms according to the new law are required to register as legal bodies.

Table 3.5 presents particular characteristics of private households and private farms.

Table 3.5. *Characteristic Differences Between Household Plots and Private Farms*

	Households	Private farms
Organizational form	Physical body: No registration requirements	Legal body: Incorporate and formally registered
Maximum Size	10 ha	100 ha
Land	Owned	Owned plus leased land
Production	Subsistence oriented with surplus sale	Commercial oriented plus personal consumption
Labor	Family	Family and hired workers
Taxation	No tax on income	Farm income taxed
State financial support	None	State Support Fund
Legal framework	Law on Household Plots, May 2003	Law on Private farms, May 2003

Source: Center for Land Reform Policy in Ukraine, 2013.

In the process of the reform, the individual sector in agriculture was developing and the number of family farms continued to increase. Growth came in spurts, first after it was possible to get land from the Land Reserve (early 1990s), and then after the land lease market opened up in 1999 (Lerman et all, 2007).

Private farms have been expected to grow to a main sub-sector of agriculture in Ukraine in the process of land reform implementation, but this has not yet happened.

Table 3.6 shows the number of private farms and their land area in Ukraine as well as in Zytomyr Oblast.

Table 3.6. *Number of Private Farms and Their Agricultural Lands in Ukraine and in Zhytomyr Oblast, 1990-2013*

	1990	1995	2000	2005	2013
Ukraine					
Private farms, unit	82	34,778	38,428	42,445	42,527
Land area, ha	2,000	786,400	2,157,600	3,661,012	4,368,125
Zhytomyr oblast					
Private farms, unit	-	310	501	686	781
Land area, ha	-	6,578	38,956	65,662	79,115

Source: State Statistics Committee of Ukraine, 2013

Several different explanations have been put forward by scientists that explain the lower than expected popularity of private farming option in Ukraine. One common argument is that there is not enough tenure security for family farmers to take a long-term perspective and invest in their farms.

This argument has many different strands. One strand relates to the overall institutional milieu, meaning that contracts enforcement is weak and markets are as yet non-transparent, thus raising information costs (Koestler, 2005; Nosick and Valletta, 2002; Roth and Valletta, 2006). Also, the cost in time and money in conducting land transactions – formulating and registering lease contracts – is high, and in some places corrupt. In such an environment, the heft of the larger operators and the contacts that managers at corporate farms have, give them an advantage. Beyond these structural reasons, active or passive resistance on the part of local agricultural officials to family farming has been cited as a reason for the slow or stagnated growth in family farming (Ash, 1998; Nosick and Valetta, 2002; Aliina-Pisano, 2004).

Many of the respondents in Rozelle and Swinnon`s (2004) study referred to such resistance, particularly when the first farms were established in the 1990s. They mentioned that they faced bureaucratic behavior from the officials, and in addition, other villagers, who were still members of collectives and also saw the emergence of family farming as a threat, were making it difficult for newly created farmers to operate.

According to another source, the reason that family farming has not emerged was that private financial institutions almost completely ignored family farmers, and there were little state support or extension services for family farmers (World Bank, 2004). The lack of access to credit could be a serious obstacle to raising capital and/or acquiring the machinery more suited to smaller-scale farming (USDA, 2009).

An additional argument that has been put forward to explain the less than anticipated popularity of family farming, was the supposed conservatism of risk averse "peasants" the world over. The study of Petrick and Carter, (2007) argued that collective farm managers seek to exploit this conservatism and prevent people from opting for family farming.

A more benign interpretation is that agricultural continuities can be seen as a continuation of a Soviet village moral economy which village residents and farm managers both view positively and participate in (Ash 1998; Hann 2003).

As Ash writes (1998): "under the Soviet system farm workers received not only material benefits, but also social security, a sense of community and various social services. Within the present context, farm workers on large farms continue to feel safe …" Allina-Pisano (2004) describes local agricultural officials in many regions of Ukraine as being particularly concerned about the social role of collective farms, and that is another reason why they were reluctant to break up the farms.

Remarks

This chapter aimed to clarify land reform in Ukraine by classifying the process into a three-stage evolution. We divided the 20-year process of agricultural land reform into three stages, implementation, transformation, and establishment, with a view to the fact that it is a part of a larger complex process, characterizing transformation and development of the whole country.

The results of the first stage of agricultural land reform:

4) For the State: no more monopoly for lands, and the State Reserve was created corresponding to only 10% of lands for specified use;
5) For people: received the right for life possession of the land under their households with the right to inheritance. Paper right to become a private farmer;
6) For collective enterprises and their members: no more control-command system and all members of former kolkhozes became collective owners of all lands and assets (at least on the paper).

The outcomes of the second stage of land reform may be summarized as follows:

2) For people: private ownership of land was created for households, and private farms were established.
3) For collective enterprises and their members: certificates were issued for the members of corporate farms to prove that they have a land plot in the former kolkhoz, but without delineation of the actual land plot in the field or even on a map; non-land assets (farm machinery, buildings and livestock) were divided into value-based paper shares.

The outcomes of the third stage of land reform may be summarized as follows:

1) For the State: Ukraine evolved from exclusive state ownership of land in 1990 to a mix of state and collective ownership in 1993-1995, and finally to a mix of state and private land ownership in 2000-2011.

2) For people: they received wider rights for their land plots after the exchange of paper certificates with State Acts. The number of private farmers has increased. Moreover, the individual sector (consisting of the traditional household plots and independent private farms that began to emerge after 1994) today controls more than 40% of agricultural lands, contributing 70% of agricultural output.

3) According to the State Land Committee, by 2011, nearly 90% of the State Acts were issued for land plots in Ukraine, which guaranteed the right of the person to a specific land plot in a specific area.

Agricultural land reform has been designed to achieve a market economy through privatization. In the process of the reform implementation, private farms had been expected to grow to a main sub-sector of agriculture in Ukraine and to contribute significantly in future to gross agricultural production of the country.

After the collapse of the USSR in 1991, the Ukrainian agricultural sector experienced a dramatic decline, however, in recent years, Ukraine's agriculture has been consistently improving and has been the only part of the country's economy to buck the recession.

In 2013 agricultural production increased by 13.7% in marked contrast to a 4.7% decline in the industrial sector. According to official statistics, Ukraine's industrial production was up 40% in the final months of 2013 when compared to the same period of 2012. This translated into an unexpected gain in fourth-quarter GDP growth (+3.7%) and prevented an annual drop in GDP.

Chapter 4. Introduction of the Study Area and Farmers' Profile

4.1. Introduction of Zhytomyr Oblast

Zhytomyr Oblast of northern Ukraine, located next to Kyiv, includes the northern part of Polissya and southern part of the forest-steppe area. It occupies 3.7% of the country's arable lands. The natural resources of the oblast—its soil and climate conditions, raw minerals, forests, and water resources—provide favorable conditions for diversified agricultural development. However, some parts of the Zhytomyr Oblast fall within the Chernobyl Zone. Villages and small towns within this area have been devastated by the effects of the disaster and cannot produce their own agricultural products. This explains why Zhytomyr Oblast is hit by unemployment. However, study area is located pretty far away and agricultural practices are conducted on the common countrywide basis.

Figure 4.1. *Zhytomyr Oblast in Ukraine, 2013*

Source: Atlas of Ukraine, 2013

This oblast was established on September 22, 1937. Its area constitutes 29.9 thousand square kilometers, or 4.9% of the territory of Ukraine. The population of the region is more than 1.3 million people.

Zhytomyr Oblast is subdivided into 23 districts, and 5 of its cities are designated as separate districts within the oblast. The regional center is Zhytomyr city.

The region is rich in natural resources, having more than 220 deposits of different minerals. They are: decorative facing stones, marble, semi-precious stones, raw materials for metallurgy and construction industry, limestone, brown coal, and peat. Zhytomyr Oblast accounts for one-fifth of the quarry stone resources of Ukraine and has considerable capacities for their processing.

The resources of decorative facing stones (labradorite, granite, gabbro), which are in great demand both in Ukraine and abroad, are unlimited. The region's explored deposits of labradorites and gabbro make up more than 90% of the resources of these stones in Ukraine. That calls for rapid development of stone-extraction and stone-working industries and increased exports of their products.

In the region they quarry semi-precious stones, such as beryl, topaz and quartz with subsequent processing to produce jewelry, while piezoelectric quartz crystal is extensively applied in electronics.

The basis of industrial potential is created by food, extractive, chemical, porcelain and earthenware and woodworking industries - the region takes the second place in Ukraine by supplies of forest resources, it has 1.49 million hectares of woods.

The basis of agricultural potential is created by traditional production, the growing of cereals and grain legumes, sugar beets, production of milk and meat, as well as flax cultivation and hop-garden.

Agricultural Profile of Zhytomyr Oblast

Production activity of the region has always been in agricultural areas. Agriculture contributes almost 30% of GDP, provides citizens with basic food and raw materials for industry. Due to the fact that the region is located in two soil-climatic zones (Polissya and woodland steppe), such natural factors as soil and climate conditions, raw minerals, forest and water resources altogether create favorable conditions for diversified agricultural development.

The share of Zhytomyr Oblast in the Gross Agricultural Output of Ukraine is 3.4% (Table 4.1).

Table 4.1. *Share of Zhytomyr Oblast in Gross Agricultural Output of Ukraine, 2013*

	Gross Agricultural Output	Gross Crop Production	Gross Animal Production
Zhytomyr oblast	**3.4%**	**3.1%**	**3.9%**

Source: State Statistics Committee of Ukraine, 2013

The agriculture of the region produces cereals, leguminous crops, sugar beets, milk and meat. Besides, the region is a leading Ukrainian producer of hop, flax and chicory.

In great demand is hop of valuable aromatic varieties, which are widely used in beer brewing, pharmaceutical production and other industries.

Agricultural production of Zhytomyr Oblast for various years is presented in Table 4.2.

Table 4.2. *Agricultural Production by the Type of Agricultural Producers in Zhytomyr Oblast, 1990-2013, million hryvnas**

	1990	2000	2013
Agricultural Production:	**5,798**	**2,988**	**3,296**
Crop Production	2,604	1,580	1,882
Animal Production	3,195	1,408	1,414
Type of Agricultural Producer:			
Agricultural Enterprises	3,439	861	924
Private Farms	0	72	85
Households	2,359	2,127	2,372

Note: * hryvna - Ukrainian currency

Source: State Statistics Committee of Ukraine, 2011

Land resources of Zhytomyr Oblast, with its area of 29.832 thousand square kilometers, are represented by 53.7% of agricultural lands, 37.1% forests, 3% lands under constructions, 1.6% lands under water bodies and 4.6% other lands (Figure 4.2.).

The structure of agricultural lands in Zhytomyr Oblast is represented by 79.9% of arable lands, 12.4% of lands under the pastures, and 5.2% lands under the hayfields and 2.5% under the perennial plantations (Figure 4.3.).

All agricultural lands (including arable lands, pastures and hayfields) could be characterized to several categories: lands of households and agricultural enterprises (45%), which could be state or non-state owned and lands of other uses (55%).

The structure of agricultural lands under the main crops in Zhytomyr Oblast for various years shows consistently that the leading crops are cereals (wheat, barley, rye), potato, rape and sugar beet (Table 4.3).

Bigger agricultural enterprises grow crops for processing and export, and smaller enterprises do so for local sale, consumption and as feed for animals (USAID, 2013).

The structural change in land ownership pattern in the country caused organizational changes in Zhytomyr Oblast as well and various forms of agricultural enterprises have emerged (Figure 4.4). The organizational forms of agricultural enterprises could be divided into two categories. The first category is those enterprises, which had owned agricultural land and the second category, enterprises which did not have owned agricultural land, but only rented-in land. In Zhytomyr Oblast this proportion is 85% of enterprises with agricultural land and 15% enterprises without agricultural land.

The main goal of the reorganization and the creation of new organization forms was to enhance the efficiency of agriculture in Ukraine by establishing private ownership for production factors and providing owners and managers with market driven incentives.

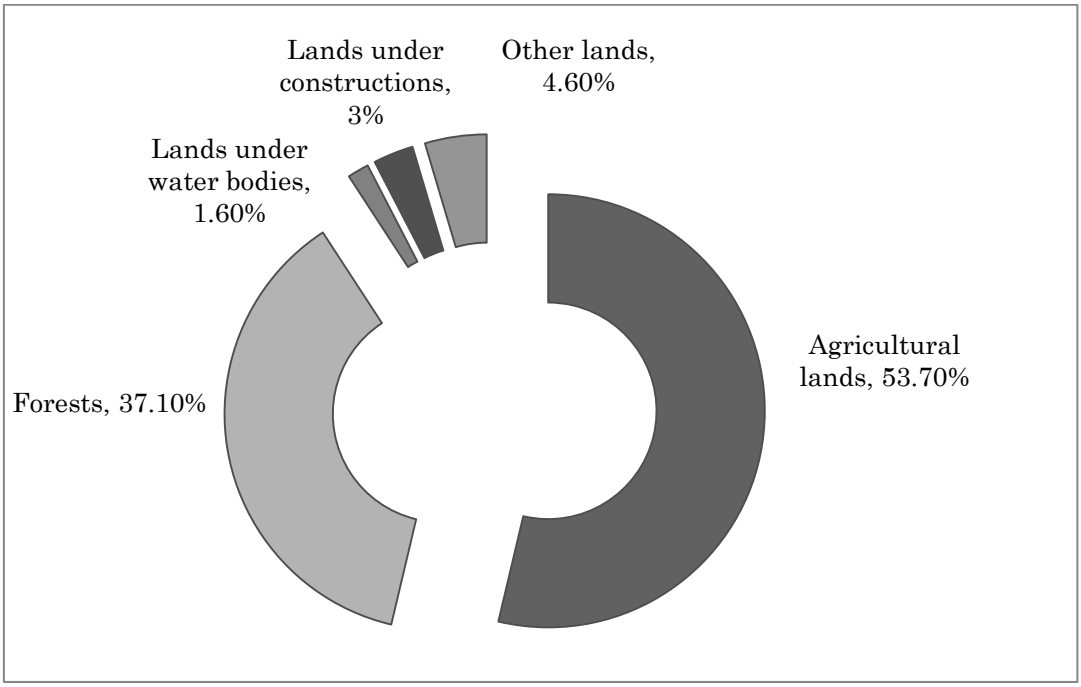

Figure 4.2. *Land Resources of Zhytomyr Oblast, 2013*

Source: State Statistics Committee of Ukraine, 2013

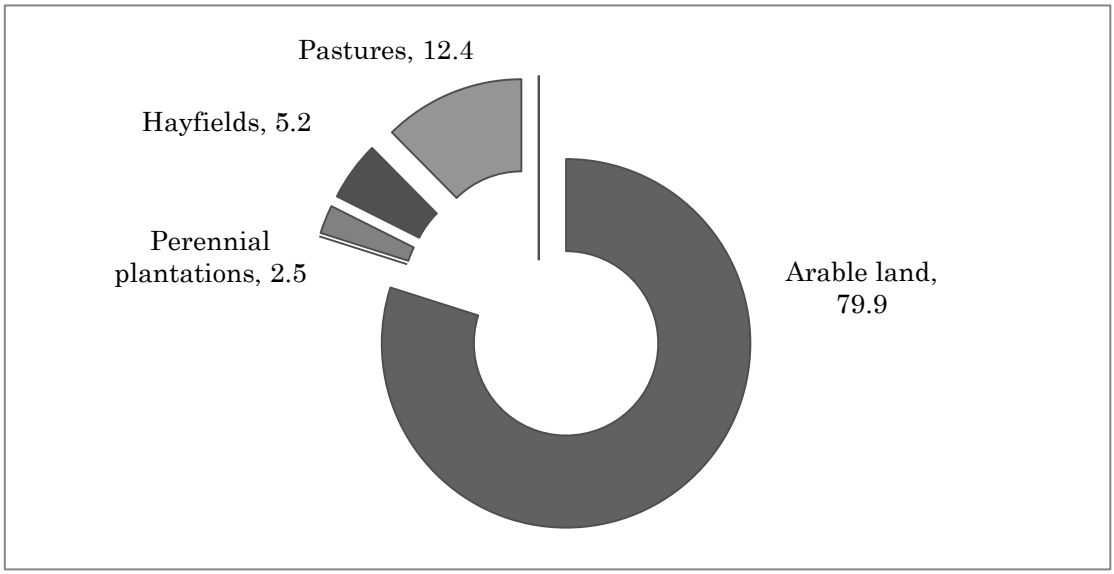

Figure 4.3. *Structure of Agricultural Lands in Zhytomyr Oblast in 2013, %*

Source: State Statistics Committee of Ukraine, 2013

Table 4.3. *Agricultural Production, Yield and Land Area under the Main Crops in Zhytomyr Oblast, 1990-2013*

	Cereals	Sugar beet	Potato	Rape seeds	Flax
1990					
Land under crop, thsd.ha:					
All Producers	506.7	50.1	93.7	3.4	38.8
Private Farmers	--	--	--	--	--
Yield, t/ha:					
All Producers	2.7	26	11	1.1	0.6
Private Farmers	--	--	--	--	--
Production, thsd.ton:					
All Producers	1,368	1,302	1,031	3.7	23.0
Private Farmers	--	--	--	--	--
2000					
Land under crop, thsd.ha:					
All Producers	413.5	20.9	82.5	6.7	4.8
Private Farmers	21.9	3.0	0.6	0.3	0.09
Yield, t/ha:					
All Producers	1.9	21.0	18.0	0.6	0.3
Private Farmers	1.8	22.6	18.9	0.5	0.2
Production, thsd.ton:					
All Producers	786	439	1,485	4.0	1.4
Private Farmers	39	68	11	0.2	0.02
2013					
Land under crop, thsd.ha:					
All Producers	404.0	10.6	58.9	30.4	0.9
Private Farmers	45.2	2.5	0.5	3.9	0.006
Yield, t/ha:					
All Producers	3.1	29.0	18.9	2.1	0.9
Private Farmers	2.6	30.0	18.7	1.9	0.7
Production, thsd.ton:					
All Producers	1,252	307	1,113	64	0.8
Private Farmers	118	75	9	7	0.004

Source: State Statistics Committee of Ukraine, 2013

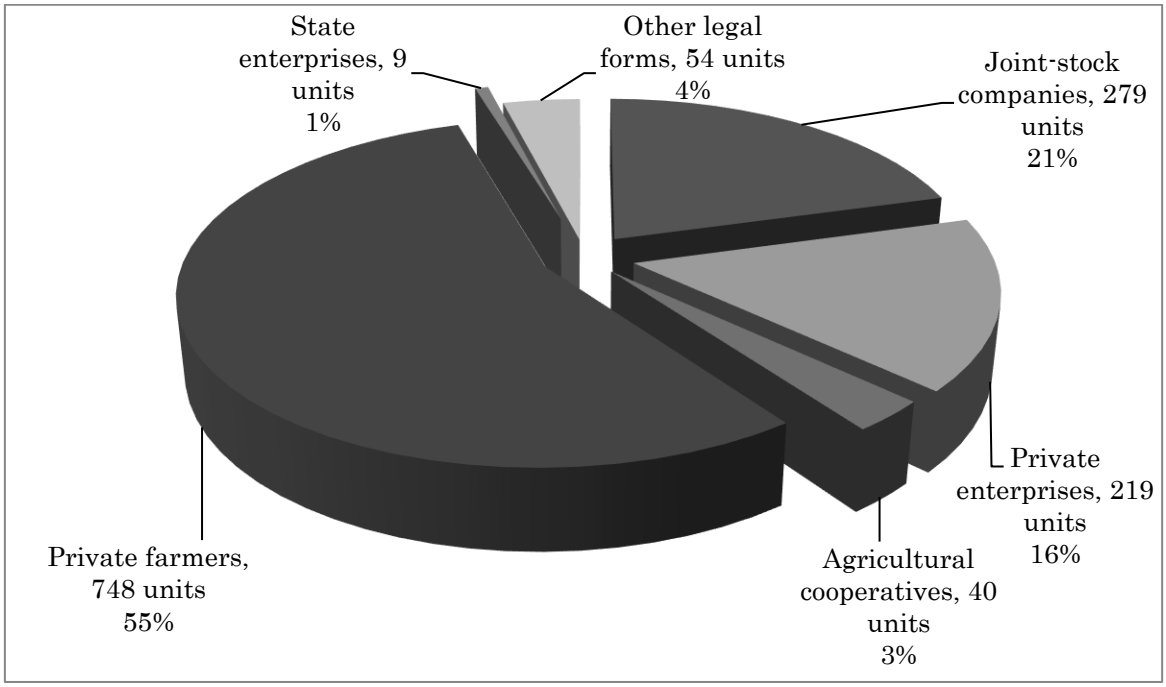

Figure 4.4. *Organizational Forms of Agricultural Producers in Zhytomyr Oblast, 2012*

Source: UNDP Agricultural Policy Project, 2013

4.2. Profile of Studied Private Farmers of Zhytomyr Oblast

Reorganization of collective farms has been widely recognized as one of the most important outcomes of Agricultural land reform in Ukraine. Nowadays a variety of new organizational forms exist, such as joint-stock companies (JSC), private enterprises, including private family farms, and production cooperatives.

First of all, it is important to explain why this study focuses on private farms. As Table 4.5 shows, the share of private farms in total agricultural production in Ukraine was just 7 percent in 2013. Agricultural enterprises and households contributed much more. Naturally, this raises the following question: How can one justify an analysis to shed light on farming units with such a relatively small share in production?

The answer is that this study is focused on exploring the qualitative rather than quantitative aspects of the reform. The aim is to show that after the reform some farming units had to adapt to the new environment and change according to the conditions, sometimes adjusting their land size and sometimes introducing new business. This means that the reform produced new types of farming units, and it is important to clarify the nature of these units.

Table 4.5. *Share of Private Farms in Agricultural Production in Ukraine, 2013*

	Amount (in millions of UAH)	%
Agricultural enterprises	98,971	44
Private farms	14,111	7
Households	110,173	49
Total	223,255	100

Source: http://www.ukrstat.gov.ua

Second, the questionnaire survey of private farmers in Zhytomyr Oblast was initially conducted in 2010 and other supplementary surveys and interviews with the farmers followed in 2011-2013, including nine interviews with agricultural officials, and three other interviews, one each with an agronomist, a property lawyer and a former state farm official.

A total of 50 farm households were randomly selected for detailed study. All the data used for this thesis, unless otherwise indicated, utilized the 2010 data with supplementation from 2011-2013 surveys.

Third, the field study of farmers in Zhytomyr Oblast was conducted in order to obtain detailed farm management data for a specific period, from the time of the farm's establishment up to 2010, because it was aimed to analyze the farm level changes that occurred in the process of the land reform implementation in the oblast.

The reasons for choosing the time period from the time of the farm establishment up to 2010, are as follows:

1) Land reform in Ukraine is still incomplete and it is impossible to evaluate it all.

2) Statistical information on private farmers in Ukraine is being published only once in five years. In connection with the legal status of the private farmers, according to the Ukrainian law, farmers do not have to submit their records directly to statistical institutions, so statistical review of data from 2000 to 2010 was utilized in the study. Only information about the numbers of private farmers and their legal status is available every year, since a private farm cannot be created without registration in official institutions. Other data about private farms` operations and development is part of the regional data and has different sources.

3) Land reform in Ukraine started in 1991, after Ukraine proclaimed its independence and the first farm in the sample was created in 1995. The majority of the 37 farms in the sample were created before 2001. Therefore, available farm data gave us an opportunity to study farm level changes in agriculture for the ten year period, 2000 to 2010, of the process of the land reform implementation in Ukraine.

A particular feature of the studied farmers is that all of them are members of Zhytomyr Farmers Association (created in 1995), which is an independent public organization that brings together mostly small private farmers on a voluntary basis and lobbies for their interests at all levels.

The studied farmers are located not so far from each other, because many of them obtained their land plots from the Land Reserve. The source of the rented-in lands from other landowners is former kolkhoz`s land, which was big, and divided to the number of previous members (around 100 people), who are renting out their small land plots. This is why the studied farmers have to rent land from many landowners in order to get a desirable land size in the area.

Two-thirds of the respondents also reported that they became private farmers in order to be self-employed. Prior to taking up private farming, some heads of households were typically employees of the local collective or state farms. In the remaining cases, the farmers used to work in rural services in the village or had managerial positions in the district centre. The majority of farmers who previously worked in the local collective or state farm reported that they were entitled to receive a land plot and some assets when they decided to exit from the collective.

It is interesting to note that all private farmers who were former employees of collectives actually used not land but asset shares from the collective to start up their

private farms. This could be explained by their unwillingness to pay some taxes in case of registration of the land plots as assets of created private farms as well as unwillingness to submit statistical information about agricultural activities carried out on these land plots. Governmental check-ups of registered lands were also not welcomed.

Farmers reported that the initial investment in their farms was about $4000 - $5000. Although some confirmed using credit, own savings was the most important source of starting up capital among studied farmers.

The studied farmers admitted that they experienced problems with finance in different stages of operating their farms, but on balance their outlook was more optimistic than pessimistic.

Table 4.6 shows the mode of creation of private farms in the studied region of Zhytomyr Oblast for various years during the reform, together with the average farm size and total land area operated.

Table 4.6 shows that the first three farms in the sample were created in 1995 and the last four in 2004. It should be also mentioned that the creation mode of the studied farmers shows that majority of farms were created between 1999 and 2000. This is consistent with the second pick of creation of private farms in Ukraine, immediately after the December 1999 Presidential Decree, which specified details and simplified basic procedures for registration of private farms, with the aim of accelerating development of individual family farming in Ukraine and after the land lease market opened up in 1999 (Lerman et all, 2007).

In terms of farmland area, the studied farmers ranged from 6 ha to 50 ha, and were growing a variety of crops, rotated year by year. Total operated agricultural land in the sample was 1,138 ha, but on average studied farmers had 23.2 ha.

Table 4.6. *Creation Mode and Land Area of Studied Farmers*

	No of farmers	Land area, ha	Average farm size, ha	SD
1995	3	37	12.3	5.5
1998	3	86	28.7	13.3
1999	8	175	21.9	12.1
2000	23	560	24.3	11.5
2001	2	73	36.5	16.3
2002	5	54	10.8	3.4
2003	2	86	43	7.1
2004	4	67	16.8	4.3
Total	***50***	***1,138***	***22.8***	***12.2***

Source of data: 2010, 2011-2013 surveys.

Some important points from the profile of farmers interviewed (presented in Table 4.7) are noted. First, an average family among the farmers under study consisted of 4 persons, a typical Ukrainian family of two children. Second, the average age of the farm head varied from 42 to 43 years, indicating a general trend of aging farmers in the country. Third, distribution of the farmers by education showed that majority of the studied farmers have tertiary education (56%) and only one farmer had primary education. The availability of free education up to university level in Ukraine is a big advantage. The only weak point is that people who live in villages, can experience difficulties with access to such educational institutions. Fourth, the great majority of the studied farmers consider farming as a full-time occupation (75%), while another 25% of farmers had off-farm employment.

Studied farmers were also engaged in subsistence farming. Almost everyone raised chickens, while some did pigs and a few had cows. These animals and poultry and output from them were used for self-consumption and partly for sale.

Table 4.7. *Profile of Studied Farmers in Zhytomyr Oblast*

	No
Studied farmers	50
Average farm size, ha	22.8
Family size, people	4
Average age of the head, years	42
Distribution of the heads by education, %:	
Tertiary	56
Secondary	42
Primary	2
Distribution of the heads by occupation, %:	
Farming	76
Supplemental Business/Other Employment	24
No. of the family members, persons	
Male	93
Female	114
Total	207
Distribution of the family members by occupation, %:	
Farming, Family Business	56
Other Employment	44

Source of data: 2010, 2011-2013 surveys.

Remarks

In conclusion, it is necessary to mention the most important points of this chapter.

First, the research was conducted in Zhytomyr Oblast, situated in the north west of Ukraine and is the fifth largest in the country. With its area of 29,832 square kilometers, land resources of Zhytomyr Oblast are presented by 53.7% of agricultural lands. The structure of agricultural lands in the oblast consist of arable lands (80%), lands under the pastures (12.5%), lands under hayfields (5%), and lands under perennial plantations (2.5%). Soil and climate conditions, raw minerals, forests, and water resources all provide favorable conditions for diversified agricultural development. The oblast contributes 3.4% of the gross agricultural output of Ukraine. The agriculture of the region produces cereals, leguminous crops, sugar beets, milk and meat, and the region is also a leading Ukrainian producer of hop, flax and chicory.

Secondly, Zhytomyr Oblast was selected for the research for the following reasons. First, this oblast is similar to other areas in terms of land fertility and climate, as well as farming methods. Second, we received direct assistance from the Zhytomyr Farmers Association in the data collection process. All farmers in the study were members of that association, which supported relatively small private farmers. With the assistance of officials from the association, we could interview farmers, agronomists, a property lawyer, and a former state farm official.

Thirdly, farms that exist in Ukraine, including in Zhytomyr Oblast, and are involved in agricultural activities can be classified into two broad organizational categories: individual farms and corporate farms.

Private farms, which were the object of our research, belong to the category of individual farms, and they are incorporated entities created by an individual, a family, or a group of individuals on the basis of jointly owned land and assets. Private farms by assumption rely mainly on family labor and family owned resources, although they may employ hired labor and lease resources.

Fourthly, the questionnaire survey of private farmers was conducted in Zhytomyr Oblast in order to obtain detailed farm management data. A total of 50 farmers were studied. In terms of farmland area, these 50 private farmers ranged from 6 ha to 50 ha, and were growing a variety of crops, rotated year by year. On average, studied farmers had 23.2 ha of land.

Fifthly, from the profile of studied private farmers the following points deserve mention. First, the average family size of the surveyed farmers was four persons. Second, the average age of the farm head was around 42 years, indicating the general aging trend of farmers in the country. Third, the distribution of farmers by education showed that most of them had tertiary education (56%) and only one farmer had primary education. Fourth, 75% of the farmers considered farming a full-time occupation, whereas the remaining 25% had off-farm employment.

And last, but not least, the majority of studied farmers were engaged in subsistence farming. Almost everyone raised chickens, while some did pigs and a few had cows. These animals and poultry and output from them were used for self-consumption and partly for sale.

Chapter 5. Farmers' Response to Agricultural Land Reform in Ukraine

5.1. Land Tenure Status of Studied Farmers

Land is the ultimate resource, for without it life on earth cannot be sustained. Land is both a physical commodity and an abstract concept in that rights to own or use it are as much a part of the land as the objects rooted in its soil. Good stewardship of the land is essential for present and future generations (UN Economic Commission for Europe: Land Administration Guidelines).

Land tenure situation refers to the ownership and use of land, which is one of the basic production factors in agriculture, and thus represents not only arrangements concerning the land factor in the production process but is also an indicator of the socio-economic system of the agricultural area. For further agricultural development, it is necessary to have a better understanding of the land tenure situation. This could allow progress to the goal of more efficient use of resources and improved incomes among farmers.

After the collapse of the Soviet Union, Agricultural land reform in Ukraine was implemented and a transition from public to private ownership started. During the 1990s, land was formally distributed to those who were working on the collective and state farms, who each received an average of 4 ha. The land-share certificates that were handed out to the rural population in Ukraine were not assigned to any specific area. Only with the adoption of the presidential decree in December 1999 was the land officially given to the approximately 7 million rural habitants. In 2001, the Land Code

came into force, which officially guaranteed land titles.

The Land Code permits two basic rights to land use: 1) the right to permanent land use (possession); and (2) lease rights (usership). However, entitlement to land ownership was not restricted to current land users: all citizens were entitled to own land for farming and other designated uses.

The list of approved land uses included establishment of independent private farms, subsidiary household plots, gardens and vegetable patches. Legitimate non-farming uses of land included construction of dachas (cottages) and garage (Table 5.1).

The list of farming uses covers two categories of eligible persons: individuals who are employees of farm enterprises and individuals outside the farm enterprises.

To enable land to be allocated to new users, some land cultivated by collective, state, and other farm enterprises was extracted into a State Land Reserve. This reserve, or redistribution fund, was intended as a pool of land for distribution to individuals who were not members or employees of existing farm enterprises:

- "Outsiders" receive land for private farms, gardens, vegetable patches, and for dacha plots.
- "Insiders" (employees of farm enterprises) receive land for subsidiary household plots.

Moreover, it is important to note the three sources from which land for private farms could be obtained: 1) From the State Reserve of the district government (the village council); 2) From the former collectives (land plots that did not have official owners yet were kept in reserve and could be rented for some time in order for agricultural land not to be idle); 3) From other private landowners.

Table 5.1. *Allowed Uses and Size Restrictions of Privately Owned Agricultural Land*

Use	***Maximum size, ha***
Private farm	50 ha agricultural land 100 ha total land
Subsidiary household plot	0.6 ha
Residential construction	0.25 rural areas, 0.1 in town
Garden plot	0.12 ha
Dacha plot	0.1 ha
Garage plot	0.01 ha

Source: in accordance with the Land Code of Ukraine, 2001

The majority of private farmers in Ukraine created their farms with allocations of land from the State Reserve managed by village and district councils. According to Ukrainian Law, any citizen of Ukraine 18 years old or more, who wanted to start up a private farm and did not have land, could rent some land from the State Reserve and later have a chance to privatize an average land share free of charge from these rented lands, if conditions were met.

State Land Reserve preferred to give big size land plots to one source (mostly to bigger agricultural enterprises), from the point of view of using these land resources more effectively and rationally, without dividing the area into the smaller plots suitable for private farmers. This meant that potential farmers were forced to look for alternative ways for establishment or expansion of their farms.

One of such ways was renting lands from other landowners. The positive feature of this way is that mostly other landowners had a land plot, which was not big, mostly the average size of the land share of the oblast, and better fitted for private farmers than for bigger agricultural enterprises.

Cooperation of farmers, then quite a popular idea, could be considered as an additional method for land size increase. The analysis of studied farmers showed that the majority of expanding farms in the sample were cooperating and increasing their land size because of lack of available resources from the original source (Land Reserve), not only with the aim to become bigger farms but also to share some operational risks and expenses.

Other studied farmers noted that they were not ready to unite with any other farmers in the area in order to increase the size, because they wanted to be independent. These farmers were relying mostly on their own resources, supporting barter relationship

along with mutual farmers` assistance on monetary or commodity base.

It is therefore necessary to study the peculiar features of private farms. Based on the conducted survey, all studied private farmers used their right given by the state and obtained land in private ownership. In Zhytomyr Oblast, the size of land plot that could be obtained free of charge by citizens of Ukraine, who were willing to do agriculture and met all official requirements, was about 3 ha per person. So the privately owned land's share out of all operated land was 3 ha per person.

Farmers in the study who had possession of a land plot and did not rent in or out any extra land were called owners-farmers. Farmers who owned some plot of land and also rented-in some extra land were called farmer-tenants. There were no farmers in the sample who rented their land out.

This certainly points to the fact that the *typical* owner-farmer was a single private farmer or family (the head of the farm and the spouse), who contributed their land plot, time and labour force for the farm's operation. At the same time, the majority of owner-tenant farmers were single-family farms (head of the farm and the spouse), while the rest were formed by two families and/or the cooperation of partners. Partners could be children, relatives of the farmer who contributed registered land plot to the farm, or affective member-workers of the farm, obtaining some land directly from that farmer, free of charge from the rented lands from the State Reserve as the obtained land plot was already a part of the assets of the farm.

With the further analysis of these two categories of farmers in the process of farms` operation it could be observed that some studied private farmers added extra land (rented-in land) in order to upgrade their farm activities and to develop their farm, while other farmers were cultivating only privately owned land plots mostly for family

consumption and for some additional income without any changes in land size.

Thus, is important to study both groups of farmers (owners and owner-tenants) with the aim of predicting what they would be willing to do with the land plots in the future, and how this might influence Ukrainian agriculture in the process of the reform.

Table 5.2 presents information about tenure status and land resources of the studied farmers. It could be observed that all 113 owner-farmers have the smallest total land operated in the sample (132 ha), with an average farm size of 7.8 ha, which is almost four times smaller than farmers who are owner-tenants in the sample.

Table 5.2. *Classification of Studied Farmers by Tenure Status and by Size of Land Resources*

	No of farms	***Land area, ha***	***Average Farm size, ha***	***SD***
Owner	13	132	7.8	5.3
Owner-Tenant	37	1,006	27.2	11.0
Overall	**50**	***1,138***	**22.8**	**12.2**

Source of data: 2010, 2011-2013 surveys.

The sources of rented-in land acquisition of the studied farmers are presented in Table 5.3. Owner-tenant farmers increased their land size by renting extra land and registering partners in the farm. Moreover, the farmers cited land rent as the current main source of farm enlargement, because of the limited Land Reserve.

In addition, farmers mentioned renting lands from the lands of former collective (kolkhoz), which did not yet have official owners, for various reasons, and were being kept as a part of the State Reserve, until official owners could be found. With the aim of preventing the land from remaining idle, State Reserve was renting it out for some time.

Land rent in Ukraine was promoted with the issuance of the State Act (Deed), recognized as the ultimate document of title confirming ownership to land. According to Governmental Statistics, in 2013, 62 thousand State Acts on property rights to land plots were filled and issued in Ukraine.

However, the development of the agricultural sector is constrained by the sensitive issue of private land ownership. The lack of a land market has prevented land being used as collateral, thus severely limiting the availability of funding. The Rada (Ukrainian Parliament) rejected a presidential decree on the sale and purchase of agricultural land owing to concerns over land speculation. Reform in this area is now more likely to focus on land leasing (European Bank for Reconstruction and Development, 1999).

Table 5.3. *Distribution of Studied Farmers by Tenure Status and by Source of Land Resources*

	Land area, ha	**Source of the land:**		
		Other landowners	*Land Reserve*	*Kolkhoz**
Owner (13)				
Owned land	132	0	132	0
Total	**132**	**0**	**132**	**0**
Owner-tenant (37)				
Owned land	354	0	354	0
Rented-in land	652	345	213	94
Total	**1,006**	**345**	**567**	**94**
All farmers (50)	**1,138**	**345**	**699**	**94**

Note: * With the aim not to keep the land idle, State Reserve was renting lands of former collective (kolkhoz) out, which did not have official owners yet, because of different reasons and were kept (land plots) as a part of the State Reserve (until official owners would not be found)

Source of data: 2010, 2011-2013 surveys.

Owner-Farmers

The special feature of owner-farmers in our case is that these farmers were older (on average 58 years old) compared to farmers who were owner-tenants (on average 41 years old). Moreover, age was consistent with the old ways of thinking of the USSR system of doing agriculture, which did not motivate people to struggle for better farm performance.

In general, the USSR system was characterized by a command-controlled way of doing agriculture, which meant that people did not participate in decision making, they were not responsible for the final result and in the end would only receive their salary. In other words, owner-farmers in the study mostly did not experience any changes in land size since they had first obtained their land plots and probably were not ready to do so in the near future.

Based on the analysis of the respondents` answers, some points about the farmer-owners and their further manipulations with land should be mentioned:

- ✓ First and foremost, they keep the *privatized land plot as the valuable asset*, mostly for personal consumption and as a source of additional income for the family.
- ✓ Farmer-owners *rely mostly on their own resources*, without cooperation with other farmers (partners).
- ✓ Some respondents confessed that they were *cultivating the land* plot (privately owned) jus*t not to leave it idle (*otherwise the government has a right to seize that land), with the aim to sell it in the future or to pass it in inheritance to their children or grandchildren later.
- ✓ *Limited financial resources* gave farmers no incentives to invest in their lands. However, despite the poor farms` performance, some farmers were not even thinking

about renting their land plot out, as they felt the danger of irrational land use by potential tenants.

According to potential plans of actions regarding the privatized land plots, studied farmers-owners were divided into three groups:

1. Farmer planning to sell the land plots in the future (9 out of 13 studied farmer-owners) – some studied farmer-owners are willing to sell the land plot after the moratorium on the sale of farmland is lifted.

This basis of this decision is that first, the younger generation is not ready to take over responsibility for the family farm and/or they are living far away from the farm. Second, physically it becomes more and more difficult to run the farm. Third, farmers are interested in financial aspect of selling the land. Fourth, there is a shortage of financial resources to support farm`s operations.

However, most Ukrainians are against the land sale, just as they were in the 1990s. Primarily, they fear the increasing degradation and concentration of land within a small group of rich people (Allina-Pisano, 2004: 573;Bychenko, 2012). Moreover, a survey of agricultural producers (Figure 5.1.) carried out by the Ukrainian Agrarian Business Club (UABC) in spring 2011 showed that 80% would support an extension of the agricultural land sale ban. Half of the respondents were categorically against, arguing that agricultural land should never be made available for sale and purchase, but only for rent. 17% were in favor but only for a moderate term (3-5 years), while 13% favored a long-term extension (6-10 years).

The respondents were: farmers, CEOs and owners of agribusinesses that arose from defunct collective farms, and top managers of agricultural holdings.

2. Farmers, who are planning to rent the land out

Six out of 9 studied farmer-owners (those who are planning to sell the land plots in the future) are planning to rent their land out first. The majority of the owner-farmers who are willing to rent their land plots out are not ready to sell the land, because they believe that when Ukraine becomes an EU member the price of land will be worth a fortune.

3. Farmers, who are planning to leave a legacy

Four out of 13 studied farmer-owners: these studied farmers are clearly scared by the prospect of land changing hands. Moreover, at the present time they are fully relying on their land plots for food consumption as well as for some additional income after selling the crops. In turn, these owner-farmers are willing to keep the land plot in possession of the family by passing it as inheritance from this generation to the next.

Owner – Tenant Farmers

Owner-tenant farmers are characterized by the following features:

1. Owned land is not for sale

The interviewed farmers mentioned that they are planning to do farming and agriculture related activities as a family business. Many owner-tenants farmers have already scouted their relatives/acquaintances to become registered members/ partners and full-time workers in the farms. This is very reasonable option for rural people to be employed, because of the high level of unemployment in the rural areas in the country. Moreover, this kind of farms (owner-tenants farms) will provide their registered partners with privately owned land, as long as all the requirements were met. In other words, this registered member of the farm would not only get a job in the rural area, but also receive

a land plot free of charge in private ownership after the completion of all the procedures.

In that case, private farming for owner-tenants farmers can really be considered as a long-term family business, where privately owned land is treated as the most valuable asset that brings all members of the farm together on the full-time employment basis with mutual responsibilities for the result (output of the farm) and mutual financial benefits at the end of the process.

2. Owned land is only for inheritance

Owner-tenants farmers are interested in developing their farms and in upgrading them with the advanced thinking of the younger generation. Moreover, these farmers would like to provide their children with sufficient income and reliable employment on the family farm in the future.

3. To sell privately owned land as a share of the company, if conditions are met

Owner-tenants farmers support the opinion that land is a unique capital in its ability to maintain its value, and, in contrast to many other assets such as currency, bonds, securities, etc., it tends to increase its value over time. This means that land may potentially become a source of significant wealth for those who own an enterprise or for those who are ready to sell their share in it.

5.2. Land Size of Studied Farmers

Land tenure status of studied private farmers was associated with the land size changes. As a result three types of farms occurred: expanding, maintaining and shrinking farms. The types according to the land size change are presented in Table 5.4.

Table 5.4. *Type of Farms According to the Land Size Change in 2010, farms*

	Type of farm according to land size change			
	Shrinking	Maintaining	Expanding	Total
Studied Farms	9	26	15	50

Note: Shrinking: the farm size decreased; maintaining—the farm size did not change; expanding— the farm size increased;
Source: Surveys in Zhytomyr oblast of Ukraine, 2010, 2011-2013

Table 5.4 shows three types of private farms: expanding farms (30% of respondents); maintaining farms (52%); and shrinking farms (18%).

According to the obtained data, the majority of studied farms are maintaining farms, which means that from the moment of their establishment and up to the present time, the size of land resources owned or rented-in did not change. A minority of farms is shrinking farms and their land size decreased with the time of farm operation. About 15 farms from the sample belong to farms with increased land area.

For expanding farms, the average starting land size, as well as land size in 2013, was the highest among the three categories. No changes were observed for maintaining farms, whereas the land size of shrinking farms dropped almost two- thirds (Table 5.5.).

Table 5.5. *Studied Farmers Grouped by Changes in Land Size, 2013*

	No of farms	Average land size at start (ha)			Average land size in 2013 (ha)		
		Own land	Rented land	Overall	Own land	Rented land	Overall
Expanding	15	8.8	16.3	25.1	14.4	24.3	38.7
Maintaining	26	6.8	9.6	16.4	6.8	9.6	16.4
Shrinking	9	7.0	14.0	16.7	7.0	7.4	14.4
Overall	50	7.4	12.4	19.1	9.1	13.6	22.8

Source: Surveys in Zhytomyr oblast of Ukraine, 2010, 2011-2013.

According to the survey, 4 of 15 farmers expanded their land size by renting in extra land. The remaining 11 expanded by registering partners in the farm. This could be considered as an alternative farm enlargement method.

This method has the following features: First, any citizen of Ukraine can obtain a land plot "directly" from the Land Reserve free of charge for the purpose of agriculture, subject to certain conditions (only once). However, Land Reserve is limited and nowadays it is getting harder to obtain land. Second, if a citizen of Ukraine is a registered partner of a private farm, and does not have owned land, he or she can receive private ownership rights to land free of charge from the private farm s/he is working for, but only from the lands that the head of the farm rented in from the Land Reserve. In this light, this person obtains the land in ownership "indirectly" from the Land Reserve. Registered partner takes (privatizes) a land plot of a size equal to the average land share in that specific area (about 3 hectares in Zhytomyr Oblast) from the lands of the Land Reserve rented in by the head of the farm.

The head of the farm prefers to have his family members or relatives to be registered partners in the farm, but there are also cases when the head of the farm will register his workers as registered partners.

This kind of land manipulation could be very convenient for both sides. The head of the farm can negotiate with the registered partner, that after the latter officially receives ownership rights to the land plot, the registered partner would either contribute that land plot toward the farm's assets (no dividends paid) or would in the future sell that land plot back to the head of the farm. The registered partner of the farm will receive the land plot free of charge, or money for that plot. As a registered partner of the farm, he will not only have a right to share in the profit of the farm, instead of receiving a salary, but

also to bear some of the responsibilities and expenses of the farm. In general, it could be considered as a viable option for employment in rural areas with a following “land bonus”, thus increasing motivation.

Features of expanding farms

Table 5.6 presents a feature comparison between expanding and non-expanding (including maintaining and shrinking) farmers, which reveals the factors responsible for the land size growth.

Some important points regarding the profile of farmers interviewed deserve mention.

First, the heads of expanding farms were much younger, 35 years on average, than those of non-expanding farms, with an average age of 47 years.

Second, from the distribution of farmers by education it is observed that most of them were well educated. However, the expanding farmers had a higher educational level (degree) compared to other farmers. Moreover, about 87% of expanding farmers also had international farming experience, had participated in different agriculture-related training programs, and taken various farming-related courses, all of which definitely had a positive influence on the farms’ operation strategy.

Third, in general, the sample farmers considered farming as a full-time occupation. However, an important feature of expanding farmers is that all of them combined farming with farming-related business activities, further processing the farms’ output and providing the final product to users through different distribution channels. They did not receive an income from employment.

On the other hand, 17% of non-expanding farmers were otherwise employed in various spheres, in addition to farming activities, or they were involved in agriculture

related businesses, mostly by renting the space (counter) in the market place and selling their produce directly to consumers on market prices.

Fourth, another important feature that could be observed from Table 5.6 is that about 80% of the family members of the expanding farmers had a tertiary degree in agriculture (post-secondary education), one of the main compulsory conditions to obtain rent-in land from the Land Reserve free of charge. The head of the farm in which the relatives worked as staff rented these lands in.

Table 5.6. *Characteristics of Studied Farmers by Type of Farms*

	Expanding Farmers	Non-expanding Farmers (maintaining and shrinking)	Overall
No of farmers	15	35	50
Average farm size (ha)	38.7	15.9	22.8
Average age of the head (years)	35	47	42
Tenure status (farmers)			
Owner	0	13	13
Owner-tenant	15	22	37
Distribution of heads of farms by education (%)			
Tertiary	93	40	56
Secondary	7	57	42
Primary	0	3	2
International farming training, courses (%)	87	14	40
Distribution of heads of farms by occupation (%)			
Full-time farming	0	54	38
Farming plus other employment	0	17	12
Farming plus farming-related business	100	29	50
Distribution of family members by education (%)			
Tertiary, in agriculture	80	29	44
Tertiary, not in agriculture	20	71	56
Distribution of family members by occupation (%)			
Farming as partner in private farm	80	26	42
Other employment	20	74	58
Registered partners in the farm, average (persons)	3	0	1

Source: Surveys in Zhytomyr Oblast of Ukraine, 2010, 2011-2013.

5.3. Tenancy Conditions of Studied Farmers

Agricultural land in Ukraine is one of the best mid and long-term investment opportunities in the world. Moreover, Ukraine's diverse farming climatic zones provide an exceptional opportunity for fully-diversified, complete-cycle farming ventures with their own livestock, seed production and row crops production of export-scale harvest volumes. Cost of investment in Ukraine's farmlands is the lowest in Europe while it provides the highest return potential given the high soil fertility and unrealized agro-ecological potential of Ukraine's soils.

Ukraine's agricultural land cannot be purchased, but lease agreements for agricultural land enable as much freedom for performing farming operations as ownership while also providing a primary right of purchase in case of the agricultural land sale moratorium lifted and given that pai (land plot) holders would be willing to sell off their property.

Agricultural land lease agreements in Ukraine carry a legal obligation of land cultivation, which inevitably requires a lessee to perform actual farming activities.

Lease contracts are closed directly with pai (land plot) holders for different periods from 1-5 years (short-term contracts), averaging at 10 years and going up to 49 years (long-term contracts).

Almost half of studied farmers wished to increase their land holdings by leasing extra land, typically up to 50-100 ha. The mean enlargement desired was 85 ha. Those who did not wish to increase their farm size complained about the lack of machinery, equipment, and capital needed to support larger holdings. Three-quarters of those who wished to expand their farms were already taking the initial steps to acquire more land.

Table 5.7 presents rented-in land information of studied private farmers. The

following points need to be mentioned.

First of all, considering that the number of long-term contracts was three times higher compared to the short-term rent contracts, it could be assumed that farmers with 10 year contracts had stronger market orientation and aimed to control the cost of the farm with the help of the long-term contract relationship. It was also confirmed that expanding farms had mostly long-term rent contracts: this was considered to be one of the biggest advantages compared to shrinking farms.

In the case of limited land resources bigger or more profitable farms are trying to increase their land size with the offering of bigger rent payment to private landowners who are renting their lands out. In many cases short-term rent contracts are obstacles that do not give farmers a guarantee to invest in the rented lands, because of the fear that they will not be able to extend the contract. This effectively demotivates them to use land effectively.

From the point of view of quantity of contracts, it should be mentioned that the majority of private farmers do not rent extra land plots only from one landowner, but from many different ones, for several reasons:

1) Some land plots are small and mostly an equal 3 ha, which is the average size of land plot in Zhytomyr Oblast.

2) Farmers are trying to rent-in land plots that are closer to their farm, and it is not always the case that the needed size of land area has only one owner.

3) Because of former collectives, one area could be divided up to 100 separate land plots with different owners (equals past number of workers of the collective).

Table 5.7. *Rented-in Land Information of Studied Farmers by Contract Period*

Contract period	No of farmers	No of contracts	*Land area, ha*	*Average per farm, ha*	*SD*
5 years	17	34	204	12.0	2.6
10 years	20	115	448	22.4	8.8
Total	**37**	**149**	**652**	***17.6***	***8.4***

Source of data: 2010, 2011-2013 surveys.

Table 5.8 shows the nature and characteristics of tenancy contracts. First of all, the negotiated rent payment predominated. This is connected with Ukrainian legislation, which did not specify a fixed amount of rent that should be paid, but stressed that the rental could not be lower than three percent of the monetary value of that specific piece of land. Maximum rental is not specified either. Based on all these factors, mostly expanding farmers in the sample were using price mechanism in order to rent lands in better conditions for them (with regard to location, longer rent term, etc.). In case of fixed rent contract, three percent of the monetary value of the land will be the rental.

Second, form of payment is presented by payment in cash and in kind. The majority of the rent contracts (105) take the form of cash payment, but prom the point of view of relation to landlord, relatives and distant acquaintances, 39 rent contracts are mixed, including cash and kind rent payment.

Third, the period for rent contracts is presented by 115 for long-term versus 34 rent contracts for short-term period. At first sight, these numbers are very different, but if we consider the number of farmers having long-term and short-term contracts, it will be 20 farmers with long-term versus 17 farmers with short-term contracts.

Fourth, in terms of landlord-tenant relations, 47% of the contracts were established between non-relatives, 34% between distance acquaintances and the remaining 19% between close relatives.

It is important to note that there was a large variation in rental level among rent tenancy contracts of studied farmers, with the highest and lowest being three per cent and seven per cent of the monetary values of the land plot respectively. In order to identify factors affecting the rental level, regression analysis for rent function was estimated, with the rental per year per hectare being the dependent variable.

Table 5.8. *Peculiarities of Tenancy Conditions of Studied Farmers*

	No of rent contracts (n=149)	***Percent***
Form of tenancy		
Fixed rent	57	38.3
Negotiated rent	92	61.7
Form of payment		
Kind	5	3.4
Cash	105	70.5
Both	39	26.1
Contract period		
5 years	34	22.8
10 years	115	77.2
Type of rented land		
Land of former kolkhoz	90	60.4
Other lands	59	39.6
Distance from farm		
Inside the village	15	10.1
Outside the village	134	89.9
Relation to Landlord		
Relatives	28	18.7
Distance acquaintance	51	34.2
Non relatives	70	47.1

Connection between relation to Landlord and form of payment	
Relation to Landlord	*Form of payment*
Relatives	Cash and Kind
Distance acquaintance	Cash and Kind
Non relatives	Only Cash

Source of data: 2010, 2011-2013 surveys.

5.4. Rent Function Analysis

Agricultural land reform is associated with the expansion of the tenancy market, in which case the issue of the determination of rental levels is considered to be important. The studied private farmers were not renting land out, but renting in extra land with the aim of expanding the farm and farm`s operations.

Rent function analysis aims to identify factors affecting the rental level of studied farmers.

The model used for the estimation is as follow:

$R=a+b1X1+b2X2+b3X3+b4X4+b5X5$

Where,

R is the average rent per ha per year per land tenancy contract, expressed in hryvnas (Ukrainian currency, UAH).

X1 refers to the type of rented land (a dummy variable, where 0 for other lands and 1 for lands of former kolkhoz),

X2 refers to the distance of the rented plot from the farm (km),

X3 refers to the contract period (a dummy variable, where 0 for 5 years rent contract and 1 for 10 years rent contract).

With limited resources of the main source (State Land Reserve) for obtaining lands for farm enlargement, there is a strong demand for the expansion of farmland area through renting land from other private landowners, especially from former members of kolkhoz, because the quality of that land is better (X1).

Beside that, tenant residence (X2) was also important in deciding the rental level, because of extra cost that might occur for potential tenant.

Total years so far rented (X3) is considered as a factor in rental determination. The rental is paid per year, and rental level can be raised easily when the contract is renewed. Therefore, the longer the years rented (the short-term contracts for 5 years, and long-term contracts for 10 years), the cheaper would be the rental level, because it was fixed in the rental contract and could be changed only after the contract would be renewed. The longest term for rent recognized by the law is 49 years, but none of the studied private farmers has this type of contract.

In order to obtain a land area that fits farmers` preferences (such as the size of the land plot, location, access to the land plot, etc.), the tenants probably accepted a higher rental level. It is expected that all the regression coefficients will have positive signs.

Results of the estimates are presented in the table below. Some important points deserve mentioning. First, the coefficient of determination (R square) indicates that the model explains more than 67% of the total variation in rental level among the 149 tenancy contracts, and regression coefficients of the three independent variables are all statistically significant at the one or five percent levels.

Second, the sign of the regression coefficients are all positive as expected. It seems that rental tended to be higher for the lands with long-term contract period and for lands of former kolkhoz even in the case it would be far away from the tenant`s farm. In other words, farmers in the study are willing to look for land, preferably from lands of former kolkhoz, with 10 years rent contract, even at a distance from the farm and at the higher level of rental. This was probably because of the Moratorium on agricultural lands in Ukraine, which supposed to be cancelled, but instead, has already been lifted three times.

In that situation landowners who are renting land out do not wish to rent out for a long-term period, because they might want to sell the land right after the Moratorium is lifted. Therefore, the longer the years rented, the cheaper would be the rental level, because it can be changed only after the contract would be renewed.

The regression coefficient for the type of rented land is also statistically significant. This is connected with the type of soil. The potential fertility level is higher for lands under former kolkhozes, because in Soviet period the State accumulated the best lands for agriculture and invested a lot in their development, because of growing population of the country. This suggests that the better the soils under contract, the higher the rental level could be achieved per hectare per year, because of potentially higher level of output of the produce.

Table 5.9. *Rent Function Estimates for Land Tenancy in the Studied Area.*

	Reg coff.		***t value***
Constant	4512.500		5.196
Type of rented land (dummy)	437.423	**	2.304
Distance from farm (km)	262.795	**	2.366
Contract period (dummy)	520.483	***	3.403
N	149		
Adjusted R square value	0.670		
F value	15.894		
Durbin-Watson value	1.039		

Note: ** Denotes significance at the 5% probability level

*** Denotes significance at the 1% probability level

Type of rented land (dummy): 0 for other lands, 1 for kolkhoz land

Contract period (dummy): 0 for 5 years contract, 1 for 10 years contract

Remarks

The implementation of agricultural land reform in Ukraine not only provided people with opportunities to obtain private ownership of land for agriculture (private farming) but also created a new generation of private farmers who did not exist in the Soviet era.

A special feature of such farmers was that they could expand, maintain, or reduce their farm size, depending on their capability and current situation, if considered necessary for farm operations. Moreover, there were two methods: renting in extra land and registering partners in the farm, and three land sources (from the State Reserve, former collectives, and other landowners) for farm expansion. However, renting land from other landowners was considered the main farm enlargement source.

The key findings are as follows: *First*, in the process of the reform there was a certain number of private farms that changed their land size dynamically. *Second*, the source of the farm size enlargement was twofold: rent-in extra land and alternative way (by registering partners in the farm). *Third*, even despite the land transaction prohibition (Moratorium on the sale or purchase of agricultural land), private farmers could adjust and increase their land size. *Fourth*, Maintaining and shrinking farms did not change their size of owned land, suggesting the current land system was meaningful for them. *Fifth*, heads of expanding farms were generally much younger than those of non-expanding farms. *Sixth*, expanding farmers had a higher level of education than others. *Seventh*, while all sample farmers considered farming as a full-time job, expanding farmers combined farming with related business activities such as processing farm output. *Eighth*, most of the family members of expanding farmers had a tertiary degree in agriculture, which was one of the main compulsory conditions to obtain rent-in land from the Land Reserve free of charge. *Ninth*, the majority of expanding farmers had

long-term rent contracts, which suggests that they had stronger market orientation and aimed to control the cost of the farm with the help of long-term contract relationship. *Tenth*, the form of rental paid by the majority of expanding farmers was cash. They were using price mechanism in order to rent lands in better condition (eg., better location, longer rent term, better soil). *Eleventh,* for the expansion of farmland area, expanding farmers preferred renting land from other private landowners, especially from former members of kolkhozes, because the quality of those lands (the soil fertility level) was better, even though the lands were located outside the village area.

And the last, but not least, a large variation in rental level among rent tenancy contracts of studied farmers was observed, with the highest and lowest being three per cent and seven per cent of the monetary values of the land plot respectively. In order to identify factors affecting the rental level, regression analysis for rent function was estimated, with the rental per hectare being the dependent variable. As a result, the estimation suggested that rental tended to be higher for the land plots with long-term contract period and for potentially fertile and high-yielding lands of former kolkhoz, even if such land would be far away from the tenant's farm, and as mentioned earlier, all kolkhozes lands are located outside the village area. In other words, most of the expanding farmers in the study are willing to look for land preferably from lands of former kolkhoz) with 10 years rent contract, even at a distance from the farm and at the higher negotiated level of rental.

Chapter 6. Agricultural Production and Economic Results of Studied Farmers

6.1. Changes in Crop Selection of Studied Farmers

Generally speaking, crop selection in research site is characterized as diversified farming. Table 6.1 indicates the planted areas of major crops (wheat, rye, barley, potato, soy, and vegetable) in 2000 and 2010, showing the diversified agriculture. Of course the table shows the figure of average planted area of categorized group, but even if we look at the individual private farm, this is almost the same. They have a combination of grains (wheat, rye, and barley) with technical crops (soy and potato), and vegetables.

This diversified crop selection in the surveyed area has several reasons. First, cropping pattern should be mentioned. Based on the respondents' answers, there were two options for crop rotation: 1) barley, perennial grasses, wheat, soy, rye, vegetables; 2) barley, rye, vegetables, wheat, soy. In addition, farmers noted that the general rule of thumb for balancing out soil nutrients was to avoid planting the same general category of crop successively in the same land plot. Second, the range of agricultural crops grown by surveyed private farms is quite wide, because such diverse production activity helps to minimize the risks caused by instable prices and productions. One related thing should be mentioned here. International experience suggests that one of the most appropriate instruments to deal with different risks is agricultural insurance (Bokusheva et al., 2007). Despite the advantages of insurance, only 3.4 % of cultivated area is covered by insurance contracts in Ukrainian agriculture (State Statistic Committee of Ukraine, 2007). Insurance in agriculture covers, for example, hail damage to crops, fire and theft of farm assets, death and disability of farmers or farm workers. However, existing

insurance opportunities in Ukraine are seldom used, except for cases when insurance is obligatory, mostly in the case of livestock.

Table 6.1 also shows the changes in crop selection of the categorized private farms by land size. We can observe interesting changes in crop selection among the three groups. In 2000, the major agricultural products of studied private farms were grains (wheat, rye, and barley). The share of technical crops such as soy and potato was and the area for vegetable was negligible. This crop selection pattern was similar among three categories of studied private farms. In 2010, on average about 57% of the cropped area was sown to grains (wheat, barley, rye), 27 % was under technical crops, such as soy and potato. Vegetables have seasonable character, and are mostly represented by cabbage, carrot, onion, pumpkin, and eggplant in the sample, but appeared as important crop with 16% fraction of the planted area, especially for expanding private farms. It seems that shrinking farmers have a stronger orientation to the production of grain crops, while expanding farmers combined grain crops with soy, potato and vegetables, which allowed them to obtain a higher margin per hectare in the present market conditions.

Before analyzing the factors for the switch of crop selection especially that of expanding farms, it may be helpful to introduce the viewpoints of surveyed farmers. In the course of this survey, attention was directed to find out what crops were most popular, and what crops farmers have given up and why, during the land reform process in Ukraine.

Analysis of the data demonstrates that 85% of surveyed private farmers have quit growing certain crops. The farmers who did so revealed that those crops were typically crops that did not have economic significance as major income generators. Among grain crops only wheat did not lose its popularity. The number of farmers who planted wheat

was highest and the land area under that crop for both 2000 and 2010 periods was also the highest compared to other main crops in the sample. It could be assumed that studied farmers preferred that crop because it would be profitable. The most popular crop among technical crops was potato, which had the highest number of growers for both periods (average planted area for both periods of around 2 ha). It could be explained by high domestic demand for this crop as a main food of Ukrainians.

The reasons for farmers to discontinue this or that crop were different, but farmers specified the most important ones:

1) The need to observe *a crop rotation* was most frequently cited. From the agro-technical viewpoint, crop rotation is the most effective practice to combat diseases and weeds.

2) *Selling prices*. Prices of agricultural commodities are influenced by a variety of unpredictable factors that are out of control of local agricultural companies, among them weather conditions and changes in global supply and demand. However, private farm as is profit oriented and the higher the price for a particular commodity, the more interest for farmer to grow that crop or to switch to it. Private farms are trying to combine financial profitability with the rational use of owned land resources.

3) *Sale of output.* In Ukraine agriculture output is distributed through various market channels, including sales to processing enterprises, organizations of consumer co-operation, at market, to the population as wages, to the shareholders as a rent payment and on commodity exchanges and auctions. According to the studied private farmers there are actually two problems connected with the sale of output: first, difficulties in selling output at

reasonable prices and second, if they cannot sell the output but use it as payment for workers or in a barter relationship, and so suffer from lack of cash and cannot buy some inputs or pay for loans. As a result, reliable or stable channels of commodity distribution can influence farmers' preference for growing a specific crop.

4) *Adverse climatic conditions.* While the weather is always a risk factor for agricultural production, measures to prevent or overcome possible consequences of the weather factor have actually been taken into consideration by studied private farmers.

Table 6.1. *Average Planted Area Per Crop by Group of Farmers in 2000 and 2010, ha*

	Average planted area per crop, ha							
	Wheat	Rye	Barley	Potato	Soy	Vegetables	**Sub Total planted areas of major crops**	**Total area**
2000								
Expanding	16.9	5.1	5.1	2.4	0.0	0.0	**29.5**	**25.1**
Maintaining	8.0	3.9	3.9	2.5	0.0	0.0	**18.3**	**16.4**
Shrinking	5.6	5.2	5.9	2.0	0.0	0.0	**18.7**	**16.7**
Average	**12.4**	**4.5**	**4.6**	**2.4**	**0.0**	**0.0**	**22.2**	**19.1**
2010								
Expanding	9.2	3.9	3.5	4.4	11.7	12.3	45.0	38.7
Maintaining	8.5	2.4	3.7	1.3	5.6	2.6	24.1	16.4
Shrinking	10.4	1.4	1.5	1.1	2.0	1.7	18.1	14.4
Average	**9.1**	**2.7**	**3.3**	**2.2**	**6.8**	**5.3**	29.4	**22.8**

Source of data: 2010, 2011-2013 surveys.

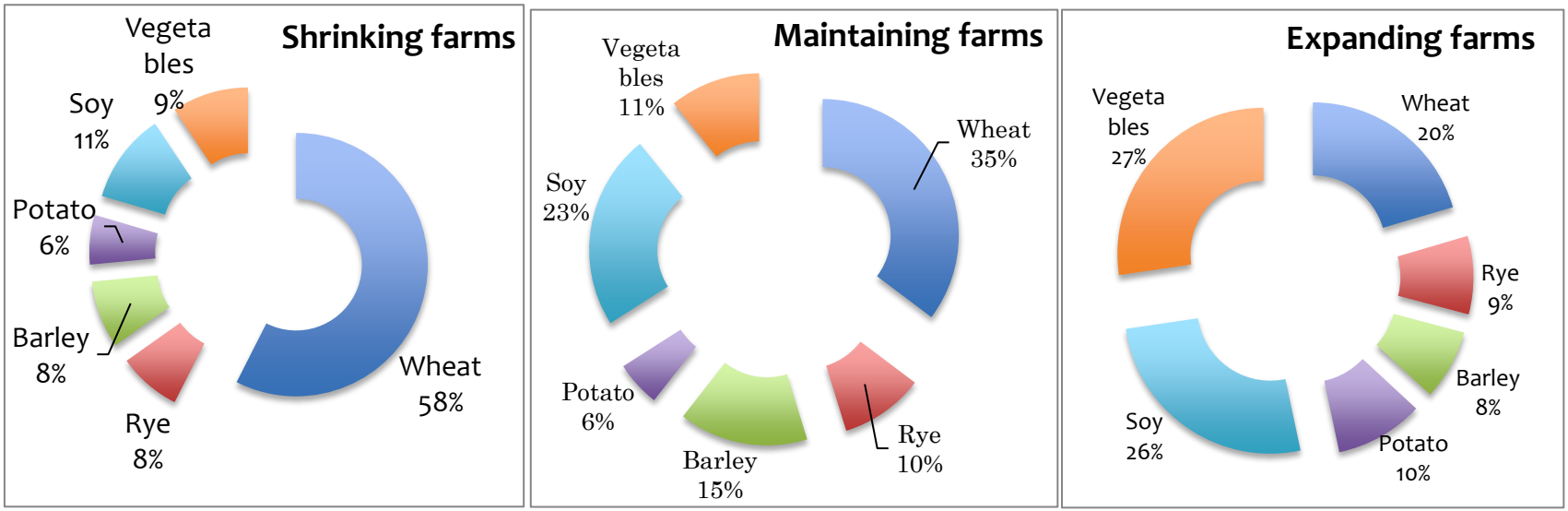

Figure 6.1. *Crop Selection of Main Groups of Studied Private Farms According to Land Size in 2010, %*

Source of data: 2010, 2011-2013 surveys.

From the viewpoints of interviewed farmers, profitability of crop is expected as the one of the most important factors for crop selection. In order to testify this hypothesis, we make the table on changes in price index of main agricultural products in Zhytomyr oblast for 2000-2010. The result is shown in Table 6.2. All price indexes increased from 2000 to 2010, however the price indexes for potato and vegetables (446 and 412 respectively) were almost double compared to the price indexes of the main grain crops, such as wheat and rye (234 and 173 respectively). Prices of potatoes and vegetables have become higher compared with those of grain crops. In that light, farmers have responded to relatively higher prices in crop selection.

However, as Table 6.2 and figure 6.1 shows that while the expanded group of farmers tended to select more profitable crops, but it seems that non-expanding farmers did not respond much. Judging from this finding, non-expanding farms were reluctant with changes in crop selection.

Besides, the present practice shows that today many private family farms, especially in Ukraine`s southwest, have a stronger footing in the production of different vegetable produce and fruits than other larger agricultural enterprises. There are a number of reasons. First, large agricultural enterprises face certain difficulties in attaining the effective production of such a labor-intensive commodity as vegetable production. Second, private family farms are more flexible and tend to respond faster to the needs of this market segment, meeting the existing demand and quality requirements. This is related with the expansion of agriculture related business of expanding private farms as will be mentioned in later part of this paper. Third, private family farms have more incentive for the changes following market conditions because they are based on family labor working for themselves. They are more motivated compared to paid workers of

the agricultural enterprises. That means that the quality of their work is better, and private farmers are more willing to contribute their time and labor to assure optimum time of cultivation.

Anyway, the main factor behind the farmers' selection of specific crops was the favorable price of certain crops. Expanding farms responded more quickly to the changes in market than other types of farming, suggesting the appearance of new private farms.

Table 6.2. *Farm Gate Price Index by Commodity for 2000-2010 for Studied Farmers, (2000=100)*

Year	*Wheat*	*Rye*	*Barley*	*Potato*	Vegetables
2000	100.0	100.0	100.0	100.0	100.0
2001	79.3	72.9	94.68	87.0	130.9
2002	63.6	48.6	81.34	107.5	151.2
2003	130.5	90.6	135.91	120.6	176.9
2004	101.2	84.1	103.40	102.6	214.2
2005	85.3	67.6	130.61	132.5	255.6
2006	108.2	88.1	128.56	207.0	270.5
2007	163.6	179.8	237.75	199.6	348.8
2008	154.6	173.3	224.44	223.2	360.0
2009	162.5	131.2	192.49	251.1	312.9
2010	233.7	172.7	324.06	412.2	446.0

Note: price data for soy for 2000-2010 is not available.

Source: Surveys in Zhytomyr oblast of Ukraine, 2010, 2011-2013.

6.2 Yields of the Main Crops of Studied Farms

Until 1991, yields in the Soviet Union were approaching those in the West, but since the 1991 reforms, the gap between yields in the West and the CIS (Commonwealth of Independent States, former USSR countries) has fallen back to the level of the 1960s.

Nowadays, Ukraine is the biggest European agricultural country with rich natural resources. However, the efficacy of agriculture is still much lower than that of most European countries and the United States. For example, potential yields for wheat in certain regions in Ukraine can reach as much as 7 tons/ha (citation), but average yields are not higher than 4-5 tons/ha. The reasons lie mainly with the previous command-administrative economy and the collective model of agriculture.

The poor performance of agricultural enterprises in Ukraine is partly due to the failure of reforms to provide adequate incentives. Farms generally face two kinds of incentives problem in a market economy. One is a penalty for failure – farms that do not perform well financially should eventually go bankrupt. The other incentive is a reward for success – owners of farms that perform well will earn profits and perhaps be able to expand their operations (Osborne and Trueblood, 2002). Those two incentives do not work well in Ukraine agriculture even after the reform, although there has been slight progress.

Now let us move to the analysis on land productivity of surveyed private farms. Table 6.3 presents information about the average yield per crop by group of studied farmers in 2000 and 2010. Note that yield of vegetables was not presented in the table below because of the seasonal character of the cropping system.

It could be observed from the table that all groups of studied farmers had increased their yields in 2010, compared with that of 2000. This increase can be associated with

the recovery of production from the disorder caused by the Reform as well as the improved agricultural technology of studied farmers, such as application of high quality seeds (hybrids), increase in input of fertilizers and herbicides, and machines and tillage equipment use. Some farmers bought new agricultural machines and/or equipment, and others negotiated about mutual cooperation and exchange of machines and/or services.

The expanding group of farmers had the highest yields for both 2000 and 2010 among three categories, while the shrinking group in 2000 had the lowest yield for wheat (1.9 ton per hectare). According to the respondents answers, this was probably because of limited material inputs of that group, and because not all farmers from the group assured the proper time of crop cultivation. In 2010 the yield for all crops of the shrinking group increased, but still was the lowest in the sample.

The poor performance of agriculture in 2000 was reflected in the fall in yields throughout the country. It is connected with the fact that after 1990, when intensive agro-technological production reached its pinnacle, Ukrainian agriculture experienced a long-lasting setback.

The crisis period of 1990-2000 can be conditionally divided into two phases. The first phase was a sharp decline in sown areas in 1991-1993. The second phase was the stabilization of areas in 1994-2000. Also, most importantly, a four-fold reduction in the application of mineral fertilizers, lack of quality grain seeds, aging and wear of the material and technical resources, low ability to adapt production management to the new market conditions and other factors aggravated the negative impact of weather conditions. This resulted in significant loss of sown areas for major crops and a countrywide decrease in yields. In the process of land reform implementation, the average yield per crop indicated some improvements, though still not approaching its

potential level. At the same time, the yield per crop of studied farmers in comparison to the level of yields of the oblast was still a little bit lower (Zhytomyr Statistic Committee, 2010).

Ukrainian analysts from the Ministry of agrarian policy in Ukraine suggest that Ukraine has the potential to increase crop production significantly, if the necessary agriculture-specific and economy wide reforms are implemented aggressively. Economy wide reforms, of the commercial code, stabilization of tax and regulatory legislation, will reduce uncertainty in the business environment. Agriculture will benefit significantly from these reforms because agricultural production occurs over a long time period and is therefore more vulnerable to risk. In more concrete terms, agricultural reforms such as bankruptcy legislation and land reform, will help the agricultural credit market work, although without economy wide reform the effect will be small. These reforms will allow the sector to modernize and fully internalize the technological advances in agricultural production made over the last several decades.

Going back to the Table 6.3, it should be remembered that category of expanding farms had the highest yields in all production cited in the table both in 2000 and 2010. Also it is important that the yield gap between expanding and non-expanding farms had widened. In case of wheat, the yield of expanding farms was 10 percent higher than the average of the surveyed farms in 2000. In 2010, the yield of expanding farms was 31 percent higher than the average. The reason for the yield gap and widening yield gap between expanding and non-expanding farms will be analyzed later.

Table 6.3. *Average Yield Per Crop by Group of Farmers in 2000 and 2010, ton per ha*

	Average yield per crop, ton per ha				
	Wheat	Rye	Barley	Potato	Soy
2000					
Expanding	2.2	1.3	2.1	13.0	0.0
Maintaining	2.0	1.1	2.0	12.6	0.0
Shrinking	1.9	1.1	2.0	12.8	0.0
Average	**2.0**	**1.2**	**2.0**	**12.8**	**0.0**
2010					
Expanding	3.8	1.7	2.7	18.5	1.7
Maintaining	2.5	1.6	2.0	16.0	1.4
Shrinking	2.3	1.5	1.9	16.1	1.2
Average	**2.9**	**1.6**	**2.2**	**16.9**	**1.4**

Note: Yield of vegetables was not presented because of seasonal character in cropping system

Source of data: 2010, 2011-2013 surveys.

Crop Production of Studied Farmers

Before going into the analysis on factors creating the yield gap between expanding and non-expanding private farms, we sum up the crop production per farm of three categories of surveyed farms (Table 6.4). It is indicated that differences in yields of grown crops as well as planted areas caused the big difference in the volume of crop production among three categories of surveyed private farms. Increase in yield between two years had positive sign for all crops. In general, farmers were producing more compared to the situation of ten years before, and moreover, newly implemented crops, such as soy and vegetables, had significantly contributed to increase in agricultural output of studied private farms.

Table 6.4. *Average Production per Crop per Farm in 2000 and 2010, ton*

Average Production per crop per farm, ton						
	Wheat	Rye	Barley	Potato	Soy	Vegetables
2000						
Expanding	37.2	6.6	10.7	31.2	0.0	0.0
Maintaining	16.0	4.3	7.8	31.5	0.0	0.0
Shrinking	10.6	5.7	11.8	25.6	0.0	0.0
Average	**21.3**	**5.5**	**10.1**	**29.4**	**0.0**	**0.0**
2010						
Expanding	35.0	6.6	9.5	81.4	19.9	195.6
Maintaining	21.3	3.8	7.4	20.8	7.8	37.2
Shrinking	23.9	2.1	2.9	17.7	2.4	23.1
Average	**26.7**	**4.2**	**6.6**	**40.0**	**10.0**	**85.3**

Source of data: 2010, 2011-2013 surveys.

6.3. Agricultural Technology and Input Use of Studied Farms

The performance of production including the yield, cost of production, gross revenue and thus the return from agricultural production are determined by the level of technology and input use. Then before going to analyze the economic performance of studied private farms, we need to explain the technology and input use of the surveyed farms. The theoretical goal is to narrow the difference between potential and actual crop yields, especially to produce products most useful to society.

6.3.1. Agricultural technology

The practical basis is to increase plant growth processes based on morpho-physiological knowledge and manipulation. Acceptance of biological limits of potential and actual crop production capacity is the basis for the dynamics of intensive technologies, for timely and correct agronomic decision-making, and for efficient utilization of soil fertility and related resources.

For the developing crop improvement technologies, therefore, priority will be given to development of high-yielding cultivars that are resistant to disease and insects, and that respond positively to efficient use of fertilizer.

Climate cannot be controlled, but it is only predicted. Thus, the adoption of farming practices suitable to local climates combined with technological adjustments to local agro-ecological factors are needed in order to provide yield stability and bulk production of farm crops.

In every eco-climatic zone there is a predominant ecological factors that crop technology must address. Thus, technological improvements will largely focus on methods for accommodating that environmental factor.

Selecting the best variety **i**s one of the most important factors of agricultural technology for successful farm operation. Following factors are crucial in selecting a variety: yield, maturity, disease resistance, straw strength, shatter resistance, plant height, and grain quality. According to studied farmers, in most cases, yield may be the most important factor, but susceptibility to a disease can affect any yield advantage.

The importance of characteristics in variety such as straw strength and plant height may vary from field to field and from year to year. Straw strength may not be as important on fields with low soil moisture reserves, but is important in preventing lodging on fields with good moisture and high fertility. According to studied private farmers an anti-lodging regulator (ethephon) is available and helps to shorten the plants, strengthen the stems and hence decrease lodging.

Disease resistance is also important in selecting a variety, especially if a particular disease has been a problem in the fields. Currently the most important diseases are leaf (crown) and stem rust, tan spot, spot or leaf blotch, loose smut and ergot.

Winter hardiness is also an important consideration in selecting a variety of wheat or rye. Studied private farmers suggest using the most winter-hardy variety of these crops, provides high yielding. Moreover, studied private farmers insisted that when selecting a variety, yield information should be checked carefully and high quality seeds should be used. This usually means certified seed to assure varietal purity and quality; or carefully selected, “homegrown seeds” of good quality. Poor quality seeds result in reduced yields. At least 90 percent germination is necessary.

Tillage: seedbed preparation. Based on the survey, the studied farmers noted the purpose of primary and secondary tillage is to prepare a firm seedbed with adequate moisture for good germination and seedling development, control weeds and bury residue. Good seed-soil contact is essential when the grain is seeded. Dry, loose soil makes for an unsatisfactory seedbed. Too much tillage increases cost and pulverizes the soil, which can lead to soil erosion due to wind and water or crusting after rainfall. Working plant residues into the soil near surface helps to control erosion and protect the seed.

Chisel plowing rather than moldboard plowing as the primary tillage reduces costs and leaves some residue on the soil surface. Primary tillage in the fall helps the soil to dry and warm up faster in the spring and makes earlier seeding possible. Disking and harrowing the land before seeding is a common method of preparing a final seedbed.

Studied farmers are increasingly switching to minimum tillage technology due to its environmental and economic benefits, such as: limitation of wind and water erosion, improvement of soil fertility. There is also a significant reduction of production cost, as in order to save fuel costs, they invest in equipment, engage in mutual cooperation and exchange of needed tools, and sometimes use of animals, and engage in collaboration in their fields.

Planting. Spring varieties of grains should be seeded as early as possible after the frost is out of the ground. Early seeding generally produces higher yields then later seeding because plants develop best during cool, moist growing conditions. If temperatures get very high during pollination, yields can be drastically reduced due to poor pollination and seed set.

Winter varieties of grains should be planted early enough in the fall so the plants can become well established before the first killing frost.

A grain drill with press wheels is the best for seeding grains because it distributes the seed at a uniform depth and gives good soil-seed contact. At the same time farmers are mentioning that grain drills should be carefully calibrated for each seed lot.

Crop rotation is also considered to be one of the most important factors of agricultural technology for successful farm operation. It helps to decrease the amount of diseases in the crop, reduces the necessity for fungicides, supports weed control and lowers herbicides costs.

6.3.2. Inputs of Studied Farmers

Needless to say, production of any crop is carried out with different kinds of input used. And the performance of agricultural activities will be much influenced by the combination of factors of production. Here major factors of the production concerning the surveyed private farms will be examined.

Labor input *(Tables 6.5.,Table 6.6.,Table 6.7.,and Table 6.8.).* In most cases, only 2-3 persons were engaged in crops production. One or two were family members and other one or two were hired workers. However, average number of workers for expanding farms was almost double (5 persons), which was connected with the contribution of labor force of the registered partners of the farm. This suggests that the labor force of the registered partners was more flexible and tended to respond faster to the needs of the farm and to the market. Moreover, compared to hired workers, the quality of work of registered partners was better, because they were more willing to spend their time and

labor force to assure optimum time of cultivation. This is consistent with the fact that they did not work on the salary-based system, but were entitled to the share of the profit.

The largest labor input per unit of land in crop production was by the shrinking group of farmers (3.9 man-hours/ha) and the lowest by the expanding group of farmers (2.1 man-hours/ha). The main explanation is that larger farms could use agricultural machines.

In total, for all studied farms 181 workers were involved, of whom 140 were family workers and 39 were hired workers.

The most time consuming processes in crop production were tillage and sowing. It should be noted that in the calculation of labor input, harvesting was not included, because all the farmers studied contracted a harvester with driver.

Table 6.5. *Average Time Spent per Hectare of Crop Production by Studied Farms, 2010, man-hour*

Size Group	No of farms	Highest	Lowest	Average	SD
Expanding	15	2.1	1	1.4	0.43
Maintaining	26	2.9	1	1.9	0.59
Shrinking	9	3.9	1	1.7	0.79
Total	50	3.0	1.0	1.7	0.6

Note: Man-hour- industrial unit of production equal to the work one person can produce in agriculture.
Source of data: 2010, 2011-2013 surveys.

Table 6.6. *Average Time Spent per Ton of Crop Production by Studied Farms, 2010, man-hour*

Size Group	No of farms	Highest	Lowest	Average	SD
Expanding	15	1.4	0.6	1	0.38
Maintaining	26	1.8	0.6	1.1	0.37
Shrinking	9	2.5	0.5	1.1	0.59
Total	50	1.9	0.6	1.1	0.4

Note: Man-hour- industrial unit of production equal to the work one person can produce in agriculture.

Source of data: 2010, 2011-2013 surveys.

Table 6.7. *Average Number of Workers per Farm Engaged in Crop Production, 2010, person*

Size Group	No of farms	Total	Family/Partner	Hired
Expanding	15	6	5	1
Maintaining	26	3	2	1
Shrinking	9	2	1	1
Total	50	2.7	2.7	1.0

Source of data: 2010, 2011-2013 surveys.

Table 6.8. *Total Number of Workers per Farm Engaged in Crop Production, 2010, person*

Size Group	No of farms	Total	Family/Partner	Hired
Expanding	15	88	73	15
Maintaining	26	67	52	15
Shrinking	9	26	15	9
Total	50	181	140	39

Source of data: 2010, 2011-2013 surveys.

Fertilizer input *(Tables 6.9. ,and Table 6.10.).* Fertilizer was applied twice: first during basic land cultivation, and the second time in rows during sowing. The second time application was carried out only if needed. The common practice to apply fertilizer was in autumn, before ploughing.

Manure was also applied to crops, but organic nitrogen mineralizes slowly. Nitrogen absorbs by the crop from the beginning of growth and also during development of the plant. However, if applied amount of nitrogen is too high it reduces resistance to lodging, increases risk of diseases and delays ripening.

Many of the studied farmers purchased fertilizers, but the shortage of capital forced them to acquire an insufficient amount of fertilizer. The amount of money spent for fertilizer can be a substantial part of the total variable costs of producing grain crops. Based on the survey, several steps can be taken to reduce fertilizer costs. These are:

1) Soil testing – there is no substitute for fertilizer recommendations based on the results of reliable soil tests. Soil testing helps in two major ways. If the nutrient status of a field is low for the expected potential yield, a soil test indicates the need to add more, or a different amount, of fertilizer. In other situations, the nutrient status of soils may be at high levels from previous fertilizer applications. In these cases no broadcast applications of nutrients other than nitrogen will be needed. Use of fertilizer with the seed can be used in place of broadcast applications in these situations. A switch from broadcast to row application of phosphate, and potash with the seed, could mean a substantial savings to the farmers.

The use of the nitrate test in some cases could be suggested. This test can be used to indicate the amount of nitrogen in the soil. If nitrogen in the soil is high, the amount of nitrogen fertilizer needed can be reduced, thus reducing cost. When nitrogen in the soil

is low, added fertilizer nitrogen can increase yields substantially and be cost effective.

2) Setting a realistic yield goal – selection of a realistic goal is the key for a cost effective fertilizer program. Based on the survey, some suggestions made by studied private farmers deserve mentioning. These are:

- ✓ Don`t aim for average yield. You can usually do better.
- ✓ Don`t aim for the world record. This will never be cost effective.
- ✓ A high yield once achieved by your farm or one of your neighbour`s may be a goal to shoot for.
- ✓ The best way to get a profit is to aim for higher but realistic yields.

3) Change to fertilizer applied with the seed – fertilizer placement can have a major impact on fertilizer costs. Phosphate, and potash rates needed for grains can be cut substantially if these nutrients are applied with the seed instead of broadcast and incorporated before planting. In many cases, the rates can be cut in half.

4) Do not try to build up perfect nutrient content of soils – some farmers involved in the survey believe that it is necessary to "build up " the nutrient level of soils. While it is not desirable to have very low levels of phosphorus, potassium, and zinc, it is not necessary to have high soil test levels for these nutrients to achieve maximum economic yields. It is expensive to buy fertilizer solely for that purpose and not necessarily effective, because the levels of these nutrients will increase slowly after year to year application usually of rates of fertilizer needed to produce optimum yields.

5) Calculate costs of nutrients – usually, there is more than one fertilizer product that can be used to supply the nutrients needed for growing crops. The prices of these various products are not the same. National fertilizer products are more reasonable.

6) Don`t look for miracles – each year many private farmers are asked to purchase

products that, if used, will produce “miracle” yields at a low cost. These products are usually sold by someone who travels from farm to farm and are often described so new that others have not heard about them. The price is usually high. The person selling these products may be new to the community and may disappear after the sale is made.

Table 6.9. *Average Quantity of Fertilizer Used per Hectare for Crop Production of Studied Farms, 2010, kilogram*

Size Group	No of farms	Highest	Lowest	Average	SD
Expanding	15	129	50	78	26.5
Maintaining	26	113	38	55	21.6
Shrinking	9	88	20	39	13.8
Total	50	110.0	36.0	57.3	20.6

Source of data: 2010, 2011-2013 surveys.

Table 6.10. *Average Quantity of Fertilizer Used per Ton for Crop Production of Studied Farms, 2010, kilogram*

Size Group	No of farms	Highest	Lowest	Average	SD
Expanding	15	80	30	47.6	16.8
Maintaining	26	69	23	34.8	13.3
Shrinking	9	63	20	31.9	12.3
Total	50	70.7	24.3	38.1	14.1

Source of data: 2010, 2011-2013 surveys.

The level of use of fertilizers in agriculture in the country started to increase from the mid-1960s onwards. During the period from 1966 to 1970, an average of 1.4 million tons of fertilizers were applied annually. In the second half of the 1980s this figure reached 4 to 4.7 million tons of fertilizers (State Statistic Committee of Ukraine, various years). The increase in the application rates of fertilizers influenced favorably the yields of agricultural crops. However, after the collapse of the USSR, the centrally planned system based on production targets was replaced and Ukrainian agriculture experienced a general crisis. There was no shortage of fertilizers in Ukraine and the fall was mainly due to unfavorable economic conditions in the country.

According to the Institute of Agronomy and Agro chemistry of Ukraine, even nowadays, fertilizers are not applied according to recommendations, based on the agrochemical mapping of fields and this is reflected in the yields obtained.

From the farmer's point of view, it is important to follow the recommendations, to know exactly the quantity of nutrients necessary to obtain one ton of crop produce in order to assess the profitability, as far as the standards are worked out on a zonal basis with type of crop and the main types and subtypes of soils of soil-climatic zones. However, the main problem is the lack of financial resources of the farmers.

Furthermore, due to the sharp decline in the quantities of fertilizers applied on the majority of farms in Ukraine, the balance of nutrients has generally become negative. This has resulted in a sharp deterioration of the humus balance in the soil and primary influenced crop productivity.

The findings of many research institutes and the agrochemical service of Ukraine testify to the role of fertilizers in the increase of the soil fertility. The low level of soil saturation with available phosphorus is one of the negative factors influencing the yields of agricultural crops. According to the results of the field experiments of the agrochemical service, depending on the soil, an application of 90 kg of phosphorus per ha increases the yields of winter wheat by 400 to 500 kg/ha, barley by 300 to 600 kg/ha, maize by 400 to 800 kg/ha, sunflower by 150 to 200 kg/ha, sugar beet by 300 to 800 kg/ha and potatoes by 150 to 250 kg/ha (Kucher and Korchinskaya, 2000).

The application of phosphate fertilizers increases the yields of almost all crops, but during subsequent years, the application of fertilizers was reduced drastically (almost 7 to 10 times).

Nowadays, the net phosphorus removal from Ukrainian soils has averaged 10 to 15 kg/ha annually. If no correction measures are taken, the available phosphorus accumulated in the soil will be exhausted as it is removed with harvested products. This will reduce soil fertility and crop production. It would also reduce quality with a negative impact on sales.

Potash deficiency leads to reduced growth and late ripening of many agricultural crops. Potash deficiency has a particularly negative impact on root and tuber crops, cabbage, fruit, ensilage crops and perennial herbs, as a result of their high uptake of potassium. One ton of potato removes 8 kg of potassium, 5 kg of nitrogen and 2 kg of phosphorus from the soil, while rye, wheat, oats and barley are less sensitive to potash deficiency (Kucher and Korchinskaya, 2000).

Nevertheless, if there is a potassium deficit, the crop tillers badly and the leaves fade, even with sufficient moisture in the soil. According to the data of the agrochemical

service, the application of one kg of potassium gives, depending on the soil, an additional yield of 3 to 5 kg/ha of winter wheat, 6 to 8 kg/ha of maize, 70 to 80 kg/ha of sugar beet, 50 to 80 kg/ha of potato and 4 to 11 kg/ha of sunflower. It should be mentioned that the potassium content of the soils of Ukraine is somewhat higher than that of phosphorus.

The present consumption level of fertilizers is very low compared with 1990, particularly in the cases of potash and phosphate. Moreover, because of excessive cultivation, a negative nutrient balance, erosion and other types of degradation, insufficient moisture at critical periods of development of the crop and, what is most important, nonobservance of proper crop production technology, crop productivity is not very high.

Today, much is being done in Ukraine to correct the situation. Modern soil protection concepts and the preliminary national and regional soil protection programs have been worked out. A new law concerning the protection of soil fertility by landowners has been prepared. Work on the monitoring of soil cover, supported by a Governmental decree concerning the certification of land, is in hand.

The transition of Ukraine's agricultural sector from a centrally planned economy to a more market oriented system has introduced the element of financial responsibility and farm managers are striving to make their enterprises as efficient as possible. Decisions on crop selection, fertilizer application, method of harvesting, grain storage and all other aspects of farm management are being made with a view to boosting farm profit.

Herbicide input *(Tables 6.11., and Table 6.12.).* One of the important elements of the technology of crop cultivation, which allows farmers to protect crops from weeds, is the use of herbicides. To fight annual weeds, the following herbicides are used: Harness (1.5-3.01 l/ha), Frontier Optima (0.8 – 1.4 l/ha), Trophy (1.5-2.01 l/ha), Dual Gold (1.2-1.6 l/ha), Treflan (2.0 – 3.0 l/ha). As insurance against cereal weeds, farmers use: Fyuzilad Super (1.0 – 3.0 l/ha), Furore Super (0.8 – 2.0 l/ha), Panther (1.0 – 2.0 l/ha), Centurion (0.6 – 1.2 l/ha plus Amigo 0.4 – 0.8 l/ha), Select (0.4 – 0.8 l/ha). During the growing season, weed control is done mechanically, if chemical methods were not used.

Based on the survey, there are some suggestions for maintaining effective but more economical weed control practices. First, seeding as early as possible in the growing season enables the grain crop to compete effectively with weeds. Delayed seeding and repeated tillage usually results in reduced yields. Second, weed identification should be the first step in an effective weed control program since many herbicides must be applied when weeds are small. Therefore, it is important to accurately identify weed seedlings early. Also, knowledge of previous weed problems will aid in selecting the proper control program. Third, since herbicides do not control all weeds, farmers sometimes use other measures. Effective weed control critically depended on the performance of available farm machinery and labour management during herbicide spraying.

The study farmers relied on reviews and experiences of fellow farmers more when choosing new fertilizers or herbicides. Recommendations of a dealer (manufacturer) were often considered unreliable in describing the characteristics of an offered product.

Mention must be made of the positive work of the Center of Training and Support of Agricultural Producers, supported by the US Agency for International Development (USAID). This Center provides free information services about seeding material, plant

protection products, fuels and lubricants. It also distributes the results of scientific work, and helps organize “Day of field”, agricultural exhibitions and demonstrations (Sabluk, 2007).

Based on the survey, there are several effective things that can be done to keep herbicide costs low.

4. Mapping the weed location in the field was applied. Often it is possible to treat only part of a field rather than entire field. Perennial weeds, which are expensive to control, usually occur in patches. These scattered patches can be spot treated.
5. Herbicide costs vary from location to location and from dealer to dealer. Herbicides may control the same weeds, yet one may be less expensive than the other.
6. It is necessary to consider crop tolerance as well as effectiveness and cost of the herbicide. For example, wheat is more tolerant to some herbicides than barley, and in that case good weed control could be achieved but the yield would be decreased because of the crop injury.
7. Accurate calibration of spray equipment will help reduce weed control cost and increase the effectiveness of the herbicides used.
8. Farmers also suggest not wasting money on additives that are not needed. Most herbicide formulations contain the needed additives (such as surfactant or oil).

Lastly, trying to decrease herbicide cost by reducing the rate below the labeled rate will not always increase profits. Reduced rates often lead to decreased weed control and decreased yields due to weed competition.

However, with the aim of cutting costs, the studied farmers suggested the lowest labeled rate of herbicide be used, but only under favorable conditions. For example,

when weeds are small and actively growing. Under adverse weather conditions, such as drought or prolonged cool weather, or for well-established weeds a higher herbicide rate is needed for effective control.

Tables 6.11 and 6.12 present the average quantity of herbicides used by farmers in the process of farm operation.

Average quality of fertilizers and herbicides used by studied farmers in selected years is presented in Table 6.13.

Table 6.11. *Average Quantity of Herbicides Used per Hectare for Crop Production of Studied Farms, 2010, litres*

Size Group	No of farms	Highest	Lowest	Average	SD
Expanding	15	5.3	3.0	3.8	0.6
Maintaining	26	4.5	1.5	3.0	1.1
Shrinking	9	3.8	0.2	2.5	1.7
Total	50	4.5	1.6	3.1	1.1

Source of data: 2010, 2011-2013 surveys.

Table 6.12. *Average Quantity of Herbicides Used per Ton for Crop Production of Studied Farms, 2010, litres*

Size Group	No of farms	Highest	Lowest	Average	SD
Expanding	15	3.3	1.7	2.2	0.3
Maintaining	26	2.8	1.2	2.0	0.6
Shrinking	9	2.1	0.1	1.7	1
Total	50	2.7	1.0	2.0	0.6

Source of data: 2010, 2011-2013 surveys.

Table 6.13. *Average Quantity of Fertilizers and Herbicides used by Studied Farmers, various years*

	2000	2005	2010
Fertilizer, kg/ha	24	52.0	75.4
Herbicide, liter/ha	1.8	2.4	3.4

Source of data: 2010, 2011-2013 surveys.

Many Ukrainian scientists and experts tried and are still trying to find and implement agricultural technology, which would serve as an alternative to excessive use of chemicals, such as herbicides and pesticides. The main directions of these new technologies include agro-biological, microbiological, physical methods and their combinations. The purpose of these technologies is to increase plant growth and development, limit the spread of diseases, to serve as alternative to chemical methods and eventually get an environmentally friendly product. The Institute of Agricultural Microbiology of UAAS (Ukrainian Academy of Agricultural Sciences) is investigating the effect of microbial treatments on crop productivity. Inoculations of seeds with bio-treatments, particularly with microgumin, can improve crop yields and product quality, as well as reduce the use of fertilizer by 40-45 kg/ha.

Another method according to the Academy of agricultural science is the application of microwave technology for seeds before planting. The main idea is to use such modes of microwave electromagnetic field on seeds in order to speed up the process of seed germination and growth with simultaneous inhibition of pathogens. After that process, seeds are no longer treated with pesticides. Research has shown that crops grow from seeds that passed microwave treatment had higher germination rate, higher resistance to diseases, increased productivity and were ecologically clean products.

It is important to produce new clean technologies in agricultural production. A serious obstacle to this is the strong commitment of farmers to traditional methods of doing agriculture.

Seeds input. The key to obtaining high productivity is certainly high quality seeds. The private farms studied used both traditional seeds, and the hybrids. Some of the

studied farmers could not afford to buy hybrids because they were rather expensive. Those who did buy hybrid seeds were buying those manufactured by Pioneer, Monsanto, Euralis, Syngenta and Gardens. Hybrid seeds of these producers have high yield potential, meeting European standards, calibrated and sprayed with preparations against diseases and pests.

At the same time, there was a high demand among farmers for seeds of Ukrainian selection and production, because of their cheaper price.

Machinery input *(Table 6.14.).* Activities of the private farms are impossible without machines. It is important to note that machines and equipment of studied private farmers were of a low level and mostly obsolete.

Table 6.14. *Availability of Agricultural Machinery in Studied Farms, in 2010, units*

Size Group	No of farms	Tractor	%	Truck	%	Tillage equipment	%
Expanding	15	13	87%	19	127%	40	267%
Maintaining	26	10	39%	13	50%	15	58%
Shrinking	9	3	33%	8	89%	8	89%
Total	50	26		40		63	

Note: *Tillage equipment (cultivators, plows, disc harrows, etc.)
Source of data: 2010, 2011-2013 surveys.

Agricultural machinery industry leaders include three plants, which manufacture tractors (Kharkiv Tractor Plant, Pivdenny Tractor Plant and LAN Concern), and two plants, which manufacture harvesters, located in Kherson and Ternopil. All domestic manufacturers of agricultural machinery have similar problems such as old equipment, the absence of modern technologies, low solvency of Ukrainian farms, and a lack of credit. Production facilities at most agricultural machinery plants are currently being

utilized at levels ranging from 15% to 30%. Lack of credit and absence of purchasing power have produced a sharp drop in domestic manufacture of agricultural machinery and equipment. The price of domestically produced agricultural machinery is not cheap, because of inefficient and outdated manufacturing technologies. All this makes local machinery less attractive for agricultural companies.

A chronic lack of modern harvesting equipment remains one of Ukraine's main obstacles to increasing grain output and quality.

Studied farmers estimate that 10 to 20 percent of the standing crop is typically lost due to outdated, inefficient machinery. Custom combining is available, but operators charge 20 to 25 percent of the crop in exchange for their services. Farmers must weigh custom-combining charges against potential harvest losses, and most choose to harvest their own grain.

Another consideration is that many farmers are compelled to sell grain shortly after harvest when prices typically are lowest. One of the main reasons is a shortage of on-farm storage capacity, especially following a good harvest. This is a relic of the Soviet system, which was designed for immediate post-harvest shipment of grain to regional elevators. The need to repay short-term debts or to satisfy "payment-in-kind" arrangements is the second chief factor contributing to the untimely sale of grain (i.e., untimely from the farmer's perspective).

At harvest time many traders are offering cash for grain. Banks do not accept grain as payment, and for a private farmer struggling with a heavy debt burden the lure of immediate cash is difficult to resist. The greatest obstacle to increasing on-farm grain storage and modernizing the fleet of agricultural machinery is the difficulty for many farms to obtain large, long-term loans for capital investments.

6.4. Yield Determinants in Crop Production

In order to examine the yield determination of the main crop in the sample, selecting the case of wheat, multiple regression analysis was conducted. The model is written as follows:

Y= a+b1X1+b2X2+b3X3+b4X4+b5X5:

Where: Y is the dependent variable: yield of wheat in 2000 and 2010 expressed in kilogram per hectare basis. The independent variables are as follows:X1: labor (man-hours/ha), X2: herbicide (liters/ha), X3: seeds ($/ha), X4: fertilizer ($/ha), X5: dummy variable of private farm size (0 for farms of less than 20 ha of arable land, 1 for farms of more than 20.1 ha of arable land), a: the constant, b: the regression coefficients

For all of these independent variables, a positive contribution to wheat productivity is expected.

Labor input is expected to have a positive relation with the average productivity. This means that by increasing labor input per hectare, the yield is expected to increase.

All studied farmers applied herbicides to keep crops free from weeds. By applying more herbicides per hectare, farmers can expect to prevent damage to plants, thus increasing productivity.

Studied farmers have bought different varieties of seeds. In many cases the more expensive and better varieties were needed in a small quantity. At the same time, seeds treated with fungicides can reduce seedling blights, root rots and loose smut. That is why seeds variable was expressed in monetary value per hectare.

Fertilizer was also expressed in monetary value per hectare, because farmers have bought different types of fertilizer, which differed by quality and quantity of nutrients.

Farm size was chosen as dummy variable, as far as it has an influence on productivity, based on the impact on every aspect of farm, including capital investment and crop rotation.

Table 6.15 presents the results of the estimates, from which the following points deserve mentioning. First, the coefficient of determination (R square) indicates that the five independent variables included in the analysis are able to explain 65% and 57% of the variations in wheat productivity among the farmers in 2000 and 2010 respectively. Second, there are regression coefficients that are statistically significant at 1% and 5% level. The major factors contributing yield productivity of wheat for both 2000 and 2010 periods to be labor input and fertilizer input, but in addition to that, seeds input is also considered to be significant, for 2000 at the 5% level and for 2010 at the 1% level. It is probably that farmers in 2010 were using high quality seeds (hybrids), which had high yield potential, meeting European standards, calibrated and sprayed with preparations against diseases and pests and certainly have better potential to high crop productivity, comparing to 2000 period. Third, the regression coefficient for herbicide is also significant and has a positive sign, but the magnitude is much larger for 2000 compared to 2010. It is probable that the predominant use of herbicides by studied farmers in 2010 compared to 2000, caused a relatively heavier dependence on these factors for 2000, whereas the nature of herbicide input may imply the contribution of other factors such as performance of available farm machinery, labor management during herbicides spraying etc. This assumption appears to be consistent with the fact that the coefficient of determination of the present model is lower in case of 2010, indicating the greater influence of other factors, which had not been taken into consideration in this analysis.

Fourth, it is also important to note that the farm size variable (in this case a dummy variable) is statistically significant and suggests that farm size is a determinant of wheat productivity in both periods. In view of that, the bigger farm size the higher wheat productivity might be achieved. This assumption appears to be consistent with the fact that larger farms can invest more money in inputs (seeds, fertilizers, plant protection, agricultural machines and equipment, etc.). It also implies that the bigger the farm size the better crop rotation patterns.

Table 6.15. *Multiple Regressions for Yields Determinants of Wheat, 2000 and 2010*

	2000		2010	
	Regression coefficients	T value	Regression coefficients	T value
Constant	356.04	2.38	414.34	2.64
Labor (man-hours/ha)	129.13***	2.32	171.18***	2.64
Herbicide (l/ha)	67.99**	2.31	8.21**	1.28
Seeds ($/ha)	4.98**	2.01	5.46***	2.19
Fertilizer ($/ha)	3.21***	2.01	4.73***	2.98
Farm size (dummy)	118.73***	2.08	146.68***	2.27
N	39		50	
R square	0.651		0.571	
F value	8.43		10.35	

Notes: farm size is dummy variable (0 for farms of less than 20 ha of arable land, 1 for farms of more than 20.1 ha of arable land)
*** Denotes significance at the 1% level
** Denotes significance at the 5% level
Source of data: 2010, 2011-2013 surveys

6.5. Cost and Return of Major Crops of Studied Farmers

Cost and return of major crops can be measured as the total monetary cost and benefits of production. The calculation of cost and return allows us to answer such questions as: “Is this product really worth money spent on its production?” or “Which product has the highest cost benefit ratio?” Such analysis is only possible if all involved parameters can be expressed in monetary terms.

This estimation could be useful in analyzing the relationship between costs, volume of production, and profit, of studied private farmers. Such evaluation is an effective tool for prediction of future activities of the farm, because it gives a quantative perspective to forecast returns on growing main crops by farmer.

Tables 6.16 and 6.17 present average revenue per crop per hectare and per farm, respectively, of three categories of studied farmers.

All calculations are presented on the monetary value using Ukrainian currency, hryvna (UAH), based on constant prices of 2010. Prices per ton by commodity for various years, including 2010 could be available from the following Table 6.18.

Tables 6.19 and 6.20 present the average cost per crop per hectare and per farm, respectively, of studied farmers. These include inputs such as seed, fertilizer, chemicals, fuel, hired labor, machine rent, land rent, and other farms’ expenses. The cost of family and partner’s labor and depreciation of machine and equipment is not included. Thus the production cost might be underestimated especially for larger farms. But when we calculate the return by deducting cost of production from agricultural revenue, the calculated return can be regarded as cash income for private farms, and thus, it is allowed to use this method for the estimation of return.

Table 6.16. *Average Revenue per Crop per Hectare, UAH*

(All calculations are at constant prices of 2010)

	Wheat	Rye	Barley	Potato	Soy	Vegetables	**Total Revenue per Ha**
2000							
Expanding	2,504	1,053	2,545	27,703	0	0	**33,805**
Maintaining	2,276	891	2,424	26,851	0	0	**32,442**
Shrinking	2,162	891	2,424	27,277	0	0	**32,754**
Average	**2,314**	**945**	**2,464**	**27,277**	**0**	**0**	**33,000**
2010							
Expanding	4,324	1,377	3,272	39,424	4,427	40,561	**93,385**
Maintaining	2,845	1,296	2,424	34,096	3,646	36,479	**80,786**
Shrinking	2,617	1,215	2,303	34,309	3,125	34,694	**78,263**
Average	**3,585**	**1,337**	**2,848**	**36,760**	**4,036**	**37,245**	**84,145**

Note: Constant prices per crop of 2010 were applied for the calculations

Source of data: 2010, 2011-2013 surveys.

Appendix table to 6.16. ***Average Monthly and Annual Wage in Agriculture (employees in agricultural enterprises) in Ukraine in 2010, UAH***

Month	*Wage, UAH*
January	1114
February	1120
March	1156
April	1229
May	1273
June	1301
July	1351
August	1372
September	1410
October	1395
November	1422
December	1430
Average Monthly Wage in 2010	***1,298***
Average Annual Wage in 2010	***15,573***

Note: Official wage with deducted taxes

Source: State statistic Committee of Ukraine, 2011

Table 6.17. *Average Revenue per Crop per Farm, UAH*

(All calculations are at constant prices of 2010)

	Wheat	Rye	Barley	Potato	Soy	Vegetables	**Total Revenue per Farm**
2000							
Expanding	42,311	5,370	12,981	66,487	0	0	**127,149**
Maintaining	18,208	3,475	9,454	67,127	0	0	**98,263**
Shrinking	12,108	4,633	14,302	54,554	0	0	**85,597**
Average	**24,209**	**4,493**	**12,245**	**62,722**	**0**	**0**	**103,670**
2010							
Expanding	39,784	5,370	11,453	173,463	51,794	498,899	**780,764**
Maintaining	24,183	3,110	8,969	44,325	20,415	94,846	**195,848**
Shrinking	27,221	1,701	3,454	37,740	6,250	58,979	**135,345**
Average	**30,396**	**3,394**	**7,959**	**85,176**	**26,153**	**217,575**	**370,652**

Note: Constant prices per crop of 2010 were applied for the calculations

Source of data: 2010, 2011-2013 surveys.

Table 6.18. *Farm Gate Prices per Ton by Commodity for Various Years, UAH*

	Wheat	*Rye*	*Barley*	*Potato*	*Soy*	*Vegetables*
2000	487	469	374	517		572
2001	386	342	354	450		749
2002	310	228	304	556		865
2003	635	425	508	623		1,012
2004	493	394	387	530		1,225
2005	415	317	489	685		1,462
2006	527	413	481	1,070	1,069	1,547
2007	797	843	889	1,032	1,697	1,995
2008	753	813	839	1,154	1,770	2,059
2009	792	615	720	1,298	2,673	1,790
2010	1,138	810	1,212	2,131	2,604	2,551

Source of data: Ukrainian Ministry of Agriculture, various years

Table 6.19. *Average Cost per Crop per Hectare for 2000 and 2010, UAH*

Average Cost per crop per ha, UAH						
	Wheat	Rye	Barley	Potato	Soy	Vegetables
2000						
Expanding	1,031	764	1,154	1,975	0	0
Maintaining	998	755	1,207	2,005	0	0
Shrinking	978	739	1,211	1,982	0	0
Average	**1,002**	**753**	**1,191**	**1,987**	**0**	**0**
2010						
Expanding	1,005	696	1,069	1,440	2,228	3,978
Maintaining	989	689	1,082	1,490	2,313	3,899
Shrinking	890	676	1,097	1,315	2,361	3,488
Average	**961**	**687**	**1,083**	**1,415**	**2,300**	**3,788**

Note 1: Average cost per farm includes input such as seeds, fertilizers, chemicals, fuel, labor, machine rent, and rental. Depreciation and labor (family and partner' labor) costs are not included.
Note 2: Constant prices per crop of 2010 were applied for the calculations
Source of data: 2010, 2011-2013 surveys.

Table 6.20. *Average Cost per Crop per Farm for 2000 and 2010, UAH*

Average Cost per crop per farm, UAH						
	Wheat	Rye	Barley	Potato	Soy	Vegetables
2000						
Expanding	16,528	4,988	4,988	2,347	0	0
Maintaining	7,986	2,944	4,708	5,012	0	0
Shrinking	5,477	3,843	7,144	3,965	0	0
Average	**9,997**	**3,925**	**5,613**	**3,775**	**0**	**0**
2010						
Expanding	9,246	2,714	3,741	6,336	26,062	48,929
Maintaining	8,404	1,653	4,004	1,937	12,951	10,136
Shrinking	9,256	946	1,645	1,447	4,722	5,930
Average	**8,969**	**1,771**	**3,130**	**3,240**	**14,578**	**21,665**

Note 1: Average cost per farm includes input such as seeds, fertilizers, chemicals, fuel, labor, machine rent, and rental. Depreciation and labor (family and partner' labor) cost are not included.
Note 2: Constant prices per crop of 2010 were applied for the calculations
Source of data: 2010, 2011-2013 surveys.

From the observation of the tables presented above, the following points deserve mentioning. First, among grain crops, winter wheat was the main crop grown by studied farmers with the largest planted area and the highest monetary contribution per farm for both 2000 and 2010. However, for the majority of studied private farms grain production is small-scale operation, because sown areas are not large, comparing to other agricultural enterprises with commercial specialization in the region.

Second, among technical crops, the 2000 period potato, which was considered as one of the most important components of the staple food in Ukraine, substantially contributed to the average revenue of the studied farmers on a per hectare and per farm basis. However, in 2010 there were already several crops, including newly implemented soy and vegetables, which together with potato had significant shares in the average revenue per farm and per hectare of studied farms. Definitely, stronger footing in the production of different vegetables allowed studied farmers not only to survive in the present market conditions, but also to expand their current production, as well as to obtain a higher margin per hectare, because of the high present selling prices and high market demand for these crops in Ukraine.

Third, it is essential to mention that the average cost per farm and per hectare was higher in the beginning of farm operation in 2000, compared to 2010. According to studied farmers, they were spending more on:

Seeds; based on the calculations presented in the following chapter, in 2010 studied farmers used 10 percent of own produced gross output for seeds like seeding material for the next harvesting season without buying the seeds outside. In 2000 all seeds were bought from outside).

Machines and fuel: studied farmers mentioned that in 2010, compared to 2000, they already had contract based relationship or negotiated agreements with other farmers who had their own machines or with companies who were dealing with leasing agricultural machines for mutual cooperation, so in that case fuel and labor costs were reduced due to the fact that driver and fuel were already included for rented machines or farmers were contributing their time, labor and sharing fuel expenses in cultivating their fields (mutual exchange of services). Some studied farmers mentioned that they bought their own machines in the process of farm operation.

Land rent (it is important to note that in the process of land reform implementation, the rental for lands increased from 1 to 3 percent of the monetary value of the land plot. In that case, farmers with short-term rent contracts after the contract extension had to pay more (rent cost increased), however, for long-term contracts the rent cost was the same. Moreover, for expanding farmers, who had registered partners and partners contributed privatized land plots to farm's assets, the rent cost, as well as labor cost decreased because partners do not get a wage but receive a share of the farm's profit.

Fourth, the task of private farmers appears to be in reducing farm expenses and increasing crop production. *Fertilizer and chemical use of* studied farmers in the beginning of farm operation was less compared to the 2010 period due to limited financial resources. However, fertilizer and chemical use, as well as other cost, increased during the process of farm operation as farmers worked to increase crop yields.

6.6. Annual Income of Studied Private Farms

Annual income was calculated in order to assess the profitability of farms on a long-term basis. The interest was in recording the market value of the farmers` total production.

Table 6.21 presents gross agricultural income of studied farmers per hectare and per farm for 2000 and 2010. The data gathered from private farmers were supplemented with the data on the prices of crop commodities from the Ukrainian Ministry of Agriculture. Constant prices per crop of 2010 were applied for the calculations.

Furthermore, there were two components that were of central importance for the gross agricultural income: average revenue (UAH, see Tables 6.16. and 6.17.) of the major crops and average cost of these crops (UAH, see Tables 6.19 and 6.20), which predefined the level of gross agricultural income of studied farmers in both periods of time. Machinery depreciation, and labor cost of family member and partners, was not included in the cost.

It is essential to mention that average gross agricultural income of private farms in Ukraine did increase in the process of land reform implementation, but not significantly and still agriculture is characterized as the sector with the lowest salary level and lowest average income in Ukraine. Moreover, the prices for agriculture commodities, which are predefined by the state, are also low, as state donations and subsidies are limited and cannot cover all the needs of agricultural producers.

Table 6.21. *Gross Agricultural Income per Crop per Farm and per Hectare in 2000 and 2010, UAH*

	Wheat	Rye	Barley	Potato	Soy	Vegetables	**Total (per farm)**	**Total (per ha)**
2000								
Expanding	25,783	383	7,993	64,140	0	0	**98,298**	**3,916**
Maintaining	10,222	531	4,746	62,115	0	0	**77,613**	**4,733**
Shrinking	6,632	790	7,158	50,589	0	0	**65,169**	**3,103**
Average	14,212	568	6,632	58,948	0	0	**80,360**	**3,917**
2010								
Expanding	30,538	2,656	7,713	167,127	25,731	449,970	**683,735**	**17,668**
Maintaining	15,779	1,457	4,965	42,388	7,465	84,710	**156,763**	**9,559**
Shrinking	17,965	755	1,809	36,294	1,528	53,050	**111,399**	**7,736**
Average	21,427	1,623	4,829	81,936	11,575	195,910	**317,299**	**11,654**

Note 1: Machine depreciation is not included in the cost
Note 2: Constant prices per crop of 2010 were applied for the calculations

Source of data: 2010, 2011-2013 surveys.

From the observation of the table presented above, the following points deserve mentioning. First of all, positive yield increase in 2010, compared to the beginning of farm operations in 2000, had a significant impact on the increase in gross agricultural income of studied farmers per hectare and per farm basis. The average gross agricultural income of studied farmers almost doubled for all crops, except for barley.

Second, wheat value in the gross agricultural income for shrinking farms in 2000 was the lowest, which was consistent with the fact that this group of farmers had the lowest yield among studied farmers (1.9 ton per hectare). In 2000 the production cost of the crop was also high, which seriously effected wheat production of shrinking farmers. However, in the process of farm operation these farmers improved their agricultural technology of growing wheat and achieved the level of yield of 2.3 ton per hectare in 2010, and in addition the planted area almost doubled. As a result, in 2010 the value of gross agricultural income of shrinking farms had a positive value and it was even higher than the value of wheat for maintaining farms for that period.

Third, high prices and market demand for such crops as soy and vegetables, as well as potato, together with increased planted area of these crops, significantly contributed to the gross agricultural income of all studied farmers in 2010, especially for the expanding group of farmers, who had the strongest footing in the production of such crops.

Fourth, it is worth noting that total gross agricultural income for all crops by groups of farmers, is the highest for the expanding group of farmers and the lowest for shrinking farmers for both periods of time.

It was also observed that studied farmers on average kept around 80% of the value of the gross agricultural income of the farm for seeds, animal feed, personal consumption, farm needs and expected future expenses for the next farming season. Studied farmers also noted that the money left after deducting the operational cost (for future harvest) and other farm expenses from the value of gross agricultural income was about 20%. It was used upon farmers' personal consideration.

It is interesting to note that more than half of studied farmers were involved in agriculture related businesses (ARB) and thus had additional income coming from this source. They did not start implementing agriculture related businesses from the start, but through the process of farm development and operation.

Agriculture related business is based on a rediscovery of the value of local agriculture, the short distribution chain, and locally closed cycles of production and consumption. In general, it aims to prioritize soil fertility, the presence of people in the countryside and biodiversity protection. This approach, sometimes also described in agricultural literature as "farm-to-fork," tends to emphasize direct relationships between producers and consumers.

Committed to meet the challenges of modern agriculture and food processing, Ukrainian farmers took positive steps to facilitate agriculture related business development. In the late 1990s there were a number of middlemen in relations between producers and consumers. These intermediaries tended to limit producers' direct access to market and monopolized it. The volumes of produce supplied directly from producers to processors or from producers to consumers significantly decreased. This resulted in the development of vertically integrated structures on the basis of processing and trading enterprises.

The large-scale agricultural enterprises have closed-circuit production cycles, covering all stages: from raw materials to finished products. These enterprises turned into holding type corporations with increasing output, processing and sales volumes.

The small-scale private farms have limited access to creating added value. Primarily, private family farms are integrated into agriculture-related business at the lowest level as suppliers of raw materials. Step by step some of them were getting involved in further levels of processing, storage and sales under a common trademark.

This process of combining farming and agriculture-related business for small-scale agro-producers is still not a widespread phenomenon in Ukraine.

Small-scale producers face a lack of access to potential markets for several reasons: 1) A lack of confidence and unstable relations between producers and potential buyers; 2) Low volumes of production and products range; 3) Poor logistical infrastructure (bad roads, insufficient transport connections); 4) Lack of reliable information about markets and financial resources to obtain it; 5) Lack of quality seeds and fertilizers and mechanization, compared to bigger agricultural enterprises, which reduces the product quality characteristics; 6) Administrative barriers of access to profitable markets: private traders limit supply on the markets to keep high prices, and relatively high mandatory payments to access the trading facility at the market.

According to the survey, farmers with agriculture related business are involved in vegetable processing, such as making pickles, drying/freezing vegetables, making homemade food for sale, making animal feed (mostly from soy), and flour production (selling flour or using it for bakery). Studied farmers distribute their produce independently or by group mostly through their own channels of distribution or through markets (village market, town markets, etc.).

Taking all these factors into consideration, the following points about studied farmers with agriculture related business, based on the Tables 6.22 (per farm) and 6.23 (per hectare) presented below, should be noted. Current prices were applied for the calculations.

First, the defining feature of expanding farmers was that all farmers from that group were participating in agriculture related business (15 farmers). 6 out of 26 farmers and 2 out of 9 farmers were involved in agriculture related business from maintaining and shrinking groups of farmers respectively.

Second, the value for the income from agriculture-related business between expanding and non-expanding farmers varied due to price differences, because of different channels of produce distribution. Expanding farmers mostly sold the produce through their own private ventures, such as kiosks, small shops, the majority of which were located on the farm or close to it, through the village market (agreement base) or through on-road family-type ventures. For non-expanding farmers (maintaining and shrinking farms) the most common channel of distribution was direct sale in the market place (renting a market space/counter) or sale by agreement (wholesale) in the market, and direct on-road sale. In addition, it should be mentioned that many farmers in the sample also contributed their income from the sale of honey, eggs, in some cases milk and meat from their subsistence farming.

Social payments, such as pensions, remittance from relatives, subsidies or other social security payments, and wages from other employment were not included in farmers' income calculations.

Third, some farmers, mostly expanding farmers in the sample, integrated and created a group with the aim of increasing the competitiveness of small-scale production. These

farmers were processing their crops together (if, for example, they were involved in flour production), because processing companies were not willing to deal with small-scale raw material batches. For example, the mill would not grind small batches of grain, because of the high operating cost.

The advantages of group participation in agriculture-related business are obvious. In terms of other participants' interests, cooperation with a group is more attractive than acting unilaterally among a large number of small-scale producers. Groups of small-scale producers may gain more benefit from integration: namely, they can combine their resources and gain access to credit and services to develop technologies and skills necessary for producing improved products; it is easier for groups to obtain the information necessary to access certain markets; groups are more capable of taking risks, setting rules and specifying quality standards, and may appoint members who will control adherence to them. Moreover, groups can get access to professional consultations and undergo the necessary certification and inspection procedures on advantageous terms in order to sell products at high prices. Potentially groups can combine available resources and receive external funds to invest in irrigation or storage facilities. They may organize internally to adjust cultivation, allowing ripening at adjusted times, thus ensuring constant supply of the produce.

Fourth, from the point of view of economic well-being, expanding farmers had the highest total profit among all groups of studied farmers for both periods. It is important to mention that in 2000 the highest level for expanding farmers among other groups of studied farmers was achieved due to higher crop yields, but in 2010 the highest total profit was positively contributed by the profit from agriculture related businesses (27 percent), which were implemented and developed in the process of farms operation.

Table 6.22. *Farmers' Income from Agriculture Activities and Agriculture-Related Business per Farm, UAH*

2000	*Gross Agricultural Income*	Share in Total Income, %	*Gross Income from Agriculture-related Business*	%	*Total*	*No of households involved in agriculture-related business*
Expanding	98,298	100%	0	0	**98,298**	0
Maintaining	77,613	100%	0	0	**77,613**	0
Shrinking	65,169	100%	0	0	**65,169**	0
Average	**80,360**		**0**		**80,360**	**0**
2010						
Expanding (n=15)	683,735	73%	255,834	27%	**939,569**	15
Maintaining (n=26)	156,763	81%	37,623	19%	**194,386**	6
Shrinking (n=9)	111,399	80%	28,392	20%	**139,791**	2
Average	**317,299**		**107,283**		**424,582**	**23**

Source of data: 2010, 2011-2013 surveys.

Table 6.23. *Farmers' Income from Agriculture Activities and Agriculture-Related Business per Hectare, UAH*

	Agricultural Income per ha	*Income from Agriculture-related business per ha*	Total
2000			
Expanding	3,916	0	**3,916**
Maintaining	4,733	0	**4,733**
Shrinking	3,103	0	**3,103**
Average	**3,917**	**0**	**3,917**
2010			
Expanding (n=15)	17,668	6,611	**24,279**
Maintaining (n=26)	9,559	2,294	**11,853**
Shrinking (n=9)	7,736	1,972	**9,708**
Average	**11,654**	**4,705**	**16,360**

Note: Current prices were applied for the calculations.
Source of data: 2010, 2011-2013 survey

Furthermore, it is interesting to note that a recent study of small and medium-sized private farms in Ukraine, prepared by Food and Agriculture Organization of the United Nations in 2013, indicated that the majority of positive examples of the advantages of private farms integrating into agriculture-related business go to the private farmers, who are the most educated, innovatively adapted, mobile and capable of overcoming distrust and risks. Interestingly, in this context, expanding farmers have the highest educational level in the sample.

However, despite the positive signs of agricultural development in Ukraine, production and distribution of major crops is limited by the low purchasing power of Ukrainians. Since 2000, salary increased and pensions have accelerated. Nevertheless, the burden of taxation, inflation and increasing food prices compared to consumer prices for commodity goods has actually made it impossible to increase the real purchasing power of the population. As a result, increase in demand for agricultural products and agricultural market capacity has been slowing down.

Since independence, rural areas lost 75% of industrial jobs, 40% from collective farms, and a third of jobs in social services (Organization for Economic Cooperation and Development, 2013). Living standards in rural areas in Ukraine are low (Table 6.24).

Remarks

The range of agricultural crops grown today by surveyed private farms is quite wide. Such diverse production activity is a positive effect of the farm level implementation of the land reform as long as it helps minimize both price and operational risks.

The present survey suggests that on average about 57% of the cropped area is sown to grains (wheat, barley, rye), 27 % is under technical crops (such as soy) and potato. Vegetables have a seasonable character, mostly represented by cabbage, carrot, onion, pumpkin, and eggplant in the sample, with a ratio of cultivated area of 16%.

Some important points from the chapter should be mentioned. First, it appears that shrinking farmers have stronger orientation in the production of grain crops, while expanding farmers combining grain crops with soy, potato and vegetables, which allows them to obtain higher margin per hectare in the present market conditions. More specifically, from the price index comparison by commodity for 2000-2010 for studied farmers, it was observed that the expanded group of farmers tended to select more profitable crops, probably because it granted more possibilities to sell the produce at higher market prices. In other words, the main factor behind the farmers' selection of specific crops (such as potato and vegetables) was higher price of the crop.

Second, expanding group of farmers had the highest yields for both 2000 and 2010 in the sample. Shrinking group of farmers in 2000 had the lowest yield for wheat (1.9 ton per hectare), probably because of limited material inputs of that group of farmers (according to the respondents answers) and not all farmers from that group assured the proper time of crop cultivation. In 2010 the yield for all crops of shrinking group of farmers increase, but was still the lowest in the sample.

Third, agricultural output of main crops grown by studied private farms suggests that changes in yield of crops grown (yield in 2010 had positive sign and increased for all crops compared to 2000 period) were transformed to higher output produced by each crop. In general, farmers were producing more compared to the previous period, when the farms were established. Moreover, newly implemented crops, such as soy and vegetables, significantly contributed to gross agricultural output of studied farms.

Fourth, in order to examine the yield determinants in the case of wheat production, multiple regression analysis was conducted. It is suggested that the major factors contributing to yield productivity of wheat for both 2000 and 2010 periods were labor input and fertilizer input, in addition seeds input was also considered to be significant, but for 2000 at the 5% level and for 2010 at the 1% level. It is probably that farmers in 2010 were using more high quality seeds (hybrids), which had high yield potential, meeting European standards, calibrated and sprayed with preparations against diseases and pests and with better potential for high crop productivity, compared to 2000. Furthermore, the regression coefficient for herbicide is also significant and has a positive sign, but the magnitude is much larger for 2000 compared to 2010. This is probably due to the predominant use of herbicides by studied farmers in 2010 compared to 2000, which caused a relatively heavier dependence on these factors for 2000, whereas the nature of herbicide input may imply the contribution of other factors such as performance of available farm machinery, labor management during herbicides spraying etc. This speculation appears to be consistent with the fact that the coefficient of determination of the present model is lower in the case of 2010, indicating the greater influence of other factors, which had not been taken into consideration in this analysis.

Moreover, it is also important to note that the farm size variable (in this study a

dummy variable) was statistically significant and suggested that farm size was a determinant of wheat productivity in both periods. In view of that, the bigger farm size the higher wheat productivity might be achieved. This tendency appeared to be consistent with the fact that larger farms could invest more money in farm inputs of seeds, fertilizers, plant protection, agricultural machines and equipment. It was also implied that the bigger the farm size, the better the crop rotation patterns.

Fifth, it is essential to mention that the average cost per farm and per hectare basis was higher in the beginning of farm operation in 2000, compared to 2010. According to studied farmers, they were spending more on seeds, machines and fuel, and land rent. Moreover, with the aim of increasing the yields of crops, fertilizer and chemical use was significantly increased.

Sixth, annual income was calculated in order to assess the profitability of farms on a long-term basis. The interest was in recording the market value of the total production.

Based on the conducted survey, the following points can be concluded. First of all, positive yield change (increase) in 2010, compared to the beginning of farms operation in 2000, had a significant impact on the sign of gross agricultural income of studied farmers per hectare and per farm basis. The average gross agricultural income of studied farmers increased by almost double for all crops, except for barley. Second, wheat value in the gross agricultural income for shrinking farms in 2000 was the lowest, which was consistent with the fact that this group of farmers had the lowest yield among studied farmers (1.9 ton per hectare). In 2000 the production cost of the crop was also high, which seriously affected wheat production of shrinking farmers. However, in the process of farm operation these farmers improved their agricultural technology of growing wheat and achieved the level of yield of 2.3 ton per hectare in 2010, moreover, planted area was also

increased by almost double. As a result, in 2010 the value of gross agricultural income of shrinking farms had a positive sign and it was even higher than the value of wheat of maintaining farms for that period. Third, high prices and market demand for such crops as soy and vegetables, as well as potato, together with increased planted area of these crops, significantly contributed to the gross agricultural income of all studied farmers in 2010, especially for the expanding group of farmers, who had the strongest footing in the production of such crops. Fourth, gross agricultural income for all crops by each group of farmers was the highest for the expanding group of farmers and the lowest for the shrinking farmers for both periods.

And finally, it is important to note that more than half of the studied farmers were involved in agriculture related businesses (ARB) and thus had additional income from this source. However, the defining feature of expanding farmers was that all 15 farmers from that group were participating in agriculture related business and 6 out of 26 farmers and 2 out of 9 farmers were involved in agriculture related business from the maintaining and shrinking groups of farmers respectively.

The value of the income from agriculture-related business between expanding and non-expanding farmers varied due to price differences, because of different channels of produce distribution. From the point of view of economic well-being, expanding farmers had the highest total profit among all groups of studied farmers for both periods. In 2000 the highest level for expanding farmers among other groups of studied farmers was achieved due to higher crops' yields, but in 2010 it was positively contributed to by the profit from agriculture related business.

Chapter 7. Conclusions and Policy Implications

7.1. Main findings and contributions of the study

Agricultural land reform is enormously important and complex: it fundamentally affects the existing alignments of economic and political power within nations.

Land reform set processes, which are considered to be central in shaping the outcomes of the transition period on the way to market-oriented sustainable agriculture.

Economically successful land reform would affect agricultural production and performance by facilitating the rational use of rural labor and the efficient use of productive inputs. A more efficient agriculture is expected to improve farm incomes, decrease farm costs, lessen the demand for state subsidies, and contribute to capital accumulation for the modernization of society. Improved agricultural performance may also enhance comparative advantage, which in turn may promote foreign trade and integration into the world economy. In this light, the importance of contemporary land reform is crucially important.

This research focuses on the farmers' response to the Land Reform in Ukraine. It aims to offer a farm level evaluation of Agricultural Land Reform in Ukraine, by discussing changes in behavior of private farms in the process of the Land Reform. For this purpose, first the process of the Land Reform implementation was examined. Second, based on the field survey in one area, this paper investigates how private farms changed their operating land size under the current institutional framework on agricultural land. Third, also based on the information collected through the survey, the paper tries to discuss whether new type of farming units were emerging, by examining land use, crop selection, production

cost structure, revenues and income of private farms as well as their attributes.

The theoretical literature on this subject and specifically in the context of Ukraine is inconclusive on several vital questions within the land reform discourse. The study sought to answer one of these questions:

1) Did land reform cause emergence of active market-oriented farming units or did it just deliver the land plots to people who wished to do agriculture for survival. Personal consumption or additional income might have played a role, but the important question is whether the main aim was to do farming or to sell the land obtained free of charge from the State reserve and later privatized, and to reap financial benefits after the Moratorium on selling and purchase of land will be lifted?

In that case, narrowing the attention from the macro level to the micro (farm) level of the land reform in Ukraine, it must be noted that introduction of private ownership of land through land reform implementation definitely played one of the most significant roles in the further creation and development of private farming in Ukraine. This is especially so for those farmers who exercise their rights not only to own the land plot as an asset, but also to actually work on the farm and to develop it through participation in land manipulations, such as land size expansion and land leasing.

The main empirical findings of the study are chapter specific and this section will synthesize them to answer the study's research question.

This study has used empirical findings to show that the current farm level implementation of Agricultural land reform in Ukraine is not making the anticipated impact. The theoretical arguments for this justification suggest the appearance of market-oriented farming units that have been emerging through land size change in the process

of the land reform implementation, even despite the land transaction prohibition (Moratorium on the sale and purchase of agricultural land). The main source of the farm size enlargement was land rent from other landowners; however, findings of the study suggest the existence and beneficial contribution of another source of expansion, which is obtaining the land plot in farms' assets with the help of registered partners on the farm. The defining features of the farmers who could expand the size are recognized as age (generally much younger than those of non-expanding), higher level of education combined with more additional farming experience and training than others. Agricultural output and correspondently agricultural income of expanding farmers was higher in comparison to other farmers due to higher yield per crop, stronger footing in income generating high priced crops and long-term rent contract relationships.

It is interesting to note that other studies (Chirca and Tesliuc, 1999; Erjavec and Juvancic, 1998; Florian and Rusu, 2000) suggest that major problems associated with development of market-oriented farming units are the low levels of education and motivation of the rural workforce. In addition, labor mobility is said to be low because farms are largely controlled by old people, or by those who have other jobs and view the farm as a safety net.

It was also mentioned that farming in Ukraine has acted as a buffer against unemployment (OECD, 1999a). In other words, the agricultural sector has acted as an "employer of last resort" for farmers who had a land plot in possession (Jackman and Pauna, 1997: page 378). This is consistent with the study findings (Chapter 5) that the majority of owner-farmers are involved in farming activities, not leaving the land idle, otherwise the State can seize it.

Considering all mentioned above, the study suggests that implementation of

Agricultural land reform in Ukraine did cause the emergence of active market-oriented farming units (in our case, expanding farmers) on the farm level. However, these farmers are in the minority (15 out 50 farmers in the sample). On the other hand, the majority of the farmers keep the land plot as a viable asset and do farming mostly for personal consumption and for additional income for the family. Cancellation of the Moratorium on selling and purchasing the land most probably will influence their decision to do farming in the future.

The findings suggest that market-oriented farmers have been emerging in Ukraine through land size change in the reform process. There is a new type of farmer who combines farming with agriculture related business activities, developing professional and business skills in order to adjust to market-oriented agriculture. However, land reform in Ukraine is still incomplete and further researches dedicated to the topic are needed.

7.2. Policy implications for the land reform in Ukraine

Land reform processes differ significantly among transition countries. After a decade of farm restructuring, most transition counties already had established a mix of farm organizations, such as private cooperative farms, joint-stock companies and family farms. In contrast, in Ukraine the share of land used by individual farms was less than 20% after the first five years from the start of the land reform (Csaki and Lerman, 2000).

These differences are not accidental: they reflect differences in incentives and the costs of shifting to individual farming, caused by both policies and structural conditions. The key issue observed in Ukraine was that even though farms in general have undergone effective restructuring, including both management reform and operation adjustment, the

collective framework, or mindset, had been preserved in most of its traditional functions.

Furthermore, without considering the implications and consequences of present policy directions, Ukraine might face the very real possibility of not being able to develop an effective individual sector, which creates uncertainty about the future state of agricultural development in the country.

In this light, evidence from several previous studies, including (Csaki and Lerman, 2000; Lerman, 1999), support this thesis in pointing to the fact that establishment of defined property rights in the process of the land reform implementation did stimulate growth and development of private sector in Ukraine. Moreover, some private farms headed towards market-oriented directions, could adjust and increased their land size. However, the lack of adequate policies on land ownership poses serious constraints for development of private farming in Ukraine. First of all, land ownership in Ukraine is limited by a moratorium on land sales, while land ownership registration is incomplete. Hence, there is no efficiently operating land market, while deficiencies in land registration limits access to credit, as land cannot be used for collateral. Secondly, poor infrastructure and marketing systems inflate agricultural commodities' costs. Farmers receive much less than world market prices due to export taxes. Certification requirements and other trade procedures are complicated and add costs to trade across borders. Furthermore, there is a serious lack of advanced agricultural machinery and modern equipped storage facilities, putting pressure on agricultural producers. Lack of pricing according to grading does not encourage producers to improve quality of their products as well.

The theoretical arguments for this justification suggest the need for policy review and further research by academics, followed by the effective implementation and problem resolution by the state.

Land reform is impacted by many favorable and unfavorable factors. The unsystematic implementation in one direction often offsets gains achieved in another. The slow pace of meeting targets in the land reform on the farm level can be attributed to three main reasons. First of all, the extreme complexity of tasks involved in resolving deeply rooted structural issues covers material-technical, technological, techno-economic, socio-economic, economic-legal and socio-psychological aspects. Second, perceptions formed by the past command-administrative economic system are not susceptible to control by the state. Third, miscalculations in formulating the strategy and tactics of the reform, and underestimation of the social factors, rural infrastructure and environmental factors in land tenure are considered to be very important constraints.

7.3. Limitations of the study and directions for future research

The study has offered an evaluative perspective on a farm level implementation of Agricultural land reform in Ukraine, and was conducted through sampling farm households. Methodologically, the study was of a qualitative nature and as a result the findings may not be generalized due to the limited number of participants that were used. However, the study provides in-depth empirical data from the respondents' point of view to contribute to the literature on land reform.

The scale of this debate is extensive and multifaceted. There have been a number of studies conducted, from a variety of different philosophical and political/policy perspectives, concerning Ukrainian land reform and farm reorganization. The dominant voices, often in English, have been attached to international aid agencies providing concrete assistance to and advocating for land privatization and agricultural liberalization.

This mostly concerns agricultural analyses produced by the World Bank, the Food and Agricultural Organization (FAO), and the U.S. Agency for International Development (USAID) (see Lerman et al 1994, 2002, 2007; World Bank 2004; Rolfes 2003; Roth and Valetta 2006; Demyanenko 2005; Meyers 2005)

However, to generate achievable policy strategies and development targets with regard to the land reform implementation in general and with regard to issues connected to land ownership rights, land market development, land cadaster, land moratorium and others, effecting private sector development in particular, there is a need for more case studies at the local (farm) level in order to research remaining issues involved in the land reform process implementation in Ukraine.

And the last, but not the least, the findings of this paper may not be generalized to the whole country because of the relatively few number in one particular area. However, this research serves as a springboard for further studies dedicated to the ongoing process of the land reform in Ukraine and in-depth empirical data will be definitely needed for the progress of research on Land Reform.

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