Benchmarking the Dutch and Ukrainian dairy farms with regard to financial and managerial aspects

by

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Wageningen – 2011

Acknowledgements

First and foremost I express my sincere gratitude to my supervisor Dr. Miranda Meuwissen for her support, guidance and patient attitude throughout the whole project.

Writing of this thesis would not have been possible without financial assistance of the Anne van den Ban Foundation and Milkiland N.V. company. I would like to express my special gratitude to them for their understanding and considerable financial support.

I would like to thank to Inna Ilienko, Jappie Rijpma and Michel de Haan for their goodwill and cooperation. Interviews with these people and their business contacts played an essential role in the execution of this project. I'm grateful to all the farmers and farm managers who participated in the study for their willingness to cooperate, openness and understanding.

The last, but far not the least, I would like to thank to my dear parents and closest friends for their empathy and emotional support.

Summary

Background

Benchmarking in dairy is a process by which a farm business can evaluate and compare itself in chosen areas to an external reference point for the purpose of monitoring and improvement. The Netherlands and Ukraine are both strategically important players in the dairy world nowadays. The Netherlands was the only country, which exceeded its milk quota in 2009. In contrast, Ukraine has fallen with the number of cows and milk production volumes to less than half after 1992. In conditions of a rapid growth of the global milk demand (15 mln tones per year) it is especially important to set up efficient dairy production first of all in countries, which have high potential. Therefore, execution of benchmarking analysis of the Dutch versus Ukrainian dairy farms' performances with regard to financial and managerial aspects is important in sense of investigating performance gaps and finding rooms for improvement in both countries, but especially in Ukraine. The objectives of the study were to identify the performance indicators of dairy farming with regard to financial and managerial aspects and to measure the performance of the Dutch and Ukrainian dairy farms with respect to identified indicators.

Materials and methods

First of all, the list of relevant indicators was identified via literature review and interviews with experts. Afterwards five dairy farms from provinces Flevoland, Drenthe, Friesland and Groningen of the Netherlands and six dairy farms from Chernihiv region of Ukraine were interviewed for quantification of selected indicators. The focus of the study was made on typical farms of both countries without any investment or management from abroad.

Results

Seven financial and ten managerial indicators were selected within the study. Financial indicators included: Break-even point (BEP), Farm income per 1kg of milk, Farm income per cow, Cost structure, Asset structure, Return on Assets, and Cost of expanding a farm with 100 cows. Selected managerial indicators were distributed into three groups: productivity, feed management and herd management. Milk yield per cow/year, Milk yield per ha/year, and Milk yield per labour hours worked/year were attributed to productivity measures group while Feed efficiency and Feed crops yield per ha went to the feed management group. Identified herd management indicators included: Herd replacement rate, Age at first calving, Calving interval, Culling rate and Lactation period. In general the results of the study showed an excellence of the Dutch dairy farms over Ukrainian ones with regard to all managerial aspects and most of financial aspects. Farms in the Netherlands were more productive with respect to growing feed

and milk yield per cow. With regard to labour and land use, Dutch dairy farms produced six times more kilograms of milk per hectare of cultivated area and almost six times more milk per labour hour. The study also indicated better herd management at the Dutch dairy farms. However, Ukrainian dairy farms had €0.15 lower sum of fixed and variable costs (break-even point) per kilogram of milk and no debt capital (see Table I).

Recommendations

Although small sample size and existence of variance in farms' results could be partial limitations of the current study, the recommendations for improvement of both Dutch and Ukrainian dairy farms can be derived. It was shown that in order to grow and reach the level of Dutch dairy farms, Ukrainian farm managers should, first of all, change the way of thinking and become open to information. "It's still ok" approach has to be abandoned. Besides, the following recommendations were derived for the Ukrainian dairy farms:

- farm managers are advised to restructure the business and considerably reduce the number of employees saving the best ones and improving their competency;
- farms which are really willing to milk cows are recommended to get rid of other activities so that they become specialized;
- more attention has to be paid to the increase in productivity of feed production. Taking into account the quality of Ukrainian soil, it's hardly satisfactory to have lower maize yields than Dutch farmers have;
- finally, efficient milking systems are recommended to be installed. It could save labour, improve milk quality and, therefore, contribute to the increase in net income.

With regard to Dutch dairy farmers, they are recommended to decrease the amount of debt capital. High share of debt capital (on average 10% of Dutch farms' cost structure is occupied by interest expense) may become a considerable threat under uncertain market conditions in the near future, taking into account that milk price is forecasted to decline. Those dairy farmers who have already invested in new capacities for 2015 are recommended to (re)execute investment (NPV) analysis taking into account forecasted milk price decline. Besides, in 2015 new environmental constraints are expected to appear in dairy farming sector. It might be important for the farmers who are planning to expand to pay attention on such constrains and make proper calculations in order to investigate if they are eligible for higher volumes of production before investing in new capacities.

Table I. A summary of the quantified financial and managerial performance indicators

Indicator	Average value*	
	The Netherlands	**Ukraine**
General		
Herd size	148.8	827
Cultivated area, ha	85.4	1912
Number of workers	2.2	101
Financial		
Break-even point (BEP), cents/kg milk	40.3	**25.1**
Farm income, EUR/kg milk	**0.022**	-0.042
Farm income per cow, EUR/cow	**138.4**	-213.3
Cost structure		
Bought feed cost, %	19.6	17.1
Cost of growing feed, %	2.9	18.5
Animal health and breeding, %	7.1	2.9
Paid labour, %	6.3	24.5
Contract labour, %	10.1	5.4
Fuel, energy and water, %	3.9	12.0
Maintenance of machinery and buildings, %	10.6	4.8
Land rent, %	4.1	5.3
Depreciation, %	18.3	9.3
Interest, %	10.3	0.0
Other costs, %	7.0	0.2
Asset structure		
Market value of the land, %	62.7	24.8
Book value of buildings, %	19.3	17.4
Book value of machinery, tools and installations, %	4.4	12.3
Market value of livestock, %	8.2	29.3
Book value of inventory, %	0.9	2
Book value of other assets, %	4.4	14
Return-on-assets (ROA), %	**1.44**	0
Cost of expanding per 100 cows, x1000 EUR	1,968-3,575	**375-636**
Managerial		
Milk yield per cow/year, kg	**7854**	5052.8
Milk yield per ha/year, tones	**14.7**	2.5
Milk yield per labour hour/year, kg	**160.4**	27.8
Feed efficiency, kg DM/kg milk yield	**1.04**	n/a
Feed crops yield (fodder maize), tones DM/ha	**15.5**	11.8
Herd replacement rate, %	30.4	39.5
Age at first calving, months	**25.6**	27.8
Calving interval, days	409	403
Culling rate, %	15.8	32.1
Lactation period, days	**351**	338

* Average values of studied Dutch and Ukrainian farms are presented

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CHAPTER I

INTRODUCTION

1.1. General background and problem statement

International benchmarking of diverse activity aspects within any business units enables them to improve, while looking at others. Dairy business is not an exception. According to DairyBase[1] (2010), benchmarking in dairy is a process by which a farm business can evaluate and compare itself in chosen areas to an external reference point for the purpose of monitoring and improvement. Using benchmarks can be a way to identify areas of strength and diagnosing problems in performance, as well as establishing good practice for reviewing progress (or not).

The Netherlands and Ukraine are both strategically important players in the dairy world nowadays. In spite of the relatively small country size, the Netherlands is one of the world's largest dairy exporters. Two thirds of its total production goes to foreign markets (Ministry of Agriculture, Nature Management and Fisheries, 2000). Dairy farming is the most important sub-sector of Dutch agriculture. Milk alone accounts for approximately 30% of the total added value of Dutch agriculture (Dutch Dairy Board, 2010). With regard to Ukraine, the Ukrainian Agribusiness Club Association states that dairy farming is going to be one of the most attractive sectors for investment in Ukrainian agriculture during the next five years (Lissitsa, 2010). Already today Ukraine is top fifth cheese exporter in the world, top sixth by export of fluid milk and non-fat dry milk (FAS USDA, 2010). In spite of such positive statistics, the country is just recovering its dairy farming sector. After being in the list of top 7 countries (Ukraine, USA, Russia, India, Germany, France and Brazil) which were producing more than fifty percent of world's milk in early 90-th (Mauser, 1999), Ukraine has fallen with the number of cows to less than half, following the political changes in 1992 (Ilienko, 2009). Nowadays, the process of transition from small household milk production to large-scale dairy farming is taking place in Ukraine.

[1] DairyBase is a web based benchmarking software tool that enables accountants and consultants to analyse farm physical information and financial statements. It is operated by DairyNZ (organization of dairy farmers of New Zealand) and supported by the New Zealand Institute of Chartered Accountants and the New Zealand Institute of Primary Industry Management.

According to FAO (2010), global milk demand is going to increase by 15 mln tones per year. In order to supply this quantity of milk, countries have to expand their dairy farmings and/or to improve their efficiencies. In spite of scarce land resources, the Netherlands is one of the leading European dairy producers and the only country, which produced (and exceeded) its milk quota in 2009. It might mean that the country is ready to increase milk production even more in the near future. As past developments showed, Ukraine has an enormous potential for both expanding dairy farming and improving its efficiency. However, proper policy, knowledge and management have to be implemented. Therefore, benchmarking comparison of the Dutch versus Ukrainian dairy farms' performances with regard to financial and managerial aspects may help to identify performance gaps and find rooms for improvement in both countries, but especially in Ukraine.

1.2. Objective of the study

The main objective of the study is to execute a benchmark analysis of the Dutch versus Ukrainian dairy farms with regard to financial and managerial aspects. The specific objectives of the study are:

1. to identify the performance indicators of dairy farming with regard to financial and managerial aspects;
2. to measure the performance of the Dutch and Ukrainian dairy farms with respect to identified indicators;

1.3. Outline of the thesis

The thesis is organized in six chapters. Chapter two is the overview of the dairy farming sectors in the Netherlands and Ukraine with the emphasis on key issues and concerns. Chapter three provides a literature review on benchmarking practices in agriculture with the focus on dairy farming. Additionally, the usage of financial and managerial indicators is examined in this chapter. Chapter four informs about current approach and methodology of the study. It tells about the sample, selection of indicators and their quantification. Results of the study are presented in the fifth chapter. Chapter six contains main conclusions and discussion.

CHAPTER II

DAIRY FARMING IN THE NETHERLANDS AND UKRAINE

2.1. General overview of the sector

The Netherlands cover the area of 3.5 million hectares. Two million hectares of the country's area is farmland. Fifty percent of the farmland is pasture devoted almost entirely to dairy farming (Ministry of Agriculture, Nature Management and Fisheries, 2000). On the 31-st of March, 2010 there were around 19,500 dairy farms (2% less than in 2009) which together held a total milk quota of 11.5 thousand million kg (Dutch Dairy Board, 2010). During the 2005-2008, annual growth rate of milk production per farm in the Netherlands was 5.9% what is world top 4-th result after South-Africa, Denmark and USA. At the same time, the percentage of dairy farms that stopped milking was low in comparison to the above mentioned countries (4.1% versus 7.2%, 8.8%, 4.1% respectively) (Burchardi, 2009). The continued fall in the number of quota holders with gently rising milk production reflects the process of an increase in the scale of dairy farming in the Netherlands (Dutch Dairy Board, 2010). One third of the dairy farms are responsible for two thirds of the milk produced. More than 80% of the dairy farms (which are mostly family farms) are specialist farms. Expertise and experience are being passed on from generation to generation. Cooperatives, which were established in the Netherlands in the end of 19-th century, involve joint responsibility of farmers and processors, which ensures proper quality control (Personal communication A). Therefore, such approach provides qualitative functioning of country's dairy sector.

Milk production in Ukraine counts for 12% of its gross agricultural production. In 2009, 11.6 mln tones of milk were produced in Ukraine of which 81% by the private households. This volume is almost twice less than the one 19 years ago when the USSR collapsed (22.4 mln tones in 1991). The number of cows during this period has decreased from 8378.2 thousand to 2856.3 thousand (SSCU, 2010). Such a rapid decrease in livestock numbers and milk production during the last 19 years has specific reasons, where the main one is that big farms were simply getting rid of the business as it was not profitable (Ilienko, 2009). Today, Ukraine is top 6-th country in

the world by the number of dairy farms (including private households) (Burchardi, 2009). The productivity, however, (average value in 2009 was 4,050 kg/cow per year according to FAOSTAT) is very low when compared to developed countries (UCAB, 2008). The past researches of Ilienko (2008) have shown that technical efficiency of Ukrainian dairy farms on average is 36.6%. It means that on the level of dairy farming the efficiency may be increased by more than 60% without attracting additional resources. The same study shows that profitability of dairy farms of a large scale (over 1,000 livestock number) is much higher than small-scale farms' one.

The comparison of main characterising figures of the Dutch and Ukrainian dairy farming is provided in Table 2.1.

Table 2.1. Main parameters of the Dutch and Ukrainian dairy farming

Parameter	Ukraine		The Netherlands	
	Value	Source	Value	Source
Farmland, mln ha	41.6	SCULR*	2	Ministry of Agriculture
Number of dairy farms in 2009, x1000	2,300	IFCN**	19.5	PZ****
Number of cows in 2009, x1000	2,856	SSCU***	1,489	SN*****
Milk production in 2009, x1000 kg	11,603.60	SSCU	11,712.90	PZ
Average milk yield, kg/cow	4,050	FAOSTAT	7,342	FAOSTAT

* State Committee of Ukraine for Land Resources
** International Farm Comparison Network
*** State Statistic Committee of Ukraine
**** Productschap Zuivel – Dutch Dairy Board
***** Statistics Netherlands

2.2. Key issues and concerns

i. The Netherlands

The 2003 Luxembourg Agreement on reform of the Common Agricultural Policy (CAP) implies that the *quota system will be abandoned* on 1 April 2015 (Jongeneel, R. et al. (LEI), 2010). As it was already mentioned before, the Netherlands was the only country, which exceeded its milk quota in 2009. Thus, after the 2015 the tendency of scale increasing in (not only) Dutch dairy farming is expected to be enhanced. It is projected that, after quota is abolished in 2015, the milk

production will expand in the Netherlands with 11% (Jongeneel, R. et al. (LEI), 2010). Except of scale increase in Dutch dairy farming, the abolishment of quota system may lead to the rise of land prices and appearance of new constraints.

With regard to price levels, taking into account the *implementation of the new WTO agreement* (on decreasing import duties for dairy products), which may take place in the near future, milk price is expected to decline by 8% (Jongeneel, R. et al. (LEI), 2010).

ii. Ukraine

The *quality of raw milk* is one of the major problems in the Ukrainian dairy sector (UCAB, 2008). Around 80% of raw milk is being produced by private households during recent years (SSCU, 2010). According to the Ukrainian grading system, the milk from households is usually graded with the "second grade" (Plate count 30^{o}C ('000 per ml) ≤ 3000; Somatic cell count ('000 per ml) ≤ 800 (Nivievskyi, 2008)). In the EU and the USA, milk of such quality is not used for food production at all (UCAB, 2008). The issues of raw milk quality and harmonization of existing Ukrainian milk quality standards with the EU ones are of the core priority in the Ukraine – EU free trade area establishing negotiation process (Lissitsa, 2010).

There used to be a special regime of the *VAT taxation* for milk producers and processors in Ukraine (UCAB, 2008). As article 6.2.6 of the Law of Ukraine "On the value added tax" says: "VAT equals zero for producers of meat (in live weight) and milk, which sell their products directly to processing enterprises" (Law of Ukraine #168/97-вр, 2010). For the year 2010 the validity of article 11.21 of the same Law was prolonged (EBA, 2010). It says that the sum of milk processor's VAT tax has to be paid as a subsidy directly to the agricultural producers, which have been providing raw milk for processing (Law of Ukraine #168/97-вр, 2010). However, starting from January 2011 this subsidy (processor's VAT) is supposed to be paid to a special fund of state budget and redistributed as equal payments (to both, households and farms) per 1 cow (regardless if the milk was supplied for processing or not). Such a system significantly reduces state support of farms as considerable part of subsidy goes to households with don't provide milk for processing.

Milk production in Ukraine during recent years is characterised by a considerable *seasonal pattern*. This illustrates the lack of managerial skills on farms (UCAB, 2008). Another reason for the fluctuations might be that small farmers (householders) don't possess sufficient financial resources in order to ensure proper herd management, and, what could be even more important,

do not consider milk production as a main income source. Seasonality in Ukrainian dairy farming has a negative impact on the sector by causing considerable income instability for larger farmers, deficit of raw milk for processors, and price volatility for consumers across the year (Personal communication B).

CHAPTER III

BENCHMARKING IN AGRIBUSINESS: FOCUS ON DAIRY FARMING

3.1. General introduction on benchmarking

Feigenbaum (1951) considers benchmarking as the process of continuously measuring and comparing one's business processes versus leading organizations' ones to obtain information that could help the organization to implement improvements. Identification of critical performance measures and their comparison with similar performance measures of "best in class" organizations, he argues, is at the heart of benchmarking. The philosophy of benchmarking is based on ability to recognize one's disadvantages and acknowledge someone's advantages, learn how the latter ones have been achieved and then implement corresponding practices in own business (APQC, 1996). Such an attitude has to be inculcated in the organization. Only in this case the organization can fully benefit from benchmarking. However, the executives tend not to talk about what they are doing in their respective organizations and businesses end up investing many times over in the same things and the successes are not shared (Bhutta and Huq, 1999). As Maire (2002) believes, benchmarking is only interesting for a company if it enables the firm to foresee a considerable improvement in its performance.

According to Bhutta and Huq (1999), the main problem with benchmarking is the focus on data, and not the processes used to make that data. However, authors admit, such system is changing as "process-based benchmarking" becomes more widespread as opposed to "problem-based benchmarking". The initial focus on data is being replaced by focus on the process and how it works and what makes it work (Bhutta and Huq, 1999). As Punniyamoorthy and Murali (2008) cite Porter (1996): "Ultimately, all differences between companies in cost or price derive from hundreds of activities required to create, produce, sell and deliver their products or services [. . .] differentiation arises from both the choice of the activities and how they are performed. Camp (1989) argues that the purpose of collecting data in a benchmarking study is more than just

understanding which companies are excelling at certain processes and to what extent. This does not answer the question of how the success is achieved, so the data collection should be focused on understanding the "enablers" of the best-practice performance. Bhutta and Huq (1999) conclude that by understanding variations in different companies' processes along with enablers of superior performance, one is able to identify strategies for improvement. Ahmed and Rafiq (1998) underline that the central essence of benchmarking is the learning how to improve activities, processes and management. The idea that for competitiveness improvement we should understand more about the processes which provide the outcomes is a larger and deeper target involving performance, processes and their interaction (Kyrö, 2003). Thus, the key requirement of benchmarking is to undertake formal measurement of measurable indicators and to link the results of the measurement to current practice, and then to identify mechanisms of improving performance. It is remarkable that benchmarking approaches have developed from initial cost-focused comparative analysis to process-orientated benchmarking (Manning et al., 2008).

3.2. Definition of indicators

i. Managerial indicators

Often in the literature it can be observed that the same indicators are categorized differently. This might take place because there is no uniform definition of what is, for instance, a physical indicator, and what is a technical or a managerial one. Wilson et al. (2004) define "performance indicator" in the agricultural dimension as a measure of physical and/or financial whole farm or individual enterprise performance. Physical performance indicators usually relate to production outcomes or yields, physical inputs, productivity (yield per unit, and input per unit), and production efficiency. All listed indicators are, however, facts which do not arise by themselves, but are consequences of certain actions. Therefore, it is considered that the category of "managerial indicators" includes all the physical indicators, which can be influenced by the manager (farmer).

ii. Financial indicators

According to Kay (2008), financial indicators estimate the solvency and liquidity of the business and help to identify weaknesses in the structure of assets and liabilities. In addition, "financial" are considered indicators, which are related to profitability (prime cost, break-even point, net profit etc.) measurements.

3.3. Benchmarking practices in crop production and livestock sectors

Benchmarking in the agricultural context has been described by Ronan and Cleary (2000), as: "[…] an enterprise or activity-based approach that focuses on the physical/technical processes used by a farmer to enact his enterprise plan and the consequences of those processes in terms of unit revenue and costs, enterprise efficiency and enterprise profitability". They suggested that comparative farm business analysis was based on aggregate measures of farm physical and financial performance, such as yield, efficiency, gross margins and farm profit. They argued that this was a different process to activity-based benchmarking (Manning et al., 2008). Wilson et al. (2004) suggest that through benchmarking, a farm manager is able to:

- measure current physical, ecosystem, social and financial performance;
- identify areas of performance where improvement needs to be made, and;
- identify drivers and therefore changes which can be made to current husbandry and business management processes and practices in order to improve enterprise and/or whole farm performance.

Ronan and Cleary (2000) believe that getting the right balance between people, processes and data is the key to a successful farm benchmarking activity. In order to strengthen theoretical knowledge, we'll take a look on some practices of benchmarking in diverse agricultural sectors starting with crop production.

i. Benchmarking in crop production

The literature review on benchmarking in crop production has shown that there is no single goal, which scientists pursue when conducting benchmarking analysis. However, majority of them focus on cost comparison. We can observe this in studies of Zimmer and Krug (2009), Langemeier (2000), and Pleßmann et al. (2005). Zimmer and Krug (2009) mention that in cash crops, the analysis of typical farms and their cost of production is based on a detailed description of the diverse production systems which are defined by key parameters such as the tillage regime, rotations and the crop management. In the research of Langemeier (2000), costs of production are divided into three categories: labour cost, purchased input cost, and capital cost. At the same time, the study of Pleßmann et al. (2005) is focused not only on comparison of costs but also on cost structure comparison between countries. The methodologies, used in above mentioned studies were different only with regard to data sources and data collection approaches. In contrast to cost benchmarking, the research of Malana and Malano (2006) was aimed at international benchmarking of productivity performance of wheat growing areas. The data envelopment analysis (DEA) was employed as a tool in this study. The list of indicators

used in above mentioned studies is presented in Table 3.1. From the discussed studies we can conclude that benchmarking in the area of crop production had mostly an economical character with a focus on costs comparison.

Table 3.1. The list of indicators, used in crop production benchmarking

Author (country, year)	Agricultural sector	Indicators
Malana and Malano (India vs. Pakistan, 2006)	Wheat production	irrigation water (m^3 ha^{-1}) fertiliser (kg ha^{-1}) seed (kg ha^{-1}) wheat yield (kg ha^{-1})
Zimmer and Krug (21 countries globally, 2009)	Rapeseed production	Cost (Cash cost, Depreciation, Opportunity cost) Gross revenue Gross margin (rapeseed) Gross margin (alternative crop) Break-even price (rapeseed) Price (alternative crop) Current price ratio Break-even price ratio
Langemeier (USA, 2000)	Alfalfa, corn, grain sorghum, soybeans, and wheat production	Labour cost Purchased input cost Capital cost
Pleßmann et al. (14 countries globally, 2005)	Soybeans, oilseed rape, sunflower and (two farms) mustard	Fertiliser costs Plant protection and seed costs Costs of buildings and machinery Cost of land rent Cost of labour

ii. Benchmarking in livestock production

Effective livestock benchmarking requires a detailed understanding of the undertaken processes (Manning et al., 2008). The indicators which are being selected for the benchmarking analysis in livestock sector have to reflect all important stages of primary production.

The performance indicators of the poultry meat production sector were assessed and collated in the study of Manning et al. (2008). According to the author, the list of indicators for benchmarking was developed to ensure that:

- they could be easily communicated to poultry growers;
- they utilised as many traditional indicators as possible which are familiar to the growers;
- performance could be readily identified if possible within the crop cycle when there was time to modify production methods; and
- the statistical analysis involved in the QA model could be undertaken by growers using a standard computer spreadsheet.

The indicators were divided into 4 groups: traditional performance indicators, traditional cost driven indicators, traditional intra-crop performance indicators and additional performance indicators. Whereas the study of Manning et al. (2008) included a lot of aspects into the research, other reviewed studies (Langemeier, 2000; Deblitz et al., 2005) were mostly focused on cost benchmarking. Langemeier (2000), for instance, has executed a study with the objective of computing cost of production benchmarks for livestock enterprises in Kansas (USA). Livestock enterprises included backgrounding, backgrounding/fini-shing, beef cows, dairy, farrow-to-

finish, and contract turkeys. An extensive cost structure has been used in the research. In contrast to Langemeier's study, Deblitz et al. (2005) has executed international benchmarking of beef production. The data from the IFCN-Beef (International Farm Comparison Network), which includes 14 participating countries, has been used. Farm data for comparison was based on typical farms instead of statistical averages or individual farm data. Beside economic performance indicators, the comparison included also physical indicators among which were: main feed sources, age at start (days), finishing period (days), daily weight gain (g/day), final weight (kg LW) and dressing percentage (%) (Deblitz et al., 2005).

3.4. Benchmarking practices in dairy farming sector

Both, financial and managerial aspects of dairy farming are very broad and include a lot of indicators. Agricultural experts and scientists recognize that differences in management result in different financial performance of the dairy farms (Ford and Shonkwiler, 1994). According to the authors, dairy farms require broad management in coping with the dairy herd, the crop program, and farm finances issues. However, they underline, "there is no clear and unified approach on which variables represent management or whether they accurately measure ability in herd, crop, and financial management" (Ford and Shonkwiler, 1994). Thus, we will try to identify relevant indicators for both, financial and managerial aspects of dairy farming, by reviewing past practices in the literature.

i. Financial aspects in dairy farming

Barry (2000) considers meaningfulness and manageability as two main criteria when selecting measures to reflect firm's profitability, liquidity, efficiency, and risk. According to the author, meaningfulness refers to "how well the measure reflects the stipulated goals" and manageability deals with ease of computation and comprehension. Barry (2000) also defines the following primary tools for the financial analysis of farm business: 1) comparative financial statements; 2) index-number trend series; 3) common size financial statements; and 4) specific financial performance measures. Amongst all listed he distinguishes common size financial statements approach as a suitable one for proper comparisons between farms. This might be the case, because, in contrast to other approaches, the common size financial statements tool uses relative values instead of absolute ones. When showing balance sheet, for instance, every item of it is divided by the total assets (Barry, 2000). In other words, by using this method with the balance sheet we assess the asset structure of the farm. Today, the same measure is used by the International Farm Comparison Network (IFCN) as one of the financial indicators for international dairy farms benchmarking. The land, livestock, cooperative shares and quota are

being calculated by market price, machinery and buildings by book values. Another financial indicator used is return on investment (ROI). The authors say that the asset structure and the return on investment analysis help to decide where one can invest profitably in dairy farming. The profitability measures used by IFCN include farm income (returns (excl. decoupled payments) minus costs from P&L account), entrepreneur's profit (returns (excl. decoupled payments) minus full economic costs (costs from P&L account + opportunity costs), and return to labour (entrepreneur's profit plus labour costs divided by total labour input) (Hemme et al., 2009).

The European Dairy Farmers (EDF) approach of cost of production comparison uses very similar indicators (see Table 3.2.), but the emphasis is made on the break-even point measurement. EDF methodology also allows researching the cost structure very precisely (EDF Farmbook, 2009).

The study of Huirne et al. (1997), aimed at identifying the critical success factors for the dairy farmers resulted in the following list of financial indicators: net farm result, margin per 100 kg of milk, fixed and variable costs, equity, net profit. Assessing the competitiveness of the milk production in the Central and Eastern European Countries (CEEC) became the subject of the study of Ramanovich and Hemme (2006). Authors mention that in order to be competitive, an enterprise has to make use of at least one of the following strategies: cost leadership and product differentiation. For the milk as a homogenous product, the cost leadership strategy is the only applicable. Therefore, the indicators related to costs have been used for the benchmarking (see Table 3.2.). The focus on costs is also dominant in the study of Swensson and Herlin (2005) investigating the influence of the biological and managerial factors on economic performance of dairy production. The financial indicators used by Jackson-Smith et al. (2004) were based on the Farm Financial Standards Council (FFSC) definitions and included: gross farm sales, net farm income, net farm income per cow, profit margin (NFI/gross sales), net worth, rate of return on assets (ROA), rate of return on equity (ROE).

According to Barry (2000), financial measures can be compared with other firms to assess peer performance. However, the author mentions, financial measures are only indicators or signals of the firm's performance. They may indicate the symptoms of a problem, but not the underlying reason or the solution (Barry, 2000).

ii. Managerial aspects in dairy farming

Gloy and LaDue (2003) call the "comparing annual farm profitability and financial efficiency measures to other farms" benchmarking, but of significance is the fact that the initial Xerox benchmarking was based on comparison of the processes used to manufacture a product, rather than a comparison of whole business' financial indicators (Ronan and Cleary, 2000). Ronan and Cleary (2000) also argue that "benchmarking is essentially about converting process data to meaningful process information on which process knowledge and wisdom can be developed". Every core area must be operated correctly if a dairy business is willing to succeed (Khade and Metlen, 1996).

The association between specified management factors and net income of the dairy farm was investigated by Speicher and Lassiter already in 1965. Fourteen factors were significant in explaining variations in net income. Factors related to size, cropping practices, and dairy herd operation accounted for 28, 25 and 29% of the explained variation respectively (see the list of factors in Table 3.2.). Results of this investigation indicate that for the purposes of analysis and management of dairy farming three-phase program should be considered: size of operation, cropping program, and dairy herd operation, which were of approximately equal importance in determining the level of net income.

Three groups of factors, which all are central aspects of the daily farm work, were hypothesized by Hansson and Ohlmer (2008) to be part of the operational managerial practices at a dairy farm: animal health, breeding, and feeding practices. All these groups consist of factors that can (if not be totally changed) at least be changed and improved in the daily work. They are: age at the first calving, calving interval, length of dry period, breed percentage, breeds, analyses of forage and fodder grain, feed ration, mix of forage (see Table 3.2.). When assessing the determinants of dairy farming competitiveness in Ukraine, Nivievskyi and von Cramon-Taubadel (2008), apart from social cost benefit ratio and subsidies factor, use such managerial indicators as: herd size, labour intensity, productivity (milk yield per cow per year) and "feed" (tillage area per cow). Khade and Metlen (1996) have performed a study on applying benchmarking to the dairy industry with focus on calving and calf raising processes. The methodology used is quite unique and unusual in sense that study was based on observations. "Yes/No" approach has been used. The farm got "Yes" if the practice was taking place and "No" if not. The results of the study were written down in a descriptive way. There was no quantification of indicators. The list of indicators is provided in Table 3.2. In contrast, the methodology of EDF gives only quantitative

values of some managerial aspects (see Table 3.2. for the list of indicators) and doesn't say anything about how operations and processes are being managed. Within the IFCN network the management level is being measured by local representatives. The assessment is being based on observations and experts' opinions.

Table 3.2. Financial and managerial indicators in dairy farming

Aspect	*Aim of the study*	*Author(s) (country, year)*	*Indicators (factors)*
Financial	Quantifying the contribution of the farm financial trainings to the financial performance of dairy farms	Jackson-Smith, Trechter, Splett (Wisconsin, USA, 2004)	Gross farm sales Net farm income Net farm income per cow Profit margin (NFI/gross sales) Net worth Rate of return on assets (ROA) Rate of return on equity (ROE)
	Determining dairy farmers' critical success factors	Huirne, Harsh, Dijkhuizen (USA vs. The Netherlands, 1997)	Net farm result Margin per 100 kg of milk Fixed and variable costs Equity Net profit
	Milk cost comparison of the European dairy farmers (benchmarking)	EDF (17 European countries, 2009)	Farm income, EUR per 100kg of ECM Net profit (excl. decoupled payments), EUR per 100kg of ECM Net profit (incl. decoupled payments), EUR per 100kg of ECM Breakeven point, EUR/100 kg of ECM Milk cost structure Average assets
	The relationship between the adoption of financial management practices and farm profitability	Gloy and LaDue (New York, USA, 2003)	Net farm income with appreciation Net farm income without appreciation ROA with appreciation ROA without appreciation Percent equity Projected cash flow coverage ratio Interest expense
	"Create a better understanding of milk production worldwide" (benchmarking)	Hemme et al. (IFCN) (2009)	Farm income Entrepreneur's profit Return to labour ROI Asset structure
	Assessing the competitiveness of milk production in Central and Eastern European countries (benchmarking)	Ramanovich and Hemme (12 CEEC countries, 2006)	Labour costs per 100 kg milk, $ Land costs per 100 kg milk, $ Level of land rents, $/ha Costs of milk production (Quota costs, Opportunity cost, Costs from P&L account)
	Researching influence of biological and management factors on economic performance in dairy production	Swensson and Herlin (Sweden, 2005)	Net profit Milk Price Total feed cost Labour cost Variable costs Total costs

Table 3.2.(continued) Financial and managerial indicators in dairy farming

Managerial	Investigating association between specified management factors and net income of the dairy farm	Speicher and Lassiter (Michigan, USA, 1965)	Number of cows Number of tillable acres Crop value/tillable acre Soil value rating; Percent cash crops Machinery expense/tillable acre Percent rented land Tillable acres/cow Milk solid/man; Milk solid/cow; Milk price/CWT Milk production distribution Dairy cattle sales/cow Livestock income/$100 feed
	Assessing the competitiveness of milk production in Central and Eastern European countries (benchmarking)	Ramanovich and Hemme (12 CEEC countries, 2006)	Milk yield, 1000 kg per cow Average wages on farm, $/hour Labour productivity, kg milk/hour Land productivity, 1000kg milk per ha
	Researching influence of biological and management factors on economic performance in dairy production	Swensson and Herlin (Sweden, 2005)	Herd size Age at calving, months Calving interval, months % of replacement Kg ECM Cell count Milk not delivered, kg milk
	Assessing the determinants of dairy farming competitiveness in Ukraine	Nivievskyi and von Cramon-Taubadel (Ukraine, 2008)	Herd size Lbour intensity Productivity (milk yield per cow) Feed (land cultivated per cow)
	Applying benchmarking to the dairy industry with focus on calving and calf raising processes (benchmarking)	Khade and Metlen (USA, 1996)	Mortality rate Sire selection Calving programme Feeding programme Confinement Sanitation Sanitation of equipment Health programme Employee training Mistake proofing
	Determining dairy farmers' critical success factors	Huirne, Harsh, Dijkhuizen (USA vs. The Netherlands, 1997)	*Milk production* Control of feed costs Milk production per cow Balancing feeding rations Care for youngstock Milk quality *Feed and roughage production* Pasture quality Quality home produced roughage Timely mowing/harvesting Planning cows using pasture Fertilizer per ha
	Milk cost comparison of the European dairy farmers (benchmarking)	EDF (17 European countries, 2009)	Herd size Land productivity, kg ECM/ha Labour productivity, kg ECM/labour unit Labour input, hours/cow Livestock concentration, cows/ha Use of stalls, % First calving, months Calving interval, days Milk yield (per whole period), kg ECM/cow Cull rate, % Calves death rate, %

3.5. Observations on reviewed benchmarking practices

The most evident fact about benchmarking in agribusiness is that *there hasn't been done a lot in benchmarking in agribusiness*. For instance, only two(!) articles which are related to agriculture were published in the journal "Benchmarking: An International Journal" during 2006-2010 (it is remarkable that one of those two is about Ukrainian beer companies). Apparently, this technique is just starting to penetrate into the roots of agribusiness. This can explain another observation that *there is no uniform or standardized approach on how to execute benchmarking* for neither of agricultural sectors. All the studies reviewed had (at least partly) different methodologies which were based on subjective considerations of the authors. The vast majority of executed researches aimed at benchmarking competitiveness by benchmarking costs. This might be partly correct. However, while looking at costs, *the most of authors didn't pay enough attention to the drivers of those costs*.

Talking about the noticeable differences between the livestock sector benchmarking and the crop sector benchmarking, it can be observed that *much more parameters are usually included into the analyses related to the livestock production, than into crop production analyses*. The reason for this might be that livestock sector of agriculture averagely incorporates more processes and daily activities, than crops production sector. From the reviewed literature it can also be concluded that *very few studies were executed versus relevant partners from abroad (internationally).*

CHAPTER IV

MATERIALS AND METHODS

4.1. Sample

Six farms from Ukraine and five farms from the Netherlands were analyzed within the current study. More farms were informed about the research via electronic mail, but only the ones of those farm managers (farmers) who agreed to participate were considered in the current study. Ukrainian part of the research was geographically limited to Chernihiv region (see Figure 4.1.). This is the only region in Ukraine where there was no decline in number of dairy cattle for the last years (Real Ukraine, 2010). It might mean that milk production is relatively stable in this province. With regard to the Netherlands, researched farms were located in provinces Flevoland, Drenthe, Friesland and Groningen. The focus of the study was made on typical farms of both countries without any investment or management from abroad.

Figure 4.1. Chernihiv region on the map of Ukraine

The analyzed Ukrainian dairy farms had greater herd size than the Dutch farms. On average, there were 827 cows at Ukrainian farms (see Table 4.1.) and 149 cows at the Dutch farms. Both means are higher than countries' averages[2]. Ukrainian dairy farms were also larger with regard to cultivated area: 1912.5 ha in average versus 85.4 ha at the Dutch farms. The number of workers

[2] According to Binternet database of LEI, average dairy herd size in the Netherlands equals 78 cows; there is no accurate statistics for Ukraine, but the average ranges between 200-400 cows

at the Dutch farms was on average almost fifty times lower than at Ukrainian farms (mean of 2.2 labour units versus 101.5 labour units). It can be concluded that samples represented relatively large scale dairy farming in both countries.

Table 4.1. General information on the researched Dutch and Ukrainian dairy farms

	Country	N	Mean	Std. Deviation
Dairy herd size	Ukraine	6	826.7	620.3
	The Netherlands	5	148.8	91.8
Cultivated area, ha	Ukraine	6	1912.5	1560.2
	The Netherlands	5	85.4	77.1
Number of workers	Ukraine	6	101.5	120.6
	The Netherlands	5	2.2	1.1

4.2. Selection of indicators

The selection of indicators for the current research was done by extracting from the list, provided in the Table 3.2. The decisions on which indicators to pick up were taken on the basis of criteria such as relevancy (the indicator is useful and in line with study objectives) and validity (the indicator is specific and not confounded by other factors so the research is repeatable). Apart from above stated requirements, indicators had to be measurable, reliable, and, therefore, comparable. Beside the usage of criteria, selected indicators were verified during the interviews with experts from Animal Sciences Group of WUR and "Alfa Accountants"[3].

The following financial indicators were selected for the benchmarking:

- Break-even point (BEP)
- Farm income per 1kg of milk
- Farm income per cow
- Cost structure
- Asset structure
- Return-on-assets (ROA)

Thus, selected measures enable to assess the competitiveness, profitability and investment attractiveness. However, all of these measures are past-oriented or, at most, present-oriented. Taking a look at the future, it was decided to investigate approximate cost of expanding the dairy farm with 100 cows.

[3] "Alfa Accountants" is the Dutch company which offers a wide range of services, such as tax- and legal advice, the handling of financial administration, and the control of annual accounts. It is specialized in small and medium-sized businesses, and the agricultural sector

Managerial indicators were divided into 3 subgroups: productivity measures, feed management indicators, and herd management indicators. Productivity measures are the ones which show yields per certain production mean. Feed management indicators are related to growing and usage of feed. Finally, herd management indicators take into consideration calving, milk production and replacement phases.

Productivity measures included:

- Milk yield per cow/year, (kg)
- Milk yield per ha/year, (kg)
- Milk yield per labour hours worked/year, (kg)

Feed management indicators:

- Feed efficiency (kg DM/kg milk yield)
- Feed crops yield, (DM/ha)

Herd management indicators:

- Herd replacement rate, (%)
- Age at first calving, (months)
- Calving interval, (days)
- Culling rate, (%)
- Lactation period, (days)

With above listed indicators, the aim was to study the most important managerial "ingredients" of dairy farming. It is not possible, however, to quantify managerial aspects totally. Therefore, descriptive way of presenting results has also been used like in the study of Khade and Metlen (1996) (see section 3.4).

4.3. Data collection

The Netherlands

All Dutch dairy farmers were visited personally at their farms. Therefore, all farm data for the Netherlands were gathered via face-to-face interviews by using the questionnaire as shown in the Appendix A. Interviews with bank employees, farmers and also data from the KWIN-2009 report were used for the cost of expanding estimation.

Ukraine

The farm data from three Ukrainian farms were also gathered with the help of face-to-face interviews and developed questionnaire. For collecting data from three other farms the EDF questionnaire[4] and phone interviews were employed. The data for the cost of expanding estimation was gathered by interviewing Association "Ukrainian Agribusiness Club", Ukrainian companies specialized in building barns, milking equipment supply, and breeding. All gathered data is for the year 2009. This holds also for the Netherlands.

4.4. Parameterization of selected indicators and their quantification

Parameterization of selected indicators is presented in the Table 4.2. The table shows which subindicators are required for quantification of selected indicators and what kind of data was gathered at the farms.

i. Financial indicators

Because of future quota abolishment and differences in state support of dairy farming between countries, it was decided not to take into account neither the quota cost, nor coupled or decoupled payments from the state, or other payments. Therefore, used break-even point (BEP) type can be calculated[5] according to the EDF methodology in the following way:

$$BEP = Total\ Cost - Quota\ Cost - Non\text{-}milk\ Returns$$

This type of break-even point indicates the lowest level of milk price, which enables the farm to cover all economic costs.

Farm income was calculated[6] by deducting cash costs, depreciation and interest costs from milk returns of the dairy farm:

$$Farm\ income = (Returns\ from\ milk\ sales + Returns\ from\ selling\ cattle\ for\ culling + Net\ change\ in\ livestock\ value + Net\ change\ in\ inventory) - (Cash\ costs + Depreciation + Interest\ costs)$$

[4] The EDF questionnaire is confidential. Therefore, it cannot be included into the appendix. It gathers all kinds of dairy farm data and consists of six chapters: Identification of the farm, Structure and production system in the accounting period, Prices in the accounting period, Farm's physical input and output in the accounting period, Farm's financial input and output in the accounting period, and Farm's balance sheet in the accounting period

[5] For the Netherlands, this indicator was not quantified but asked as an aggregate number during interviews with farmers. In Ukrainian case the beak-even-point is equal to the total cost of 1kg of milk. This is because there is no quota cost in Ukraine and cost articles presented in Table 4.2. were multiplied by the percentage of usage in milk enterprise of the farm. In other words, there was no non-milk income generated from presented expenses

[6] The indicator was calculated only for Ukrainian farms. For the Dutch farms, the net farm income from operations was asked as an aggregate number during interviews.

In fact, according to Kay (2008) such farm income is called "Net farm income from operations". It was decided to use this type of farm income because it reflects actual dairy activity and does not include income from sale of capital assets.

Farm income was adjusted for the return-on-assets (ROA) calculation. Interest expenses were added to the net farm income from operations to eliminate the influence of capital structure of the farm. However, opportunity cost for labour and management was deducted:

ROA = (Net income from operations + Interest expenses – Opportunity cost for labour and management) / Average yearly assets

The subtraction of opportunity cost for labour and management has been done, as, according to Kay (2008), it is important to separate that part of net income, which was earned by labour and management of the farmer from the return-on-assets analysis. The opportunity cost for labour and management was calculated by multiplying the number of family labour hours by the rate per hour[7].

The cost structure was computed in the way that costs, which are relevant only for one country, were put into the "Other costs" group or not taken into account (opportunity cost). The "Growing feed crops" group included cost of seeds, fertilizers and pesticides.

In order to be able to compare asset structure between countries, only the following assets were considered: land; livestock; buildings; machinery, tools and installations; and inventory. The "other assets" included accounts receivable, cash and bank assets. Every asset item is presented as a percentage from the sum of all listed assets. The asset structure was computed according to the IFCN methodology: market values were used for land and livestock and book values for other items.

The cost of expanding per 100 cows

In the light of future milk production quotas abolishment in the EU and ongoing negotiations on EU – Ukraine free trade area creation, the cost of expansion a dairy farm with 100 cows in Ukraine and the Netherlands was assessed. The quantification of this indicator was based on summing up investment expenses related to embarking on another 100 cows at the farm. Such

[7] The hourly rate of opportunity cost for farmer's labour and management which was taken for the adjustment equals €10. This value is not supported by any scientific article or estimation and, therefore, may slightly differ from the real one

expenses included: costs of capital, land, housing, livestock, milking parlour and cooling tank for milk. It was assumed that corresponding already existing capacities are fully loaded.

ii. Managerial indicators

As Miller (2005) underpins, the effective enterprise level analysis requires access to individuals who can facilitate or jointly participate in knowledge transfer. Thus, communication with farmers and observing the processes related to different stages of dairy farming is of a core importance for valid analysis. Talking about managerial indicators, most of them have been reported directly by the farmers. For those of them, which have been calculated, the methodology outflows from the names of indicators and should not cause difficulties with understanding and comprehension (see Table 4.2.). Though, the feed efficiency might be a complex indicator within managerial group. The quantification of this indicator was not needed as it was asked the farmers during interviews. However, when the indicator is to be calculated, the amount of dry matter (DM) fed per cow per day in kg has to be divided by amount of milk produced per cow per day in kg:

Feed efficiency = Dry matter fed (kg) / Milk produced (kg)

When not available, the amount of fed dry matter can be calculated by summing up the multiplications of the DM percentages in the crop/silage/concentrate (the type and number of items depends on the ration structure) by physical amount fed per cow per day (in kg).

As it was already mentioned in section 4.2., the results on managerial part of the study are not only quantitative, but also qualitative. The latter ones are based on observations and interviews with farmers.

Table 4.2. Parameterization of indicators

Indicators	Subindicators	The Netherlands							Ukraine							
		1	2	3	4	5	Mean	Std. dev.	1	2	3	4	5	6	Mean	Std. dev.
General																
Herd size	n/a[8]	160	120	60	104	300	148.8	91.8	513	600	1965	282	1100	500	827	620
Cultivated area, ha	n/a	48	60	27	72	220	85.4	77	1402	1104	4362	400	3307	900	1912	1560
Number of workers	n/a	2.5	2	1	1.7	4	2.2	1.1	43	52	343	23	94	54	101	121
Milk produced, tones	n/a	1155	848	494	745	1443	937	369	2513	4231	10361	1270	4767	2128	4212	3286
Financial																
Break-even point (BEP), cents/kg milk		40	44	39.4	33	45	**40.3**	**4.7**	**39.4**	**19.1**	**24.2**	**24.3**	**19.2**	**24.5**	**25.1**	**7.4**
	Total cost[9]:	-10	-	-	-	-	n/a	n/a	39.4	19.1	24.2	24.3	19.2	24.5	25.1	7.4
	Bought feed	-	-	-	-	-	n/a	n/a	3.2	5.4	5.8	1.5	3.9	3.9	3.9	1.6
	Growing feed crops	-	-	-	-	-	n/a	n/a	13	2.1	1.4	3.8	1.1	9.7	5.2	5
	Animal health and breeding	-	-	-	-	-	n/a	n/a	0.4	0.3	0.8	1.6	0.5	0.6	0.7	0.5
	Paid labour	-	-	-	-	-	n/a	n/a	5.7	5.7	7.9	5	5.5	5	5.8	1
	Contract labour	-	-	-	-	-	n/a	n/a	5	0.04	0	4.2	0	0.5	1.6	2.3
	Fuel, energy and water	-	-	-	-	-	n/a	n/a	2.7	3.4	2.6	4.2	1.2	3.1	2.9	1
	Maintenance of machinery and buildings	-	-	-	-	-	n/a	n/a	2.2	1.2	2.2	0.4	0.4	0.9	1.2	0.8
	Land rent	-	-	-	-	-	n/a	n/a	1.3	0.7	1.1	1.6	2.3	0.3	1.2	0.7
	Depreciation	-	-	-	-	-	n/a	n/a	5.7	0.2	2.3	1.6	4.2	0.4	2.4	2.2
	Interest costs	-	-	-	-	-	n/a	n/a	0	0	0	0	0	0	0	0
	Other costs	-	-	-	-	-	n/a	n/a	0.3	0	0	0	0.1	0.01	0.07	0.13
	Non-milk returns	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Farm income, €/kg milk		**0.05**	**-0.03**	**-0.03**	**0.09**	**0.03**	**0.022**	**0.052**	**-0.07**	**-0.01**	**-0.06**	**-0.07**	**-0.03**	**-0.01**	**-0.042**	**0.029**
	Total milk returns, €1000:	-	-	-	-	-	n/a	n/a	811.3	790.4	1851	213.9	776	499.5	823.7	554.2
	Returns from milk sales, €1000	-	-	-	-	-	n/a	n/a	581.7	730	1831	161.4	659.6	398.3	727	578.2

[8] "n/a" stands for "not applicable"

[9] Total cost (or total expenses) from Income Statement excluding quota cost is meant

[10] "-" means that this type of data was not collected at the farms

Table 4.2. (continued) Parameterization of indicators

Indicators	Subindicators	The Netherlands							Ukraine							
		1	2	3	4	5	Mean	Std. dev.	1	2	3	4	5	6	Mean	Std. dev.
	Returns from selling cattle for culling, €1000	-	-	-	-	-	n/a	n/a	22.4	25	50.1	33.6	81.1	94.5	51.2	30.3
	Net change in livestock value, €1000	-	-	-	-	-	n/a	n/a	67.8	24.3	-62.8	6.9	12.8	0	8.2	42.3
	Net change in inventory, €1000	-	-	-	-	-	n/a	n/a	139.4	111.4	32.2	12	-22.5	6.7	29.8	56.5
Farm income per cow, €/cow		**363**	**-227**	**-250**	**673**	**133**	**138.4**	**393.9**	**-351**	**-87**	**-334**	**-335**	**-128**	**-46**	**-213.3**	**140.9**
Cost structure	Bought feed cost, %	29.0	20.6	20.4	20.3	7.7	19.6	7.6	8.2	28.3	24.0	6.1	20.3	15.9	17.1	8.8
	Cost of growing feed, %	2.6	1.1	2.4	6.1	2.0	2.9	1.9	32.9	10.8	6.0	15.8	6.0	39.6	18.5	14.4
	Animal health and breeding, %	6.5	6.6	11.8	7.5	3.3	7.1	3.1	1.0	1.7	3.1	6.7	2.4	2.6	2.9	2.0
	Paid labour, %	5.8	18.6	0.5	2.9	3.5	6.3	7.2	14.5	29.8	32.6	21.2	28.5	20.5	24.5	6.9
	Contract labour, %	11.9	18.6	8.0	8.8	3.1	10.1	5.7	12.7	0.2	0.0	17.4	0.0	2.0	5.4	7.7
	Fuel, energy and water, %	2.9	5.5	6.5	2.5	2.1	3.9	2.0	6.7	17.8	10.8	17.5	6.4	12.7	12.0	5.0
	Maintenance of machinery and buildings, %	6.5	16.0	8.9	13.9	7.5	10.6	4.2	5.5	6.4	9.2	1.8	2.0	3.7	4.8	2.8
	Land rent	1.3	4.4	6.4	3.6	4.6	4.1	1.8	3.2	3.8	4.7	6.7	12.1	1.2	5.3	3.8
	Depreciation, %	30.0	0.2	14.5	14.2	32.8	18.3	13.3	14.5	1.3	9.7	6.7	21.9	1.8	9.3	7.9
	Interest, %	0.0	0.0	10.7	12.5	28.2	10.3	11.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Other costs, %	3.5	8.4	9.9	7.8	5.2	7.0	2.6	0.8	0.0	0.0	0.0	0.5	0.1	0.2	0.4
Asset structure	Market value of the land, %	53.8	73.8	48	90	47.9	62.7	18.6	35.8	35.8	28.2	8.8	3.5	36.9	24.8	14.9
	Book value of buildings, %	35.4	14.1	14.4	1.4	31.5	19.3	13.9	43.8	22.9	6.7	20.7	1.8	8.2	17.4	15.4
	Book value of machinery, tools and installations, %	3.7	1.3	6.2	1.4	9.7	4.4	3.5	3.9	28.2	6.2	17.8	0.3	17.6	12.3	10.6
	Market value of livestock, %	5.8	5	15.3	5.1	9.5	8.2	4.4	16.4	9.9	14.4	24	93.3	18	29.3	31.7
	Book value of inventory, %	1.3	0.4	1.6	0	1.3	0.9	0.7	0	3.1	3.6	2.1	0.1	3.3	2	1.6
	Book value of other assets, %	0	5.4	14.5	2	0	4.4	6.1	0	0.1	40.9	26.5	0.9	16	14	17
Return-on-assets (ROA), %		**0.0**	**0.0**	**0.0**	**1.7**	**5.5**	**1.4**	**2.4**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**n/a**
	Net income from operations, €1000	58	-27.2	-15	70	40	25.1	43.8	-180	-52.3	-656	-94.3	-141	-22.9	-191	234.7
	Interest expenses, €1000	0	0	20.8	25.9	202	49.7	85.9	0	0	0	0	0	0	0	n/a

Table 4.2. (continued) Parameterization of indicators

Indicators	Subindicators	The Netherlands							Ukraine							
		1	2	3	4	5	Mean	Std. dev.	1	2	3	4	5	6	Mean	Std. dev.
	Total opportunity cost for farmer's labour and management, €1000	98.9	0	30	50	30	41.8	36.6	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Family labour hours worked	9890	0	3000	5000	3000	4178	3658	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Average yearly assets, €1000	4650	2724	1017	2689	3878	2991.3	1378.2	1493	1177	5908	1734	36383	931.4	7937.6	14057
Cost of expanding per 100 cows, €1000				-			1,968-3,575	n/a			-				375-636	n/a
	Cost of capital, %			-			2-16	n/a			-				14.5-25	n/a
	Cost of 50ha/100ha of agricultural land, €1000			-			1,500/3,000	n/a			-				25/50	n/a
	Cost of building, €1000			-			345-393	n/a			-				250-400	n/a
	Cost of livestock (100 heifers), €1000			-			80-140	n/a			-				57-143	n/a
	Cost of milking parlour 2x5, €			-			24,871	n/a			-				27,000	n/a
	Cost of cooling tank for 3000 ltr of milk, €			-			17,731	n/a			-				16,000	n/a
Managerial																
Milk yield per cow/year, kg	n/a	8200	7470	10000	7600	6000	7854	1447	4898	7051	5272	4505	4333	4256	5053	1050
Milk yield per ha/year, tones	n/a	24.5	14.1	18.3	10.3	6.5	14.7	6.8	1.8	3.8	2.4	3.2	1.4	2.4	2.5	0.9
Milk yield per labour hour/year, kg		**96.1**	**212**	**165**	**149**	**180**	**160.4**	**42.8**	**29.2**	**44.2**	**15.3**	**31.7**	**26.8**	**19.3**	**27.8**	**10.1**
	Labour hours worked, x1000	12	4	3	5.6	8	6.4	3.6	86.2	95.8	676.4	40	177.6	110	197.7	238.7
Feed efficiency, kg DM11/kg milk yield		1.3	1	0.97	0.84	1.08	1.04	0.17	-	-	-	-	-	0.98	n/a	n/a
	DM fed per cow per day, kg	-	-	-	-	-	n/a	n/a	-	-	-	-	-	-	n/a	n/a
Herd replacement rate, %	n/a	30	28	18	41	35	30.4	8.6	26	46	53	14	64	34	39.5	18.4
Age at first calving, months	n/a	25	24.1	25	24.7	29	25.6	1.96	30	26	28	28	26	29	27.8	1.6
Calving interval, days	n/a	395	400	420	410	420	409	11.4	400	400	380	500	340	400	403	52.8
Culling rate, %	n/a	7	6	4	40	22	15.8	15.3	11	33	50	22	43	34	32	14
Lactation period, days	n/a	355	340	370	350	340	351	12.45	334	341	328	325	337	365	338	14.3

[11] DM = Dry Matter

CHAPTER V

RESULTS

5.1. Financial aspects

In this section performances of the Dutch and Ukrainian dairy farms with regard to financial indicators are presented.

The break-even-point (BEP) of the Ukrainian dairy farms was averagely lower by 15.2 cents per liter of milk (see Table 5.1.). The minimum milk price which would cover full economic costs in Ukrainian case was 25.1 cents, while for the Dutch dairy farms it was 40.3 cents. However, the Dutch farms enjoyed higher income per kg of milk, which made 2.2 cents. In Ukrainian case farm income was negative for all farms and in average made -4.2 cents per kg of milk. The difference in farm income per cow had similar character. For Ukrainian dairy farms it made -213 euros per cow, while the Dutch farms got 138.4 euros of farm income per cow. This might be partly explained by the fact that an opportunity cost for farmers' labour and management (in Dutch case) was not taken into account when calculating the farm income.

The return on assets (ROA) for Ukrainian dairy farms equaled zero, as adjusted farm income was negative as well. Adjusting of farm income for ROA calculation had different effect on Dutch dairy farms. In average, however, the "Dutch" ROA equaled 1.44%.

Table 5.1. Performances of the Dutch and Ukrainian dairy farms with regard to financial indicators

	Country	N	Mean	Std. Deviation
BEP, eurocents	Ukraine	6	25.1	7.4
	The Netherlands	5	40.3	4.7
Farm income per kg of milk, EUR	Ukraine	6	-.042	.03
	The Netherlands	5	.022	.05
Farm income per cow, EUR	Ukraine	6	-213.3	140.9
	The Netherlands	5	138.4	393.8
ROA, %	Ukraine	6	.00	.00
	The Netherlands	5	1.44	2.4

Cost structure

The cost structure of the researched Dutch dairy farms is presented on the Figure 5.1[12]. As it can be seen from the diagram, the greatest share belongs to feed cost (19.59%), followed by depreciation (18.33%), maintenance costs (10.55%), paid interest (10.27%), and contract labour cost (10.08%). Much lower shares had animal health and breeding costs (7.13%), paid labour (6.27%), land rent (4.06%), fuel, energy and water costs (3.89%), costs, related to growing feed crops (2.85%), which include expenses for seeds, fertilizers, pesticides and other related costs. The share of "other costs" occupied 6.97%, what includes consultancy and accountancy agencies costs, local payments, manure utilization cost etc.

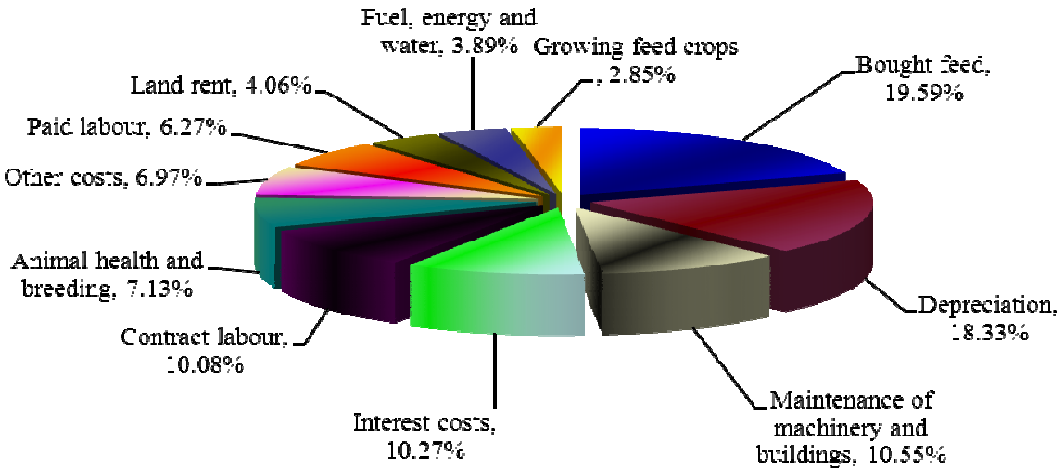

Figure 5.1. Cost structure at the researched Dutch dairy farms

The cost structure of the researched Ukrainian dairy farms is presented on the Figure 5.2. In Ukrainian case, the greatest cost share is occupied by the paid labour part (24.52%), followed by expenses for growing feed crops (18.52), bought feed costs (17.11%), fuel, energy and water costs (11.97%), and depreciation (9.31%). The rest of cost structure was distributed between contract labour cost (5.39%), land rent cost (5.27%), maintenance costs (4.76%), and animal health and breeding costs (2.92%). The share of "other costs" was insignificant (0.24%).

[12] The means of researched farms are presented. This holds for all figures

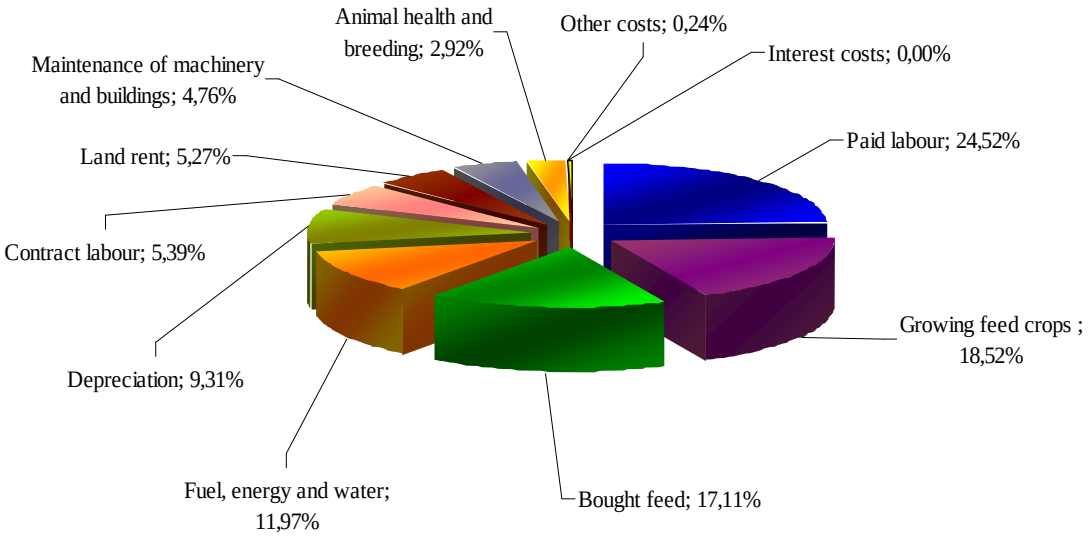

Figure 5.2. Cost structure at the researched Ukrainian dairy farms

With regard to differences between countries, there are several interesting moments here. First of all, paid labour part is one of the most interesting. In the cost structure of Ukrainian farms it occupies the largest share with 24.52%, but in the Dutch cost structure its percentage is almost insignificant (6.27%). Such considerable difference might be partly explained by the absence of family labour at Ukrainian dairy farms (so that all labour is paid). Besides, the amount of labour input (labour productivity) may matter (will be discussed later in 5.3.). The difference in contract labour cost shares is opposite. This might be explained by the fact that Ukrainian farms are averagely larger so they prefer to have own machinery and execute most of technological operations by themselves. Another aspect, which deserves to be stressed attention on, is feed cost. By summing up “bought feed” cost and “growing feed crops” cost we get total feed cost of the dairy farm. However, these two cost articles were split up with the purpose to show the difference between them with regard to country. For the Dutch dairy farms, the cost of growing feed crops (2.85% of total cost) is relatively insignificant. In contrast, the same cost article occupies the second greatest share in the Ukrainian dairy farms’ cost structure (18.52%). This might be partly explained by the amount of land available at the Ukrainian farms so that management desires to satisfy feed needs with own crops. Apparently, such approach is not completely successful as the share of bought feed cost is still high (17.11%). When adding the cost of bought feed to the cost of growing feed crops, it makes 35.63% of total cost for the Ukrainian dairy farms. Besides, when looking at the cost share of fuel, energy and water in two countries, we can see that at Ukrainian dairy farms this article occupies relatively high percentage (11.97%), what could also be partly associated with larger land cultivation scale. In addition, the question of efficient resources usage arises here as well.

The paid interest cost is another interesting cost article to compare between countries. For Ukrainian dairy farms such cost equals zero, whereas for the Dutch ones represents significant share (10.27%). The reason for Ukrainian farms don't have any loans is simple: the capital from local banks is extremely expensive (this aspect will be discussed later). In contrast, interest cost share is quite high at the Dutch dairy farms what makes them dependent on banks and less flexible in market conditions.

Asset structure

The assets structure at the researched Dutch dairy farms is presented on the Figure 5.3. The absolute leading share here is occupied by land (62.72%), followed by buildings (19.35%) and livestock (8.17%). The percentages of "machinery, tools, and installations" and "inventory" were relatively smaller, 4.45% and 0.92% respectively. The "other" assets, which include accounts receivable and other circulating capital, contributed 4.39% to the complete assets structure.

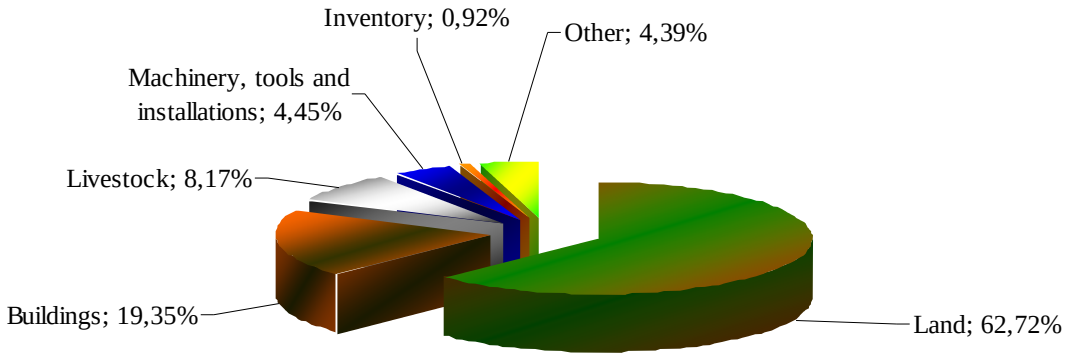

Figure 5.3. Asset structure at the researched Dutch dairy farms

The asset structure of the researched Ukrainian dairy farms can be observed on the Figure 5.4. In contrast to the asset structure of the Dutch dairy farms, the greatest share here is occupied by livestock (29.35%), followed by land[13] (24.83%), buildings (17.37%) and machinery, tools and installations (12.34%). The share of inventory (2.05%) was relatively insignificant. The percentage of "other" assets (14.06%) was higher when compared with the Dutch dairy farms' asset structure.

The considerable difference in shares of land within the asset structure of farms from two countries (62.72% for the Netherlands versus 24.83% for Ukraine) might be partly explained by the high market value of land in the Netherlands due to its scarcity. In contrast, in Ukraine there is a lot of land available, but there is no real market of land. Even though, the maximum estimate of the price for Ukrainian agricultural land is 500 USD per hectare. The conclusions become

[13] In reality, according to Ukrainian law, it is not allowed to buy land for agricultural purposes. Only rent for max 49 years is possible. Thus, there stands "0" in the line "Land" of the farms' balance sheets. Therefore, the estimate of land market value has been used for comparison. The estimation was executed by the Association "Ukrainian Agribusiness Club" (Lissitsa, 2010).

quite evident when taking into account that price of agricultural land in the Netherlands varies in the range 30,000 – 35,000 EUR per hectare. The reason for difference in the shares of livestock value in asset structures becomes evident as well. In relation to Dutch land prices the livestock in the country is cheap, whereas, the qualitative livestock from abroad is relatively very expensive and valuable for Ukrainian dairy farms.

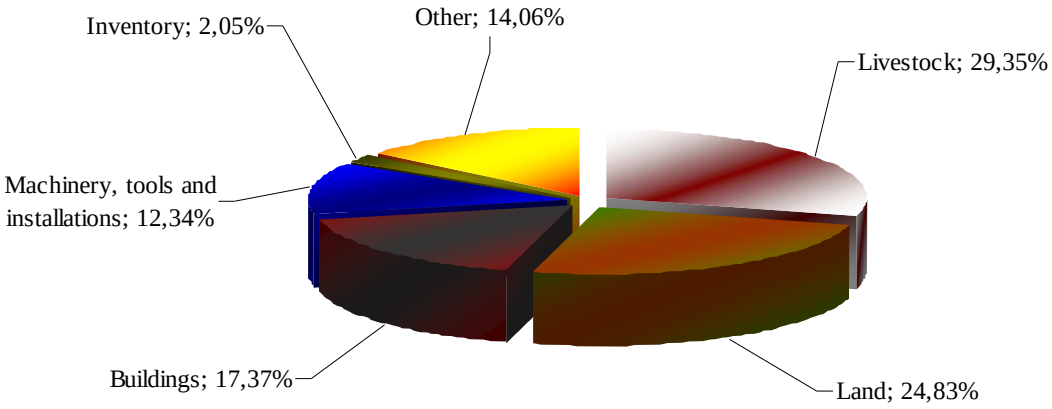

Figure 5.4. Asset structure at the researched Ukrainian dairy farms

Cost of expanding with 100 cows

The nearest few years will become the time of serious structural changes in dairy farming for both the Netherlands and Ukraine. The reasons for this are different though. Financially and organizationally strong Dutch farmers are looking forward for the 2015 when they will be able to expand (or use the facilities they have already invested in). Large Ukrainian dairy businesses are intrigued by exceptionally high milk prices of 2010 (around €0.4 per litre) and the possibility of entering the EU market soon. Therefore, estimation of the cost of expending a dairy farm with 100 cows is interesting and relevant for both countries. Results of such estimation are presented in the Table 5.2.

The cost of capital in the Netherlands may vary between 2%-16% (the level of 16% is settled by the Dutch Central Bank as the highest possible). However, this range has nothing to do with reality. Of course, the interest on a loan depends on farmer's current property, his managerial style and other factors, but, in practice, most of the time Dutch dairy farmers manage to attract financial resources under 2-3% interest rate. In contrast, the lowest possible interest rate for dairy farm in Ukraine (in national currency (UAH)) is about 14.5%. It is hardly realistic to get such a loan though. Therefore, vast majority of Ukrainian dairy farms are functioning without borrowed capital at all. Such state of affairs with capital availability in Ukraine is one of the main reasons of the circumstances, under which the best and strongest (typically, the best = the largest)

survives, and the others are either selling their businesses to powerful agriholdings, or concluding agreements with processors about long-term relationships and cheap financing, or culling their cows and go out of the business. Unfortunately, the last option is the most widely spread in Ukrainian dairy farming so far.

Table 5.2. Cost of expanding dairy farm with 100 cows

Object of investment	The Netherlands	Ukraine
Cost of capital	2%-16%	14.5% - 25%
Land 50ha/100ha	€1,500,000/3,000,000[14]	€25,000/50,000[16]
Building	€345,100-392,700[15]	€250,000-400,000[17]
Cattle	€80,000-140,000	€57,000-143,000[18]
Milking parlour 2*5	€24,871	€27,000
Cooling tank (vol. 3000 litres)	€17,731	€16,000
Total	**€1,967,702-3,575,302**	**€375,000-636,000**

As it was shown above, land is the main asset of Dutch dairy farmers. Its price is fluctuating around €30,000 per hectare (depending on location and soil type) being definitely the most expensive production mean in dairy business of the Netherlands. In spite the price of land is high enough, it is anticipated to go up even more after 2015 as it is likely that the demand for this relatively scarce resource will increase. The market of agricultural land is not functioning in Ukraine at all. However, the cancellation of existing moratorium on agricultural land sale is expected in 2012 by entire "agribusiness world" of Ukraine. According to estimates of the association "Ukrainian Agribusiness Club", after the cancellation on the moratorium, the agricultural land price will fluctuate around €500 per hectare. This price can even hardly be compared with the price of average Dutch cow. The reasons for such relatively low price for agricultural land might be lower price index and lower level of salaries and pensions in the country. Representatives of the middle class and also poor population, who have financial problems, will be willing to sell their land as soon as they have such an opportunity. This will lead to exceeding of demand by supply.

According to KWIN report (2009), the cost of building for 100 cows ranges between €345,100-392,700 (excluding installations). It is remarkable that in Ukraine there is a possibility to construct building for 100 cows including all installations for nearly the same amount of money

[14] According to the Dutch legislation, in case of selling land by the father to the son, the latter one pays only 50% of the market price
[15] Excluding installations
[16] As there is no real agricultural land market in Ukraine due to moratorium on agricultural land sale, the price estimate of the Association "Ukrainian Agribusiness Club" has been used
[17] Including installations
[18] The upper constraint is the price for hundred 22-23 months old heifers of "holsteinized" Ukrainian breed

(€250,000-400,000). Such a difference might be explained by cheaper construction materials and construction services in Ukraine.

The cost of dairy cattle differs not that much between countries. The cheapest cows in the Netherlands are being sold for around €800, whereas in Ukraine one can buy a dairy cow for €570. However, if we talk about highly productive breeds of local selection or imported cows (Holstein Fresian breed for instance), the price in Ukraine can be even higher, than in the Netherlands.

The costs of milking parlour and cooling tank for milk may vary with regard to manufacturer, but still are nearly the same in two countries (see Table 5.2.). The costs in Ukraine might be even slightly higher as almost all such equipment is being imported from the EU.

5.3. Managerial aspects

As it has been already stated in Chapter 4, managerial indicators were divided into 3 subgroups: productivity measures, feed management indicators, and herd management indicators. First of all, the productivity of the Dutch and Ukrainian dairy farms will be discussed.

The milk yield per cow per year at the researched Ukrainian dairy farms was equal 5052.8 kg (see Table 5.3.), what is 55.4% lower, than at the Dutch dairy farms (7854 kg). Both values are slightly higher, than countries' averages (4050 kg for Ukraine and 7342 for the Netherlands). The milk yield per hectare per year at the Dutch dairy farms equaled 14679.7 kg, what is 5.9 times more, than Ukrainian dairy farms produced (2496.9 kg). The difference in milk production per labour hour is also striking: 27.8 kg of milk produced at Ukrainian farms versus 160.4 kg at the Dutch ones.

Table 5.3. Productivity of the Dutch and Ukrainian dairy farms

Indicator	Country	N	Mean	Std. Deviation
Milk yield per cow, kg	Ukraine	6	5052.8	1050.5
	The Netherlands	5	7854	1446.9
Milk yield per ha, kg	Ukraine	6	2496.9	881.7
	The Netherlands	5	14679.7	6821.5
Milk yield per labour hour, kg	Ukraine	6	27.8	10.1
	The Netherlands	5	160.4	42.8

Feed management

The feed efficiency (intake of dry matter (DM) in kilograms per 1kg of milk) at the researched Dutch dairy farms equaled 1.04 kg (see Table 5.4.). Unfortunately, this indicator cannot be compared with researched Ukrainian dairy farms' one, because only one farm from the sample was able to provide with such information (the result was 0.98kg). The other five farms didn't count the intake of dry matter at all. For the differences in soil type and climate, the Netherlands and Ukraine have different typical feed crops. Ryegrass is typical for the Netherlands, whereas alfalfa is typical for Ukraine. The only common crop, which is widely used for feeding cows in both countries, is fodder maize. Therefore the yields of this crop were compared as another indicator of feed management. At the researched Ukrainian dairy farms, the average yield of fodder maize was equal 11.8 tones DM/ha, what is 31% lower than at the Dutch dairy farms (15.5 tones DM/ha).

Table 5.4. Feed management indicators of the Dutch and Ukrainian dairy farms

Indicator	Country	N	Mean	Std. Deviation
Feed efficiency kg DM per kg milk	Ukraine	1	.98	n/a
	The Netherlands	5	1.04	.17
Fodder maize yield tones DM per ha	Ukraine	6	11.8	2.8
	The Netherlands	5	15.5	3.5

Herd management

Average herd replacement rate at the researched Dutch dairy farms equaled 30.4%. The value of corresponding Ukrainian indicator was 39.5%. Culling rate of the dairy farms in the Netherlands and Ukraine equaled 15.8% and 32.1% respectively. Thus, for the farms of both countries we can observe increase in dairy herds which is more rapid in case of the Dutch dairy farms. In principle, high replacement and culling rates are often associated with high productive dairy farming. Talking about researched Ukrainian dairy farms (39.5% replacement rate and 32.1% culling rate), this is not the case though. It is likely, that these high percentages are linked with still ongoing process of culling low productive cows of local breeds and bringing more productive cows into the herd (so-called "holsteinization").

According to Meyer et al. (2004), age at first calving has serious impact on the total cost of raising dairy replacements. As the author also argues, decrease in age at first calving can "improve the profitability of the enterprise by increasing lifetime milk production and milk production per year of herd life". However, according to Stewart (2005), age at first calving should not be less than 24 months. As we can see from the Table 5.5., age at first calving at the researched Dutch dairy farms equaled 25.6 months, what was more than 2 months less, than the age at first calving at the researched Ukrainian dairy farms (27.8 months). Average calving

interval at the researched Dutch dairy farms was 409 days, what is 6 days longer, than at Ukrainian farms (403 days). The difference in average duration of lactation period is more significant though: 338 days at the Ukrainian dairy farms versus 351 days at the Dutch ones. Thus, dry period (dry period = calving interval – lactation period) is averagely shorter at the researched Dutch dairy farms.

Table 5.5. Herd management indicators of the Dutch and Ukrainian dairy farms

Indicator	Country	N	Mean	Std. Deviation
Herd replacement rate, %	Ukraine	6	39.5	18.4
	The Netherlands	5	30.4	8.6
Age at first calving, months	Ukraine	6	27.8	1.6
	The Netherlands	5	25.6	1.9
Calving interval, days	Ukraine	6	403	52.8
	The Netherlands	5	409	11.4
Culling rate, %	Ukraine	6	32.1	14
	The Netherlands	5	15.8	15.3
Lactation period, days	Ukraine	6	338	14.3
	The Netherlands	5	351	12.4

Unfortunately, not all important aspects of dairy farm management are quantifiable. Therefore, such qualitative issues are going to be described below.

Organizational structure and decision making

The researched Dutch dairy farms are very simply organized (see Figure 5.5.). On average, there are two workers on the farm. Normally, there is only one owner and the same person is farm manager who deals with all aspects of farm functioning and works at the farm. He is aware of both technological processes at every production stage and financial position of the business. For there is no complex hierarchy, the same person is taking the decision and works on its implementation. The decisions are taken qualitatively and proactively. The second worker is either family member or hired. A disadvantage of such organizational structure might be that there is a very limited number of people the decision can be discussed with. However, often in such cases external experts or consulting agencies are being involved.

The organizational structure at researched Ukrainian dairy farms is fundamentally different (see Figure 5.6.). Often the actual owners have also other businesses and are far from the farm. The director (top manager) of the farm has no power of taking decisions which foresee financial expenditures. Very often managers complain about it. They argue that sometimes the decision has to be taken within a day, but they have to wait for a week instead. For the existing hierarchy

and a lot of subdivisions, the bottom workers are not well informed about the strategic and tactical goals of the business. However, even if they were informed, they would hardly be interested in achievement of those goals as their wage is not dependent on that. Another important aspect is that there are too many activities at the researched Ukrainian dairy farms. All of them have either beef, pork or crop production business beside dairy business. This causes lack of specialization and, therefore, lack of efficiency.

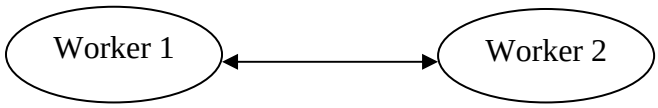

Figure 5.5. Organizational structure of typical Dutch dairy farm

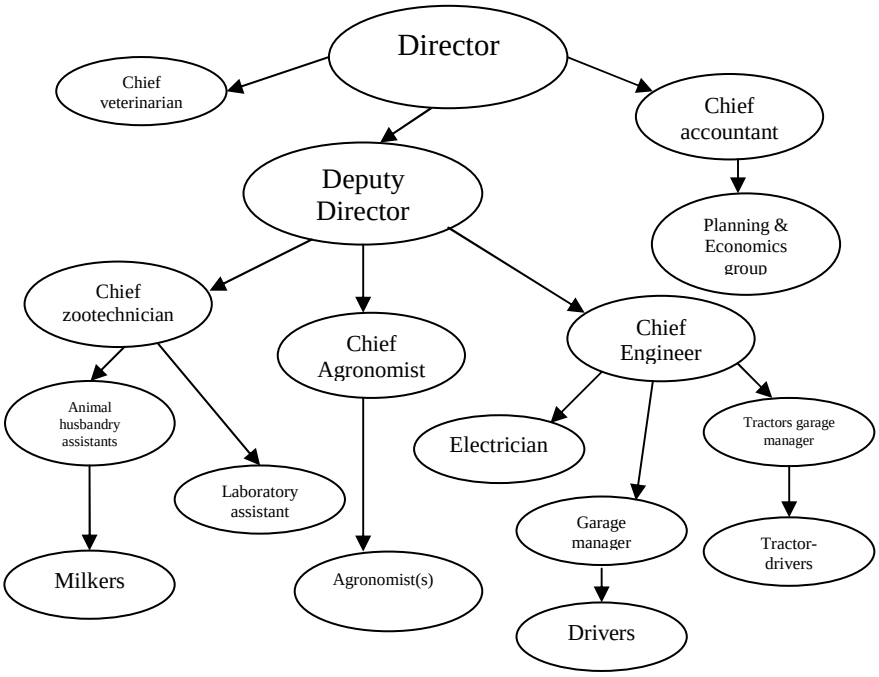

Figure 5.6. Organizational structure of typical Ukrainian dairy farm

Housing

Today one still can face housing system at the Ukrainian dairy farms, where cows are kept on the chain. Such system requires more labour and limits freedom of the cow what might eventually affect milk yields.

Milking and milk quality

At the most of Ukrainian dairy farms cows are being milked three times a day (two times in the Netherlands). Such approach foresees more operations within same time period and complicates an overall production process. Even today old-fashioned movable milking devices and milking pipeline system are being used at the Ukrainian dairy farms. Such milking systems require

greater labour input and neglect sanitary and quality requirements. As the consequence, obtained milk meets only the lowest quality standard and cannot be sold for high price.

Accounting and openness to external communication

In the Netherlands dairy farmers don't do accounting themselves, but hire accounting companies for that. Such approach saves time and provides with timely and qualitative accounting reports. Moreover, accounting companies include average values of the group (all dairy farms which hired this company) for every cost article or other indicator into the report so that the farm is benchmarked in some sense. However, the disadvantage is that such approach causes additional cost article for the farmers. In Ukrainian case, accounting is being done at the farms, separately from external world. All kinds of reports are being printed (or even written with pen) and stored in physical folders. At some farms digital accounting is being introduced, but this is more exceptional than common. The data is not compared with other farms. Such a system doesn't provide with sufficient amount of information and requires tremendous labour input.

There is also remarkable difference in external communication styles between the Dutch farmers and Ukrainian directors of farms. When you come to the Dutch farmers you are very welcome. First they like to have a cup of tea with you (or even complete lunch) and talk a bit about life in general. Afterwards they are really enthusiastic to show you the farm, answer all your questions and tell even more. It seems that they are proud of what they are doing. Finally, they see you off and some even add you to "Friends" in Facebook afterwards. The style of external communication at the Ukrainian farms is a bit different. Sometimes you have a feeling you are torturing the director and chief accountant by gathering data. When you ask about some indicator you may hear: "Oh, we have to get not a single report from the archive in order to calculate your indicator... It's not a task for five minutes!". Such attitude is surprising and it is not clear why bosses don't want to change the system so that my task becomes manageable in five minutes. It is likely, that old soviet fear to open real information matters. In addition "it's still ok" approach is working. Though, the situation is better at the farms where the management is younger and the owners are really concerned about improvements on regular basis.

CHAPTER VI

CONCLUSIONS AND DISCUSSION

6.1. Conclusions

The first objective of the current study was to identify the performance indicators of dairy farming with regard to financial and managerial aspects. This was done via literature review and interviews with experts. The literature review showed that there is no uniform or standardized approach on how to execute benchmarking in dairy farming and there hasn't been done a lot in not only international benchmarking of dairy farms, but in neither of agricultural sectors. Nevertheless, identified financial indicators included: Break-even point (BEP), Farm income per 1kg of milk, Farm income per cow, Cost structure, Asset structure, Return on Assets, and Cost of expanding a farm with 100 cows. Selected managerial indicators were distributed into three groups: productivity, feed management and herd management. Milk yield per cow/year, Milk yield per ha/year, and Milk yield per labour hours worked/year were attributed to productivity measures group while Feed efficiency and Feed crops yield per ha went to the feed management group. Identified herd management indicators included: Herd replacement rate, Age at first calving, Calving interval, Culling rate and Lactation period. The second objective of the study was to measure the performance of the Dutch and Ukrainian dairy farms with respect to identified indicators. Five dairy farms from Flevoland, Drenthe, Friesland and Groningen provinces of the Netherlands and six dairy farms from Chernihiv region of Ukraine were considered for the analysis. The results of benchmarking analysis provide the following:

1. *Managerial aspects*

   Productivity: milk yield per cow per year at the researched Ukrainian dairy farms was 55.4% lower than at the Dutch dairy farms (see Table 6.1.). The Dutch dairy farms were even more productive in comparison with Ukrainian farms when calculating yields per hectare of land and labour hours. This illustrates the relatively inefficient land use and low labour productivity at the researched Ukrainian dairy farms.

   Feed management: the yields of fodder maize per hectare were considerably higher at the Dutch dairy farms in comparison to Ukrainian ones. It was not possible, however, to benchmark the feed efficiency because of the lack of data from Ukrainian farms. Insufficient attention towards feed efficiency likely illustrates the poor feed management.

Herd management: herd replacement and culling rates were higher at the Ukrainian dairy farms which may be linked to still ongoing process of renewing dairy herds. The interval between calvings is slightly longer at the Dutch dairy farms. However, the lactation period is much longer in the Dutch case which makes the dry period shorter. The age at first calving is lower at the Dutch farms.

2. Financial aspects

BEP, farm income, ROA: The break-even-point (BEP) of the Ukrainian dairy farms was on average lower. However, the difference is mainly caused by lower input prices in Ukraine. In spite of the lower BEP at Ukrainian farms, the Dutch farms had higher net income from operations per kg of milk. Such a difference might be explained by the difference in milk prices between countries in 2009 and the fact that opportunity costs for farmers' labour and management (in the Dutch case) were not taken into account when calculating the farm income. The return on assets (ROA) for Ukrainian dairy farms equaled zero, as farm income was negative. In contrast, the ROA for the Dutch dairy farms was slightly positive. We can conclude that in general the Dutch dairy farms had a better financial position than the Ukrainian ones.

Cost structure: the greatest share of Ukrainian dairy farms' costs belonged to feed and paid labour. In the Dutch case, the largest shares were occupied by bought feed, depreciation, and maintenance costs. Remarkable is the fact of a high leverage of the Dutch farms.

Asset structure: Land is the most valuable asset of the Dutch dairy farms whereas livestock has the greatest value at the Ukrainian ones. There is no land market in Ukraine at the moment, but it is expected to be created in 2012.

The cost of expanding a dairy farm with 100 cows is expected to vary from €375,000 to €636,000 for Ukrainian dairy farms. In the Dutch case this range is expected to be €1,967,702-3,575,302. The difference is caused solely by the high land prices in the Netherlands.

Table 6.1. Results of the quantification of performance indicators

Indicator	Average value*	
	The Netherlands	**Ukraine**
General		
Herd size	148.8	827
Cultivated area, ha	85.4	1912
Number of workers	2.2	101
Financial		
Break-even point (BEP), cents/kg milk	40.3	**25.1**
Farm income, EUR/kg milk	**0.022**	-0.042
Farm income per cow, EUR/cow	**138.4**	-213.3
Cost structure		
Bought feed cost, %	19.6	17.1
Cost of growing feed, %	2.9	18.5
Animal health and breeding, %	7.1	2.9
Paid labour, %	6.3	24.5
Contract labour, %	10.1	5.4
Fuel, energy and water, %	3.9	12.0
Maintenance of machinery and buildings, %	10.6	4.8
Land rent, %	4.1	5.3
Depreciation, %	18.3	9.3
Interest, %	10.3	0.0
Other costs, %	7.0	0.2
Asset structure		
Market value of the land, %	62.7	24.8
Book value of buildings, %	19.3	17.4
Book value of machinery, tools and installations, %	4.4	12.3
Market value of livestock, %	8.2	29.3
Book value of inventory, %	0.9	2
Book value of other assets, %	4.4	14
Return-on-assets (ROA), %	**1.44**	0
Cost of expanding per 100 cows, x1000 EUR	1,968-3,575	**375-636**
Managerial		
Milk yield per cow/year, kg	**7854**	5052.8
Milk yield per ha/year, tones	**14.7**	2.5
Milk yield per labour hour/year, kg	**160.4**	27.8
Feed efficiency, kg DM/kg milk yield	**1.04**	n/a
Feed crops yield (fodder maize), tones DM/ha	**15.5**	11.8
Herd replacement rate, %	30.4	39.5
Age at first calving, months	**25.6**	27.8
Calving interval, days	409	403
Culling rate, %	15.8	32.1
Lactation period, days	**351**	338

6.2. Discussion

There are several important issues to consider in current benchmarking analysis. With regard to limitations of the study, the first stands sample size. The number of researched farms in both countries is relatively small. Face-to-face interviews had to be used as selected indicators are not reported in any source and qualitative issues need to be observed. Therefore, in some sense this is a physical limitation and a question of access to farmers for a MSc student. Although the sample sizes in two countries were relatively small, the results are expected not to differ significantly in case of large sample size.

It was not possible to calculate the feed efficiency indicator for five Ukrainian farms because of the lack of data. This has partly limited the conclusions with regard to feed management. Another tough issue was the estimating opportunity cost for farmer's labour and management. It is not supported by any suitable methodology in the literature so the accuracy of ROA calculation for the Dutch farms may be questioned.

In general, the outcomes of financial aspects benchmarking showed that Dutch dairy farms have better financial results than Ukrainian ones. However, as mentioned in chapter four, state support was not taken into account when calculating net income. With respect to Ukraine, this is very important as the support itself, which is in fact VAT of the processors, is quite significant. It's very likely that Ukrainian dairy farms are profitable if taking into account income from processors' VAT. Nevertheless, starting from the 1-st of January, 2011 a new system of state support is introduced. All processors' VATs are supposed to be gathered to the special fund and the payments are supposed to be redistributed in equal amounts per cow, regardless if the milk goes to processor or not. Such a system is less beneficial for the dairy farms and will affect their profits. However, new system of state support brings the situation when old reluctant "it's still ok" approach is not okay anymore and this system may become another significant driver for qualitative changes at Ukrainian dairy farms. In contrast to Ukraine, state support of dairy farms in the Netherlands is relatively insignificant and almost 100% of it consists of decoupled payments for which milk production is not necessary.

Average values (means) were used everywhere when presenting the results. Such approach is suitable, but neglects the variation of the data which actually exists not only in sizes of researched dairy farms from both countries, but also in farm income indicators, ROA and culling rate indicator of the Dutch dairy farms.

6.3. Recommendations for Ukrainian and Dutch dairy farms

Although small sample size and existence of variance in farms' results could be partial limitations of the current study, the recommendations for improvement of both Dutch and Ukrainian dairy farms can still be derived. It was shown that in order to grow and reach the level of Dutch dairy farms, Ukrainian farm managers should, first of all, change the way of thinking and become open to information. "It's still ok" approach has to be abandoned. Besides, the following recommendations can be derived for the Ukrainian dairy farms:

- farm managers are advised to restructure the business and considerably reduce the number of employees saving the best ones and improving their competency;
- farms which are really willing to milk cows are recommended to get rid of other activities so that they become specialized;
- more attention has to be paid to the increase in productivity of feed production. Taking into account the quality of Ukrainian soil, it's hardly satisfactory to have lower maize yields than Dutch farmers have;
- finally, efficient milking systems are recommended to be installed. It could save
- labour, improve milk quality and, therefore, contribute to the increase in net income.

With regard to Dutch dairy farmers, they are recommended to decrease the amount of debt capital. High share of debt capital (on average 10% of Dutch farms' cost structure is occupied by interest expense) may become a considerable threat under uncertain market conditions in the near future, taking into account that milk price is forecasted to decline. Those dairy farmers who have already invested in new capacities for 2015 are recommended to (re)execute investment (NPV) analysis taking into account forecasted milk price decline. Besides, in 2015 new environmental constraints are expected to appear in dairy farming sector. It might be important for the farmers who are planning to expand to pay attention on such constrains and make proper calculations in order to investigate if they are eligible for higher volumes of production before investing in new capacities.

6.4. Recommendations for further research

Current study has pointed on the problems of (mainly) Ukrainian dairy farms. The recommendations were derived on which actions have to be undertaken and which changes have to be implemented in order to reach improvements. However, future research needs to be dedicated to investigation of possible and the most suitable ways or scenarios of bringing these ideas to life. First of all, it is needed to identify the most optimal way of restructuring Ukrainian dairy farms and find the most efficient approach on how to succeed with fewer employees. In

addition, with regard to the Netherlands, future studies have to investigate the essence of main constraints for the Dutch dairy farms after 2015 and suggest qualitative ways of coping with them.

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Appendices

Appendix A – The Questionnaire for the Netherlands[19]

Indicator	Farm data
General information on the farm Province	
Cooperative	
Quota size	
Herd size Tillage area	
Number of workers	
BEP	
Farm income, EUR/kg milk - net farm income from operations;	
- milk produced in 2009;	
Cost structure[20]	
Asset structure	
Return-on-assets (ROA), % - interest expenses;	
- average yearly assets;	
Productivity measures Milk yield per cow/year, kg;	
Milk yield per labour hour/year, kg; - labour hours worked	
- of which family labour hours	
Feed management Feed efficiency, kg DM/kg milk - DM fed per cow/year (day);	
Feed crops yield, DM/ha	
Herd management Herd replacement rate, %	
First calving, months	
Calving interval, days	
Culling rate, %	
Lactation period, days	

[19] The questionnaire shows which data was asked during interviews with farmers

[20] Cost structures were computed at the farms so relative values (percentages) were written down into the questionnaire. The same holds for Asset structure.