# Evaluating the Financial Position and Performance of a typical Dairy Farm in Bulgaria

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# EVALUATING THE FINANCIAL POSITION AND PERFORMANCE OF A TYPICAL DAIRY FARM IN BULGARIA.

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## ABSTRACT

The aim of this paper is to explore the potentials of typical middle sized dairy farms (with 22 cows) to absorb the quotas and market shares released by the small scale farms after the EU accession in 2007. The hypothesis is that quota introduction combined with high quality standards for raw milk will significantly reduce the share of small scale farms in milk production for processing. If different opportunities for alternative income-generating activities become available for small farms (as a consequence of the EU accession), their willingness to give up dairy farming will increase. Middle sized farms will benefit from an improved access to resources and also from more favourable conditions for economic growth.

In this paper the analysis was made on the International Farm Comparison Network (IFCN) concept of typical farm. The Trade Implication and Policy Implication CALculator (TIPICAL) modelling program provides financial statements and most of the calculations for business' profitability, solvency, liquidity, cost analysis and comparisons.

The results of the financial analysis show the poor credit power of farms, when calculated only on farm assets market price. In the same time, it reveals the potential of growing and carries out an economy of scale when both financial and farm management are improved.

***Keywords****: dairy farm structure; financial position; measures of solvency; growth potential*

## Introduction

Traditionally Bulgaria is a net exporter of milk and milk products, it can be expected that after joining EU, Bulgaria will try to sustain that position. The problem with that is not only the strong price competition by EU processors, but the quality requirements of the EU market and increasing domestic quality requirements. Combining the competition issue with the trend of restoring the domestic milk consumption to the former level, reveals a situation in which the sector will face serious deficit for quality raw milk supply. In such a situation there is a possibility that Bulgaria will become a net importer of milk and milk products in a few years. That conclusion was made by many processors and from 1998 we can observe increasing numbers of support programs for dairy farms from one side (the processors) and many programs and activities of the government from the other, to support quality improvement measures on the farm.

Nevertheless during the last years dairy processors suffered increasing lack of supply with high quality raw milk. At the beginning of 2000 the professional farms, those with more than 10 cows, were able to satisfy most of the demand for high quality raw milk and the rest (45-50%) of the milk for processing was collected from the small-scale farms. Now in 2006-07 the processors still have 1 year permission to collect lower quality milk[i]. Empirical evidence (Swinnen at al. 2004) shows that support programs offered by the processors are getting wider and include some investment support, bank guarantee and other. Those programs are in best

used by the middle sized farms (10 to 50 cows), but it is not enough since the numbers show that small-scale farms still dominate in the supply for processing.

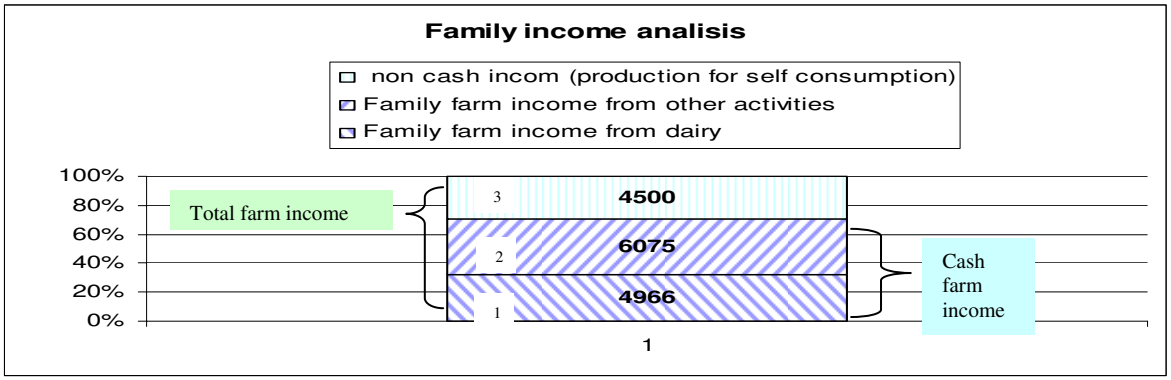
The current farm structure and producer-processor relations could be summarised in the following table with respect to the processors, small and middle farms:

| **Agents** | **Raw milk market for processing** | **Quality improvements** | **Capital market, investment** |
|---|---|---|---|
| Dairy processors | Short of supply for quality raw milk for processing. Need more and stable suppliers very soon | Farm support programs – cooling tanks, milking equipment, identification of correct cleaning programs. | Contracting with farms with more than 10-15 cows in general. Short term capital support, milk futures, |
| Professional, middle size class farms 10 till 50 cows | Typically half of the milk given to the processors is collected by the nearby small scale farms – lower quality. In near future these farmers will lose half of their income from that milk. | Relatively done, but need serious measures to maintain the situation and at least shifting above 30 cows to be able to pay back the expenses for improved quality | The assets structure in farms with less than 25 cows gives no chance for significant capital accumulation. Land is not accepted as collateral by the banks, government programs offer micro credit with very complicated procedures. |
| Small scale farms – less than 5 cows | Little or no access directly, normally via bigger farms nearby. Low prices, high level of direct sales and self consumption. | Barely possible in this size | No access to any investment sources, not eligible for significant government support programs, age structure constrains |

We are going to examine this situation from the point of view of the Bulgarian (BG) 22 cow "typical farm", as we consider its potential for development the professional dairy farming in Bulgaria. The census and interview shows that in general, farms with 20 and more cows are managed by younger farmers who considered themselves as professionals, and have tradition and plans to stay in dairy farming.

## The problem under investigation

### Graph 1: Family income structure of the typical 22 cow farm




The major part of the farm income is the one from milk collecting (section 2 of Graph 1) form nearby small farms and selling it to the local processors with a good margin. One can assume that the farm is going to loose this income when the processors are forced to collect only high quality milk, that with less than 400 000 somatic cells/ml. That is because lower quality of the milk from the small farmers – 40% of the total amount the farmer is selling to the processor. The 3rd part of the income is the estimation of the production comes from the farm backyard in form of vegetables, fruits, eggs and meet, in other words production for self consumption.

The problem have come to a head with 40% lose of cash income when the regulations for quality of the milk for processing are taking place. From processor point of view he has to refuse the half or all of the milk from that farm due to low quality. Decision driving forces for the farmer are the desire to sustain and increase his income, assuming that he will remain in the dairy business. That is supply the processor with the same amount of milk but better quality or instead collecting form the small farmers to produce it by his self. The processor will try to insure the stable supply with the height quality milk therefore he will more likely support the contracted farms in growing and quality improvements.

The aim of the paper is to examine the potential of middle size farms to grow and absorb resources from small-scale farms if and when they release it. The assumption is based on sector analysis (Graph 2 and 3) and the framework of the EU acceptance.

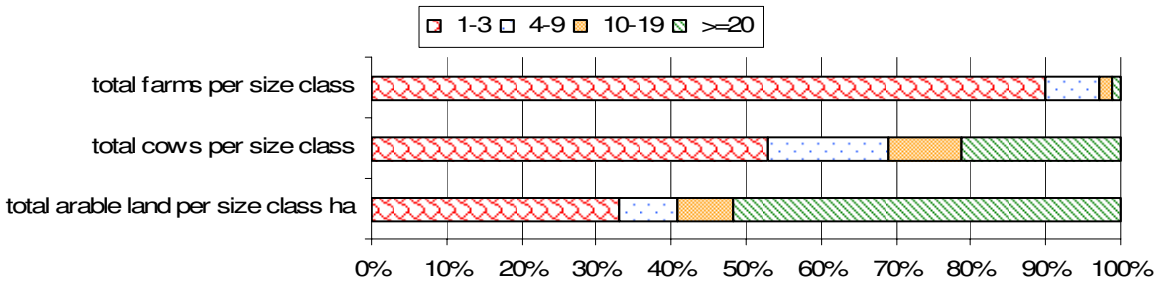
The Annual agriculture report of Ministry of Agriculture and forestry 2005, Annual report of SAPARD program for Bulgaria 2005 and State Fund Agriculture account the negative effect of the small-scale farm structure. Furthermore, government policy and Common Agricultural Policy (CAP) reform are setting up constrains in front of small-scale farms. As a result the chance of obtaining cash returns is almost impossible for them after 2007.

The conclusion is that it is difficult to manage the “negative” small-scale structure of dairy farms. From other side, the government rural development policy from last 5 years was to create non-agriculture income opportunities in rural areas. The combined results show a weak but still sensible reduction of the small-scale farms corresponding to an increase in the medium size farms. The farms with more than 10 cows are growing in numbers with 13,5% from 2003 till 2005.

## Area descriptions

The brief picture of the farm structure is given by Graph 2, where the red (first from left to right) bars represent the share of small scale self-sufficient farms. Half of the dairy cows and the farms of this group cultivate 1/3 of the total arable land. Because of the farm numbers and significant resource in possession, these farms determine the aggregated results from the last census and sector statistics.

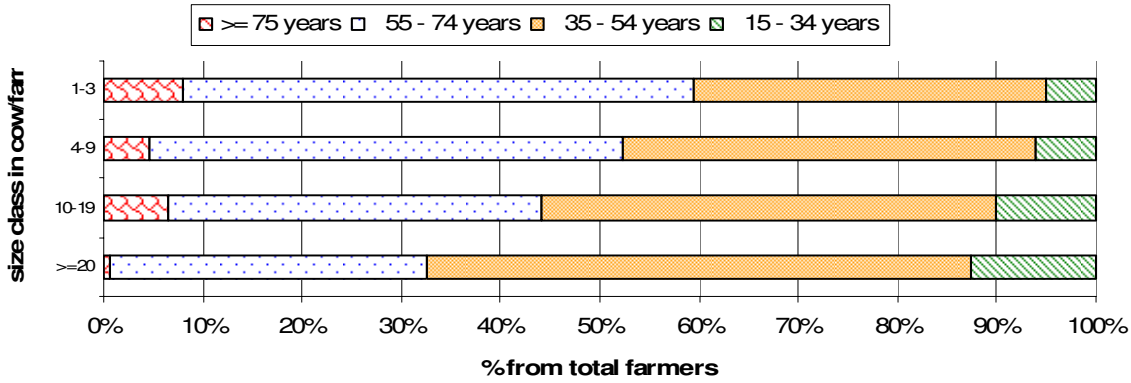
**Graph 2: Farm size class, size class per cows and arable land**




Source: Agrostatistics, MAF Bulgaria 2003-2005

Age structure analysis reviles some important aspects about the future structure alteration. First of all relatively high percent of old farmers, 8% more than 75 and 51% in age group form 55 to 74 years and second is the positive but not very clear tendency - the younger the farmer the bigger the dairy herd is. An idea for future analysis is arise since this age group has particular characteristics including extreme sensitiveness to social polices and services as well as very conservative behaviour in general. Age plays a prominent role when analysing subsistence agriculture in transition economies, social security system hence play a key role in solving subsistence (Noev at al. 2002)

**Graph 3: Age structure per size class**




Source: Agrostatistics, MAF Bulgaria 2003-2005

On this basis we accept that a relative amount of resource will be released by the oldest age group and the small scale group. Our task is to determinate the ability of the next group to absorb that resource or to use this opportunity when solving his own problems.

***Methods***

To define the "next group" we use the typical farm approach of International Farm Comparison Network (IFCN) and apply it to the Bulgarian dairy farm structure.

A typical dairy farm represents the dairy farms in a region in terms of size, crops grown, livestock systems, labour organisation and production technology used. For selection of typical farms, we first identify the region(s) in a country where milk production is most important in terms of volume of production and/or density of dairy cows. Also a dairy farm is defined as generating the majority of its income from selling milk, e.g. measured in percentage of total gross margin. The percentage of milk production in total gross margin should be at least 50%.

In the case of Bulgaria dairy farm structure this criteria could mislead us. It contradicts the average farm size (by number of cows) and consequently the majority of milk production.

In short, the average farm size by number of cows is 2.5 animals and this comes from 90% farms in the group with 1-3 cows per farm. This group produce around 40% of the milk. In the same time almost all of the farms in this group generate less then 50% of their income from selling milk. The specialisation is observed in farms in size class form 4 to 49 cows, and in bigger than this when the farm is organised in independent enterprise (the case where big crop production enterprise is maintaining a dairy farm).

That makes the criteria specialisation not very relevant in current situation, but it gives us more weight to the middle size class with 4-19 cows because high level of specialisation was observed among them. The characteristics of the farms with accent to the size and the perspectives for development are better represented by the subsequent grouping.

1-3; 4-19; 20-49 and >50

Following this a BG 2 and BG 22 were created as typical farms representing the country milk production. In the IFCN Dairy Report 2006 these farms were used to compares Bulgarian milk production and dairy farming world wide.

For the purpose of this paper more detailed analysis was carried out on BG 22 cow's farm with the aim to find the problems and opportunities inside it. However, what we often see firs are symptoms and not actual problems or opportunities.

***Techniques***

Using the BG22 typical farm as base line we make some "better management" corrections on it. The first was simplifying the feed calculations for more realistic projections and secondly, simulate replacement of the milking equipment together and the construction of a new milking parlour in a separate premises (building). For that purpose we **reduced the economic life time** of the milking equipment and set it up to be replaced in 2006, and "put in use" the new milk collecting centre in 2007, this represents a combined investment of 27000 leva (1 lev = 1,95 euro) in first years of simulation. These settings slightly changed the base line farm results from the first year of simulation with respect to the assets at the end of the year and their depreciation.

From the financial analysis of the base line we have the maximum loan capacity of the farm as 80% of the assets or 40000 leva. With this constraint we prepared a projection with the TIPICAL[ii] model using the following strategy:

- removing the "other farm income" comes from milk collecting
- reducing the "other farm activity" – services with machinery to other farmers
- doubling the herd size in two steps before the end of the second year (approximately 13000leva in two years for 16 animals, the rest is farm self reproduction)
- investing 20000 leva for "Milk collecting centre" – room for the milk tank and 2x3 fish bone milking parlour
- replacing the old milking equipment (upgrading) to use it in to the milking parlour – 7000 leva

The price assumptions for the projections were made on the data from Bulgarian National Bank and Agency for Economic Analysis and Forecasting (http://www.aeaf.minfin.bg/), concerning inflation and interest rate. The rest of the price (materials, services etc.) are the Bulgarian prices from 2005 multiple by coefficient for price development in EU till 2014 (IFCN Dairy Research Center 2005/06).

The weakness of that strategy projection is that we use the model option for cash flow calculation and let him to take loans when the farm needs it. That gives us the real amount of the investment needed for the strategy and reduces the amount of interest to be paid. In practice farmers in that size do not possess such an option, and if they use such a strategy a full amount should be taken at the beginning. From other side, as we mentioned, farmers are not able to take such a loan if for example they don't use their house as collateral, but they could eventually make several smaller loans and through the model we can see when and how much the farm will need in order to realise that strategy.

After running the model, financial analysis were made on the results for the first five years and compared with the initial situation. Detailed specification of the variables and their values can be requested from the author.

**Results**

The financial positions of the typical middle size dairy farm (BG22 base line) revealed that small-scale and middle size farms are at a certain level self-sufficient. It was estimated (IFCN method for family living calculation) that Family Living Expenditure (FLE) is about 15 000 leva, for the farmer family. The average income for household (Statistical Year Book 2005) with 4 members is about 9569 leva, and desirable target for the farmer since the household is typically 5-6 persons, is about 18 000lv. The analyses show that only the subsistence minimum is covered by the farm net cash income (11041 leva) or the family budget is relatively satisfied with respect to the cash. During the interview on the question: "How much you pay for vegetables per month?" farmer's answer was – "I never ever buy a tomato from the market! I grow them in my backyard, as well as chickens and usually a pig". So the calculations shows that the cash equivalent of all the goods produced for self consumption (vegetables, fruits, meat and milk) is exactly the deviation between subsistence minimum and FLE or from 4 to 6 000 leva.

In the case of BG 22 typical farm, when we separate the farm activities (Graph 1) and use the arguments of Kostov and Lingard 2002, we can define the dairy enterprise as fully market

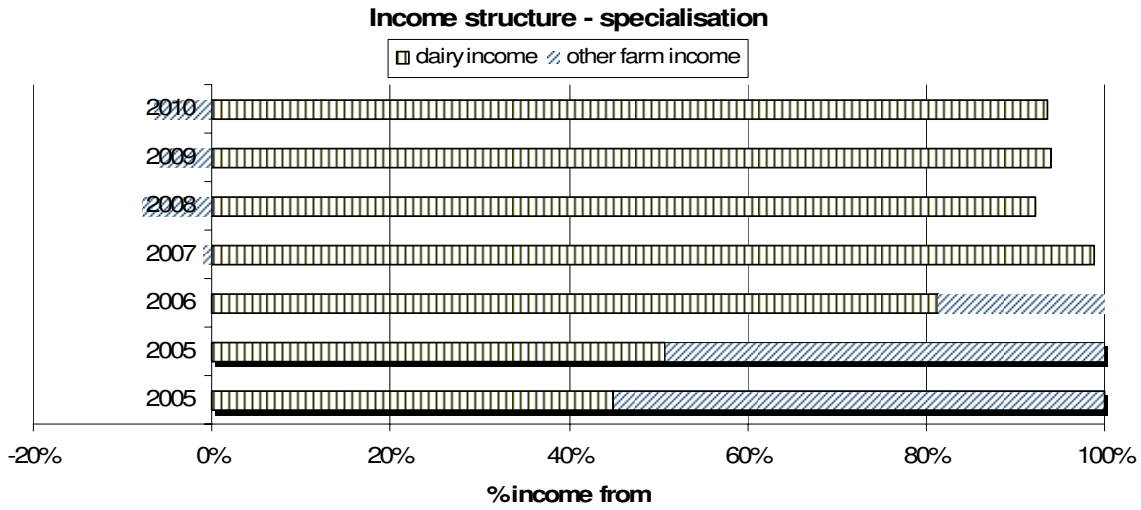
orientated and the rest (agriculture farm activities – vegetables, poultry, pigs etc.) as self-sufficient farming while no evidence is collected that farms of this size sell other farm products they produce.

The interesting thing within the income from other farm activity (non crop or dairy) is that it is mostly from milk collecting. Opportunity for this is the number of small-scale farms nearby and the processor preference to work with relatively fewer, larger, and modern suppliers (Swinnen at al. 2004).

When combining the off-farm and non-dairy returns (17 000lv) the result is de-facto the amount that farmer most probably will lose after processor stops buying low quality milk. There is two alternatives, to quit farming or find a way for earning this amount form the dairy farming by using the available potential, farm resource (labour, machinery etc.) for growing in meaning of dairy specialisation, only missing component is the investment capital. In other words how could it happened that the farm receive 23 000lv (17000 + cash equivalent of the self-sufficient production 6 000lv) more out of the dairy instead of other farm and off-farm activities?

First aim of the strategy we apply was to obtain the desired picture concerning the income ratio from dairy enterprise and other enterprises (Graph 4). The first two bars are the base line farm and the "better managed" one for first year of simulation.

**Graph 4: Income ratio of the farm in projection**




In the second year the income from dairy is almost 100% from the total, which implies that we substitute other farm incomes by income from dairy only. In other words all the resources used for milk collecting (costs) were transferred (relocated in the model) to the dairy enterprise and returns are found in to milk sales. That is family labour, machinery and buildings fully relocated to the dairy because the needs of doubled herd size and therefore increase in receipts from milk sales.

That actually is the answer we were searching for, but most important is how this investment of (actual from the model simulation) 27000 leva for building and machinery and approximately 13000 for livestock, affect the financial position of the farm.

## Discussion

### *Measure of Profitability*

With this measures high value is desired, the non-farm and family portion of set of records is excluded from the analysis unless explicitly stated otherwise.

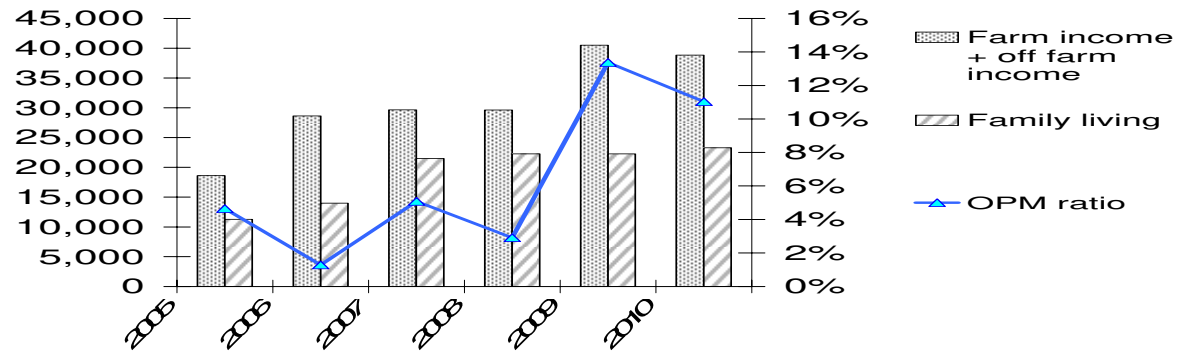
The evaluation shows than in this category the farm has major weaknesses. The farm has no liabilities in the calculated period, private property is not included in to the assets and there are no income taxes on the agricultural production at all.

The Net Farm Income is in fact farm profit and it is a basis for family drawings. Since all of the measures are mostly affected by the amount of family drawings it is interesting to see the elasticity based on this variable. It is obviously that in terms of cash the farm can't cover the living minimum estimated on minimal annual salary for the country. A positive result by using almost all of the net farm income as family drawings shows that rates of returns on assets of the farm is strongly depend on the cash expenditures of the family.

In reality it is known that the biggest amount of family cash expenses in Bulgaria is for food and it is different for the rural and urban areas. In rural areas it is lower than urban areas. Since all the cost for industrial goods and fuels are accounted in to the total farm expenses, the net farm income need to cover clothes, luxury commodity etcetera. In that matter it appears that the two family members working in the farm are earning more than average annual salary estimated in the country (BG Statistical Yearbook 2005).

Operating efficiency of the business, a relative profitability measure, is revealed by operating profit margin ratio (Graph 5). A low net profit margin is caused by all together: low prices, high operation expenses and inefficient production. But as we mentioned the farmer drawings are in influencing the coefficients, so when the Net Farm Income (NFI) is increasing, the family increases their drawing and that is why operation profit margin is very low in second and third years.

**Graph 5 Operation Profit Margin Ratios**

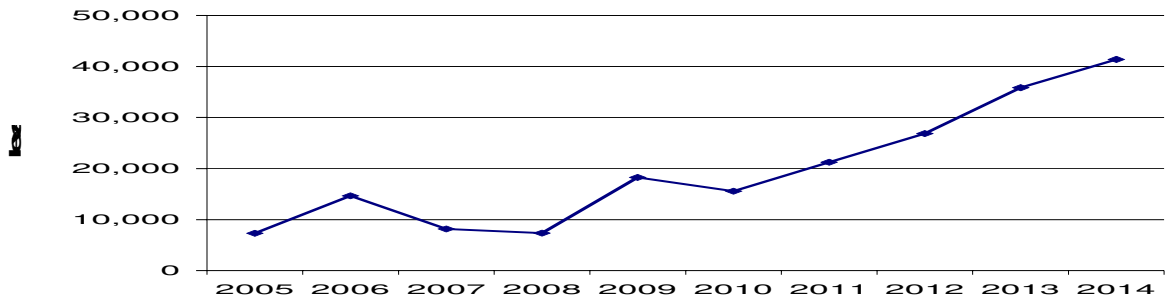



### *Measure of Solvency*

The first solvency measure is *Net worth (NW* Graph 6*)*, or it is absolute measure of the cushions between asset values and liabilities. It can be used to increase borrowing and (or)

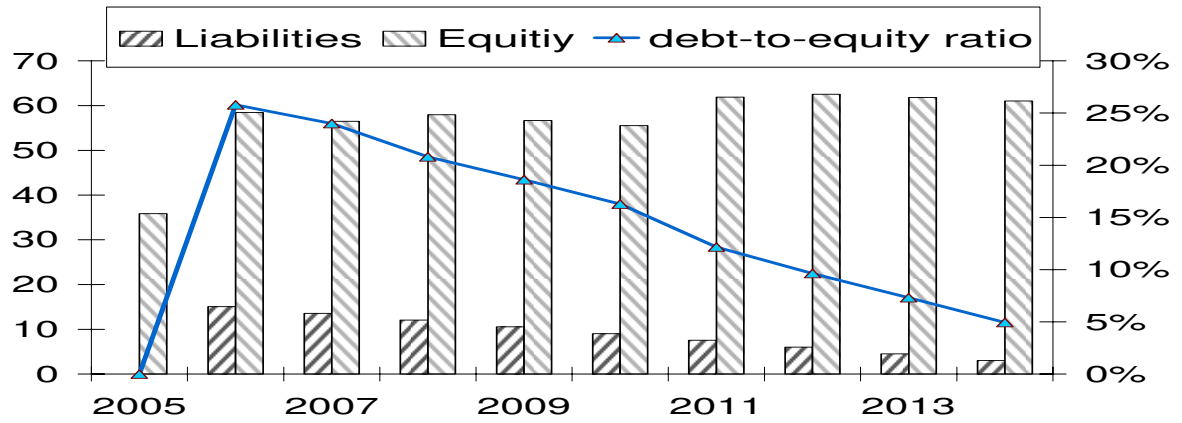
enduring loss in asset value. In the base line its value is lower but the important note here is that NW is calculated on **cost basis**. The banks usually would estimated the borrowing capacity of such a farm only on the 80% basis of the **market value** for the animals and the bigger machinery like tractors or trucks, nothing else is accepted by the banks (land – low price and no real market for it, tools and milking equipment, tractor inventory, trailer's etc. – no actual market value). That would give us real borrowing capacity less than 25 000 leva.

**Graph 6 Net worth of the farm**




The low amount of working capital and poor operating efficiency leads to negative or low profitability marks. In the same time we have extremely positive (less than 40% is generally considered as positive –Olson 2004) marks for solvency (Graph 7), in other words the farms has low credit risk. The Farm debt-to-asset ratio reveal that only 10% of farm assets are financed by debt capital or potential creditor will face lower financial risk. Together with his mirror-image, equity-to-assets ratio (the sum of both is 100%), this measures shows positive financial position of the farm: a smaller portion of the assets is owned by creditors. In the first year of projection this is 0, but that is coming from the fact that the old loans of the farm are paid back in 2005 and to avoid overlapping we make it zero.

**Graph 7 Farm debt-to-equity ratios**




***Financial Efficiency and Repayment Capacity***

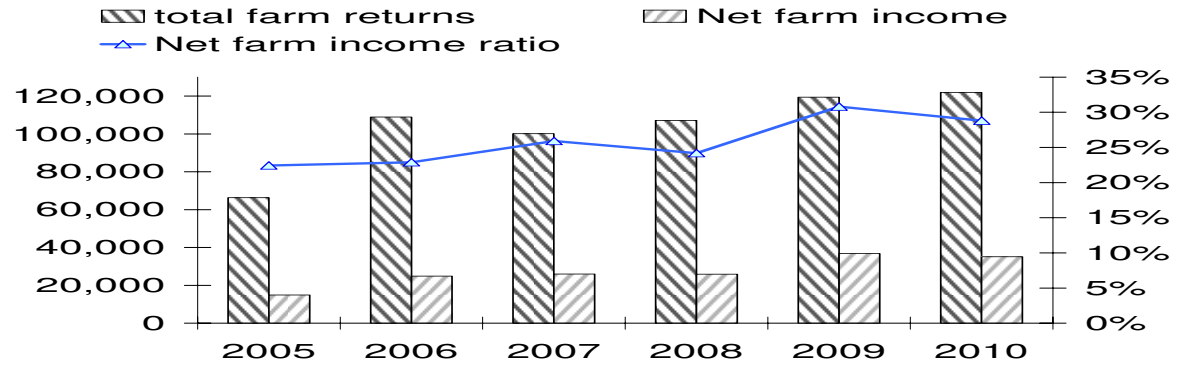
The assets-turnover measure is more than 100% and that comes from the depreciated machinery first and second, the absence of buildings because the barn is rented, all together with very low market price. It doesn't actually mean fast asset turnover, in fact it represents the main characteristic of farming in Bulgaria – very old machinery, no or few buildings, high level of hand work use.

With 75% operation-expense ratio (78% in base line farm without better management settings) the farm has very low capacity for financing capital replacement (capital replacement margin) and in practice it is difficult to distinguish this from the family drawings. Or the replacement is not depending on the capital replacement margin but on farmer decision either to cut from family drawings or to increase it. If the farm has bookkeeping, it must reinvest at least 60% of the tax calculation, because farmers don't pay taxes but still they should calculate them.

The subsidies are going to reach 20% of the income till 2010 as it was set by the accession contract (AGRARIAN REPORT Bulgaria, 2005). Considering that no change in land is projected, in reality the farmer will try to increase his arable land since it is source of income as well. This is related with the feed price and ability of the farm to produce own feeds.

There is a "strong" net income ratio from more than 20% all the years of simulation which is an evidence for general positive financial position of the farm. It if farm from optimal, but it's what is necessary to prepare the farm for future development, an enterprise structure which makes it easier for prediction and manipulation.

**Graph 8 Net income rations**




**Conclusion**

Capital comes in two basic forms: equity capital and debt capital. However, equity capital on a farm is a residual claimant on income, that is, paid after other expenses and claims are paid. If there is noting left after that, then any increase in farm equity can't be expected.

The analysis reveals the potential of this farm to grow and improve its efficiency only if together with better capital market accesses a significant step in improving the management is made. In the same time it shows how sensitive are all the measures by different level of family drawings. Therefore until the farmer reach stable coverage of the normal (more than basic) cash expenditures, he would probably give-up any self-sufficient production and consider himself as professional dairy farmer (Kostov et al. 2002).

The above discussion is referring the "other farm activities" and "subsistence production" in a BG 22 typical farm. One must pay attention on the fact that BG 22 cow typical farm has **some self-sufficient production** (Graph 1) but in general it is market orientated. The strategies simulated actually transform the farm in a shape that can be easily predicted. The improved income (from dabbled herd size) predisposes disengagement from subsistence production and other activities in to dairy (or alternative employment). But extending production, which is a

consequence of agricultural commercialisation, is not possible unless there are conditions for accumulating the specific capital needed for this expansion (Kostov at al. 2004).

Such conditions are available when considering the milk quality issue. Bulgaria has a lowest degree of vertical coordination in dairy chain but most of the dairy processors offer assistance to their suppliers. Security in supply base is indicated as the main reason for offering credit programs for dairy specific investment, support for assessing inputs for on-farm feed production and even bank loan guarantees (Swinnen at al. 2004).

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[i] Hygienic and safety standards for raw milk fixed by dates

1. from 01.01.2006 - 31.12.2007 criteria number of germs from 500 000/ml till 300 000/ml and for Somatic Cell Count (SCC) from 500 000/ml till 400 000/ml;
2. form 01.01.2008 - 31.12.2009 criteria number of germs from 300 000 /ml till 100 000/ml., and for SCC till 400 000/ml;
3. From 01.01.2010 is not allowed to collect milk for processing which has more than 100 000 gems and 400 000 SCC, it can be use only for self consumption.

[ii] TIPI-CAL is the abbreviation of Technology Impact and Policy Impact Calculations.

TIPI-CAL is a European further development of the FLIPSIM model (Farm Level Income Policy Simulation Model), operated by the Agriculture and Food Policy Centre AFPC, Texas A&M University, USA. TIPI-CAL is a farm-level, 10-years, recursive production and accounting model. At present, the dairy enterprise including forage production as well as the arable enterprise and organic farming are covered by the model. Extension towards further enterprises (beef, beef cow calf, sow and pig production) is foreseen.