EXECUTIVE SUMMARY
A FRAMEWORK FOR DEVELOPING INTERNATIONAL REPRESENTATIVE FARMS: THE CASE OF DAIRY

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AGRICULTURAL & FOOD POLICY CENTER
TEXAS A&M UNIVERSITY SYSTEM

Department of Agricultural Economics
Texas Agricultural Experiment Station
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1 Need for international representative farms

The world economies are globalising and becoming more interdependent. The removal of trade barriers will continue; modern technologies facilitate storage and long-distance transport of agricultural products; new communication technologies have made international exchange of information very easy; big food companies originate commodities, process and sell products in many countries throughout the world.

For these and other reasons, the future allocation of agricultural production will be increasingly influenced by the comparative advantage of world's agricultural production regions. The question of how the different production areas in different regions will perform in future, is of interest for policy makers, agribusinesses and farmers. They ask for:

- Assessments of the impact of alternative liberalisation strategies on different farm types.
- The reasons for lack of competitiveness.
- The best strategies to improve competitiveness of domestic agriculture.
- Analyses of the influence of government regulations on international competitiveness.
- Analysis of the impact of production systems on the environment in different parts of the world.

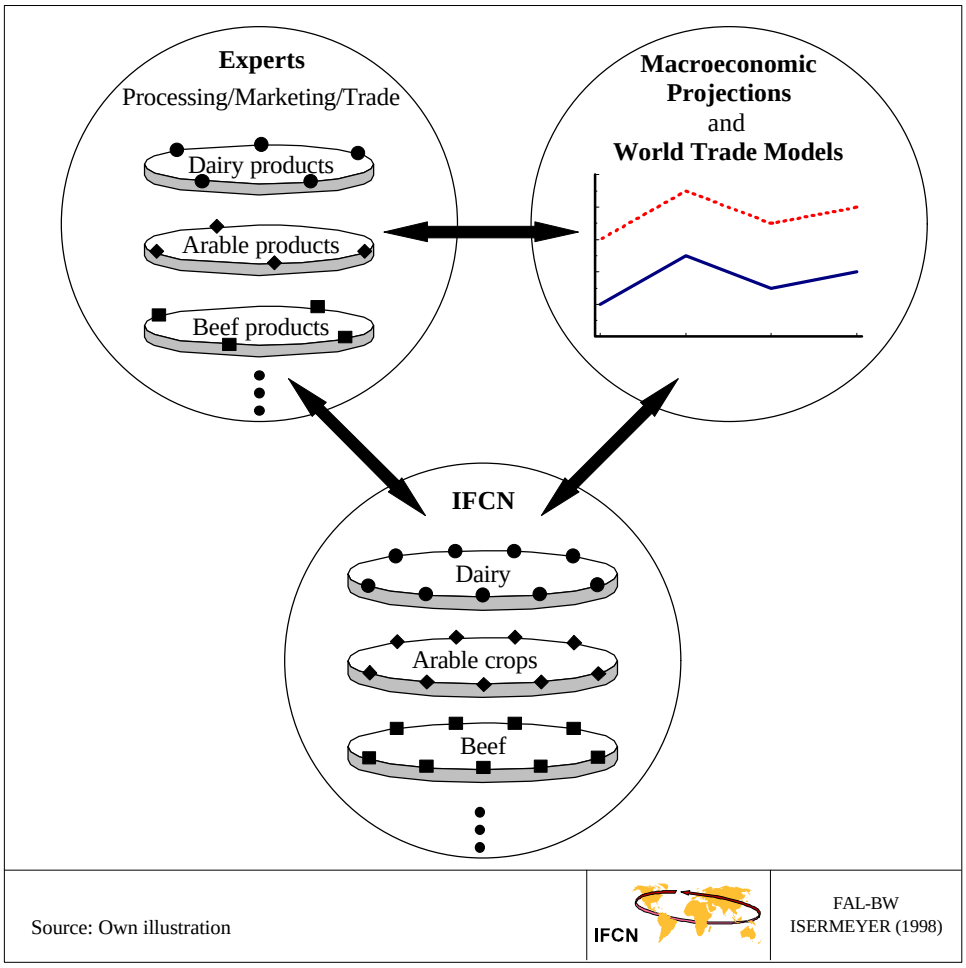
Until now, there are insufficient answers to these questions. There is no infrastructure available that enables agricultural economists to produce the desired answers within reasonable time. The reasons are:

- The great majority of farm economists is still operating on a national scale. A few studies on international competitiveness have been carried out on an ad-hoc basis and consequently became outdated within short time. The results of these studies cannot be compared because different methods were used. Almost all studies look backward and do not provide future projections.
- International trade models operate on a very high level of aggregation. In most cases, they rely on assumptions about the elasticity of supplies. There is scope for improvement by linking these models to farm-level analysis. Questions regarding the potential for increasing competitiveness of a certain region, cannot be answered by highly aggregated trade models.

A major goal of IFCN is to close these gaps (see Figure 1). The idea to create IFCN was born at the FAL (Germany) in 1995/95, based on 10 years of research experience in the field of international competitiveness in co-operation with the Agriculture and Food Policy Centre (AFPC) at Texas A&M University (USA). The AFPC has 15 years of experience with a

national network of typical farms (see Figure 2) and recent experience with the extension of that system to Mexico and Canada.

Figure 1: Vision of a linkage between IFCN and other networks



The IFCN has the following objectives

- To create and maintain an infrastructure allowing sustainable analysis of agricultural production systems around the world.
- To analyse and project the impact of structural, technological and political changes in the participating countries.
- To facilitate communication and data exchange among economists interested in farm-level analysis and issues.

2 Framework for developing international representative farms

The IFCN is based on three elements:

- The international network of the participating institutions, who enter into a sustainable co-operation in line with well-defined rules (partnership approach).
- Panels that build "typical farms" of different farm types (like dairy, crop etc.) in various regions of the participating countries. For each typical farm, a panel consisting of four to six farmers, one local advisor and one scientist from the national IFCN centre must be established.
- Simulation models that projecting the typical farms under various scenarios up to 10 years into the future

The technical and economic data of the typical farms are gained on the consensus achieved in the discussion of the panel meetings, based on the accounting data of the participating farmers and their expert knowledge. Thus, the data are neither statistical averages nor individual farm accounting data. Internationally harmonised procedures for data collection, data handling and data analysis (cost of production, profit, etc.) are applied to develop and utilise the typical farms for analytical purposes. Panels come together for data collection and update as well as for identifying and discussing strategies and adjustments to changing policy, technology and market conditions.

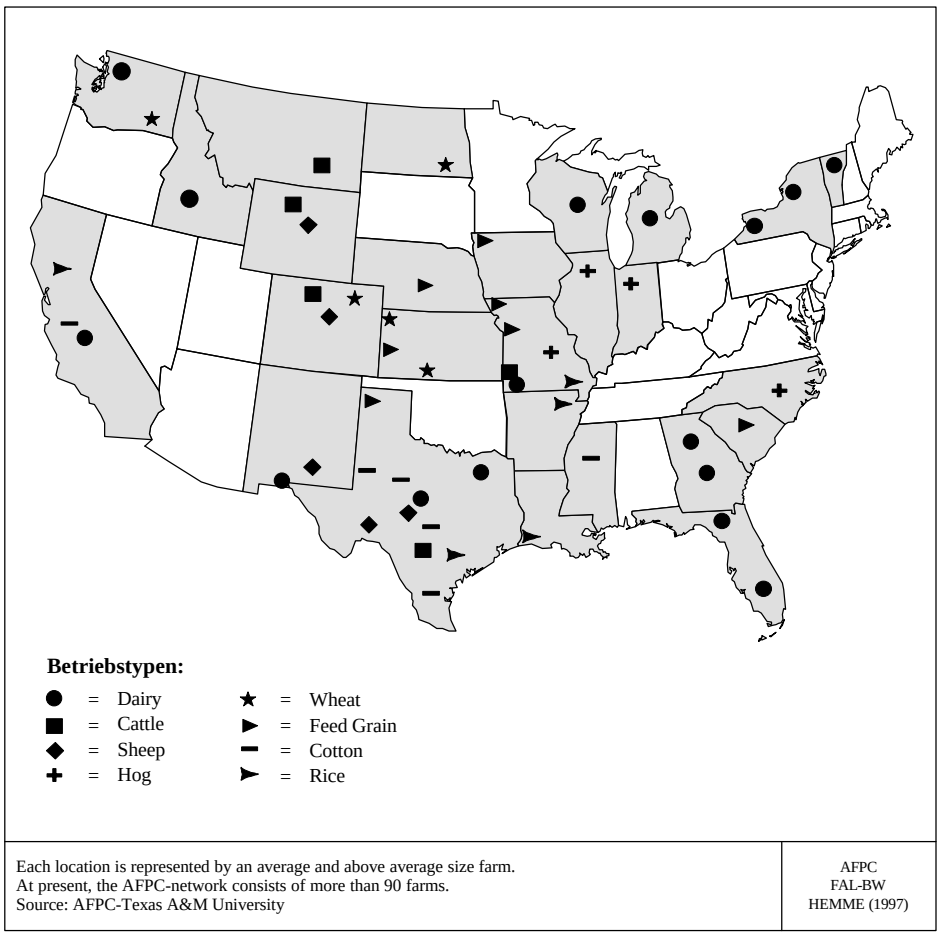
For the 10 year projections, assumptions on the development of prices and assessments about the development of the upstream-industries (processing, distribution, trade) are required. Therefore it will be necessary to combine the farm-oriented, micro-economic approach of the IFCN with other macro-economic and agriculture sector tools operating in networks (see Figure 1).

The participants of the First IFCN meeting at Braunschweig (April 1998) agreed on the following division of labour between the scientific institutions involved:

- Each participating country shall have one national headquarters responsible for all national network activities, establishment and maintenance of panels, data exchange and harmonisation. Further partners may join the network in co-operation with the national headquarters with the objective of adding experience in other farm types, commodities or regions that cannot be covered sufficiently by the national headquarters.
- A small number of world region centres (WRC) shall take responsibility for the co-ordination of the network on a supranational level, development and maintenance of the models, co-ordination, storage and review of publications as well as marketing of IFCN on an international scale. For the time being, the FAL will be the in charge for Europe

and the AFPC for the America. Other WRCs will emerge with the growing of IFCN. The world region centres have a particular long-term commitment to provide resources for the co-ordination of the network.

Figure 2: AFPC Representative Farms



Each farm type indicates one panel or a pair of two panels:
Dairy: 16; Cattle: 5; Sheep: 5; Hog: 3; Wheat: 5; Feed Grain: 7; Cotton: 6; Rice: 4

Each country headquarters must seek national funding and permanent staff to establish and maintain the national infrastructure. Once this is assured it is anticipated that the country headquarters will contribute to the costs of operating the WRCs. It is further envisaged to seek funding from supra-national institutions in those cases where it seems appropriate.

Suitable action will be taken to assure that only internationally authorised and harmonised models are being used under the IFCN label. IFCN participants can only publish data from their foreign IFCN partners on prior agreement and participation of the foreign country headquarters.

3 International competitiveness of dairy production: An illustration of what can be done with international representative farms

The First IFCN meeting took place in Braunschweig from April 14 - 19, 1998, sponsored by the German Federal Ministry of Agriculture. 30 participants from 17 countries attended the meeting.

The following world regions and countries were represented:

- Oceania: Australia, New Zealand
- Africa: South Africa
- Americas: Argentina, Brazil, Uruguay, USA
- Central Europe: Bulgaria, Czech Republic, Hungary, Poland
- EU: Austria, France, Germany, Italy, Netherlands, United Kingdom

The scope of the meeting was

- To discuss and agree on the vision of IFCN and on a set of common rules for the future organisation of the IFCN (see the results in chapter 2), and
- To illustrate the potential of the IFCN by producing initial results (a) on the international competitiveness of milk production world-wide and (b) on the impact of the Agenda 2000 on selected arable and dairy farms in three EU member states (10 years projections). The results on the policy impact analysis of Agenda 2000 are not reported in this paper. They are available in the full report.

The reason for choosing dairy production as the main subject for the First IFCN meeting was that most experience of the organisers lies in this field and that there is substantial policy interest in dairy competitiveness. Moreover, it would have been too ambitious to start IFCN with all farm types at once. However, IFCN is not limited to dairy. The establishment of a panel structure for arable farms is already under way and first steps with regard to other farm types has begun.

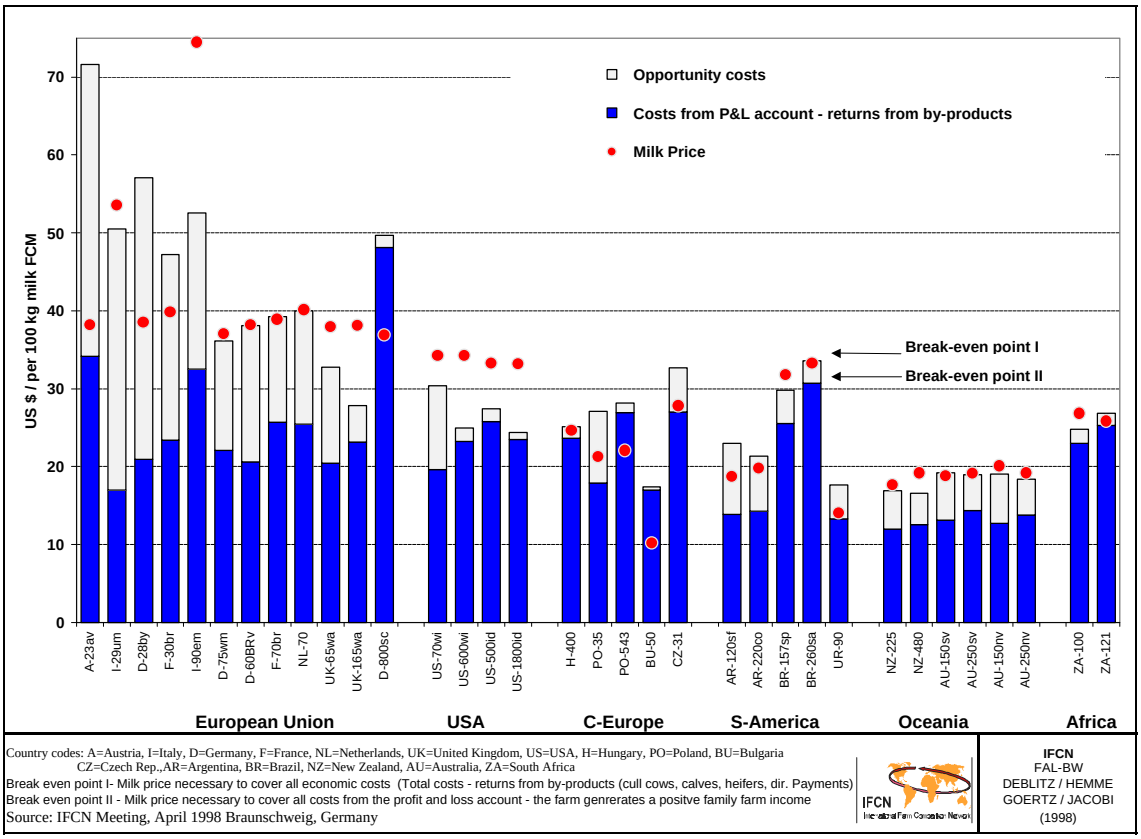
In preparation for the Braunschweig meeting, the participants were asked to collect data for two typical dairy farms of their country according to a standardised format and send these data to the FAL prior to the meeting. Based on further preparatory work carried out by FAL, these data were subject to intensive discussion during the first two days of the meeting.

The internationally harmonised results on milk prices and cost of milk production for the selected typical farms are summarised in Figure 3. The total production costs of dairy farming include costs of what can be termed ‘by-products’ such as cull cows, calves, surplus heifers, beef sales and direct government payments. In order to identify the total cost of ‘milk only’ (total cost less cost for by-products), it is assumed that non-milk returns are equal to

the costs of producing those returns. For example, the return from culled heifers is equal to the cost to produce the heifers. Therefore, the returns of the by-products have been deducted from the total cost of milk production to achieve the total cost for milk only. These can be compared to the milk price.

The cost items refer to total cost including opportunity cost for the owner's capital, land and labour. Milk yield has been corrected to 4 % fat corrected milk (FCM). The data are from 1996 or 1997. For conversion into US-$ terms, the relevant 1996/97 exchange rates have been used. Owned capital was valued at a real interest rate of 3 percent, borrowed capital at 6 percent. All values are stated without value added tax.

Figure 3: Milk price and total costs of milk production in typical dairy farms in 1996/97



Country codes: A=Austria, I=Italy, D=Germany, F=France, NL=Netherlands, UK=United Kingdom, US=USA, H=Hungary, PO=Poland, BU=Bulgaria CZ=Czech Rep.,AR=Argentina, BR=Brazil, NZ=New Zealand, AU=Australia, ZA=South Africa

Break even point I- Milk price necessary to cover all economic costs (Total costs - returns from by-products (cull cows, calves, heifers, dir. Payments)

Break even point II - Milk price necessary to cover all costs from the profit and loss account - the farm genrerates a positve family farm income

Source: IFCN Meeting, April 1998 Braunschweig, Germany

IFCN

IFCN
FAL-BW
DEBLITZ / HEMME
GOERTZ / JACOBI
(1998)

Each country expert was asked to give his assessment on the following questions:

- How representative are the selected farms?
- Why are the cost of production higher or lower than elsewhere?
- What is the potential to expand production?
- How does the national dairy industry perform in processing, marketing, and trade?

Figure 4 is an attempt to give a quick overview on the results of this work. The following represents additional comments gleaned from the meeting on the competitive position of the participating countries. It should be mentioned, however, that most of the participants of the

Figure 4: Summary of production, cost levels and expansion potential of dairy farming

Country	Production 1998 (mn t)	Range of cost levels* 1996	Expansion potential in case of increasing national milk price [1]	
			on the dairy farms without extra land [2]	by increasing number of dairy farms [3]
EU-countries				
Austria	3.0	70	+	+
Italy	10.5	50	+	+
Germany	28.7	40-55	+	++
France	24.7	40-50	+	++
Netherlands	11.2	40-50	+	+
UK	14.7	30-35	+	++
USA	71.3	25-30	+	++
Central Europe				
Hungary	1.9	25	+++	++
Poland	12.2	27	+++	++
Bulgaria	0.4	17	+++	++
Czech-Rep.	2.7	33	+++	++
South America				
Argentina	9.7	22	++	+++
Brazil	21.8	32	+++	+++
Uruguay	1.4	18	++	++
Ozeania				
New Zealand	11.6	17	++	+
Australia	9.6	19	++	+
South Africa	2.2	26	++	++

+++ = high; + = medium; + = low

* Break even point of milk production based on typical farms in the countries
These farms only represent a certain part of dairy farms in the countries

[1] Without production limits
[2] More concentrates, (corn) silage, fertiliser, higher stocking rate, irrigation, improved genetics
[3] Conversion of other agricultural land into dairy land
Source: IFCN Network

IFCN International Farm Comparison Network

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ISERMEYER (1998)

IFCN meeting are farm-oriented experts with limited experience in the field of processing and trade. The IFCN experts would appreciate a close linkage to an international, commodity-oriented network (see Figure 1).

Oceania

The selected farms of Australia and New Zealand reflect the predominant production systems. Cost of production are very low because the climatic and soil conditions allow the cows to be kept on pasture throughout the year. Most of the farms take advantage of a strictly seasonal production system. The high degree of seasonality may cause some extra costs in the processing plants.

Even though further increase of milk production at an annual rate of 10 percent seems to be possible for a number of years, there are limits to growth. There is not much land available for the expansion of the current production system. Land prices have already increased to rather high levels. However, further increase in milk prices would encourage the farmers to start with concentrate feeding and intensify the production system.

The New Zealand or Australia dairy industry appears to have no comparative disadvantage over European or North American competitors in processing, marketing and trade.

South Africa

The broad variety of dairy farms within the country cannot be reflected by only two typical farms. However, the two selected farms represent a typical commercial dairy farm. Costs of production are higher than in Oceania because in most locations of the country the weather conditions require housing of cows. Concentrate feeding seems to be profitable although concentrate prices are higher than in Australia or South America.

With more favourable world market conditions, the South African dairy industry would be able to expand production from the commercial dairy farms and increase total milk production considerably.

South America

The dairy industry in the three selected countries indicate great structural variety. In particular, the two selected farms from Brazil can not be regarded as representative; they are at the leading edge of modern commercial farms. The selected farms from Argentina and Uruguay are representative for commercial farms of each country. However, there is a

rapidly growing group of very big farms with high yields per cow in Argentina that is not represented in Figure 3.

In the case of Argentina, cost of production indicated in Figures 3 and 4 are probably somewhat over-estimated. Expert assessment lead to the conclusion that the climatic conditions in Argentina and Uruguay are very favourable for milk production. Dairy cows can be kept outdoors throughout the year. Concentrate feed and labour is available at low prices. On the contrary, the hot and humid climate of Brazil creates a number of management problems for dairy farms There are a number of open questions with respect to which production system is the best for the various locations of the country.

The production potential of the three countries is probably very high. If world market prices for dairy products remained high, the low cost production system can be vastly expanded at almost constant opportunity cost of land. In the long run, even an expansion of the dairy herd by the factor 5 or 10 would probably not lead to higher average cost of production. Hence, for the supply side of the world market, Argentina is regarded as one of the most interesting locations in the world.

Compared to the big dairy exporters in the world (e.g. New Zealand, EU), the dairy industry in South America has little experience with regard to world trade (entering foreign markets, international marketing, etc.).

United States

Even though the four selected farms give a good cross-section of the traditional and the expanding regions of the US dairy industry, they can not cover the total picture.

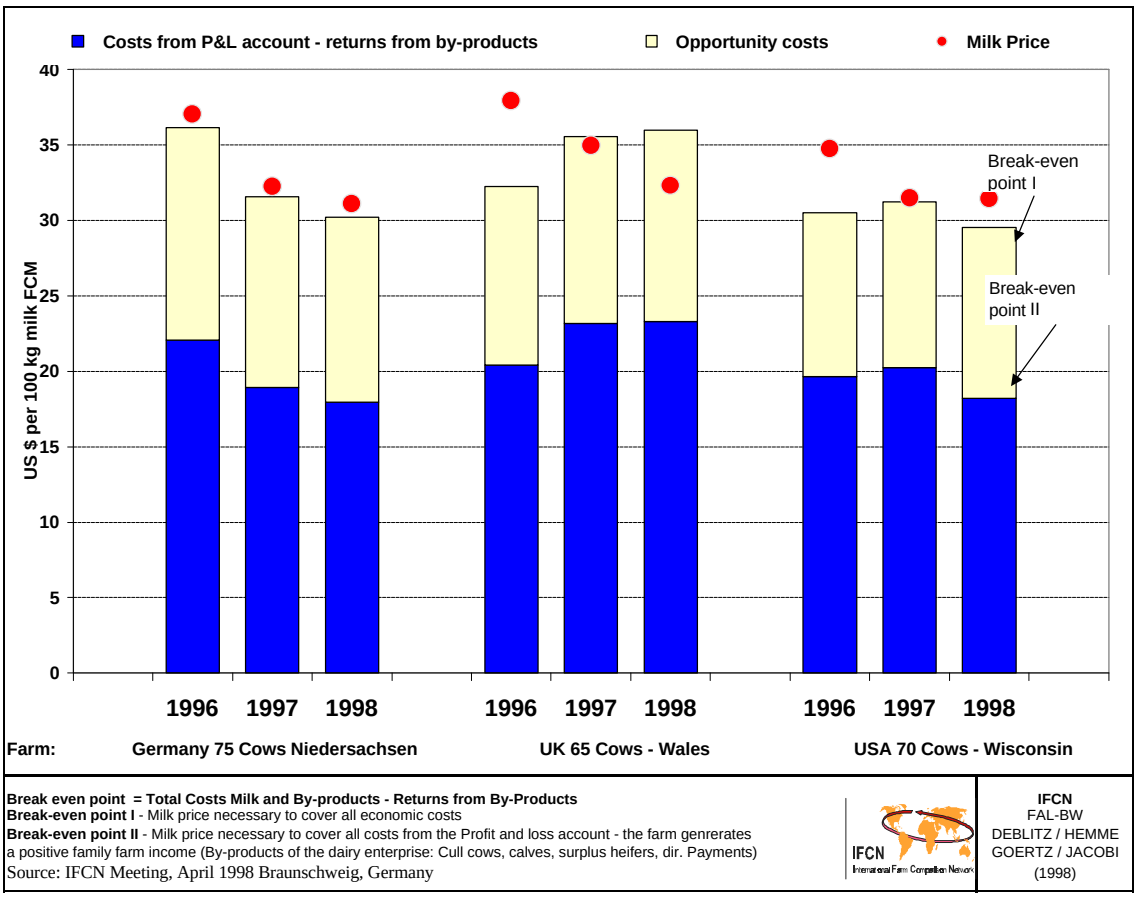
Costs are higher than in Oceania or Argentina, because (a) housing, at least in terms of shade is required in all areas and (b) wage rates in the US are relatively high. Most US cows are permanently kept in a confined farm operation. Compared to European summer pasture systems, this results in extra costs for forage (summer feed). However, confining cows has important economic advantages including no fencing, continuous TMR feeding, high milk yields, better conditions for farm growth and introduction of new technologies.

In 1998 the cost advantage of the US farms against the EU farms would be much smaller than indicated in Figures 3 and 4, because the recent revaluations of exchange rates has considerably improved the competitive position of Europe (see Figure 5).

Whether the US dairy sector would be a net exporter under free world market conditions, cannot be answered yet. The answer will probably depend on the performance of the national

US economy, resulting in more or less favourable exchange rates. However, if the US dairy exporter became a net exporter, there would be much scope for further increases in production without higher cost of production. There is much land available at low opportunity cost, and the US dairy sector has demonstrated a very high potential to quickly respond to changing economic conditions.

Figure 5: Impacts of exchange rates on prices and costs - per 100 kg milk FCM in typical dairy farms in Germany, UK and USA in US-$ 1996-1998



European Union

The selected farms are a good cross-section of the great variety of dairy farms in the EU. In 1996/97, costs of production were considerably higher than in the United States. After the revaluation of currencies, the best farms in the EU are about on the same cost level as the average US farms. The comparative advantage of UK dairy farms (against dairy farms in other EU member states) has disappeared (see Figures 3 and 5).

The main reasons for the comparative disadvantage of the EU dairy sector can be summarised as follows:

- Unfavourable weather conditions require housing of cows in the wintertime.
- High wage rates lead to high labour costs, in particular for the labour-intensive dairy sector.
- Small herd sizes mean that farmers cannot take advantage of large scale effects.
- Traditional land use patterns (small plots) cause extra costs.
- The EU as well as national authorities tend to over-regulate the economy.
- The milk quota system has a negative impact on the international competitiveness.

The very high costs experienced by some of the very small EU farms and the large East German farm raise immediate questions. In some cases small farms receive very high prices for their products and in other cases they may benefit from environmental programmes. The performance of the East German farm can only be explained in the context of the transformation of an ex-socialist economy. Other studies carried out by FAL indicate that some of the large East German dairy farms are the most successful of all EU farms while others experience the highest costs and greatest losses.

Central European Countries

The Central European countries have a very heterogeneous farm structure including many small farms as well as very big farms. The transformation process from a centrally planned to a market economy is still affecting the agricultural sector. Therefore it is very difficult to say whether the selected farms are or will remain typical. Therefore, the cost of production must be treated with caution.

All in all, the cost level of the Central European farms is low compared to the EU farms. The reasons are mainly low labour costs and low depreciation due to the use of old equipment and reduced investment activities. There are indications that this cost advantage could disappear in the future when the countries join the EU. Investments to improve milk quality and to fulfil environmental regulations will be required. In this process both factor and input prices will rise. The question whether the Central European countries will keep their comparative advantage against other competitors in the long run should be subject to further analysis within the framework of the IFCN.

Considering the ample availability of agricultural land, the long term potential to expand Central European milk production is assessed to be quite high. However, the outlook for the near future is less optimistic. Many farms (especially the small farms) will have difficulties

adapting their production system to the EU quality standards. The dairy processing industry suffers from old equipment, over-capacity and a lack of distribution and marketing infrastructure. The East German experience has shown that domestic products can be quickly replaced by imported goods from the West. Without foreign investment, it will hardly be possible to avoid this.

The comprehensive report of the results can be obtained from AFPC at:

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