Aus dem Institut für Betriebswirtschaft, Agrarstruktur und Ländliche Räume

Claus Deblitz
Folkhard Isermeyer
David Anderson
Christof Möller
Torsten Hemme
Ron Knutson
Dieter Goetz
Joachim Riedel

Report on the 1st International Farm Comparison Network (IFCN)-Meeting April 14-19, 1998 at FAL Braunschweig, Germany

Manuskript, zu finden in www.fal.de

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Report on the 1st IFCN-Meeting *

April 14 - April 19, 1998 at FAL Braunschweig, Germany

IFCN
International Farm Comparison Network

THE MODEL TIPI-CAL©
Technology Impact Policy Impact Calculations

IFCN Report 1/1998

Authors:
C. Deblitz, T. Hemme, F. Isermeyer
R. Knutson, D. Anderson, D. Goertz, C. Möller, J. Riedel

Institute of Farm Economics, Federal Agricultural Research Centre (FAL)
Bundesallee 50, D-38116 Braunschweig, Germany
E-mail: deblitz@bw.fal.de, Tel. +49-531-596-793, Fax.: +49-531-596-357
IFCN-homepage: http://www.fal.de/english/institutes/bw/ifcn/html/ifcnhome.html

Participating Scientists of IFCN:

Argentina:	Eduardo Guardini	Ministry of Agriculture (SAGYP), Buenos Aires
Australia:	Russell Cummings	Dairy Research Development Corporation, Melbourne
Austria:	Hubert Janetschek	Federal Agricultural Research Centre, Vienna
	Hubert Pfingstner	
Brazil:	Marcelo de Carvalho	Advisor, Nutricell Ltda, Sao Paulo
Bulgaria:	Jens Adler	Institute of Agricultural Development for Central and Central Europe (IAMO), Halle
Czech Republic:	Frantisek Vanicek	Research Institute of Agricultural Economics, Praha
France:	Bruno Guermonprez	Institut Supèrieur d'Agriculture (ISA), Lille
	Fabrice Rabourdin	
	Alain Revel	Unité d'Economie et de Sociologie Rurales, (INRA ESR), Grignon
	Sébastien Thery	
Germany:	Claus Deblitz, Dieter Goertz, István Heinrich, Torsten Hemme, Folk-hard Isermeyer, Elgin Jacobi, Lutz Knölke, Joachim Riedel	FAL, Braunschweig, Institute for Farm Economics
	Christof Möller	University of Kiel
Hungary:	Csaba Borbély	Pannon Agricultural University, Kapozsvar
Italy:	Francesco Ansaloni	University of Bologna
	Fabio Santucci	University of Perugia
	Andrea Marchini	
Netherlands:	Bram Prins	European Dairy Farmers (EDF)
	Wim Zaalmink	Agricult. Economics Res. Inst., LEI-DLO, Den Haag
New Zealand:	Mark Leslie	Livestock Improvement Centre, Hamilton
Poland:	Michael Switlyk	Academy of Agriculture, Szczecin
South Africa:	Koos Coetzee	Milk Producer's Association, Pretoria
United Kingdom:	Alun Davis	Welsh Institute for Rural Studies, Aberystwyth
	Tim Jenkins	
Uruguay:	Jorge Alvarez	University of the State, Montevideo
USA:	Ron Knutson	Agricultural and Food Policy Center AFPC,
	David Anderson	Texas A&M University, College Station

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Contents

0 Summary

The first IFCN-meeting took place from April 14 to April 19, 1998 at Bundesforschungsanstalt für Landwirtschaft Braunschweig-Völkenrode (FAL), Braunschweig, Germany. 30 participants from 17 countries attended the meeting. This report summarises the main results of the meeting and will be used as material to introduce the International Farm Comparison Network (IFCN) and to promote abilities to analyse agricultural competitiveness around the world.

The objectives of the meeting were to discuss and agree on common rules for future organisation of IFCN and to show the potential of IFCN for policy, technology and market analysis by producing initial results on international competitiveness of dairy farming and policy assessment for dairy and arable Farms.

This report focuses on dairy farm competitiveness. Dairy farms around the world face substantial future policy changes and structural changes in production technologies and economics.

The main results of the meeting are the following:

A: The vision of IFCN

- The vision of IFCN is a world-wide network of actively participating scientists, advisors, farmers and representatives of agricultural organisations. IFCN should include all relevant commodities for the countries and regions in the participating countries.
- IFCN is based on three elements: (a) the network itself, (b) panels consisting of 4-6 farmers, 1 advisor and 1 scientist each and (c) simulation models projecting the financial performance of the typical farms under alternative scenarios. It is important that internationally harmonised methods of analysis are implemented, and that the IFCN has a sustainable design.
- IFCN is designed as a partnership and shall be continued in this sense. Based on certain rules, each partner has the possibility to set up typical farms, do model calculations and participate in international studies within the network or with the help of the network.
- It is clear to the participants that the participation of farmers and advisors in the network is the unique strength of IFCN. Substantial efforts must be made to develop panel farms as soon as possible. This will allow the generation of realistic and up-to-date data for typical farms, provide access to farmers' and advisors expert knowledge and their active participation in farm level analysis and evaluation of adjustment strategies to changes in the farm related world.
- National efforts must be made for acquisition of funding. For the development of farms in the country and related analysis, all partners must be committed to sustain participation in IFCN. This can best be achieved by provision of a staff member who is committed to work within IFCN.

B: IFCN Rules

- The participants agreed on a set of rules for the future organisation of IFCN.
- In regards to the organisational framework, it was agreed to establish the following main elements of IFCN:
    - A national headquarters in each country responsible for co-ordination of all national network activities, development and maintenance of panels, data exchange and harmonisation. In addition to the headquarters, further partners may join the national network, in particular for product sectors that can not be covered by the country headquarters.
    - World region centres responsible for co-ordination of the network on a supranational level, development and maintenance of the models, co-ordination, review and storage of publications as well as marketing of IFCN on an international scale. For the time being, these are FAL for Europe and AFPC for America. Other regions are pending.

- As concerns funding of the network, the country headquarters will seek for national funding and for permanent staff to establish and maintain the national infrastructure. Once this is assured it is also envisaged to seek funding from international institutions like EU-COM, OECD, WTO.

C: First results on international competitiveness of dairy farming

- The main scientific focus of the meeting was on the analysis of the competitive situation of dairy farming world wide and the growth potential of milk production in the participating countries. The issue could not be discussed in all detail, but encouraging results were developed given the time available. In particular, the huge potential of a fully established IFCN was demonstrated.
- Initial analysis indicate that the EU-countries have the highest milk production cost levels of between $40 and $70 US per 100 kg milk produced (based on 1996 exchange rates). New Zealand and Australia are at the lower end with production costs of around $19 US. USA, South America, South Africa and Central Europe can be found between the two former groups, at levels between $25 and $35 US. These cost data can only provide a very rough picture and there are exceptions within these country groups. A detailed analysis on the cost differences is discussed in later sections of this report.
- The growth potential for milk production could be realised by two means if the world market prices for milk remained favourable. In the absence of government restraints, there is potential for more intensified production in areas where milk is currently produced. Growth can also be realised by expanding the existing systems to locations presently not used for milk production. This potential appears to be greatest in the South American countries with abundant land resources. For the other countries, the

growth potential would be mostly a mix of both possibilities but at different expansion levels.

- Analysis of varying exchange rates over a three year time period on cost comparisons for typical dairy farms in the USA, United Kingdom and Germany indicate the importance of country macro-economic policies on the farm sector.
- Moreover, cost projections for a 75 cow German farm over a 10 year study period showed both the negative impact of the costs related to the EU-quota system and the potential of reducing costs by around 3 US-cents per kg milk (or 5 %) produced if the farm were able to produce more milk.

D: Initial results on policy impact assessment

- The likely impact of the proposals made by the EU-Commission on the future agricultural policy (Agenda 2000) on selected dairy and arable farms in Europe were analysed. For this purpose, the farms were projected 10 years in the future under different policy and adjustment scenarios.
- For the dairy sector, analysis on German, French and UK farms showed net income losses between 3 and 18 percent for small and moderate sized farms. The main reason is that the 15 percent milk price decrease is not fully offset by the new compensatory payments. For the large 800 cow farm in East Germany net income losses were up to 96 percent because payments are being reduced in two steps (20 percent, 25 percent) once they reach a ceiling of 100.000 ECU and 200.000 ECU per farm. It should be noted that under such severe income losses farm adjustments are very likely.
- In arable farming, the income losses for typical farms in the UK, France and Germany are less serious than for dairy farms and vary between 1 percent and 10 percent. This is mainly due to the fact that the compulsory set-aside areas of arable land would be returned into production, thereby increasing the total gross margin. The large East German farm suffers from reduction of premium payments due to payment limitations.

1 Objectives and short Description of IFCN

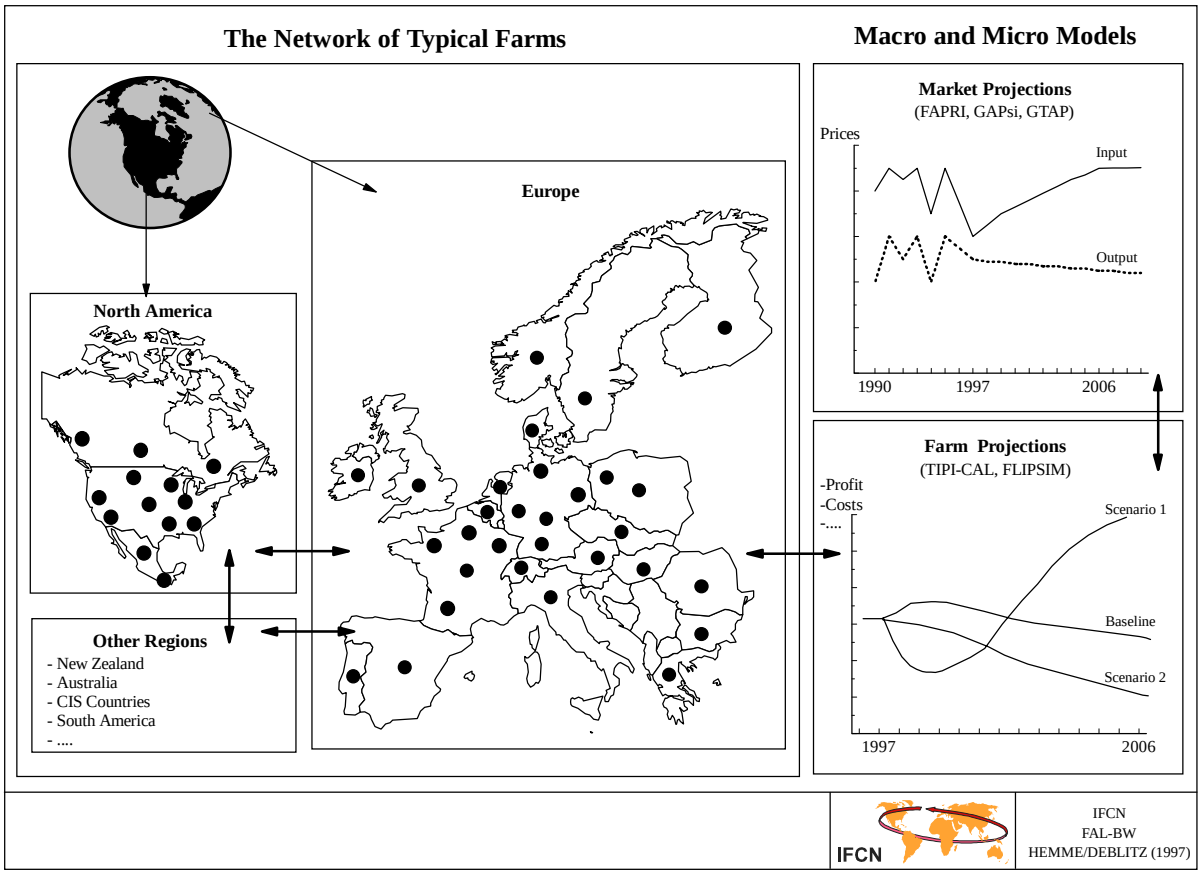
The International Farm Comparison Network IFCN is an international network of scientists, advisors and farmers. The objectives of IFCN are:

- to create and maintain an infrastructure allowing sustainable analysis of agricultural production systems around the world,
- to improve the ability to analyse structural, technological and policy changes around the world,
- to facilitate communication and data exchange among economists interested in farm level analysis and issues.

IFCN has a long-term perspective. The network is in its starting phase and it will take a period of at least 3 years until the basic network is established.

It should be stressed that the establishment of IFCN requires support and national funding by all participating countries. Consequently, the following description of the network is rather vision than reality. The main components of IFCN are shown in Figure 1 and are briefly explained in the following sections.

Figure 1: The vision of the International Farm Comparison Network



The components of IFCN are:

1 The **network** itself, consisting of scientists, advisors, consultants and farmers. IFCN builds up a infrastructure that generates a continuous interchange and feedback between scientists and farmers on an international scale, thereby permitting analysis of the farm level impacts of alternative policies. Unique methodology utilising groups of real farmers to develop unique data-sets for analysis makes IFCN a valuable approach.

2 A unique, realistic and up-to-date **data base of typical farms** of different types and in various regions. These data are developed from so called **'panels'**, each consisting of 4-6 farmers, 1 advisor and 1 scientist. The panel structure is a precondition for the success of IFCN. Panels will be used (a) to develop and update the panel farm data for calculations with the models, (b) to identify and discuss strategies and adjustments to changes in market, technology or policy conditions and (c) to review the results of the modelling. A typical farm represents the type (e.g. a dairy farm) of farm in a production region in terms of size, crops grown, livestock systems, labour organisation and production technology used. The technical and economic data to describe the typical farm are neither individual farm nor statistical averages but based on a consensus achieved in the panel meeting. In each region and for each relevant farm type we intend to set up one moderate (average) sized farm and one large farm to represent typical farms in the area and to capture economies of scale. The large farm should represent the upper 10 percent of the farms by size in the area.

3 Complex **production and accounting models** (TIPI-CAL and FLIPSIM) are used to simulate the farm's financial performance in the future. The models allow status quo analysis of production costs as well as projections of the farm under different strategies, risk and policy conditions. The performance measures are standardised easily allowing international comparison.

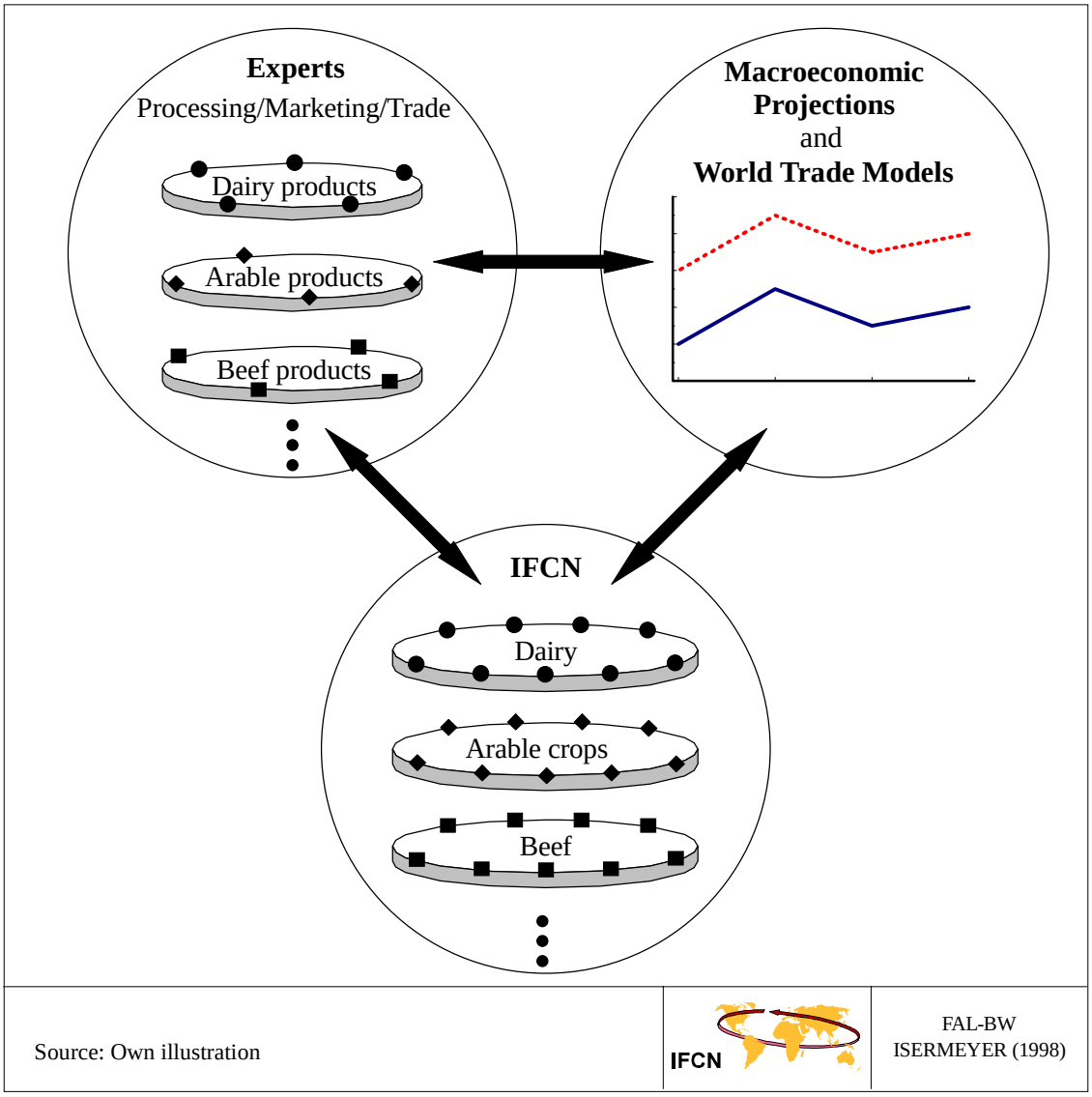
The results of the 10 year farm projections are, of course, highly dependent on the assumptions about price developments. Therefore it is necessary to combine the micro-economic approach of IFCN with agricultural sector and macro-economic models that are able to develop longer-term projections of variables including: price, production and utilisation.

For the time being, the price projections will be taken from one of the following sources:

- Projections that are regularly published by certain institutions (e.g. USDA, OECD, FAPRI, European Commission)
- Co-operation with consortiums that are applying highly aggregated models in order to assess future developments on a world wide scale (e.g. GTAP)
- Ad hoc expert consensus assessments in special cases (especially if problems of limited regional extension have to be solved).

In the longer run, research institutions that provide macro-economic projections and model-based projections of international trade should be linked to the network. Further, commodity experts who are specialists in the field of processing, marketing and international trade, will eventually be integrated into IFCN to provide analytical capabilities that extend throughout industry sectors that will increasingly being linked together. This vision is outlined in Figure 2.

Figure 2: Vision of a linkage between IFCN and other networks



The organisational design assures that identical methods and are applied for all commodities. Therefore, the IFCN rules outlined in section 5 provide that there will be only one national IFCN headquarters per country. Within the participating countries the headquarters can have intensive working contacts to a number of IFCN partners that may, for example, be specialised on certain commodities or farm types.

A more detailed description and further information of IFCN can be found in the Internet under: *http://www.fal.de/english/institutes/bw/ifcn/html/ifcnhome.html*

There is no doubt that the establishment of such an infrastructure is a great challenge but is there any alternative? In past decades, many ad hoc studies have been carried out in order to analyse international competitiveness of farms and farm adjustments to changing conditions. Every study starts "at zero", the data used were not comparable, they become outdated rather soon, and almost every study covers only a very limited set of countries and commodities. Furthermore, there were usually no sustainable structures established or permanent staff employed to continue the work. Hence, the overall impact of these studies (e.g. on the WTO level) has been very limited.

The concept of IFCN shall help to overcome the problems of ad-hoc-studies:

- IFCN uses a concept that has proven to be successful for more than 15 years in the United States.
- IFCN uses the experience in international comparisons that have been built up within the European Dairy Farmers (EDF) Network since 1990.
- IFCN applies internationally compatible and harmonised methods.
- IFCN produces high quality research where the quality of the scientific results is checked by the network of farmers and advisors.
- IFCN provides a permanently active, world-wide network of experts with an up-to-date data base, i.e. it that can produce results within a very short time.

For these reasons, we believe that the IFCN will provide an infrastructure that makes farmer's experience and micro-economic knowledge better available

- for the analysis of national policies related to agriculture,
- for the quality of world trade models and assessments,
- for the analysis of international agricultural products trade policies.

2 Scope and Objectives of the Meeting

The idea of IFCN was born at FAL in 1995/1996. It goes back to 10 years of research experience in international competitiveness of farming. The principle idea is derived from a national network of representative farms in the USA which has been developed and updated by the Agriculture and Food Policy Center at Texas A&M University for more than 15 years. IFCN provides a unique data base for making comparison across countries that would not otherwise be done.

The first panels in Germany were developed in 1996. In early 1997, the idea of IFCN was spread throughout Europe and the first partners joined the network. By mid of 1998, 11 dairy and 2 arable panel farms were set up in Germany. A basic network had been set up with a few typical farms in Austria, France, Italy, the Netherlands and United Kingdom. Most of the typical farm data in these countries are still on regional statistics with the help of local experts (termed the ”fast track approach”), thus no real panel process had been implemented yet. However, preliminary policy analyses could be carried out in Germany and across some EU member states.

In December 1997 the decision was made to hold an international IFCN-meeting focusing on dairy. It was decided at the same time to expand IFCN to non-EU countries at this early stage for the following reasons:

- The upcoming WTO-negotiations require a timely analysis on a world wide scale rather than a European focused view.
- The dairy sector in the EU is considered to be particularly vulnerable to further liberalisation.
- In non-EU countries the dairy sector shows remarkably dynamic development (increases in world demand for dairy products, production increases, and fast regional production shifts).
- FAL and AFPC already had long standing experience with analysis of competitiveness of dairy farming within the network of European Dairy Farmers (EDF) and the US network of representative farms.

Consequently, potential partners in non EU countries were contacted and invited. A precondition for participating in the meeting was the submission of typical farm data in order to develop a farm data base that could provide a basis for comparison of production costs and for further discussion and adjustment in the meeting.

Objectives of the meeting were:

- to discuss the structure of IFCN and create a common vision
- to create an understanding of the panel farm development process
- to show the potential of IFCN for policy, technology and market analysis
- to agree on common rules for future organisation of IFCN
- to analyse the competitiveness of dairy farming world wide
- to assess the impacts of Agenda 2000 on selected dairy and arable farms in the EU
- to agree on a common publication as a result of the meeting

3 Participants

The following list shows the participants' names and their institutions. The meeting hosted 24 guests from 17 countries (plus 8 staff members of FAL):

Argentina:	Eduardo Guardini	Ministry of Agriculture (SAGYP), Buenos Aires
Australia:	Russell Cummings	Dairy Research Development Corp., Melbourne
Austria:	Hubert Janetschek	Federal Agricultural Research Centre, Vienna
	Hubert Pfingstner	
Brazil:	Marcelo de Carvalho	Advisor, Nutricell Ltda, Sao Paulo
Bulgaria:	Jens Adler	Institute of Agricultural Development for Central and Central Europe (IAMO), Halle
Czech Republic:	Frantisek Vanicek	Research Institute of Agricultural Economics, Praha
France:	Alain Revel	Unité d'Economie et de Sociologie Rurales, (INRA ESR), Grignon
	Sebastien Thery	
Germany	Claus Deblitz	FAL Braunschweig
	Dieter Goertz	FAL Braunschweig
	István Heinrich	FAL Braunschweig
	Torsten Hemme	FAL Braunschweig
	Folkhard Isermeyer	FAL Braunschweig
	Elgin Jacobi	FAL Braunschweig
	Lutz Knölke	FAL Braunschweig
	Joachim Riedel	FAL Braunschweig
	Christof Möller	University of Kiel
Hungary:	Csaba Borbély	Pannon Agricultural University, Kapozsvar
Italy:	Francesco Ansaloni	University of Bologna
	Fabio Santucci	University of Perugia
	Andrea Marchini	University of Perugia
Netherlands:	Bram Prins	European Fairy Farmers (EDF)
	Wim Zaalmink	Agricultural Economics Research Institute, LEI-DLO, Den Haag
New Zealand:	Mark Leslie	Livestock Improvement Centre, Hamilton
Poland:	Michael Switlyk	Academy of Agriculture, Sczeczin
South Africa:	Koos Coetzee	Milk Producer's Association, Pretoria
United Kingdom:	Alun Davis	Welsh Institute for Rural Studies, Aberystwyth
(Wales)	Tim Jenkins	
Uruguay:	Jorge Alvarez	University of the State, Montevideo
USA:	Ron Knutson	Agricultural and Food Policy Centre AFPC,
	David Anderson	Texas A&M University, College Station

4 Time Schedules and Tasks

The meeting was divided into a pre-meeting (April 14 - April 16) and a main meeting (April 16 - April 19). The time schedules can be found at the end of this section.

Apart from one Italian partner, participants of the pre-meeting were from non-EU countries, namely Argentina, Brazil, Hungary, New Zealand, Poland, South Africa, USA and Uruguay. The main objectives of the pre-meeting were to improve the farm data base that had been submitted by the partners prior to their arrival at FAL, to exchange information on the dairy sector in the participating countries and to get working experience with the new partners. For this purpose the participants split up into three country groups. Apart from working on their farm data, the participants had the opportunity to visit two dairy farms in Western and Eastern Germany on a field trip.

The main meeting was attended by all participants. It started with an evening welcome buffet on Thursday, April 16. Friday morning was used for a plenary session to introduce the concept, the elements and the philosophy of IFCN. Additionally, the European partners reported on their experience with IFCN according to the following structure:

- Experiences in data collection
- Communication and data exchange with FAL
- Main problems and proposals to overcome them
- Perspectives of IFCN in the country
- Future position within the IFCN

This discussion was followed by a presentation of preliminary results:

- Production costs and competitiveness of dairy farming
- Impacts of Agenda 2000 on selected dairy farms in Europe
- Impacts of changes in prices and exchange rates on the competitive situation of dairy farms in Germany, UK and USA
- Impacts of Agenda 2000 on selected arable farms in Europe

The presentation showed the great potential of IFCN. On the other hand, it was clear that results are preliminary and more research is necessary to further develop a uniform database using the panel process for analysis.

The meeting continued with a dairy workshop and an arable workshop. The participants of the arable workshop are listed in the time schedule. Because of the large number of participants in the dairy workshop, it was decided to further divide it into two groups:

Group 1:	Group 2
Eduardo Guardini	Alun Davies, Tim Jenkins
Marcelo de Carvalho	Wim Zaalmink, Bram Prins
Jens Adler	Ron Knutson
Csaba Borbély	Koos Coetzee
Frantisek Vanicek	Mark Leslie
Michael Switlyk	Russell Cummings
Hubert Pfingstner, H. Janetschek	Francesco Ansaloni
David Anderson	Jorge Alvarez
Folkhard Isermeyer, Claus Deblitz	Torsten Hemme
István Heinrich	

The following discussion guidelines were used and followed country by country (see section results 1):

1 Description of the representative farms relative to the industry.

2 Why are the production costs of these farms (and other farms) higher or lower than elsewhere?

3 In case of further increase of world demand for milk products:
   a) could the production system of the typical farm be further expanded within your country without significant extra-costs?
   b) if yes, how much more milk could be produced at current costs?
   c) if no, would there be a possibility to implement another production system elsewhere in your country?

4 How does the country's dairy industry perform in processing, marketing and trade?

The workshops went through Saturday noon time. All participants actively participated and presented their country following the discussion guideline. The results of the workshops were presented to all participants and are described in sections 7 and 8.

In the next step the rules for the future organisation of IFCN were discussed. The participants agreed on a set of rules which are detailed in section 6.

The following tables provide an overview on the time schedule of the main meeting.

Figure 3: Schedule of the IFCN main meeting April 16 to April 19

Date/Time	Activity	Responsible / Participants
Thursday, April 16, 1998		
Afternoon	Arrival in Braunschweig, Check in	FAL-staff
19.30	Introduction of participants and buffet	All
Friday, April 17, 1998		
8.30 - 9.00	**Opening of the meeting** • Background • Objectives • Organisation	Folkhard Isermeyer
	Introduction to IFCN • What is IFCN and EDF • Objectives • Benefits • History and Time Path • Vision	Folkhard Isermeyer
9.00 - 9.15	**Experiences with the US Network of typical Farms**	Ron Knutson
9.15 - 10.00	**Data Requirements** • What is a typical farm? • Data collection and the need to have Panels	Claus Deblitz
	Models • Structure • Options • Validation	Torsten Hemme David Anderson
10.00 - 10.30	Break	
10.30 - 11.30	**Experiences within the European IFCN**	
	• French Arable Farms • UK Dairy Farms • Netherlands Dairy Farm • Austrian Dairy Farms • Italian Dairy Farms in Emilia Romagna • Italian Dairy Farms in Umbria • Hungarian Dairy Farms	Alain Revel, Sebastien Thery Alun Davies Wim Zaalmink Hubert Janetschek Francesco Ansaloni Fabio Santucci Csaba Borbély
11.30 - 12.30	**Discussion**	All
12.30 - 13.30	Lunch Break	
13.30 - 15.00	**Presentation of preliminary results**	
	• Definition of profit, family income, net cash farm income • Competitiveness of Dairy Farming World Wide • Agenda 2000 Impacts European Dairy Farms • Effects of prices and exchange rates in selected countries • Agenda 2000 Impacts on German Arable Farms • Discussion	Torsten Hemme Claus Deblitz Torsten Hemme Torsten Hemme Joachim Riedel
15.00 - 15.30	Coffee/Tea Break	

Figure 3 (cont.): Schedule of the IFCN main meeting April 16 to April 19

Date/Time	Activity	Responsible / Participants
Friday, April 17, 1998		
15.30 - 18.30 until Saturday 12.00	**Work Shops in parallel sessions**	
	Work Shop: Competitiveness of Dairy World Wide ● Specifiy Steps for Work Shop Session ● Present existing Model Farms ● Main Characteristics of Production Systems ● Comparison of Production Costs ● Identify Reasons for different Production Costs ● Assessment of Perspectives of Dairy Farming ● Agreement on Structure and Contents of the common Publication ● Summary and Conclusions	**see list of participants in text**
	Work Shop: Agenda 2000 Impacts on European Arable Farms ● Specifiy Steps for Work Shop Session ● Present existing Model Farms ● Specifiy Policy Scenarios ● Specifiy Price Projections ● Specifiy Farm Adjustments ● Agreement on Structure and Content of the common Publication ● Summary and Conclusions ● Agreement on next Steps and Feedback from Participants	Alain Revel Sebastien Thery Ron Knutson Andrea Marchini Hubert Janetschek Folkhard Isermeyer Joachim Riedel Christof Möller Lutz Knölke
19.30	**Dinner in a restaurant in Braunschweig City**	
Saturday, April 18, 1998		
8.30 - 12.00	**Continuation of the Work Shops**	
	Work Shop: Competitiveness of Dairy World Wide	Workshop Participants
	Work Shop: Agenda 2000 Impacts on European Arable Farms	Workshop Participants
12.00 - 13.00	Lunch Break	
13.00	**Departure to Hemme Dairy Farm (Field Trip)** ● Family Farm, 150 Cows, 8000 kg Milk Yield, 32 Rotary Parlour ● Direct Doorstep Sale of Milk, 3000 Customers	All
14.00 - 15.00	● Roundtrip on the farm	
15.00 - 15.30	**Presentation of Results of Work Shops** ● Work Shop: Competitiveness of Dairy World Wide ● Work Shop: Agenda 2000 Impacts on European Arable Farms	 F. Isermeyer, T. Hemme, C. Deblitz Joachim Riedel
15.30 - 19.30	**Discussion of future Activities in the IFCN Network** ● Proposal on Rules of IFCN ● Network organisation ● Data ● Models	All
19.30	**Dinner**	All
23.00	Departure to Braunschweig	All
Sunday, April 19, 1998		
9.00 - 10.30	**Discussion of future Activities in the IFCN Network** ● Funding Activities ● Transition Regulations	All
10.30 - 10.45	Coffee/Tea Break	
10.45 - 12.00	● Conclusions ● Further Steps	All
12.00 - 12.30	Feedback from Participants and Closing of the Meeting	All

5 Rules of IFCN

All participants of the first IFCN meeting (Braunschweig, April 14 to 19) intensively discussed the rules under which the further co-operation within the IFCN should be carried out. They agreed upon the following set of rules:

Rules for IFCN

Preamble

IFCN is based on the principles of voluntary participation, international co-operation and fair partnership.

IFCN will only become a success:

- if all participants are willing to share methods, data, experience and expertise across countries,
- if all participants take responsibility for the establishment of the network in their countries, and
- if all participants accept and follow clearly defined rules.

Objectives

IFCN has the 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 policy changes in the participating countries, and
- to facilitate communication and data exchange among economists interested in farm level analysis and issues.

Network Organisation

- 1 national headquarter (**Country Headquarter, HQ**) in each country plus associated **Partners**
- Each Country HQ has one committed person for IFCN who has the responsibility to
  - establish the national infrastructure,
  - set up and update model farms (panels),
  - establish and maintain contact to farmers, advisors and network participants,
  - participate in studies conducted within IFCN.

  We foresee that this is a full time job.

- World Region Centres (WRC), for the time being:
  - America: Texas A&M University
  - Europe: FAL
  - Oceanic, Asia, Africa, others: to be decided after some working experience
- Each WRC has additionally one full time person for:
  - co-ordination of the network on a supranational level
  - ensuring the quality of the data
  - ensuring the harmonisation of the method and the models
  - co-ordination, review and storage of publications
  - marketing of IFCN on an international scale
- Later on, an **IFCN-Committee** will be set up with one representative of each WRC plus other elected members. The main tasks of the Committee are to facilitate international co-ordination, to prepare proposals for the further development of IFCN and to act as a dispute settlement group.

Data

- Every Country HQ is the owner of it's country's data. Property rights between country HQ and their Partners shall be decided in the countries.
- The Country HQ declares at least one typical farm of each country and each farm type that may be used by the WRC for internal use (methodology-related work etc.) without extra-permission. Data are to be submitted to the WRC for storage, cross-checking and to demonstrate IFCN potential on a supranational level. The WRC is not allowed to publish these data.
- If results of the work based on IFCN-data shall be published (including Internet publications or government briefing reports), an agreement of the Country HQ, whose data are utilised in the study, is necessary.

Models

- For the time being, models are developed and maintained by Texas A&M and FAL.
- For the time being, models remain under the ownership of Texas A&M and FAL.
- Partners and other Country HQ may develop parts and modules of the model upon prior agreement with Texas A&M and FAL. New modules must be made available to the model owners as a contribution to improve the overall performance of IFCN. New versions of the models may only be issued by Texas A&M and/or FAL.
- At present, calculations are done by Texas A&M and by FAL and her Hungarian and German partners (Universities in Kiel, Hohenheim and Berlin, IAMO Halle). In the long run, all Country HQ's should be able to use the models for policy and technol-

ogy assessment. This requires at least one full time person and training by Texas A&M and FAL.

- Training in the model requires a period of approximately 3 months and a prior agreement of the Partner to be trained to co-operate at least 3 years. Coverage of cost of training is subject to negotiation on a case-by-case basis.
- Trained Partners may use the models according to a license agreement drawn up and signed by the Partners.

Funding

- Each Country HQ has to raise sufficient funding from **national** sources in order to fulfil the task to establish and maintain the **national** IFCN-infrastructure.
- All Partners may seek funding for inter-national studies under the label IFCN. They may do this on their own responsibility or in a consortium with other Partners, if panel data from other countries are involved.
- At present, the costs of the international IFCN-infrastructure (WRCs) are covered by Texas A&M and FAL. In the long run, part of the revenues from international IFCN-studies with involvement of WRCs should cover these costs.
- Farmers benefit from participation and receive results from IFCN-analysis but no payment for farmers participating in panels is foreseen.

Results

- Results and data obtained from a country's data must be sent back to the country headquarters.

Transitional Regulations

- The rules outlined above form a basis for IFCN organisation and expansion.
- These rules should be adjusted according to experience and special needs.
- A proposal for adjustment could be made by the IFCN-Committee, decisions should be made by the general meeting of all IFCN Country HQs.

6 Participating Countries Perspective of IFCN

Each participant has been asked about their perspective of the implementation of IFCN in his country. Based on these first assessments, intensive discussions (bilateral and/or multilateral) took place in order to identify the most promising strategy for a sustainable establishment of IFCN.

The following can be summarised as a general conclusion of this discussion process:

- That it would be in the interest of each of the countries to join the IFCN.
- That almost all participants expressed a high personal commitment to promote the IFCN concept in their countries.

The participants will now contact the most relevant persons in their institution or in other more suitable institutions of their country in order to

- explain the concept of IFCN,
- explain the benefit of IFCN for the country,
- find ways to establish the IFCN in the country.

Intensive negotiations have also shown that the implementation strategies will probably differ substantially between the countries. This reflects country-to-country differences with respect to the organisation of agricultural research, extension services, and ministries of agriculture.

It is generally accepted that internationally diverging implementation strategies are no problem as long as the participating countries follow the rules of IFCN (see section 5). For the success of IFCN, it is much more important

- That the panel structure, the data collection within the panels and the applied analytical models be harmonised in all participating countries.
- That the participating institutions find it useful to be member of IFCN and consequently assure a longer term participation.
- That these institutions name a person that takes full responsibility for the establishment of IFCN in the country.
- That these institutions identify at least one person who will build the first panels in the country and works together (a) with these panels and (b) with the international IFCN partners for at least three years. Experience indicates that this provcess quickly becomes a full-time job.

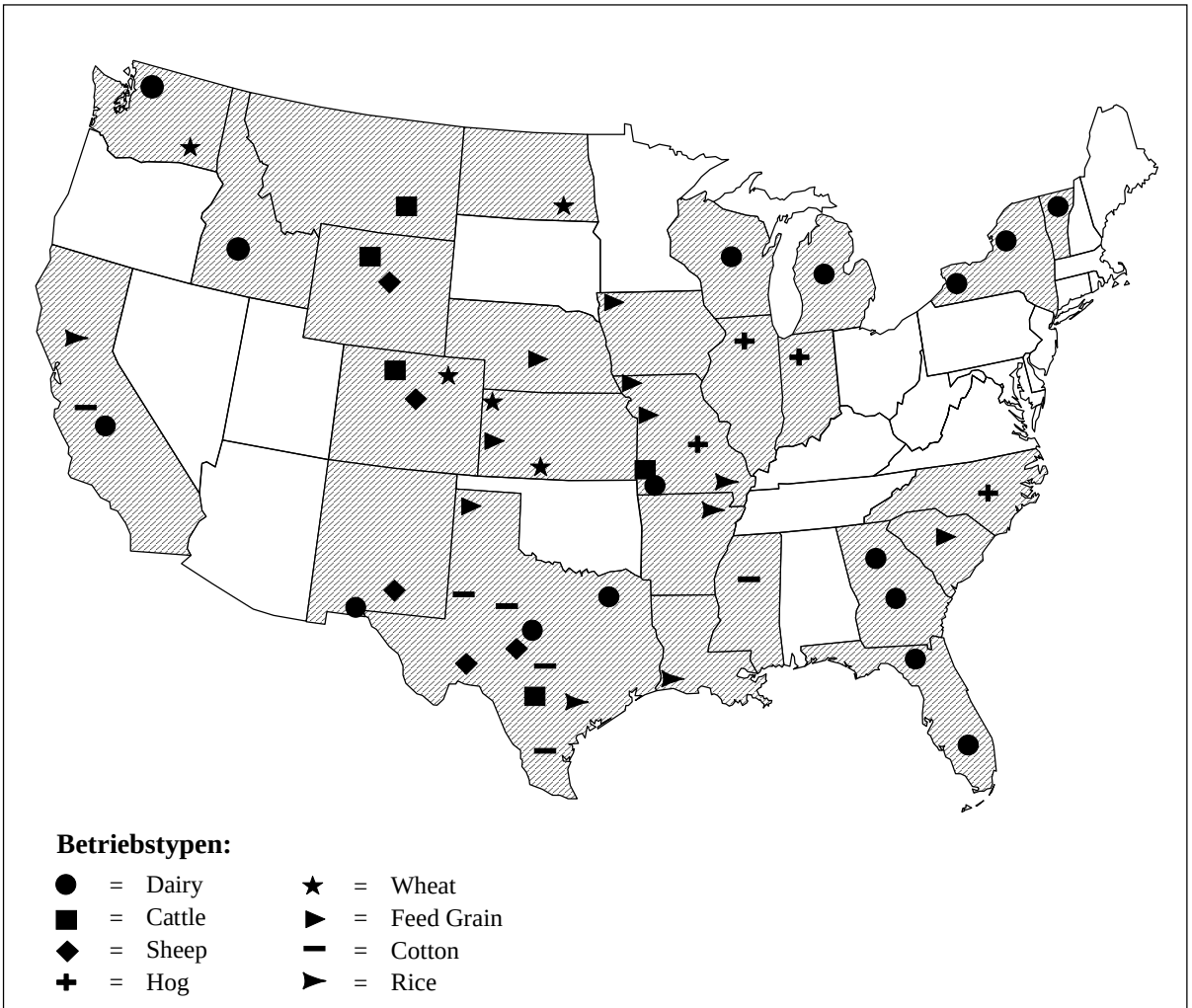
It is not possible to describe here in detail which implementation strategy has been identified as being the most promising for the individual countries. First the participants must now take charge to contact the relevant persons in their country according to the strategy

discussed in the Braunschweig meeting, and these persons must have the chance to carefully think about the potential use of IFCN for their institutions.

Hence, at this point in time, only some general conclusions regarding the progress in the participating countries shall be reported:

- In the **United States**, more than 80 representative farms have been developed (26 dairy, 13 other livestock, 29 crop, see Figure 4). AFPC began this work in the early 80s, and since then numerous studies have been carried out. Panel farms are continuously updated every 2-3 years. If necessary, the panel structure can be further extended to other regions or to other agricultural products. AFPC and FAL have started to discuss research projects that would require the establishment of representative sugar farms in the United States and other countries.

Figure 4: AFPC Representative Farms



Each location is represented by an average and above average size farm.
At present, the AFPC-network consists of more than 90 farms.
Source: AFPC-Texas A&M University

AFPC
FAL-BW
HEMME (1997)

Note: 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

- Under the lead of AFPC, a few dairy panels have also been established in **Canada** and in **Mexico**. AFPC and FAL have started to discuss research projects that would develop representative crop (arable) farms in Canada.
- In **Germany**, the establishment of panels started in late 1996. By mid 1998, 11 dairy panels and two arable panels have been fully established. There are very good prospects for the further expansion of dairy panels. By end of 1998, at least 12 dairy panels will have been completed, 4 arable panels will be established in 1998.
- With the help of several institutions, FAL started to expand the IFCN to other EU-countries (**Italy, Austria, France, Netherlands, United Kingdom**) during 1997. Until now, the model TIPI-CAL has been successfully adopted to the specific conditions of these countries, and a number of typical farms have been developed. In most of these cases, however, data from other than panel sources has been used. This "fast track" - approach was necessary to achieve quick results and to demonstrate the potential of IFCN within Europe. However, the discussions in the Braunschweig meeting showed very clearly that for the sustainable success of IFCN it is absolutely necessary to transform the "fast track" farms into "panel based" typical farms in the near future. Several options to reach this goal and to extend the panel structure were discussed with the participating institutions in the Braunschweig meeting. The expansion to other EU member states will follow.
- Central Europe was represented by scientists from three countries that are especially important for future agricultural markets in the evolving EU structure (**Poland, Czech Republic, Hungary**). Moreover, a German scientist who is analysing agriculture in **Bulgaria** also participated. The discussions indicated that there are good prospects for the implementation of IFCN in the three countries mentioned first. Hungary is in the lead. A scientist already works with the TIPI-CAL model and has adapted the model to Hungary. The first panel will be established this year. The participants from Poland and from the Czech Republic indicated that they see good chances to find researchers who will start the implementation process in co-operation with FAL.
- In **New Zealand**, a lot of work has already been done in order to collect information on international competitiveness, in particular in the field of milk production. Moreover, there are well-performing institutions available where co-operation between farmers and advisors is being organised. There seem to be good prospects for a quick establishment of IFCN at least in the field of dairy.
- In **Australia**, the institutional background is different. This will probably call for a different implementation strategy. The establishment of the dairy network may be more complicated than in New Zealand, but on the other hand there are perhaps better starting conditions for a broad implementation strategy including all commodities of major importance.

- In **South Africa**, the institutional framework is similar to New Zealand. There are good chances for a quick establishment of dairy panels within existing institutions. Furthermore, South Africa expressed some interest in expanding the IFCN concept to other countries in southern Africa.
- South America was represented by experts from three countries that are (or may become) very important for some world food markets (**Argentina, Brazil, Uruguay**). The great potential of this region was underlined by the discussion about the future dairy production in several countries (see section 7.4). The discussions about implementation strategies have shown that the participants from South America are highly committed to the IFCN approach and will strongly support it. On the other hand, these participants (and their institutions) can only play a minor role in the implementation process. Consequently, it has been attempted to identify the most appropriate institutions of the three countries during the Braunschweig meeting. These institutions will be contacted directly by the participants. If these institutions are interested, then there will be the special need for direct assistance (by FAL or AFPC) during the first steps of the implementation process.

7 Results I: International Competitiveness of Dairy Farming

The discussions during the Braunschweig meeting indicated that international competitiveness can only be partly analysed by comparing cost of production among typical farms. Also needed is:

- agriculture sector and macro-economic projections to develop a baseline and alternative scenario for analysis.
- the transformation of these (and other) model projections to a consistent analysis for the dairy industry.

Therefore, IFCN is designed to be more than a tool for cost comparisons (see examples in sections 7.4.8 and 8). At this very early stage of IFCN, however, projections could only be given for a very limited number of panel farms in three countries. In most countries, there is still neither a panel structure nor a scientist who can handle FLIPSIM or TIPICAL.

Therefore, at present, there is no choice but to base economic estimations on the results of cost comparisons for a few selected farms. These results are the best that are currently available world-wide. However, they must be interpreted with great care to avoid wrong conclusions that could otherwise be drawn.

Despite of this lack of infrastructure, the organisers of the Braunschweig meeting decided that the first IFCN meeting should report the results on international competitiveness in dairy that were developed "Learning by doing" is perhaps the best way to develop the most appropriate organisational and methodological IFCN concept for the future as well as develop a publication for distribution that illustrates the analytical power of IFCN. It is important, however, to note that the results of these analysis were quite consistent with prior hypothesis and conventional thinking on competitiveness issues in dairy.

Thus, all participants were asked prior to the meeting to send the data of one or two typical farms from their country via E-mail to FAL. FAL scientists harmonised these data to the extent possible, based on the methods that have been developed in the past for the European Dairy Farmers (EDF). Of course, a lot of open questions and harmonisation problems were detected. During the first two days of the meeting, FAL scientists and the experts from abroad formed small working groups, and they worked to solve these problems together.

The results of this co-operation is described in sections 7.2 and 7.3. Section 7.4 contains further information about the dairy industry in the participating countries. Before turning to the results, Figure 5 gives an overview on milk production and milk yields in the countries to give an impression on their position in the international context.

Figure 5: Development of milk production and milk yields in main milk producing countries

Milk production million tonnes							
Country	1992	1993	1994	1995	1996	1997 [1]	1998 [2]
Austria	3,3	3,2	3,2	3,1	3,0	3,1	3,0
France	25,3	25,0	25,3	25,5	25,1	25,0	24,7
Germany	28,1	28,1	27,9	28,6	28,8	28,7	28,7
Italy	10,6	10,4	10,4	10,5	10,8	10,6	10,5
Netherlands	10,9	11,0	11,0	11,3	11,0	11,1	11,2
United Kingdom	14,4	14,6	14,9	14,7	14,7	14,7	14,7
Bulgaria	1,6	1,3	1,2	1,2	1,1	1,0	-
Czech Republic	3,8	3,5	3,1	3,0	2,7	2,7	2,7
Hungary	2,5	2,3	1,9	1,9	1,8	1,8	1,9
Poland	13,1	12,7	11,8	11,4	11,7	12,0	12,2
Canada	7,6	7,5	7,8	7,9	7,9	7,8	7,7
USA	68,4	68,3	69,7	70,6	70,0	71,2	71,3
Australia	6,9	7,5	8,3	8,4	9,0	9,3	9,6
New Zealand	8,6	8,7	9,7	9,7	10,4	11,5	11,6
Argentina	6,8	7,2	7,8	8,5	8,9	9,2	9,7
Brazil	15,5	16,3	16,7	18,4	19,5	20,6	21,8
Uruguay	1,1	1,2	1,2	1,3	1,4	1,4	-
South Africa	2,4	2,4	2,3	2,4	2,2	2,2	2,1
India	29,4	30,6	31,0	32,5	33,5	34,5	35,5

Milk yield 1000 kg per cow							
Country	1992	1993	1994	1995	1996	1997 [1]	1998 [2]
Austria	3,9	4,0	4,0	4,2	4,3	4,5	4,5
France	5,2	5,4	5,5	5,3	5,4	5,5	5,6
Germany	5,1	5,2	5,3	5,4	5,5	5,5	5,6
Italy	4,5	4,5	4,5	4,8	5,1	5,0	4,9
Netherlands	6,3	6,3	6,5	6,6	6,6	6,9	7,1
United Kingdom	6,3	6,4	6,4	6,5	6,7	6,8	6,9
Bulgaria	3,0	2,9	3,0	3,1	3,1	2,8	2,8
Czech Republic	3,9	3,8	4,0	4,1	4,3	4,4	4,5
Hungary	4,6	4,8	4,8	4,8	4,9	4,8	4,9
Poland	3,0	3,1	3,1	3,1	3,4	3,4	3,3
Canada	5,9	6,1	6,3	6,4	6,4	6,2	6,2
USA	7,0	7,1	7,3	7,5	7,5	7,7	7,7
Australia	4,2	4,3	4,7	4,7	4,9	4,9	4,7
New Zealand	3,3	3,2	3,5	3,2	3,3	3,5	3,5
Argentina	3,3	3,4	3,4	3,6	3,9	3,8	3,8
Brazil	0,9	0,9	1,0	1,1	1,1	1,2	1,2
Uruguay	2,6	2,6	2,7	2,8	2,9	2,9	3,0
South Africa	5,1	5,5	6,1	6,2	6,2	6,1	6,1
India	0,9	1,0	1,0	1,0	1,0	1,0	1,0

1) Preliminary
2) Forecast
Source: USDA-FAS, National Statistics (various years)

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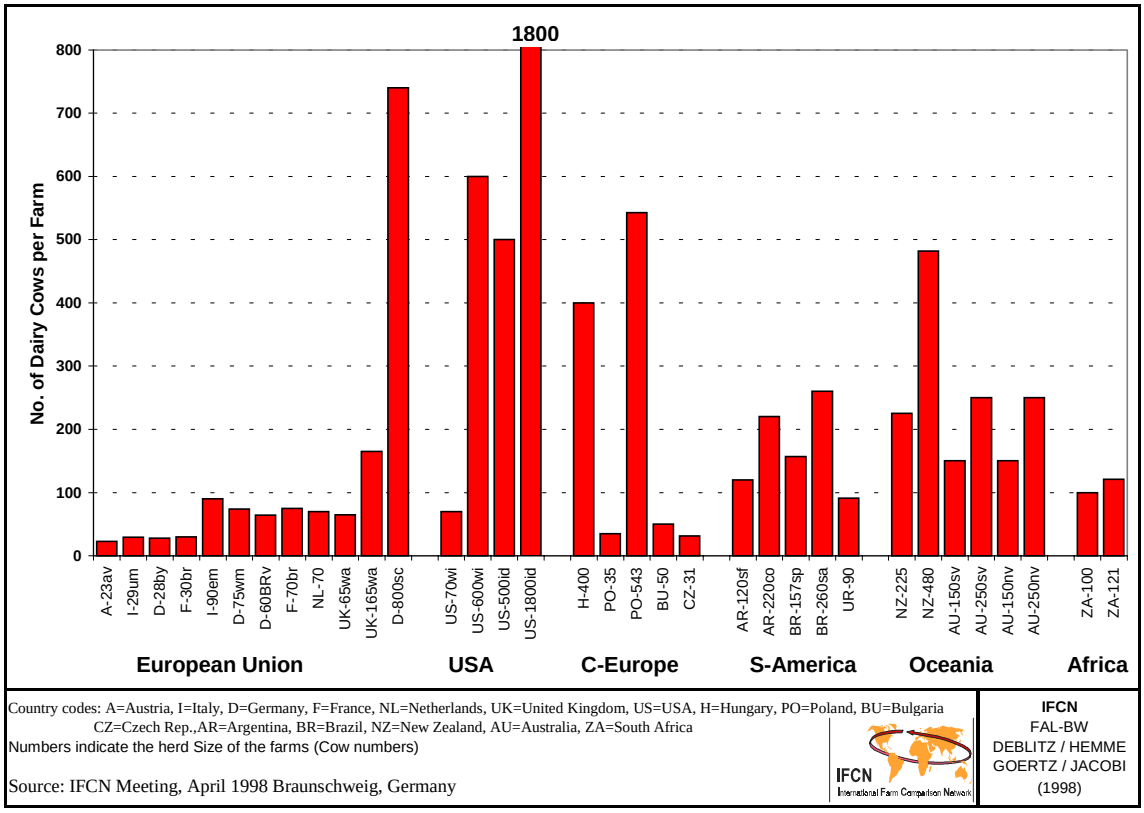
DEBLITZ (1998)

Please note: Canada and India were not included in this first meeting but those countries are important milk producing countries and future plans include their participation.

Figure 6 indicates the size of farms analysed in the dairy workshop. A more detailed description of the farms is given in Figure 7. The standard format for figures is as follows:

- Farms are shown on the x-axis and grouped by world regions. The order within the world regions is made according to farm (herd) sizes and countries.
- Each farm has a code that indicates the country, the cow numbers and the region the farm is located, e.g. *US-500id* means the US farm with 500 cows in Idaho.
- The footnotes under each chart provide additional information on the country codes and specific information on the relevant chart.
- The full names of the regions are given in Figure 7.

Figure 6: Farm Size of typical dairy farms analysed in the meeting



Farm size data can be summarised as follows:

- In the EU, there are a number of rather small farms with between 20 to 30 cows. Another size grouping includes farms with 65 to 90 cows. The UK farm with 165 cows reflects the larger farm structure in the UK, whereas the 800 cow farm in Eastern Germany is a result of the farm structure in the former GDR.
- In the US, the 'small' farm with 70 cows can be compared with the second group of EU-farms. Two farms with 500 and 600 cows represent large size in Wisconsin but a moderate size farm in Wisconsin. The biggest farm is a 1.800 dry lot dairy in Idaho.
- Farm sizes in Central Europe vary significantly with smaller family type of farm having up to 50 cows while co-operative type of farms approach 600 cows.
- In South America, New Zealand, Australia and South Africa we have 'moderate size' farms with around 100 cows and large farms of 200 to 500 cows.

Figure 7: Typical Dairy farms in the IFCN Network 1998

Country	Region	Year of data	The Dairy Enterprise				Acerage	
			Cows no.	Milk yield t/cow	Production t/farm	Returns from dairy %	ha total	% Grassland
EU-countries								
Austria	Alpenvorland	96	23	4,8	109	66%	28	54%
Italy	Umbria	96	29	5,7	166	96%	18	0%
Germany	Bayern	96	28	5,3	149	88%	27	70%
France	Bretagne	96	30	8,1	244	93%	39	62%
Italy	Emilia Rom.	96	90	6,5	583	98%	45	69%
Germany	Niedersachsen	96	74	7,2	533	88%	76	92%
Germany	Niedersachsen	96	64	7,3	464	75%	94	48%
France	Bretagne	96	75	7,5	564	90%	116	16%
Netherlands	Nord	96	70	7,8	545	93%	45	89%
UK	Wales	96	65	5,7	368	99%	42	100%
UK	Wales	96	165	6,1	1.010	93%	118	60%
Germany	Sachsen	96	740	5,7	4.253	56%	1.500	1%
USA								
USA	Wisconsin	96	70	8,7	612	100%	79	0%
USA	Wisconsin	96	600	8,4	5.064	100%	405	0%
USA	Idaho	96	500	8,8	4.409	100%	32	drylot
USA	Idaho	96	1800	8,8	15.895	100%	224	drylot
Central-Europe								
Hungary	Center	96	400	5,3	2.134	97%	430	10%
Poland	Wielkopolska	97	35	3,2	113	100%	26	62%
Poland	Msice/Pomorze	97	543	5,1	2.752	38%	2.175	34%
Bulgaria	Burgas	96	50	1,8	89	100%	135	44%
Czech-Rep.	South	96	31	5,4	152	47%	135	24%
South America								
Argentina	Santa Fe	96	120	3,2	388	80%	130	64%
Argentina	Cordoba	96	220	3,1	681	100%	230	80%
Brazil	Sao Paulo	97	157	5,3	832	100%	72	43%
Brazil	Sao Paulo	97	260	7,2	1.874	100%	205	12%
Uruguay		96	91	4,6	416	100%	132	89%
Oceania								
New Zealand	North Island	96/97	225	4,1	931	100%	103	100%
New Zealand	South Island	96/97	482	4,0	1.952	100%	244	100%
Australia	Victoria South	96/97	150	5,3	797	100%	107	100%
Australia	Victoria South	96/97	250	5,7	1.428	100%	183	100%
Australia	Victoria North	96/97	150	5,4	806	100%	106	100%
Australia	Victoria North	96/97	250	5,7	1.429	100%	179	100%
South Africa								
South Africa	Model farm	98	100	4,5	445	100%	10	drylot
South Africa	Natal	96	121	4,6	553	85%	100	70%

Source: IFCN Network

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7.1 Assumptions for the Calculations

The cost calculations are based on the dairy enterprise that consists of the following elements:

- milk production
- raising of replacement heifers
- forage production and/or feed purchased for dairy cows and replacements

The analysis results in a comparison of returns and total costs per kg milk. Total costs consist of expenses from the profit and loss account (cash costs, depreciation, etc.), and opportunity costs for farm-owned factors of production (family labour, own land, own capital). The estimation of these opportunity costs must be considered carefully because the potential income of farm owned factors of production in alternative uses is difficult to determine. In the short run, the use of own production factors on a family farm can provide flexibility in case of low returns when the family forgoes income. However, in the long run opportunity costs must be considered because the potential successor of the farmer will make a decision on the alternative use of the production factors, in particular his own labour input before taking over the farm. To indicate the effects of opportunity costs we have them separated from cash costs in most of the figures.

For the estimations and calculations the following assumptions were made:

- **Labour costs**: for hired labour, cash labour costs currently incurred were used. For unpaid family labour, the average wage rate for a qualified full-time worker in the respective region was used.
- **Land costs**: for rented land, rents currently paid by the farmers were used. Regional rent prices provided by the farmers are used for owned land. In those countries with limited rental markets (like NZ), the purchase price was capitalised with 4 percent annual interest to obtain a theoretical rent price.
- **Capital costs**: own capital is defined as assets, without land and quota, plus circulating capital. For borrowed funds, a real interest rate of 6 percent was used in all countries; for owner's capital, the real interest rate was assumed to be 3 percent.
- **Quota costs**: rent values were used for rented or leased quota. Purchased quota was valued at depreciation values from the profit and loss accounts. These costs are not deducted in the comparison.
- **Depreciation**: machinery and buildings were depreciated using a straight line schedule on purchase prices with a residual value of zero.
- **Adjustments of fat content**: all cost components and forage requirements are established to produce FCM (fat corrected milk with 4,0 % fat)
- **Adjustment of VAT**: all cost components and returns are stated without value added tax (VAT).

Figure 8 provides the definition and method of calculation for the most important economic indicators produced by the model TIPI-CAL. The model produces both the profit definition mainly used in the EU-countries (= family farm income) and the net cash farm income used in the US and generated by the FLIPSIM-model.

Figure 8: Definition of Farm Economic Indicators in TIPI-CAL

FARM ECONOMIC INDICATORS

+	Total receipts	= +	CROP (wheat, barley, ...)
		+	DAIRY (milk, cull cows, calves, ...)
		+	Government Payments
-	Total expenses	= +	variable cost CROP
		+	variable cost DAIRY
		+	fix cash cost
		+	paid wages
		+	paid land rent
		+	paid interest on liabilities
=	**NET CASH FARM INCOME**		
-	Depreciation		
+/-	Change in inventory		
+	Interest on saving		
+/-	Capital gains / losses		
=	**PROFIT (TIPI-CAL), Farm Family Income**		
-	Opportunity costs	= +	calc. interest on own capital
		+	calc. rent on land
		+	calc. cost for own labour
=	**ENTREPRENEURS PROFIT**		

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(1998)

7.2 Overview on Returns and Costs of Production for typical Farms and Reasons for their Differences

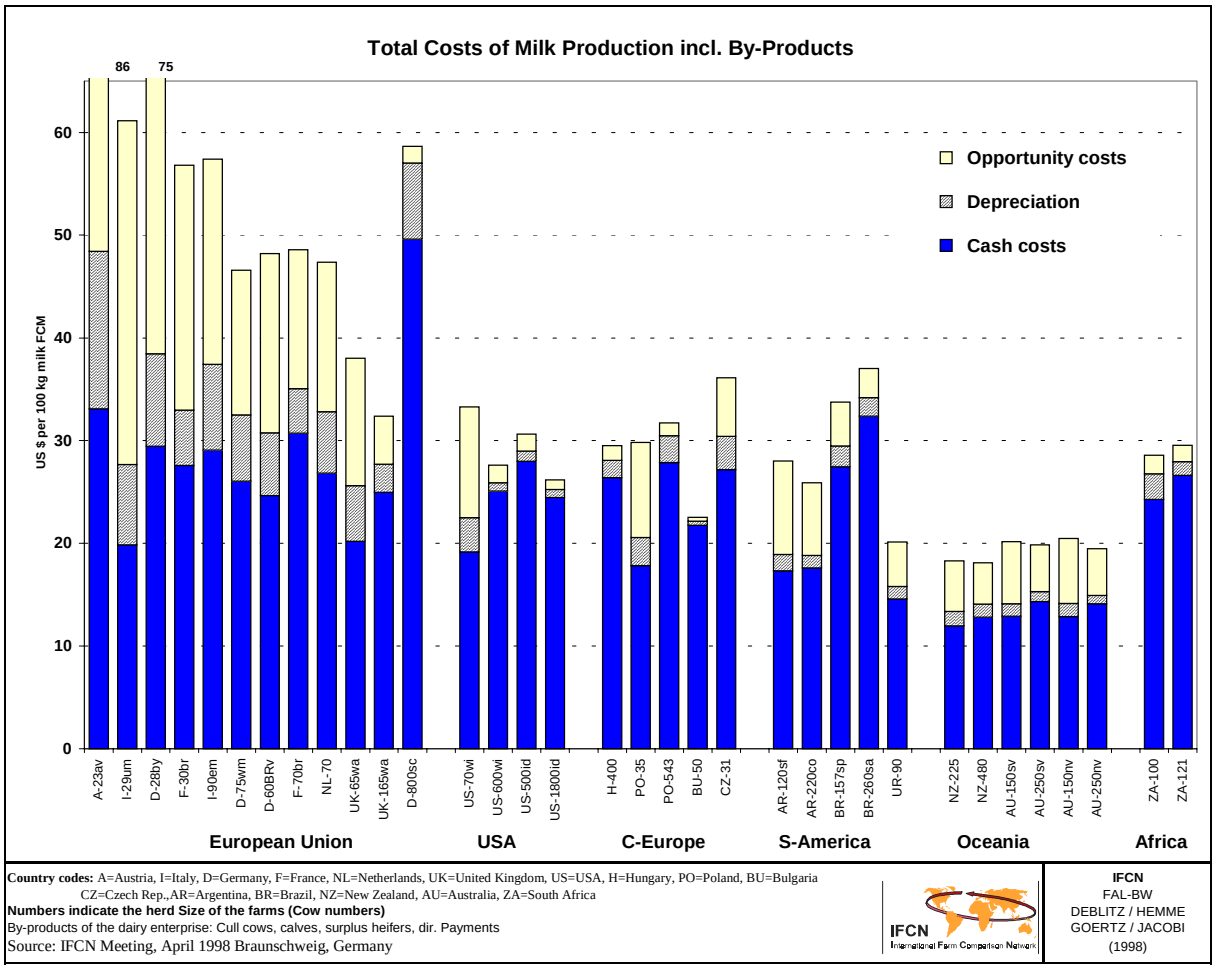
In addition to the previously indicated assumptions:

- All values are expressed in US-$.
- All figures refer to the dairy enterprise that includes: dairy cows, replacement heifers, and forage production.
- The farm data are from 1996 and 1997, respectively. For conversion of national currency into US-$ terms, the relevant exchange rate has been applied.
- Included in cost data is the value of cull cows, calves, bulls and surplus heifers as by-products of producing mlk.
- Cost comparisons are based on the exchange rates that existed.

Total costs of milk and by-products

Figure 9 shows the result of the cost comparison. Cost have been broken up in cash costs, depreciation and opportunity costs for production factors that are owned by the farmer.

Figure 9: Costs of milk and by-products in typical dairy farms in 1996/97



The results of the cost comparison shown in Figure 9 can be summarised as follows:

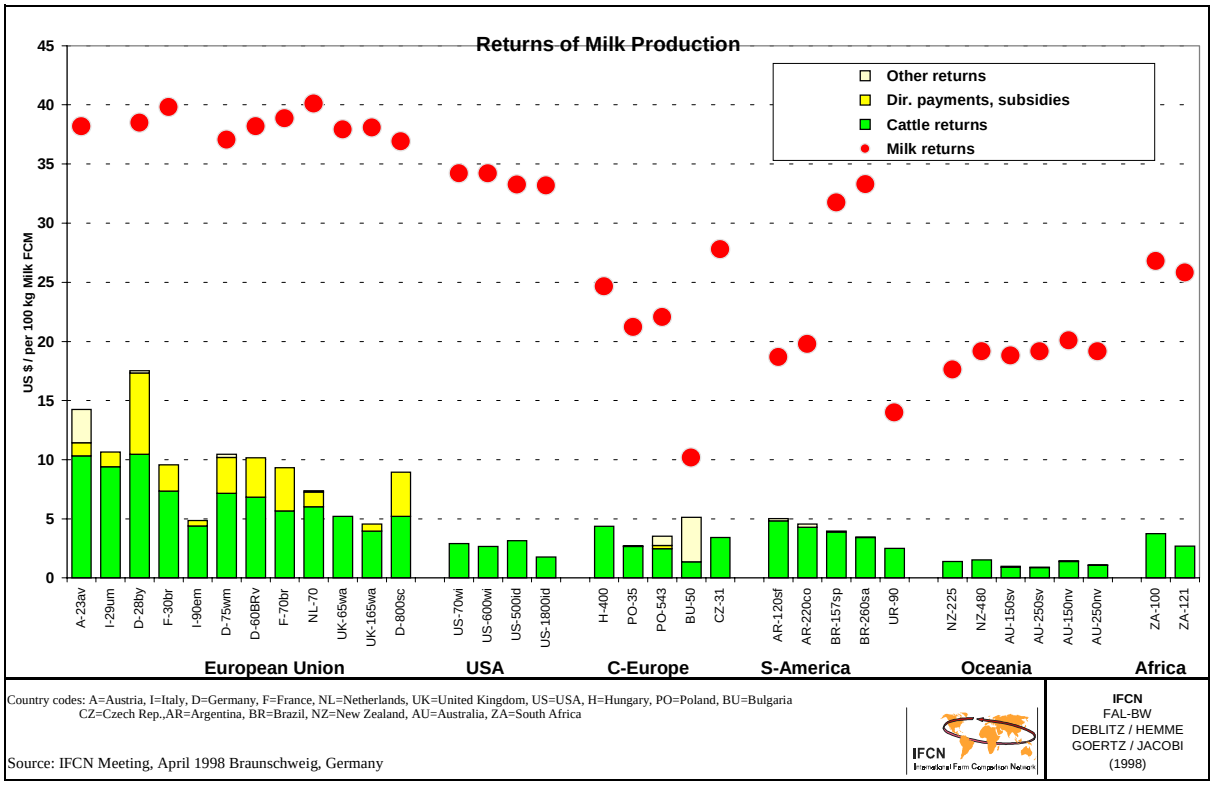
- The production costs of milk and by-products are highest in the EU-countries and range from around 47 US-$ (larger farms) to above 57 US-$/100 kg milk. High labour costs are the predominant reason for the higher cost structure. High labour costs likewise were experienced by the large 800 cow dairy in Eastern Germany that has by far the highest cash expenses for wages.
- The farms in the UK have a significant total cost advantage relative to the other EU-countries approximating the cost level of the US-farms (32 to 38 US-$).
- Costs in the US seem to be similar to those on the representative farms in Central Europe, South Africa and parts of South America (around 30 US-$).
- The costs in Oceania and Uruguay are about 30 % below the US level (at 20 US-$).
- High labour and land costs associated with high depreciation values create a disadvantage for most EU-farms.
- The lowest cost can be found in New Zealand, Australia, and Uruguay. These farms combine a grass based system, year round grazing, low wage levels and high labour productivity.

Returns of milk production

The comparison of returns are shown in Figure 10. The results can be summarised as follows:

- Four milk price levels were observed:
    - The EU-countries with approximately $38 US per 100 kg of milk. The particularly high price in the Emilia Romagna area of Italy is due to the production of the milk for Parmigiano Reggiano cheese.
    - USA and Brazil with prices around $33 US per 100 kg of milk.
    - Central European prices vary greatly between countries. The price levels in Hungary, Poland and the Czech Republic are comparable to those in South Africa.
    - Prices in Argentina, Uruguay, New Zealand and Australia are in the range of $17 to $19 US per 100 kg of milk.
- Beef returns are high in the EU due to high levels of supported beef prices.
- Direct payments and subsidies play an important role in the EU-countries returns.

Figure 10: Returns of milk production in typical dairy farms in 1996/97



Break-even points of milk production

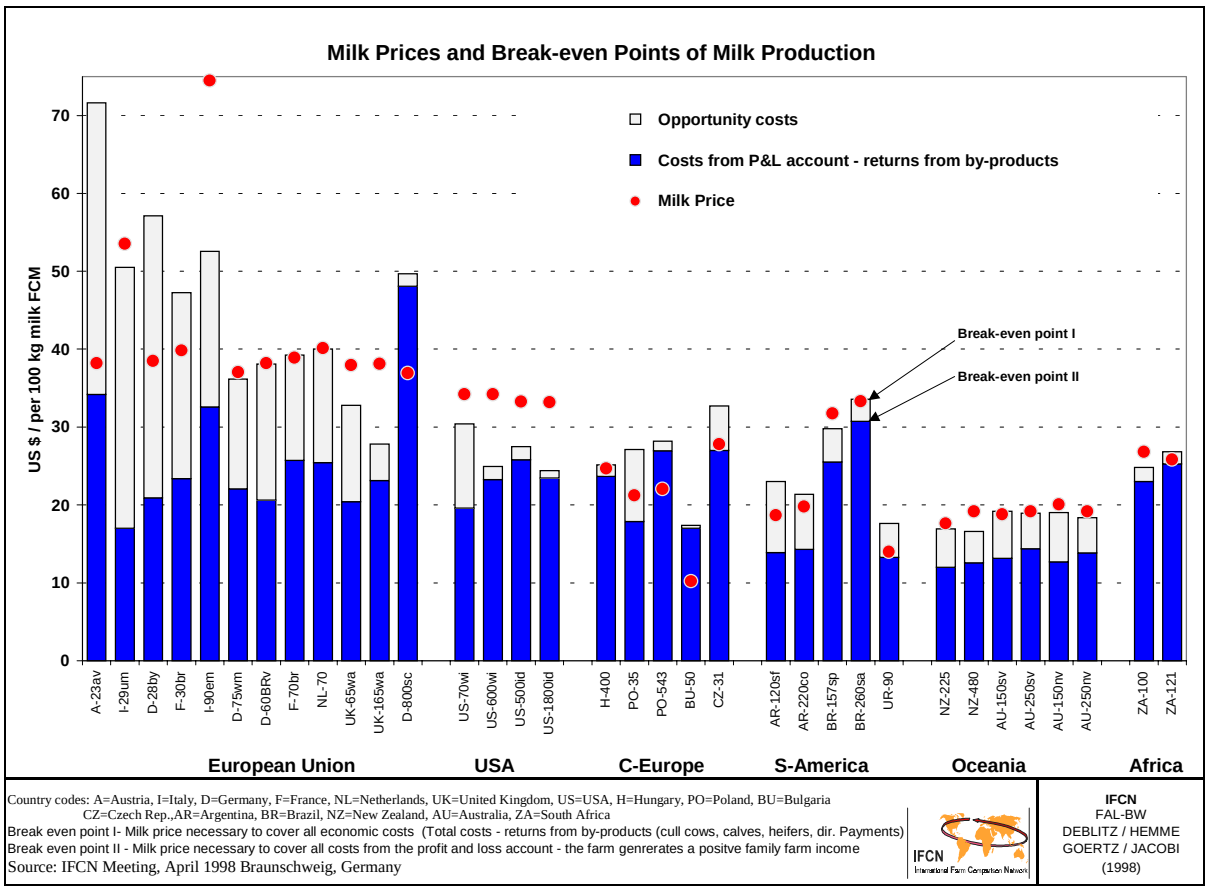
The total production costs of dairy farming include costs of producing what might be termed by-products such as cull cows, calves, surplus heifers, beef sales and direct government payments. In order to identify the minimum price at which the farms can produce milk, the break-even points have to be computed. It is assumed that non-milk returns is equal to the costs of producing those returns. For example, the return from culled heifers is equal to the cost to produce the heifers.

Break-even points and the milk price are contained in Figure 11. The break-even point is computed by deducting all returns from the by-products of milk production from the total costs shown in Figure 9. If the realised milk price is higher than the computed break-even point I, all economic costs are covered. Therefore this break-even point can be also seen as total costs for milk only within the dairy enterprise.

Break-even point II reflects the price needed to cover all costs from the profit-loss account (including cash costs and depreciation). The break-even point II is calculated as follows: Break-even point I *less* opportunity costs for all farm-owned production factors (labour, land, and capital).

The results of these calculations are shown in Figure 11.

Figure 11: Milk prices and break even points in typical dairy farms 1996/97



Four cost levels become apparent in Figure 11:

- Approximately $50 US and above for the EU-farms with around 30 cows.
- Costs around $38 US for the EU-farms with 60 to 75 cows.
- USA, Central Europe, Brazil and South Africa with costs of $25 to $30 US.
- Costs around $20 US in Argentina, Uruguay, Australia and New Zealand.
- Relatively higher returns in the EU to by products of milk production (beef etc.) means that break-evens are reduced relatively more than those in other countries.

Most farms are able to generate a positive family living withdrawals. Exceptions are the 800 cow Eastern German farm, the 543 cow Polish farm and the 50 cow Bulgarian farm. All are co-operatives and all have very high labour costs with an accompanying low labour productivity. The low milk price in Bulgaria is the result of government fixed milk prices. Recently, the government eliminated the fixed milk price and prices increased to $30 US in the Spring of 1998.

Full economic costs can not be covered by many EU-farms (except the UK farms) and none of the Central European farms. The farms in New Zealand, Australia can cover full economic cost. The farms in the United States can also covered full economic cost, although it should be noted that 1996 was a year with exceptionally high milk prices. In 1998 milk prices were $30 US.

Reasons for cost differences

The reasons for the cost differences are different prices of the production factors and different factor productivity levels. In the following, we go through the main cost components for identifying their contribution to cost differences between the farms under consideration.

Different levels of **labour** prices and productivity are a major reason for different cost levels (see Figure 12). The EU-countries experience both unfavourable conditions - high wages (opportunity costs) and relatively low labour productivity - resulting in the highest labour costs. However, it should be noted that these farms are mainly family farms with little or no hired labour. Labour costs mainly reflect opportunity costs for family labour (see remarks in section 9).

Wage levels in the US are comparable to some of the other areas, productivity is very high when measured in yield per cow. Low wage levels in Central Europe should provide an advantage but are fully or partly offset by low productivity. Poor equipment quality, production per cow and large amounts of labour contribute to low productivity. A similar situation can be found in South Africa and Brazil. Additionally, as many of the Central European farms are co-operatives, they work with hired labour and can not use family labour as a buffer for foregone income in case of low returns.

Wage levels in South America are higher than in Central Europe and South Africa, but are low compared to EU-countries. Labour productivity is comparable with small EU-dairies keeping 20 to 40 cows. In Australia and New Zealand, moderate wage levels and a productivity of more than 200 kg/hour result in a very low labour cost.

In the case of **land (rent) costs**, again the EU-countries have the highest costs (see Figure 13). Rent prices in the EU and in particular in the Netherlands are the highest. High stocking rates with accompanying high yields per cow result in high land productivity in Italy, the Netherlands and the UK, coinciding with low land prices in the UK. High productivity in a dry lot type of farm is also the reason for low land costs per kg of milk produced in Idaho despite relatively high land prices. High land productivity is also found in Brazil where high yields per cow meet good yielding pastures, corn silage and sugarcane. Land prices in New Zealand and Australia have been climbing in recent years due to the expansion of the dairy herd and related demand for suitable grazing land. Combined with a moderate land productivity, this results in higher land costs than in the US but lower than in most the EU-countries. Land costs in Central Europe and South Africa are the lowest and in most cases result from low land prices.

Interest costs for owned or borrowed capital are another important reason for differences in production costs (see Figure 14). However, drawing conclusions from this point is rather difficult because of high inflation and lack of credit markets in some countries. For example, in Argentina a credit market is not established yet, instead suppliers provide credits which are included in the input prices and not separately shown here. Bulgaria is facing economic instability and valuing capital at this stage is impossible. Because of the difficulties in determining the correct interest level and the high mobility of capital we have used a standard real interest rates of 3 % for owned capital and 6 % for borrowed capital. Consequently, the capital costs shown in Figure 14 reflect differences in capital productivity. Based on these assumptions interest costs in the EU are highest but vary significantly. Costs in the US are relatively low. South American costs are surprisingly high considering the year round grazing systems. This will be an area for further research as the IFCN group expands its analyses.

Figure 12: Labour - costs, prices and productivity of milk production in typical dairy farms in 1996/97

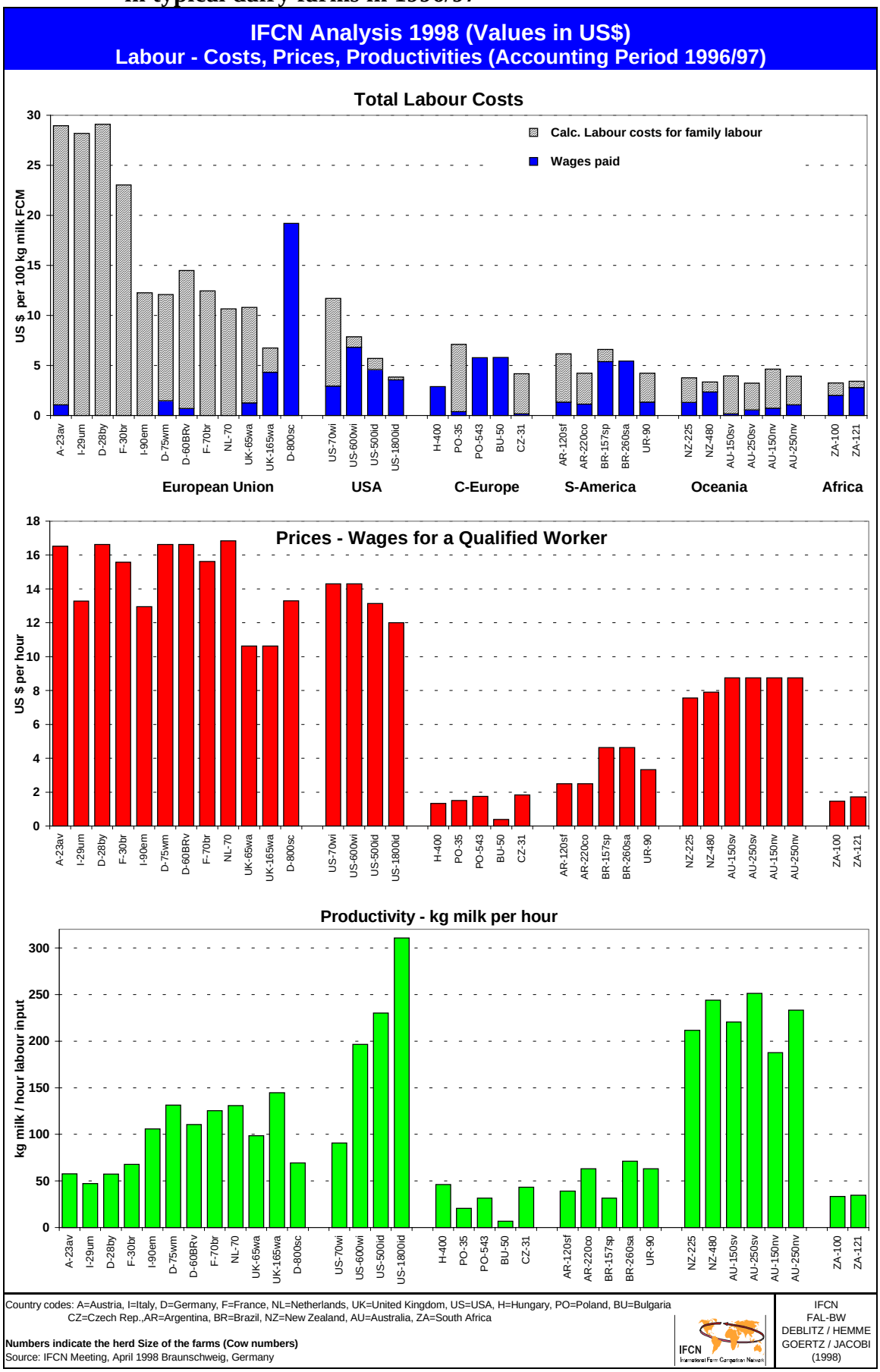


Figure 13: Land - costs, prices and productivity of milk production in typical dairy farms in 1996/97

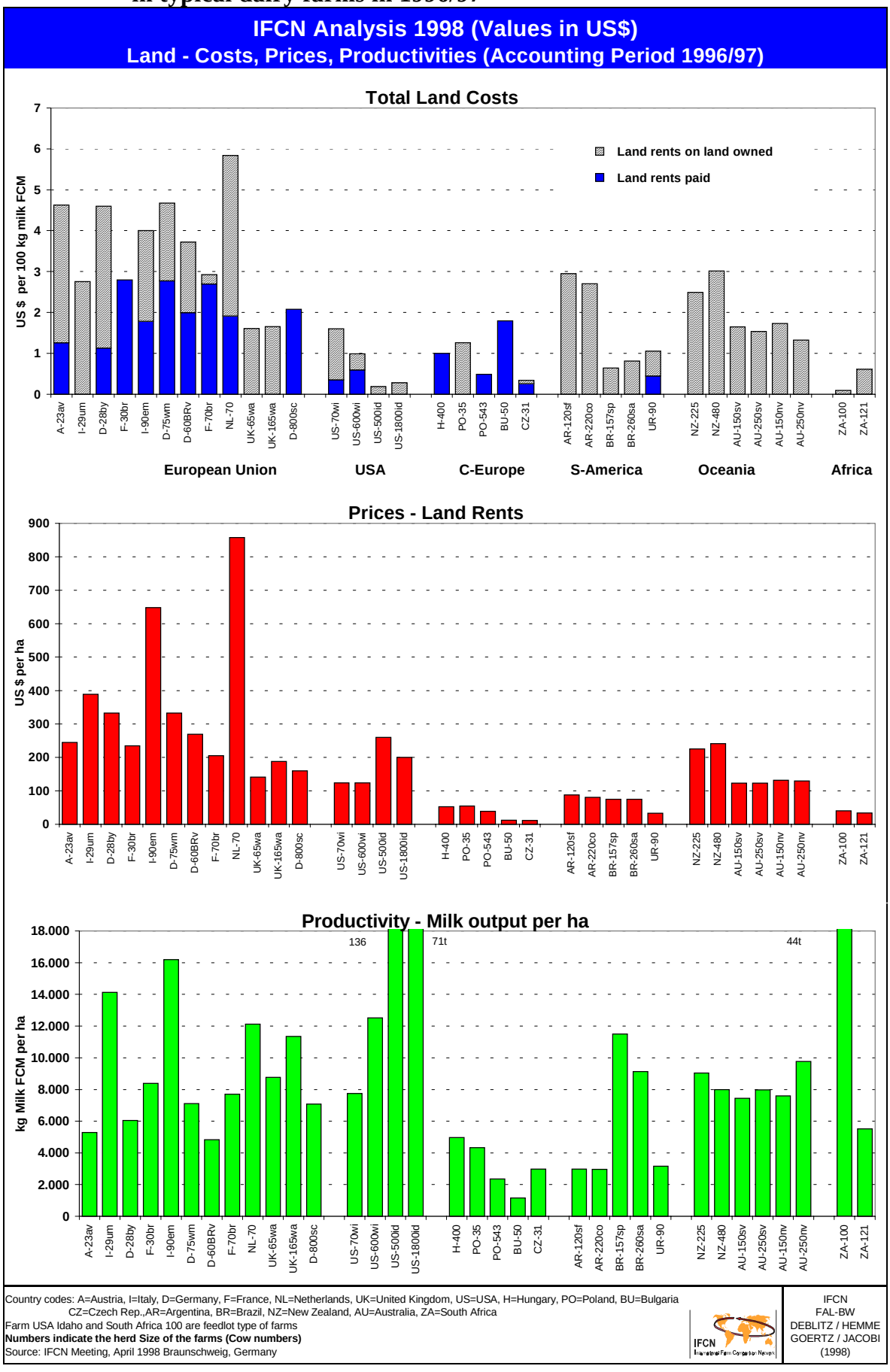
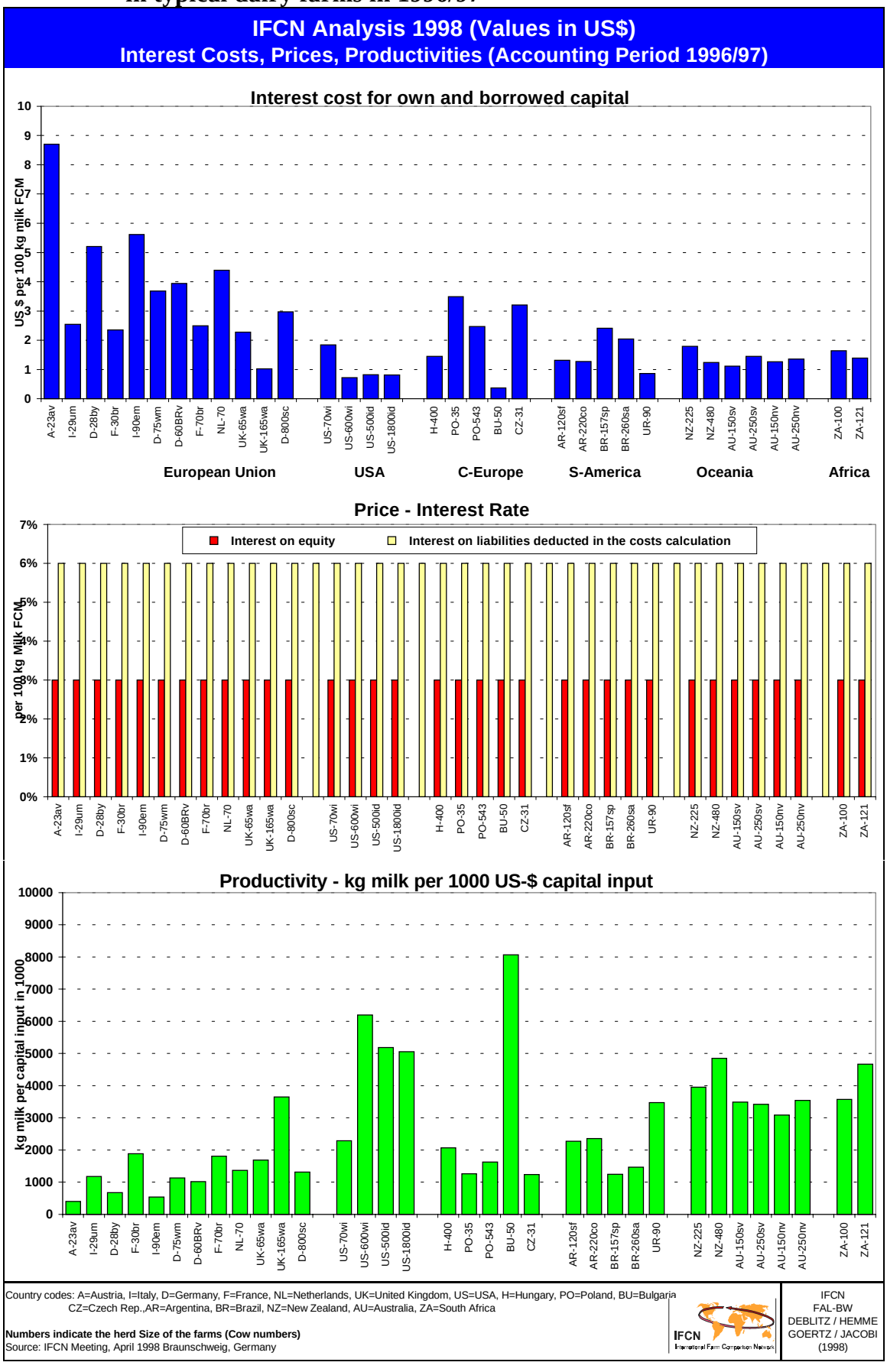


Figure 14: Interest - costs, prices and productivity of milk production in typical dairy farms in 1996/97



7.3 Competitiveness of Dairy Farming in Germany, the UK and the USA in the Time Period 1996 - 1998

The results shown in section 7.2 provide an overview of competitiveness of dairy farming using the standard inputs of land, labour, and capital. The analysis drawn from this information is from 1996/1997 and subject to variation from one year to the other according to changes in factors like exchange rates, prices, technology and policies. It is of particular interest for all players in the dairy sector to get an idea of the most likely **future developments** under these changing conditions. IFCN is a tool very well suited and particularly designed to provide insight into the **dynamics of farming**.

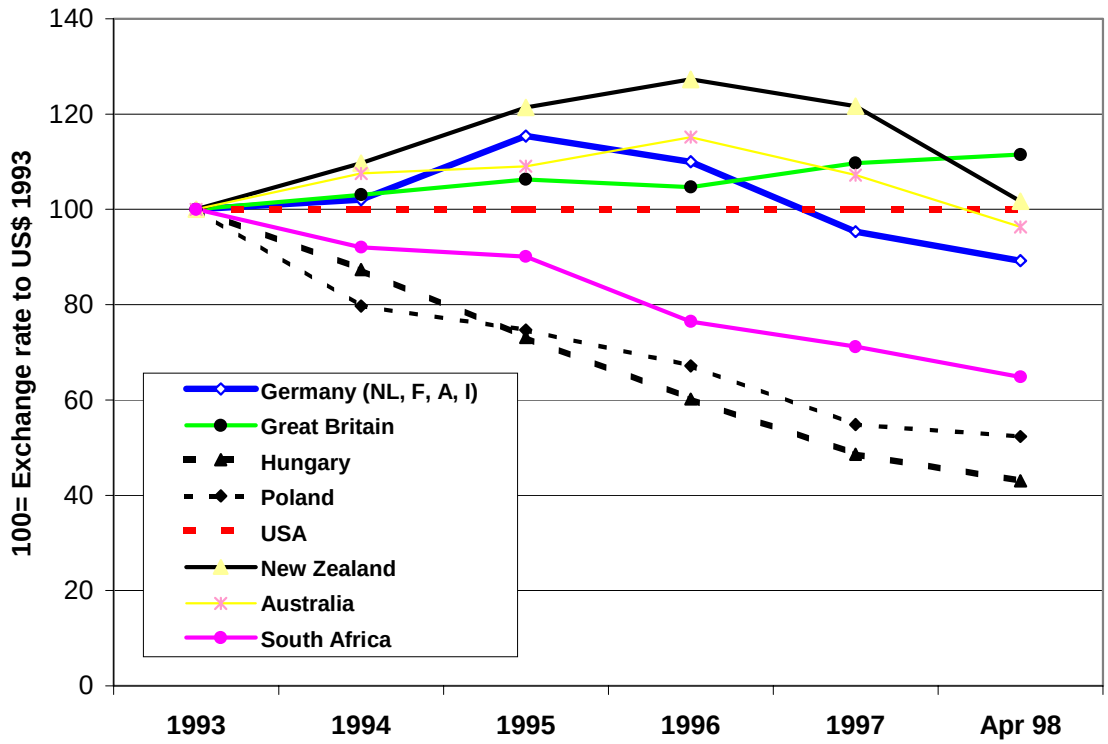
For demonstration purposes, the influence of variations in exchange rates on production costs was analysed. To show the dynamics of competitiveness over time we have selected 3 farms in Germany, the UK and the USA. By using the simulation models TIPI-CAL / FLIPSIM and the prices that farmers have received in the year 1997 and 1998 the farms were simulated over the 1996-1998 period.

Figure 15 indicates the history of exchange rates over the period 1993-1998. Except from Poland and Australia the value of the US-$ has increased substantially in relative terms, particularly when compared to EU-currencies. Correcting the figures for the change of the value of the US-$ has the effect of equalising both milk prices and production costs when expressed in terms of the dollar (Figure 16).

The results shown in Figure 17 and Figure 18 and can be summarised as follows.

- Due to the relative strength of the US dollar the milk price difference between Germany and the USA is eliminated when prices are adjusted to dollar terms. The difference in beef returns has been reduced due to reduction in German beef prices and the strong dollar.
- When expressed in DM, the costs of milk production have remained rather constant on the German farm. In US-$ terms the costs have been reduced by 18 percent. Looking at the cost of milk, the 75 cow German farm appears to be as competitive as the 70 cow Wisconsin farm. It should be noted, however, that probably larger farms than these will be competitive in 10 years from now.
- The British £ was the strongest currency in comparison to both the DM and the US-$. The consequences for the farms and the prices are:
    - Milk prices come under pressure because the milk price is linked to the ECU and the European intervention system. The milk prices in British currency drop to the same extent as the British pound is gaining against the ECU. In terms of US-$ the decline in milk prices is not as sharp because of the strength of the pound.
    - Total costs of milk production, in US-$ terms, rises due to the strong £. The main reasons are increasing costs of land, labour, and services. The costs for feed, especially imported concentrates, are reduced.

Figure 15: History of Exchange Rates 1993-1998



Exchange rate 1US$ = XX national currencies

	1993	1994	1995	1996	1997	Apr 98
EU						
Germany	1,65	1,62	1,43	1,50	1,73	1,80
Great Britain	0,67	0,65	0,63	0,64	0,61	0,60
Netherlands	1,86	1,82	1,61	1,69	1,95	2,09
France	5,70	5,55	4,99	5,12	5,84	6,21
Italy	1573,70	1612,40	1692,89	1542,90	1703,46	1828,27
Austria	11,63	11,42	10,08	10,59	12,20	13,05
Eastern Europe						
Hungary	91,93	105,20	125,70	152,60	189,18	213,45
Poland	1,81	2,27	2,43	2,70	3,30	3,46
Bulgarien	27,59	54,13	67,17	202,97	1699,98	1842,50
Cec Rep	29,15	28,79	26,54	27,15		34,55
Oceania						
New Zealand	1,85	1,69	1,52	1,45	1,52	1,82
Australia	1,47	1,37	1,35	1,28	1,37	1,53
South America						
Uruguay	3,95	5,05	6,35	7,97	9,47	10,30
Argentina	1,00	1,00	1,00	1,00	0,99	1,00
Brazil	0,03	0,64	0,92	1,01	1,08	1,14
South Africa	3,27	3,55	3,63	4,27	4,59	5,04

Source: Deutsche Bundesbank, Devisenkursstatistik 1996
Statistisches Jahrbuch
1997 Mittelwertbildung aus 4 Quartalswerten 1997
(Monatsberichte der deutschen Bundesbank)

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(1998)

Figure 16: Impacts of exchange rates on prices and costs - per 100 kg milk FCM -

	Germany		United Kingdom		USA	
	1996	1998	1996	1998	1996	1998
In national currencies	DM		£		US$	
Milk price	56	56	24	19	35	31
Production costs*	55	55	21	21	31	30
Exchange rate to the US-$	1,5	1,8	0,64	0,61	1	1
In US-$	US$		US$		US$	
Milk price	37	31	38	32	35	31
Production costs*	36	30	32	35	31	30

Costs milk only: Total costs milk incl. By-products – returns from by-products (cull cows, calves, surplus heifers, dir. Payments)

Source: IFCN-meeting, Deutsche Bundesbank

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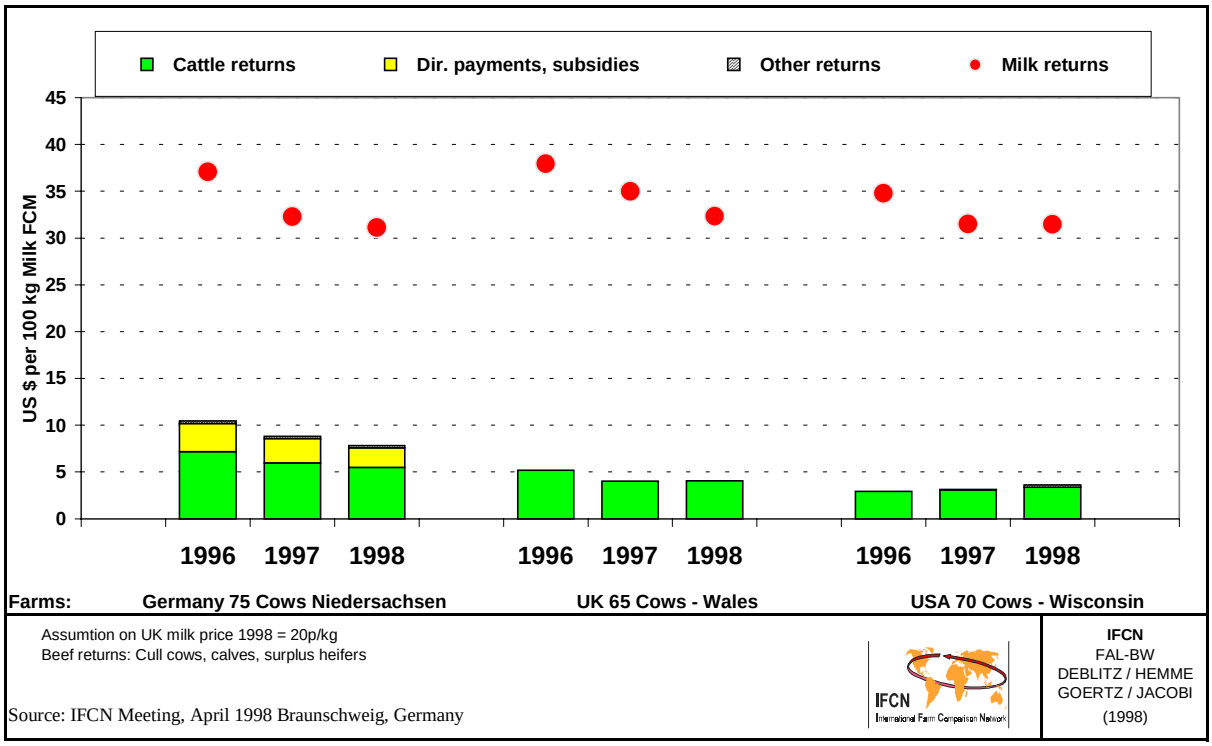
(1998)

Figure 17: Returns of milk production in typical dairy farms in Germany, UK and USA in US-$ in 1996-1998



Assumtion on UK milk price 1998 = 20p/kg
Beef returns: Cull cows, calves, surplus heifers

Source: IFCN Meeting, April 1998 Braunschweig, Germany

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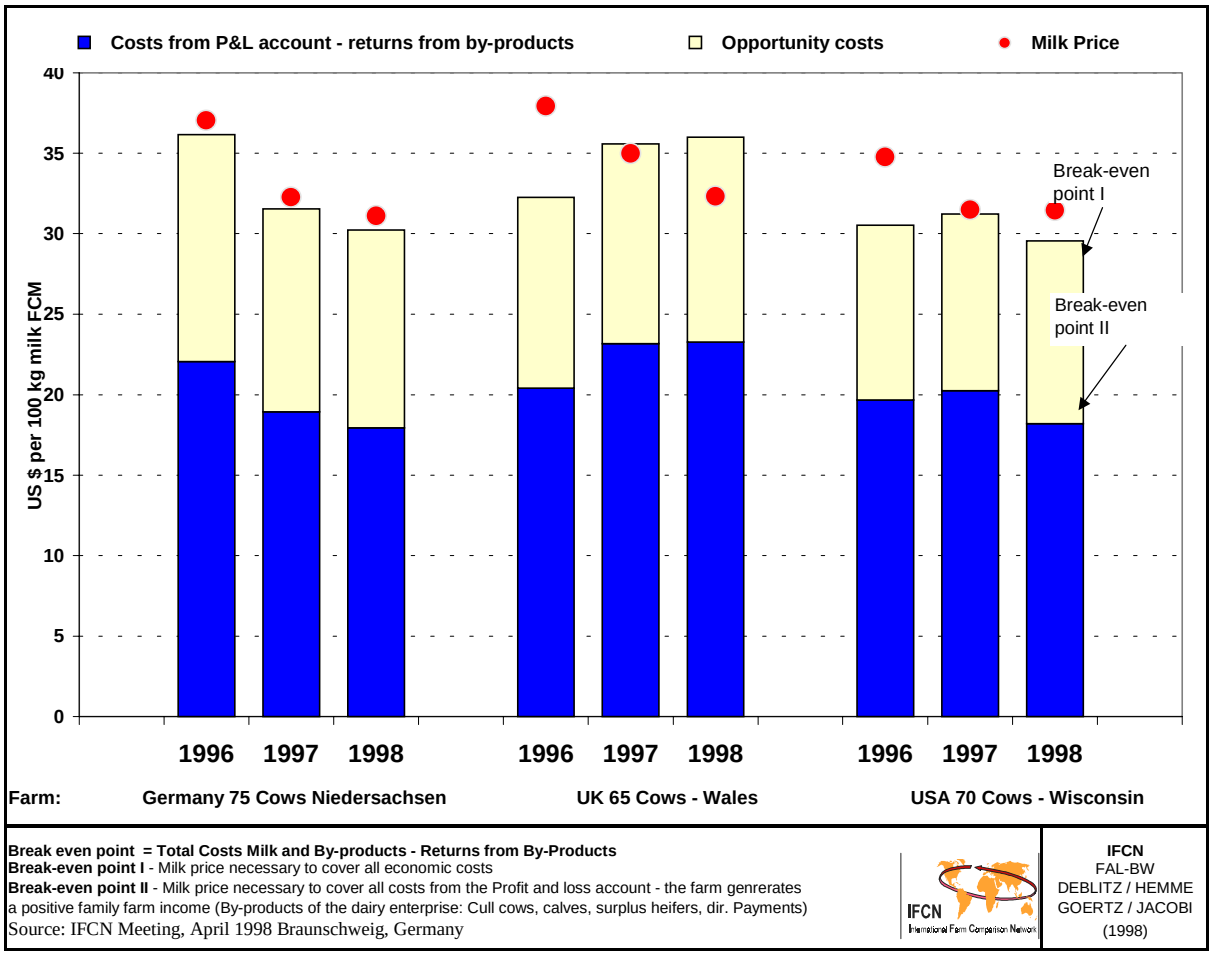
(1998)

Figure 18: Costs of milk only and milk price in typical dairy farms in Germany, UK and USA in US-$ 1996-1998



This analysis would also suggest that competitiveness, in the long-term at least, is strongly influenced by the relative value of currencies. Therefore, the adopting of the EURO would be expected to impact the competitiveness of EU agriculture.

This first analysis of production costs for a three year period illustrates the potential of IFCN and the related models TIPI-CAL and FLIPSIM. Future steps involve developing projection of future costs and returns to evaluate the impacts of changes in policy, technologies, and shifts in macro-economic parameters such as inflation, interest rates, exchange rates and world market prices.

7.4 Future Development of the Dairy Industry in the Participating Countries (Expert Assessments)

After having discussed the results for the typical farms, the participants were asked to give some tentative assessments about the future development of the dairy industries in their countries. As a guideline for the structure of their contributions, they were given the following questions:

- How do the typical farms used in this workshop fit in the context of the countries industry? How typical are the farms?
- Why are the production costs of these farms (and other farms) higher or lower than elsewhere?
- Where is the industry headed in your country? How far could the milk production system (as represented by the typical farm) be expanded without additional costs; how much more milk could be produced?
- How does the country's dairy industry perform in processing, marketing, and trade?

The answers were discussed both in working groups and in a plenary session. This procedure led the participants to a number of interesting assessments.

Some key results shall be reported here on a country by country basis. It has to be stressed, however, that these first results cannot show a full picture of the dairy industries in each country. It is a complement to the quantitative results that have been presented earlier, and the picture is certainly provisional and selective.

7.4.1 New Zealand

How typical are the selected farms?

Both farms reflect the production areas, the farm structure and the most common production systems in New Zealand. The small farm represents the average farm size on the North Island, whereas the big farm is the size and type of farm on the South Island.

Why are costs of production lower / higher than elsewhere?

Available information indicates that New Zealand has the most efficient and cost-effective production system meaning that it can produce milk for the lowest cost. The results achieved are consistent with this information.

Due to the mild winter, all dairy cows can be kept on pastures year round. Therefore, building costs are very low. Investments are only required for the milking parlour and for fencing, driveways, drinking water equipment and the like. None or very limited invest-

ments are required for housing and for storing manure and forage. The climate is very favourable for high yielding, clover-based grasslands. The production climate and soil combined with manure from the grazing cows save cash outlays for fertiliser.

Most farms have a strict seasonal calving pattern (spring calving). This reduces cost for winter feed to a minimum. Moreover, it has social advantages (holidays for farmers) and makes management easier because the dairy farmers have to concentrate their mind on certain tasks only for a limited time of the year.

On the other hand, the high degree of seasonality causes some extra costs in the dairy processing plants (over-capacity in summer, autumn and winter). This must be considered when conclusions are drawn regarding competitiveness in manufactured products from the results presented in Figure 9.

What is the potential to expand production?

In recent years, favourable world market conditions have stimulated a steady expansion of the national dairy herd. A major part of the flat, arable land is already used for dairy production. Furthermore, the "simple" way of expanding the production system by converting cattle & sheep - farms into dairy farms has only a very limited scope. This would only allow a further expansion of the dairy herd by perhaps 20 percent (this figure may be too low; a deeper look into land use statistics is necessary).

All other expansion strategies will cause an increase in production costs. Whether they will be profitable or not, depends (a) on the future level of the world market price and (b) on the amount of extra cost caused by the change in the production system.

The first and easiest way to increase milk production is to increase the amount of concentrate feeding. Starting with New Zealand as an example, the prospects and profitability of concentrate feeding to increase milk output per cow was discussed for all countries. Figure 19 shows the price relationship between milk and concentrates and the feeding efficiency for the different countries. It indicates that the use of concentrate is unfavourable in New Zealand because of high price of concentrates. New Zealand does not grow large amounts of concentrates so imported feed would be necessary.

Marginal costs of milk production by using concentrates are very low (10-15 US $/100 kg) in all regions of the southern hemisphere (apart from New Zealand) and Eastern Europe. Therefore an increased use of concentrates and a subsequent increase of milk production can be expected when milk prices raise in these countries.

It is not an easy task to come to a quantitative assessment about the changes in cost of production that might be caused by changes in the production system. The main reason is that the production system that has been developed in New Zealand over decades, is adapted to the climatic conditions of the country. If one element of the production system

is changed (for example introduction of concentrate feeding), a number of other elements must also be changed (not only feeding equipment but perhaps also pasture management strategies, seasonality, etc.). If the calculation methods that are being applied are too simple (e.g. pure partial analysis), some important interactions may be neglected and the additional costs may be underestimated.

Figure 19: Relation of Milk Price and Concentrate Prices 1996/97

Country	Milk price	Concentrate price	Milk Price/ Concentrate Price		Marginal feed costs in US$/100 kg Feed efficiency**		
	US$/ 100kg	US$/100kg	Ratio	Ranking*	1:1	1,5:1	2:1
EU-countries	38	22	1,7	++	**22**	15	11
USA	34	18	1,9	++	**18**	12	9
Central Europe	25	22	1,1	+	22	**15**	11
South America							
Argentina	19	23	0,8	-	23	**15**	12
Brazil	33	20	1,7	++	20	**13**	10
Uruguay	14	15	0,9	-	15	**10**	8
Ozeania							
New Zealand	18	31	0,6	--	31	21	**16**
Australia	19	16	1,2	+	16	**11**	8
South Africa	26	20	1,3	+	20	**13**	10

* Ranking: Price ratio is ++ = Very favourable + = favourable; - = non favourable
** Feed efficiency = kg additional concentrate input required per kg additional milk output
Bold figures indicate the feed efficiency necessary to make concentrate use profitable

Source: IFCN Analysis 1998

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HEMME (1998)

Future analyses could consider possible changes in the production system (as a result of higher dairy prices and land scarcity), for example:

- raise all young stock on hill farms
- feeding corn silage
- feeding concentrates
- move breeding strategy towards high yielding breeds
- quit strict seasonality in calving, move dry cows onto hill farms
- produce milk in hill locations

How does the dairy industry perform in processing, marketing, and trade?

Aside from the seasonality of production leading to higher processing and storage costs, the New Zealand dairy industry has a long, successful tradition in milk processing and export marketing of dairy products. Based on this history, there is no reason to assume that New Zealand has any comparative disadvantage against other export nations. On the contrary, New Zealand certainly benefits from the fact that the dairy export industry started early enough to enter into the booming Asian food markets.

7.4.2 Australia

How typical are the selected farms?

Both selected farms seem to reflect the available production areas, the farm structure and the most common production systems in Australia quite well.

Why are cost of production lower / higher than elsewhere?

The most important difference between New Zealand and Australia is that in Australia only a very small region allows milk production without irrigation. In most parts of the country, forage for dairy cows has to be produced with irrigation. This causes a disadvantage in cost of production.

The milk production system in Australia - both on irrigated and non-irrigated land - is very similar to the production system in New Zealand (pasture-based, strict seasonality, low milk yields).

As Figure 9 indicated, the Australian production system generates low production costs - almost at the same level as New Zealand.

What is the potential to expand production?

If world market conditions remain favourable, Australia will be able to increase national milk production at a rate of about 10 percent per year for a number of years. However, limits to growth are already emerging because irrigated land and water resources are scarce.

To come to a quantitative assessment (based on our micro-economic approach), two growth patterns would have to be analysed:

Increase milk production without having more farm land available

Experts estimate that it should be possible to increase milk yield per cow by about 25 percent by feeding more concentrates. Under Australian conditions, that is probably

the most inexpensive way to increase production. In contrast with New Zealand, Australia has a favourable milk/concentrate price ratio (see Figure 19). Other ways to increase production would be to raise young stock at other locations and to purchase forage from other locations. The latter way could lead to a more American type of dry-lot dairying.

Establish new dairy farms on irrigated land currently used for other purposes

More research is needed to analyse the profitability of dairying relative to other enterprises and to assess how much irrigated land would be available or could be made available. At first glance, one might assume that this option is not very profitable especially if land presently used for cotton production would have to be replaced. However, cotton and milk (and other land use options) have been competing for irrigated land for many years, and milk has not been replaced by cotton irrigated cropping to any significant extent even when world dairy prices were very low. It would certainly be interesting to analyse quantitatively the competitive situation within the country (under various price scenarios) by establishing a number of different panel farms (milk, cotton, grain, beef).

How does the dairy industry perform in processing, marketing, and trade?

Having in mind the growing success of Australian exporters in the past, there is probably no reason to assume that there is any comparative disadvantage against other export nations.

7.4.3 South Africa

How typical are the selected farms?

The structure of the dairy farms within the country is quite heterogeneous. It is not possible to easily reflect this broad spectrum with only two typical farms. However, the two selected farms represent typical commercial dairy farm operations in these areas.

Why are cost of production lower / higher than elsewhere?

In most places of the country, it is not possible to keep the cows on pasture all year round. This implies higher feed costs and higher costs for buildings, facilities, and manure disposal. An additional cost disadvantage compared to the oceanic countries results from high concentrate prices. Furthermore, the milk yield in the dry lot operation is far too low relative to the level of concentrate input. There are some dairies in South Africa who successfully operate as dry lot dairies as in the Western US. Whether this trend will continue, depends largely on the milk/maize price ratio which is presently very volatile but currently quite favourable (see Figure 19).

What is the potential to expand production?

The typical farms could increase milk production by about 25 percent without substantially higher costs by using more concentrate/TMR feeding systems. Moreover, there is much land available that could be used for producing feed for dairy cows. The opportunity costs for this additional land would not be much higher than the opportunity costs for the land that is already used for forage production. Favourable prices can cause a large expansion of milk production by a factor of 2 or more. The dairy herd will however, not grow at the same rate as most of the increased production will probably come from the intensification of existing herds.

At the moment, however, the dairy sector in South Africa suffers substantially from unfavourable economic conditions. The protection of the South African dairy market is very limited and among other problems, especially the subsidised exports from other countries are regarded as a major threat to the industry. If the short and medium term problems can be overcome, the longer term perspectives look rather promising.

How does the dairy industry perform in processing, marketing, and trade?

At present, there are over-capacities in the dairy processing plants. Therefore, investment activities are somewhat reduced.

7.4.4 Argentina

How typical are the selected farms?

The national dairy herd can be roughly classified in three types:

- Small dairy farms (20 - 40 cows per farm) with low milk yields per cow (less than 3.000 kg/year).
- Medium sized dairy farms (about 125 cows per farm).
- Large dairy farms (about 600 cows per farm).

In the medium and large sized groups of farms there is no evidence for correlation between size and milk yield. The small dairy farms are only of minor importance and will probably disappear. The medium size farms are a very important group (about 18.000 farms). There are only about 1.000 large dairy farms at this time. But, this group is expected to increase rapidly in numbers.

Conclusion: The two selected typical farms belong to the most important, medium sized group. However, as there is not yet a large panel included, the numbers in Figure 9 do not fully express the potential of Argentina as a low cost dairy producer.

Why are production costs lower / higher than elsewhere?

The cost of the two selected farms are probably somewhat overestimated, because the land costs seem to be too high. This data problem could not be solved during the workshop. The first plausibility-check indicates that the value for the land rent is probably correct but the amount of land that is needed to produce one litre of milk has been overestimated in the data set that forms the basis for the model.

Also the labour costs seem to be surprisingly high for a year round pasture based dairy farm. Three family labour units and one hired labour unit have been calculated for the 125 cow farm. The comparison indicates that in New Zealand labour productivity is five times higher whereas wage rates are only three times higher. The discussions in the workshop showed that there is potential for a considerable increase in labour productivity in the Argentine production system. This is partially indicated by the data for the 250 cow farm. Without a doubt, a panel for a 600 cow farm would show a much better labour productivity than the 250 cow farm.

Conclusion: The 600 cow operation will probably have costs that come close to the New Zealand and Australian level. There are reasons, however, that for the time being, even an optimised 600 cow farm in Argentina would probably show slightly higher costs than a comparably sized dairy farm in New Zealand:

- The natural conditions for grass growth are not as good as they are in New Zealand.
- Argentina runs a year round production system. Therefore, the advantages of the strictly seasonal system of New Zealand and Australia cannot be obtained (spring calving, hardly any winter feed).
- Fat corrected milk yields in Argentina are lower than in New Zealand. This may be due to the fact that the dairy companies in Argentina are pricing milk protein much higher than milk fat. The question arises whether a stronger world market-orientation of the dairy industry would make a change in the pricing strategy profitable. This could perhaps reduce cost and increase profit for the whole dairy sector.
- In Argentina, milk production does not convey a high social status among farmers. That means that it will not be as easy to draw high quality labour into this sector.

What is the potential to expand production?

For the supply side of the world milk market Argentina is currently one of the most interesting places in the world. If the world market prices for dairy products remain high, the low cost production system in Argentina could be widely expanded. At present, Argentina has about 2 million dairy cows out of a total of about 52 million head of cattle. This gives a little indication of the growth potential. In the long run, an expansion of the dairy herd by the factor 5 or 10 would probably not lead to higher production costs. There is much land of similar quality available, so that rising opportunity costs as a result of the dairy industry's demand for land cannot be regarded as a major problem.

Of course, the on farm competition (especially against beef and grains) has to be considered. This calls for a quick extension of the IFCN panel network to these commodities. Some initial rough calculations suggest that in the scenario high world prices for milk relative to other commodity prices dairy is probably more profitable than grain or beef.

It should also be considered that a further expansion of milk production would imply rising transportation cost for dairy products because the new growth regions would be more remote from ports and places of consumption. Whether this is an economically important aspect or not should be further analysed in subsequent studies.

How does the dairy industry perform in processing, marketing, and trade?

Compared to the big dairy exporters of the world (e.g. New Zealand, EU), the Argentine dairy industry has only very limited experience with regard to world trade (entering foreign markets, promoting Argentine products, etc.). There is a significant potential for improvement in this area.

There is a great number of dairy processing companies in Argentina. Most of them are oriented to the domestic market. In many cases, the management skills in the field of marketing could be further improved.

Multinational dairy companies show a increasing interest in the Argentine dairy sector (especially for production of milk powder). The easiest way to get into the industry involves take-overs of existing companies. The alternative of building a plant and advertising for milk supply would be too costly. There are no restrictions on foreign investments.

The quality of the raw milk that is being delivered to the dairy factories has been improved considerably during recent years. Thus, inadequate milk quality would not be regarded to be a major problem for world market oriented processing companies.

7.4.5 Brazil

How typical are the selected farms?

The farms selected are certainly not representative for the average dairy farm in Brazil. The milk yields of the selected farms (around 5000 and 7.000 kg/cow) are far above average milk yield per cow in Brazil (about 1.200 kg/cow), and the selected farms keep more cows than the average farm.

Like in South Africa, the structure of the dairy farms within the country is very heterogeneous. Weather conditions are less favourable for milk production than, for example, in

Argentina. The combination of hot and humid climate areas increases stress. This is a particular problem for high yielding cows in confined systems rather than for low yielding cows in grass based systems. Farmers find it quite difficult to keep the cows on the pasture all year round. Most of the larger farms tend to keep the cows on drylot operations all year round, thereby achieving higher milk yields. The smaller farms keep the cows on grassland in summer. In winter, cows are kept in a freestall or in a dry lot. In many areas, it remains an open question as to what kind of production system is most efficient.

Why are production costs lower / higher than elsewhere?

First, the labour cost component of milk production costs for the selected farms might be somewhat overestimated (see Figure 9). These figures can be expected to be refined with the establishment of panels.

Second, the competitiveness of Brazil against the US has improved in the last two years due to the revaluation of exchange rates. Figure 9 contains 1996/97 data. If 1998 exchange rates were taken, production costs in Brazil (expressed in US dollars) would be 13 percent lower.

Third, it can be assumed that even in the selected farms there remains potential for productivity growth and cost reduction. The most important starting points for improved efficiency and productivity include:

- to improve feed efficiency and benefit from favourable ratio between milk and concentrate prices (see Figure 19),
- to reduce labour input per cow, and
- to increase milk yield per cow.

However, it can be assumed that even fully optimised dairy farms in Brazil would have slightly higher cost of production than comparable dairy farms in Argentina or New Zealand. The hot and humid weather causes some inevitable extra costs including:

- It is more difficult to achieve very high milk yields because cows are suffering from heat/humidity stress.
- It is probably necessary to provide some sort of housing/shade for the cows. This results in extra building costs as well as extra costs for feeding, manure handling, etc. compared to year round grazing.
- The favourable conditions for plant growth can also be regarded as a disadvantage for the Brazil dairy industry because the opportunity costs of land may become relatively high (due to high yields of corn, soybeans, etc.).

These problems can be partly compensated by

- the relatively low wage rates,
- low cost, high producing feeds (chopped sugar cane, elephant grass),
- a lack of environmental regulations.

However, it remains doubtful whether these advantages can fully offset the disadvantages that have been mentioned above. Hence, in the long run, the Brazil dairy industry may face the same kind of problems within MERCOSUR as the dairy industry in the South East of the US, i.e., being the high cost producer.

What is the potential to expand production?

In Brazil, demand for dairy products could dramatically increase in the future. The main reason is improving performance of the national economy and the introduction of the refrigerator in many households.

Because there is some uncertainty with regard to the comparative advantage of milk production in Brazil, it is not easy to give a clear answer to the question how the dairy sector will respond to increasing demand. It may be that "improvised" production systems (low milk yield, low building costs, high input of manual labour) will expand faster than more sophisticated production systems. One important reason would be that the real interest rates for domestic investors are extremely high. This is a very important aspect that requires further analysis.

In this context, the question of milk quality must also be carefully analysed. At present, about 95 percent of the milk is C-class milk (low quality, mostly from cross bred cattle).

If Brazil’s dairy industry can be organised in a way that production costs are internationally competitive, there would be practically no limits to a further expansion in the foreseeable future. At present, Brazil has about 18 million dairy cows but a total of about 170 million head of cattle. This provides some indication about growth potential. In the long run, an expansion of the dairy herd by the factor 5 or 10 would probably not lead to higher costs of production. As in Argentina, there is much land of similar quality available, so that rising opportunity costs cannot be regarded as a major problem.

Currently, the highest production growth can be observed in a region west of Brasilia (capital of Brazil).

How does the dairy industry perform in processing, marketing, and trade?

Foreign companies are investing money in dairy processing plants, especially in the main growth region west of the capital Brasilia. The economic framework conditions for foreign investment have been improved considerably.

As mentioned earlier, the processing plants are facing the problem of low milk quality supplied by farmers. Hence, the question arises whether the foreign investors might also start to invest money in milk production units (on-farm investment). At present this is apparently not the case.

7.4.6 Uruguay

How typical is the selected farm?

The farm represents a well managed average type of commercial dairy farm. The farm is based on a survey of 150 dairy farms in Uruguay 1996.

Why are cost of production lower / higher than elsewhere?

The production system in Uruguay is similar to that in Argentina. There are very good conditions for low-cost dairy production. The cows can be kept outdoors all year round, and there are good growing conditions for forage production.

Thus, it is not surprising that the selected farm produces milk at very low costs. Whether the cost of production are really considerably lower than in Argentina has to be further analysed in subsequent studies. It shall be repeated here that the costs for the two Argentina farms may be somewhat overestimated (see section 7.4.4).

What is the potential to expand production?

The potential for a further expansion of the national dairy herd is certainly not as high as in Argentina or in Brazil, because the country is much smaller. Moreover, the farm structure is characterised by small traditional family farms and the milk production is showing a less dynamic growth in the past than can be observed in Argentina.

However, it is worth to analysing the potential production of Uruguay more carefully because (a) the cost of production are so low and (b) there seems to be a considerable scope for further expansion.

The estimations showed that, if economic conditions remain favourable, the typical dairy farm itself can increase production by 50 percent without additional land (25 percent from higher input of concentrates, 25 percent from higher crop yields). Moreover, there is much land available that could be used for dairy production. The opportunity costs for this additional land would not be much higher than the opportunity costs for the land that is already used for dairy production. Hence, in the long run and under favourable economic conditions an expansion of the dairy herd by the factor 5 (or more) would be possible.

As in Argentina and Brazil, further research is needed to examine the on farm competitiveness (dairy against beef and grain) under alternative price conditions.

How does the dairy industry perform in processing, marketing, and trade?

The dairy industry is characterised by a monopolistic structure. Processing capacities can be a limiting factor for the Uruguay dairy industry. Moreover, international marketing of dairy products is not yet developed despite a high export share in production.

7.4.7 USA

How typical are the selected farms?

Four of the 26 representative dairies maintained by the AFPC were included in this report. Wisconsin as part of the Upper Midwest is the traditional centre of US milk production. The 70 cow dairy is representative of moderate size producers. The 600 cow dairy is large for the state. It can be thought of as where the industry is headed in that area.

Idaho is a rapidly growing milk producing state. The two dairies represent moderate and large operations in the state.

The four selected farms can be regarded as being fairly typical for much of the United States. The Wisconsin dairies would represent typical production practices throughout the Midwest and Northeast, although costs would differ regionally. The Idaho dairies would represent producing practices in the West. About two-thirds of the US milk production occurs in the West and Midwest. Both the moderate and larger dairies are dry-lot, feedlot style dairies. These dairies are not representative of Southeastern production with higher costs and more adverse climate and weather conditions.

Why are production costs lower / higher than elsewhere?

The predominant production type in the US involved concentrate feeding, much of it in the form of TMR (total mixed ration). While feed is grown on three of these farms (moderate and large Wisconsin and large Idaho) concentrates are purchased. The purchased feeds lead to higher cash costs than the shown in the pasture based systems of Oceania.

Cash costs on the four US dairies are fairly comparable to the EU countries. Relatively low cash costs on the 70 cow Wisconsin dairy are partially related to its growing a larger percent of its feed. But, when opportunity costs are included its costs are higher than the other US dairies.

The US industry will continue to improve its competitive position versus the EU because of the rapid structural change in the industry. The industry is rapidly moving to larger

dairies. Many smaller dairies have exited and continue to exit production. As Figure 9 indicates that suggests moving to lower total cost producers.

What is the potential to expand production?

In the short run, total milk production in the United States will probably grow slowly. As long as US prices remain above world market levels, there is little potential for an increase in exports of bulk commodities like butter and powder. Structural changes, however, will contribute to reduced average production costs and lower milk prices better preparing the industry for a more liberalised world market.

It can probably be expected that the WTO-negotiations (sooner or later) will lead to a more liberalised world-wide dairy industry. For the US to become a significant exporter world prices will have to increase and domestic production costs will have to decline.

The choice of locations for future dairy production will probably be more and more affected by environmental regulations. Increasing clean air regulations will become more restrictive on dairy producers. It can be expected that dairy production (and other livestock production) will move further to remote areas with lower population density. The problem of associated increases in transport costs will probably only be of limited importance. Recent technological breakthroughs in milk filtration techniques may reduce transportation costs facilitating industry relocation throughout productive areas.

How does the dairy industry perform in processing, marketing, and trade?

The processing and marketing industry is undergoing rapid consolidation in the US. This consolidation has been fuelled by large amounts of investment funds from the rapidly growing economy. These companies will look for opportunities for international sales as well as domestic sales.

7.4.8 European Union

How typical are the selected farms?

The farms that have been selected for this workshop, represent a cross-section of the variety of dairy farms in the EU. They range in size from a 25 cow Austrian dairy to an 800 cow dairy in Eastern Germany. Because there are only one or two farms per country available at this point in time, care must be taken in interpreting results. These aspects will be addressed in the sections below.

Why are production costs lower / higher than elsewhere?

The EU dairy farmers indicate higher costs than those in New Zealand, Australia or Argentina. It is not possible to produce milk in the northern hemisphere at the current cost

level of these countries. The main explanations for the current comparative disadvantage of most EU dairy farms (against the US farms) can be summarised as follows:

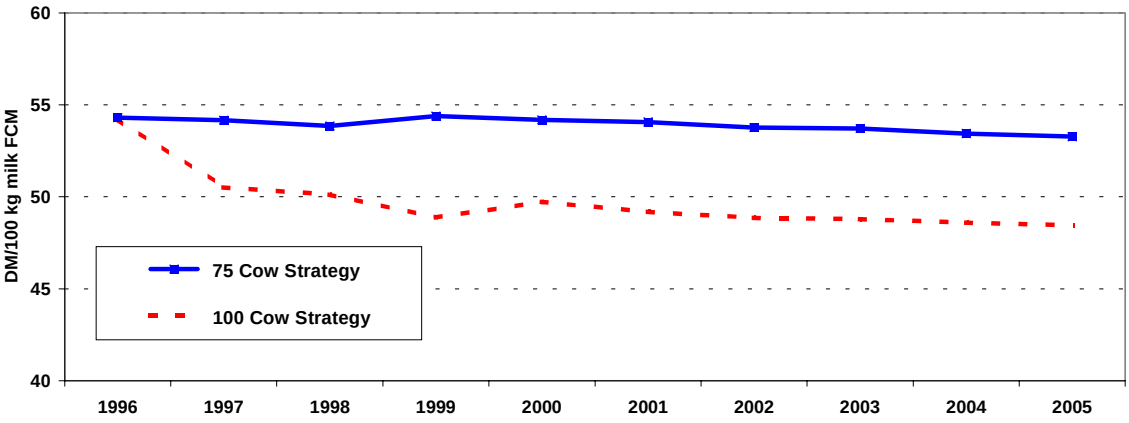
- The herd sizes are very small and farmers cannot take advantage of large scale effects.
- For historic and political reasons, the specific land use patterns cause higher costs, for example, small plots of land that are more difficult to farm.
- EU and national governments have tended to over-regulate the economy.
- Pasture based production system make it more difficult to increase herd size than the US system.
- The milk quota system has a negative impact on international competitiveness by locking in structural inefficiencies, disadvantaging larger farms, fostering a ”brain-drain” of managers and advisors, by stopping structural change across region and country borders, and by creating capitalised quota values which inevitably become a cost component.

An example for the possible effect of farm growth on production costs in the 75 cow German farm is given in Figure 20. In the first strategy, cow numbers are kept constant at 75. Production cost over the 10 years period remain at a level around 0,54 DM/100 kg milk produced. In the second strategy, the farm increases its herd to 100 cows in 3 steps by retaining more replacement heifers. The assumptions utilised for this strategy are detailed in the footnote of the Figure. The result is a decrease of production costs by 0,05 DM per kg. (approximately 3 US-C) annually over the period of 10 years.

The high cost levels of the 800 cow dairy in Eastern Germany raise an immediate question. A more detailed analysis of the situation in Eastern Germany shows, that the group of large dairy farms is a very heterogeneous one. Many farms indicate results that can only be explained correctly by the peculiarities related to the transformation process in an ex-socialist economy. Results from analyses within the network of European Dairy Farmers indicate that many of the large dairies struggle with social questions related to labour and changing management decisions to a profit, performance based system. In this group of farms, the best as well as the worst performing dairy farms in Germany can be found.

It is further necessary to explain the very high costs that are indicated (Figure 9) for some of the small farms with 20 to 30 cows (e.g. Austria, Italy, southern Germany). These cases show that "high costs" do not necessarily mean "low competitiveness". One of the two Italian farms, for example, receives very high milk prices because the farm is producing milk for a special parmesan cheese. The farm has to carry some additional costs but the net effect is highly positive. Other dairy farms in the EU take part in environmental programmes that provide an extra income for the farmer. Under certain conditions it may be profitable for the farmer to continue milk production despite high costs. Organic milk production and niche marketing may also generate higher costs but also higher milk prices.

Figure 20: Projection of costs for a German dairy farm under different development strategies



Break even point: Total costs (Milk and By-products) - Retruns from By-products (cull cows, calves, surplus heifers, dir. Payments)
Description of the Farm: 75 cows, 6.800 kg milk yield, 15 steers, raising all youngstock
Changes 100 cows: No steers, sell 35% female calves, sell all male calves,
+ 7ha grassland, + 1000 h part time labour, + 7500 DM fix costs, no investments, rent additional quota
Source:TIPI-CAL Calculations

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These last examples show that it is not enough to just compare production costs. It is necessary to come to future-oriented farm financial projections that are based on an internationally harmonised data base and linked to the judgement of real farmers.

What is the potential to expand production?

Comparing the sections 7.4.1 to 7.4.9, it becomes quite clear that with trade liberalisation the EU dairy sector will probably lose market share. Therefore the question of how much more milk could be produced in the EU at current costs, is not practically relevant.

That does not mean, that in a liberalised world no milk, butter or cheese would be produced in the EU. The EU will continue to have a comparative advantage in serving its expanding domestic market for fresh milk products. Moreover, freer trade combined with the elimination of production controls would lead to substantial structural reforms that would increase efficiency and competitiveness. Whether the EU then remains a milk producer of importance in a long-term perspective is difficult to answer. This depends on the realisation of the cost saving potential in the EU as well as on the capabilities to expand production in the Southern Hemisphere.

As noted previously, the disadvantage for the leading EU farms has decreased a lot due to the revaluation of the exchange rate (see Figure 17 and Figure 18). On the other hand, EU-producers must be aware that within a short time the old exchange rate can become relevant again (for example, if the EURO mobilises the overall economic performance in the EU).

Should it really happen that the world market equilibrium price is as high as to stimulate the EU to further increase production, then there would be much land available at low opportunity costs (in a free trade scenario). If necessary, the EU milk production could easily be doubled or tripled in the longer run.

How does the dairy industry perform in processing, marketing, and trade?

There is no reason for the assumption that the EU companies, which are involved in dairy processing and trade, should be generally more or less competitive than their competitors from the US or Oceanic. An advantage of EU dairy processors might be in the production of high quality dairy products, for example such as cheeses.

Of course, in a politically highly protected environment, like the dairy industry, a number of companies can survive that would not in a more liberalised environment. It can be assumed that if the level of protection declined a consolidation in the EU's processing sector would occur.

7.4.9 Central European Countries

Similar to the EU-countries the Central European countries represented in the meeting (**Bulgaria, Czech Republic, Hungary, Poland**) will be discussed as a group because many (not all) issues and problems in these countries are similar.

How typical are the selected farms?

In all participating countries the farm structure is very heterogeneous, i.e. there are a number of small family farms and a number of large survivors of the former co-operative and state farms. This structure is often either due to historical reasons (Poland) or a result of the transformation process where land has been given to former land owners or to virtually all the population (in particular Bulgaria). Due to uncertain economic conditions and the ongoing restructuring process of these economies in general, and the farm sectors in particular it is difficult to judge how typical these farms are in the context of the dairy industry. However, they do represent certain segments of the industry. These farms can only be considered as a starting point of IFCN in Central Europe and more research is required to improve data reliability and representation. The results, therefore, should be interpreted with caution.

The importance of co-operatives in these countries is illustrated by the farms chosen for the comparison. Three out of the 5 Central European farms presented here are co-operative farms of different sizes. The co-operative farms can not be considered specialised in milk production. They have substantial income from beef and/or crop farming which is typical of these large post-communist countries. The Bulgarian farm is very

small for this type of co-operative farm. The Hungarian farm is part of a group of 850 farms producing 70 % of Hungarian milk. It is representative of the vast majority of milk production in the country. The farm is quite comparable in terms of costs and prices to EDF farms in that size range. The two family farms in Poland and the Czech Republic are above the national average in terms of herd sizes (31 and 35 cows).

Why are cost of production lower / higher than elsewhere?

All in all, the cost level of the Central European farms is low compared to EU-countries and in the range of the US cost-level. The main reasons are low labour costs and low depreciation due to the use of old equipment and reduced investment activities. Additionally, high inflation rates in these countries suggest some asset revaluation. Low asset values would result in abnormally low depreciation costs. This cost advantage is expected to be partially reduced in the future, particularly when these countries join the EU because:

- Investments to improve milk quality will be necessary (milking parlour and equipment, cooling, and handling improvements).
- Environmental constraints and regulations.
- Gradual increases in wages to EU-levels can be anticipated.

However, these increasing Central European costs could be offset by:

- low cost forages,
- increased productivity and milk yields,
- realisation of economies of scale, and
- lower labour costs during the transition period.

What is the potential to expand production?

At present, the total production of the countries under consideration is still below the levels of 1990 (see Figure 5). It is expected that milk production in Bulgaria will increase in the next 2 or 3 years as a result of the favourable price development following the introduction of free market prices for milk in 1997. In the Czech Republic a further decrease of production for the next 2 to 5 years is projected. A slow recovery to 1990 production levels is expected longer term. Deficiencies in the processing and marketing chain contribute to the loss of production. In Hungary, the decline in production is expected to be less serious. A considerable increase in milk production of approximately 25 percent in the next 5 years seems to be realistic in Poland. However, most of the milk in Poland is produced by farms with very few cows. Under these circumstances, it will be very difficult to achieve widespread adoption of production systems to achieve EU quality standards. The overall expectation for Central Europe is that the long-term potential for expanded production is relatively great considering the availability of land in relation to the population.

How does the dairy industry perform in processing, marketing, and trade?

As mentioned, the Central European dairy industry suffers from old equipment, excess capacity and a lack of transportation and marketing infrastructure. A lack of capital remains a major problem. Moreover, the investment activities of foreign companies are at present still more (Bulgaria) or less (Poland) limited. The limitation of investment activities of foreign companies is caused by the unstable and insecure economic conditions rather than by government restrictions. The experience of Eastern Germany has shown that foreign investment is necessary to avoid the displacement of domestic products by imported goods from the West.

7.5 Conclusions for the further Work within IFCN

In the sections 7.1 to 7.3, the results of a first application of the IFCN (in the field of dairy production) have been summarised. Figure 21 is an attempt to further aggregate the main findings in one table. It must be repeated that these results are preliminary; they are based on a "fast track" - approach that has been primarily designed to quickly demonstrate the potential of the IFCN concept.

Figure 21: 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

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While a first step in the development of the IFCN, the internationally harmonised calculations and the dairy workshop discussions of the Braunschweig meeting have contributed towards a better understanding of the economic aspects of the world dairy farming.

Moreover, the workshop discussions have led to some important conclusions with respect to the methodological and organisational design of IFCN. These conclusions can be summarised as follows:

- International comparisons of production costs are a very important precondition for a better understanding of competitiveness. However, if such results stand alone, they can easily be misinterpreted. In addition to the cost comparisons, farm economics projections (output, income, etc.) under different scenarios are necessary.
- It is absolutely necessary to apply the same representative panel farm process in each country. Without panels, it is impossible to have data sets that are comparable. The panel farm process can ensure that the data is gathered in the same manner for each farm.
- More emphasis should be placed on the detailed analysis of reasons for country-to-country differences in production costs. Therefore it is necessary to carefully collect a product-related data base (enterprise budgets) for each panel.
- The panel data should be up-to-date. Farm data and, therefore, analytical results can become outdated even within two or three years. Therefore, it is suggested that a well-established IFCN network should meet once a year in order to develop baseline-projections on an international scale.
- It is difficult to draw conclusions on the agricultural sector of a country if only one or two panels per country are available. On the other hand, in most countries not more than 6-8 panels per farm type (dairy, arable, etc.) will be needed to capture a good cross-section of the sector.
- In the longer run, it will be very important to link the IFCN closely (a) to networks of experts who can contribute knowledge about commodity processing, marketing and trade, and (b) to institutions that provide macro-economic projections and model-based projections of international trade.

If the IFCN will be established as outlined in the sections 2 and 5, then it shall be possible to meet all these requirements sufficiently.

Do production costs matter at all?

It is sometimes argued by economists that farm production costs do not matter because the value added in the "upstream" industries (Processing, distribution, marketing, and trade) is much higher than the value added on the farm.

The result of this discussion (for the case of milk) can be summarised as follows:

- There is no doubt that a certain number of milk producers in some parts of the world can survive despite high production costs, because the "upstream" industry is adding high value and/or the region has a successful marketing strategy ("regional labelling", e.g. Parmesan cheese).
- However, the great majority of milk producers in the world cannot rely on the high competitiveness of "their" upstream industries:
- Milk is processed into bulk products (butter, powder, and non-specialised cheese) for shipment around the globe at very low cost.
- Due to new technologies, it becomes easier to separate and extract milk components in remote production areas, to transport the components over long distances at reduced transportation costs and to recombine them where more profitable.
- Every technological progress in the upstream industries is quickly available in all dairy exporting countries. The "global players" are present in all locations, and they will incorporate the new technologies where ever profitable.
- In the case of world-wide liberalisation of agricultural trade, the global players will not invest in locations where they have to pay high prices for raw milk. They will reduce their prices for raw milk. If farmers are not able to produce at lower cost, milk production will disappear. New investments in milk processing plants will move to the locations where more raw milk can be produced at low cost.

Conclusion: For projections about the future locations of dairy production in the world, the analysis of on-farm production cost and their determinants is very important.

8 Results II: Effects of Agenda 2000 on selected Farms

8.1 Effects of Agenda 2000 on selected dairy farms in Europe

What has been done?

This section summarises a first analysis on the impacts of Agenda 2000 on typical German, French and UK dairy farms. It should be stressed that at this point of time the results can only give the direction of policy impacts rather than providing a reliable basis for comparison of absolute figures. The French and the UK farms are not based on panel data, adjustment strategies of farmers are not yet investigated and the projections of prices are still on a week basis. Thus, the results should be considered with care.

The farms have been simulated over a ten years period with the TIPI-CAL simulation model. The proposals of the European Commission in July 1997 (referred to as *Agenda old*) and in March 1998 (referred to as *Agenda new*) are analysed in this study. In this paper only a brief summary is given. The detailed report is available at FAL from T. Hemme and D. Goertz. An overview of the farms studied is illustrated in Figure 22.

Figure 22: Description of the typical dairy farms analysed

	Germany							France		UK	
Region	28 BY	30 NDS	60 NDS	75 NDS	70 WF	120 SH	800 NBL	30 BR	75 BR	65 WA	165 WA
No. Cows	28	30	64	74	70	120	800	30	75	65	165
Acreage in ha	27	40	90	76	65	141	1500	39	106	42	110
% Grassland	70 %	30 %	47 %	92 %	27 %	50 %	20 %	62%	46%	100%	64%
% Corn silage	11 %	20 %	22 %	8 %	27 %	40 %	13 %	29%	26%	0%	15%
Milk yield in t	5,2	7,3	7	6,8	6,8	7,7	5,5	8	7	5,5	6
Milk quota in t	145	220	450	510	480	830	4 400	216	525	357	990
% Purchased/rented[1)]	0/24	27/0	0/22	15/15	19/46	12/30	0/0	0	0	12/12	0/15
Cash crops (ha)	3,5	5	12	-	18	-	860	3	20	-	18
Other farm activities	10000 DM[2)]	40 sows	28 bulls	15 bulls	-	80 bulls	-	10 steers	15 steers	-	-

Regions: Germany: BY=Bayern, NDS=Niedersachsen, WF= Westfalen, SH=Schleswig Holstein, NBL=Eastern Germany
France: BR=Bretagne
UK: WA=Wales

1) % of quota purchased after 1983 / % of quota rented
2) Off-farm income
Source: TIPI-CAL Calculations

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Summary of results

Agenda old reduced the incomes of specialised dairy farms from 10 to 46 percent compared to the baseline (see Figure 23). Lower milk receipts are not fully offset by the cow premium payment on the farms with high milk production per cow. Farms utilising high percentage of corn silage feeding for example, the 120 cow Schleswig Holstein farm, (SH120) suffer from the elimination of the corn silage subsidy. Farms producing milk on grassland, with relatively low milk yields and low culling rates resulting in low beef returns per kg milk produced (like the 65 cow farm in Wales) are less negatively affected by *Agenda old*.

The proposal in *Agenda new* where corn silage subsidy is continued and cow premiums are linked to regional milk differences further reduces farm profits. Income under the new Agenda is 3 to 18 percent lower than the baseline. Dairy farms where production is solely based on grass (WA-65 and NDS-75) will not benefit from the Agenda new proposal of a continued corn silage subsidy.

If the milk price declined by only 10 percent, due to a favourable market situation (5 percent above the new EU intervention price), dairy farm income would not be lower than baseline levels.

It should be noted that because of the significant revaluation of the British £ against the ECU (+30 %), farm profits have been reduced by 50 percent in the period 1996-1998. This indicates that macro-economic changes can have stronger impacts than policy changes like Agenda 2000. Due to the uncertain development of macro-economic figures in the UK, the projection of farm development must be considered with care. Consequently , the results shown indicate the direction of where the profits will move to rather than providing exact profit levels.

Calculation with the Green-ECU instead of the market exchange rates or the EURO after the year 1999 would benefit the UK farms in a range of 50 to 60 DM per cow. For Germany and French farms this change would have a minor impact because the difference between Green-ECU and market exchange rates are smaller than for the UK.

The large East German farm with 800 cows and 1.500 ha is the only farm that is affected by the reduction of payments with increasing farm sizes (proposed under *Agenda new*). It suffers from large income losses. This farm will be forced to look for strategies to divide the farm into separate units to avoid payment losses associated with size. It would also be reasonable to assume that farmers affected by payment losses would look to improve efficiencies throughout the operation.

In both Agenda scenarios the percentage of income from direct payments in specialised dairy farms will double, ending up in the range of 30 to 100 percent. Due to the additional payments in the *Agenda new* this percentage is higher than in the *Agenda old*.

Figure 23: Impacts of Agenda 2000 on typical German, French and UK Dairy Farms

	Germany							France		UK		
Region	BY	Nds	Nds	Nds	WF	SH	NBL	BR	BR	WA	WA	
No. Cows per Farm	28	30	60	75	70	120	800	30	75	65	165	
Average Family Farm Income 2000-2005 in 1000 DM[1]												
Baseline	36	79	140	133	74	145	349	72	172	54	105	
Agenda-Old 7/97	32	72	122	119	55	79	189	62	157	57	100	
Agenda-New 3/98	31	75	128	116	62	119	13	70	166	48	93	
										52	105	2
Changes to Baseline Policy 2000-2005												
Changes of Family Farm Income per Farm in %												
Agenda-Old 7/97	-11%	-8%	-13%	-11%	-26%	-45%	-46%	-14%	-9%	5%	-5%	
Agenda-New 3/98	-15%	-5%	-9%	-13%	-16%	-18%	-96%	-4%	-3%	-11%	-11%	
										-5%	0%	2
Changes of Family Farm Income per Cow (DM)												
Agenda-Old 7/97	-140	-221	-305	-190	-275	-546	-200	-340	-216	40	-32	
Agenda-New 3/98	-194	-125	-206	-228	-171	-219	-420	-87	-77	-91	-69	
										-42	2	2
Percentage of Income from direct Payments in the year 2005												
Baseline	37%	16%	23%	8%	35%	38%	>>100%	20%	33%	0%	24%	
Agenda-Old 7/97	70%	30%	51%	35%	76%	134%	>>100%	40%	61%	47%	80%	
Agenda-New 3/98	84%	42%	64%	48%	97%	147%	>>100%	55%	76%	61%	107%	

Description of Policies

Baseline	No changes in policy
Agenda-Old 7/97	Proposal of the EU-Commission dated 7/1997
Agenda-New 3/98	Proposal of the EU-Commission dated 3/1998

1) Exchange rate to calc. profits in DM: 1 DM = 0,298164 FF, 1 DM = 0,339446 £
Exchange rate to calculate premiums: DM/ECU: 1,94; after 1999: 1,98
£/ECU: 1997: 0,80; 1998-99 0,75; after 1999: 0,67
FF/ECU: 1997–1999: 6,61; after 1999: 6,64

2) Modification in exchange rate for premiums: Using Green-ECU instead of market rates

Regions: Germany: BY=Bayern, NDS=Niedersachsen, WF=Westfalen,
SH=Schleswig Holstein, NBL=Eastern Germany
France: BR=Bretagne, UK: WA =Wales
Source: TIPI-CAL Calculations

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WIRS Aberystwyth
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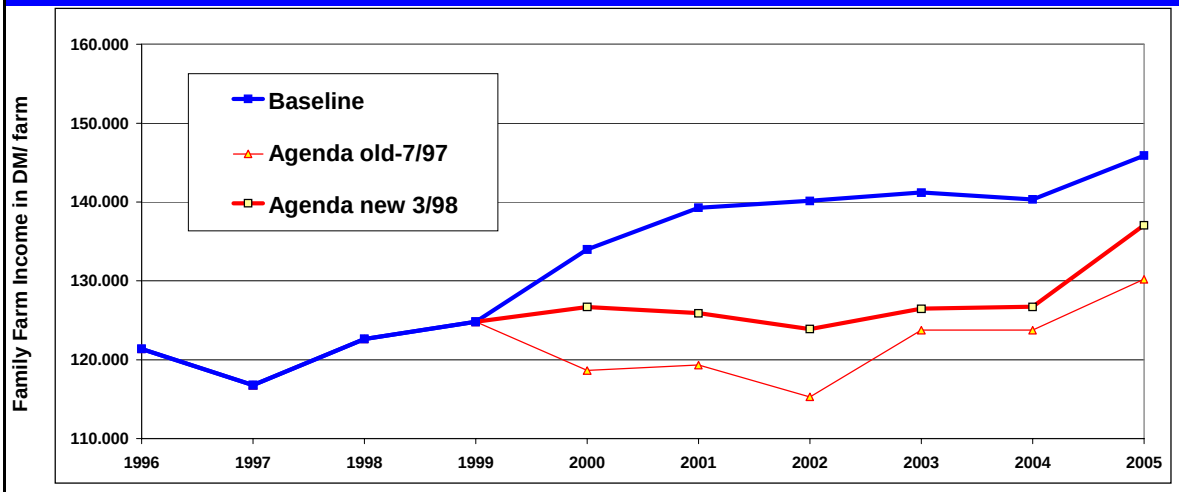
(1998)

Figure 24: Effects of Agenda 2000 on a typical 60 cow farm in Germany keeping cow numbers constant

Policy Analysis 60 cows-Dairy-Farm Germany-Bremervörde

Policy= Agenda Strategy= Keep no. Cows constant



Year	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
No. Cows										
Baseline	64	65	65	65	65	65	65	65	65	65
Agenda old-7/97	64	65	65	65	65	65	65	65	65	65
Agenda new 3/98	64	65	65	65	65	65	66	65	65	66
Milk Production (t/year)										
Baseline	448	462	469	476	483	490	498	505	513	520
Agenda old-7/97	448	462	469	476	483	490	498	505	513	520
Agenda new 3/98	448	462	469	476	483	490	505	505	513	528
Milk Prices per 100 kg , nat. content										
Baseline	65	65	65	65	65	64	64	64	63	63
Agenda old-7/97	65	65	65	65	63	61	58	58	58	58
Agenda new 3/98	65	65	65	65	62	60	58	55	55	55
Quotaprice - rent per 100 kg										
All Scenarios	12	18	18	18	18	18	17	17	17	17
Quota costs per 100 kg milk produced										
Baseline	4,4	6,1	6,3	6,5	6,5	5,1	5,4	5,3	5,5	5,8
Agenda old-7/97	4,4	6,1	6,3	6,5	6,5	5,1	5,4	5,3	5,5	5,8
Agenda new 3/98	4,4	6,1	6,3	6,5	6,5	5,1	5,3	5,3	5,5	5,7
Total payments dairy (1000)										
Baseline	0	0	0	0	0	0	0	0	0	0
Agenda old-7/97	0	0	0	0	9	18	28	28	28	28
Agenda new 3/98	0	0	0	0	9	18	28	37	37	39
payments corn silage (1000 DM)										
Baseline	8	8	8	8	8	8	8	8	8	8
Agenda old-7/97	8	8	8	8	0	0	0	0	0	0
Agenda new 3/98	8	8	8	8	10	10	10	10	10	10
Liabilities (%)										
Baseline	21%	19%	17%	16%	14%	12%	10%	8%	7%	6%
Agenda old-7/97	21%	19%	17%	16%	14%	12%	11%	9%	7%	6%
Agenda new 3/98	21%	19%	17%	16%	14%	12%	10%	9%	7%	6%

Description

Baseline - Continuation of current policy, Worldmarket price for grain high = EU Intervention level
- Exports without subsidies possible, EU Garin price at world market level
-Milk Price 97+0,5%;98const, 99-05 -0,5%/year, Setaside rate 5%

Agenda 2000 old 7/97: reduction of prices: milk -10%, Beef -30%, Calves -15%, Heifers -15%, grain market price -10%
- payments arable: Common payments cereals, oilseeds, setaside max. 66 ECU/t (here 60 ECU/t), protein crops; no payments corn silage, no setaside
- payments animals: Cow payments 215 ECU (145 dairy, 70 beef), Bulls 368 ECU, Steers 2*232ECU

Agenda 2000 new 3/98 = Agenda 2000 old, but:
- reduction of milk price -15%, dir. payments for corn silage
- payments animals: per kg milk: 3,69 ECU/100kg (EU=2,32; National=1,37), bulls 355 ECU (EU=220 National=135),
- Quota extension assumed + 1% per farm based on owned quota

Source: TIPI-CAL calculations

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8.2 Effects of Agenda 2000 on selected Arable Farms in Europe

What has been done?

Discussions in the arable farm workshop focused on what the impacts of Agenda 2000 on typical arable farms in Europe would be and what kind of adjustment strategies farmers could develop. It should be stressed that at this point of time the results can only give the direction of policy impacts rather than providing a reliable basis for comparison of absolute figures. The French farms and the moderate sized UK farm are not based on panel data, adjustment strategies of farmers are not yet illustrated here and the projections of prices are still on a week basis. Thus, the results should be considered with care.

A further important objective of the working group was to discuss the data of the French and the UK farms with the participants of the corresponding countries (Figure 25). The participation of Hubert Janetschek (Austria), Andrea Marchini, Fabio Santucci (Italy) indicates the interest in expanding the network for typical arable farms. Ron Knutson (USA) contributed his experience with the US-network of typical farms.

Figure 25: Description of the typical arable farms

	F 76 IF	F 165 IF	UK 157 EA	UK 380 EA	D 100 SH	D 560 MB
Size (ha)	76	165	160	380	100	560
Rented Land (%)	82	84	0	30	50	96
Quota S-Beats (t/ha)	0	7,7	6,4	2,2	14,0	4,3
Percentage of Oilseeds (%)	14	7	13	16	0	13
Yields Winter Wheat (t/ha)	7,4	7,4	8,0	8,0	9,0	7,3
Yields Winter Barley (t/ha)	6,2	6,2	7,0	7,0	8,6	6,5
Yields Oilseed rape (t/ha)	3,5	3,5	3,1	3,1	-	3,6
Yields S-Beets (t/ha)	61	61	42,5	42,5	55	45
Yields Peas (t/ha)	5,2	5,2	3,7	3,7	-	3,7-
Labour (n/100 ha)	1,6	0,9	1,5	0,8	1,1	0,73
Employees (n)	0,1	0,4	1,4	1,0	0,1	2,1
Arable rent price (DM/ha)	215	258	295	443	1.020	415
Profit in 1996 DM	59.294	135.544	73.651	450.740	131.560	466.000

Regions: UK: EA=East Anglia
France: IF=Ile de France
Germany: SH=South Hanover
MB=Magdeburger Börde

Exchange rates: see Figure 26

Source: TIPI-CAL Calculations

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Summary of Results

In this paper, the results are summarised briefly. Results of the French farms and the moderate sized UK farm have to be considered preliminary. The detailed report is available at FAL from J. Riedel, C. Möller, L. Knölke. Figure 26 indicates variations among regions (farms) and grain price scenarios as well. Income losses compared to the baseline occurred due to decreases in grain prices which were not fully offset by direct payments. Figure 27 contains the impacts of Agenda 2000 reform under alternative price paths on the large East Anglian farm.

Figure 26: Impacts of Agenda 2000 on typical arable farms in France, the UK and Germany

Country	Germany		France		United Kingdom	
Region	South Hannover	Magdebg. Börde	Ile de France		East Anglia	
Size (ha)	100	560	76	165	160	380
Average Family Farm Income 2000-2005 (in 1000 DM)						
Baseline	126	507	69	168	125	285
Agenda 0%	134	495	68	169	128	263
Agenda 10%	120	446	61	154	119	221
Change compared to Baseline 2000-2005 (%)						
Agenda 0%	6 %	-2 %	-1 %	1 %	2 %	-7 %
Agenda 10%	-5 %	-12 %	-11 %	-8 %	-5 %	-22 %
Percentage of Income from direct Payments in the year 2005						
Baseline	51 %	72 %	90 %	68 %	88 %	95 %
Agenda 0%	48 %	67 %	80 %	61 %	82 %	90 %
Agenda 10%	59 %	83 %	100 %	75 %	98 %	116 %

Description of Policies

Baseline	Continuation of actual Policy with intervention price = world market price
Agenda 0%	Agenda 2000 with constant grain prices
Agenda 10%	Agenda 2000 with 10% decreasing grain prices

Exchange rates national currencies to the ECU used for payment calculation (2000-2005):
FF: 6,663186; £: 0,671214; DM: 1,97738
Source: Own Calculations with TIPI-CAL

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- If prices remain on the baseline level ("Agenda 0 %") hardly any farm experiences any losses in family farm income. This is mainly due to the increased total gross margin induced by the abolishment of the mandatory set aside. The set aside particularly affects the small German farm. Those farms growing oilseeds and proteins experience decreased payments associated with those crops, mitigating the positive impacts of the "Agenda 0 %". This applies especially to the small French farm.

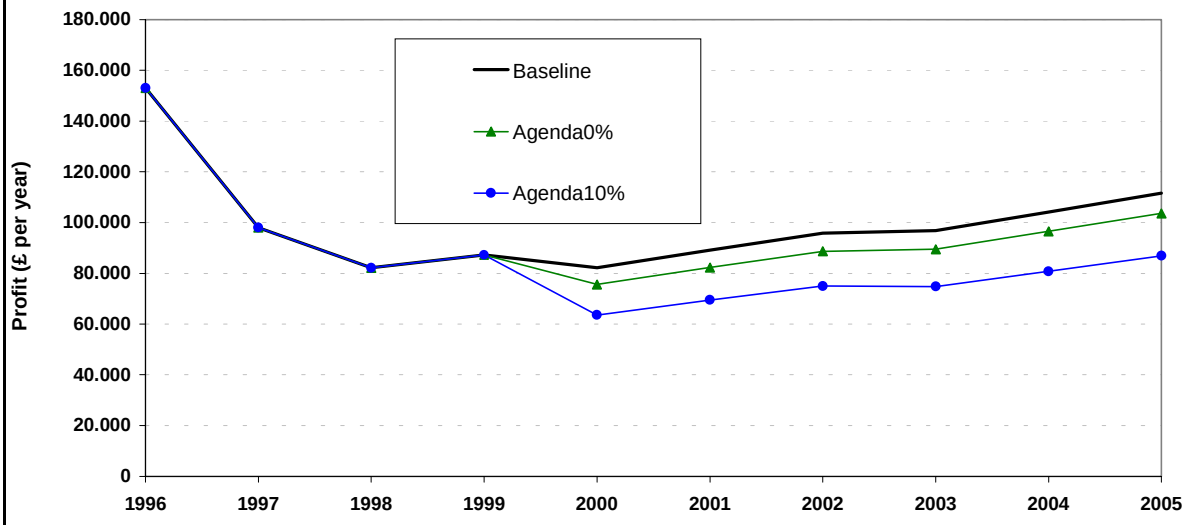
- If grain prices drop by 10 percent the less than offsetting compensation payments and the differences between high yields and the official reference yields become obvious.
- In the Agenda scenarios the large East German and the large East Anglian farm undergo additional losses (28.000 to 45.000 DM respectively 2.000 to 5.500 £) from modulation of payments (reduction of per ha payments with increasing farm sizes) which does not affect the other farms. This might lead to adjustment strategies on the large farms such as dividing them into two or more units.
- Regarding the large East Anglian farm, in all scenarios profit losses are highest for farmers in East Anglia in the course of time (esp. 1996-1998). This is caused by the revaluation of the British Pound and not by policy change. The exchange rate between £ and ECU has decreased from 1992 (0,8338) until now (0,6717). The importance of the level of the currency against the ECU for European farmers is very apparent. Local revaluation decreases both the local prices and the premium levels.
- The small German farm and the large French farms suffer less from the Agenda implications because they have a higher acreage of sugar beets, none or just a small acreage of oilseeds or they are able to shift production towards peas. Agenda provides an additional premium for proteins. Moreover, especially in Ile de France yields for peas are relatively high.
- The bottom of Figure 26 shows the increasing importance of direct payments for the profitability of the farms. The lower the prices the higher the share of payments in the profit. Their contribution to the farm's profit increases significantly and reaches more than 100 % in the large UK-farm.

Conclusions

The discussion of farm input data and projected results revealed several questions. For example, cost have to be broken down further to enable the calculation of crop specific costs of production in the future. Moreover, the differences in the crop specific gross margins indicate a different crop mix (within the physical cropping pattern restrictions) than observed in the East Anglian and French farms. This situation complicates the assessment of farm adjustment strategies. It should be stressed that elaboration and incorporation of farm adjustment strategies was not possible at this stage but will be in the centre of further work. Therefore, it is extremely important to set up specific panels consisting of farmers and advisers in each region. The solutions achieved so far within the "fast track" procedure can be only an approach to IFCN's potential.

Figure 27: Development of profit and other indicators under different policy scenarios for the big UK arable farm

380 ha Arable Farm "East Anglia" under different Policies
Adjustment of Oilseedrape Acerage



Year	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Percentage Profit from dir. Payments (%)										
Baseline	75	110	124	116	110	102	95	94	87	81
Agenda0%	75	110	124	116	105	96	89	88	82	76
Agenda10%	75	110	124	116	135	124	115	115	106	99
Change in Networth (1000 £)										
Baseline	122	66	49	54	48	54	61	61	67	74
Agenda0%	122	66	49	54	42	48	53	54	60	66
Agenda10%	122	66	49	54	30	35	40	39	44	50
Set Aside (%)										
Baseline	10	5	5	5	5	5	5	5	5	5
Agenda0%	10	5	5	5	0	0	0	0	0	0
Agenda10%	10	5	5	5	0	0	0	0	0	0
Grain payment (£ / ha)										
Baseline	267	257	242	242	215	215	215	215	215	215
Agenda0%	267	257	242	242	213	213	213	213	213	213
Agenda10%	267	257	242	242	237	237	237	237	237	237
Wheat price (£ / t)										
Baseline	103	80	70	70	70	70	70	70	70	70
Agenda0%	103	80	70	70	70	70	70	70	70	70
Agenda10%	103	80	70	70	63	63	63	63	63	63
Rape price (£ / t)										
All Szenarios	176	160	178	178	178	178	178	178	178	178
Gross margin Wheat (£ / ha)										
Baseline	754	565	475	482	462	470	477	484	492	499
Agenda0%	754	565	475	482	461	468	476	483	491	498
Agenda10%	754	565	475	482	426	432	439	445	452	459
Gross margin Rape (£ / ha)										
Baseline	679	562	603	611	581	589	598	606	615	624
Agenda0%	679	562	603	611	480	488	497	505	514	523
Agenda10%	679	562	603	611	503	512	520	529	538	547

Description

Baseline - Continuation of current policy, Worldmarket price for grain high = EU Intervention level
- Exports without subsidies possible, EU Garin price at world market level, Setaside = 5%

Agenda 2000 implications
- uniform payments for grain, oilseeds and voluntary set aside, - additional Protein payment (6,5 ECU/t cereal), - compulsory set aside =0%,
- degressive modulation of payments, - adjustment of payments in case of high grain prices

Agenda 0%: Worldmarket price for grain high = old EU Intervention level (119ECU/t), - uniform payments for grain and oilseeds (54 ECU/t)
Agenda 10% : World market price drops by 10%, - payments for grain and oilseeds increase from 54 to 60 ECU/t

Source: TIPI-CAL calculations

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