Inter-regional competitiveness - a cross-country comparison of dairy farming [1]

István Heinrich and **Peter Hinrichs**
Institute of Farm Management and Rural Studies (BAL)
Federal Agricultural Research Centre Braunschweig (FAL), Bundesallee 50,
D-38116 Braunschweig, Germany

1. Introduction

The economic aspects of "sustainable development"

Sustainable development, as defined by the FAO Council in 1988 "...is environmentally non-degrading, technically appropriate, economically viable and socially acceptable." Regionally different livestock systems should therefore be assessed, not only in terms of social and ecological goals, but also long-term economic viability, i.e. competitiveness and success on world markets.

Why are inter-regional and world-wide comparisons necessary?

This study aims to identify the advantages and disadvantages of global competition, and to assess how the competitive situation can and will be changed in the future.

The ideal economic option for livestock production is to be independent of agricultural policy and its subsidies. Farmers should not hope to receive subsidies indefinitely. As the liberalisation of world trade seems to be regarded as the best development policy, Western European farmers will have to accept that farm products from less developed countries will enter "their" markets and in some cases may turn out to be more competitive.

Since 1990, the Institute of Farm Economics at the FAL in Braunschweig has been analysing dairy systems in Europe and overseas. The competitiveness of these systems is defined by the long-term average of total production costs.

The data for these international comparisons is provided by a panel of "European Dairy Farmers" (EDF) who voluntarily co-operate with the scientific staff of this project. It should be noted that this sample of EDF-farms is too small to be representative of each respective country. Nevertheless, they do show typical, country-specific farming or management systems, based on specific geographical, social and political environments.

2. Indicators of competitiveness and profitability

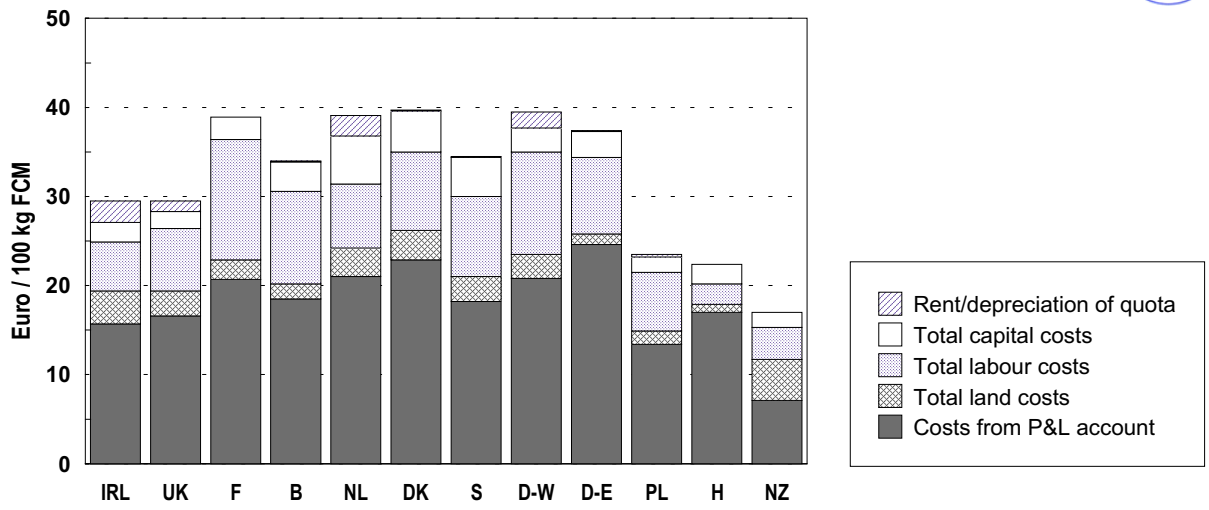
Returns and costs in the dairy enterprise

A dairy enterprise includes the dairy cows, female calves, heifers for replacement as well as the fodder production for all these animals. The production costs have been split into cash costs (and depreciation) and factor costs (land, labour and capital; Figures 1 and 2).

---

[1] Updated version of a presentation given by István Heinrich at the second ELPEN Workshop in Vienna, June 1998. ELPEN (European Livestock Policy Evaluation Network) is a EU-funded research project (QLK5-1999-01296).
István Heinrich is in charge of the central scientific management within the "European Dairy Farmers" organisation. Home page of EDF: http://www.dairyfarmer.net. Peter Hinrichs covers ELPEN's work package "Economic evaluation"

Figure 1: Structure of production costs

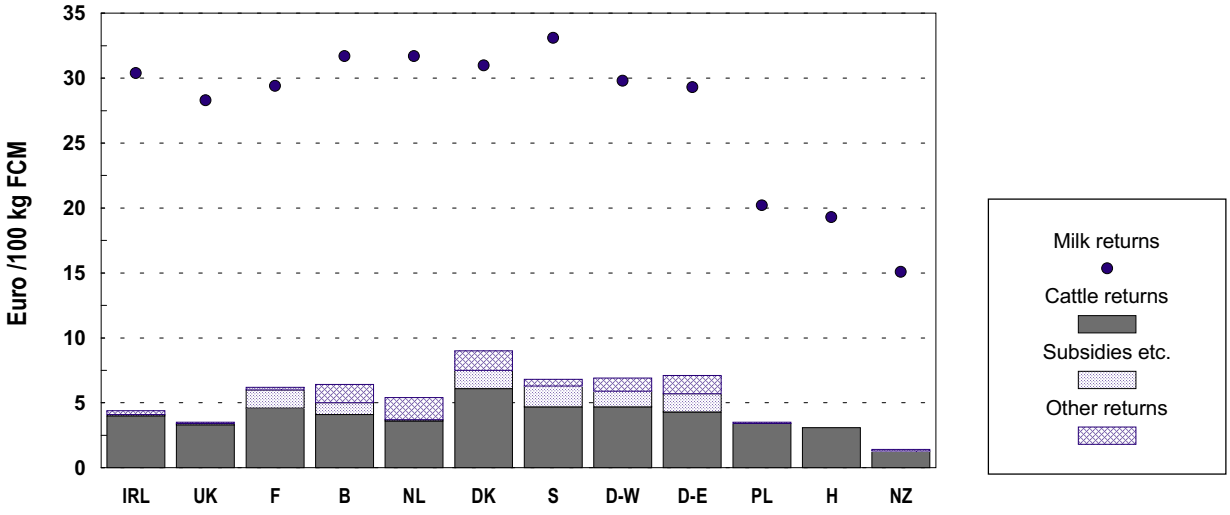


Country	IRL	UK	F	B	NL	DK	S	D-West	D-East	PL	H	NZ
No. farms	8	6	22	6	20	2	3	9	9	4	5	55
Cows per farm	138	218	43	59	99	84	107	84	571	52	388	162
kg FCM per cow	5580	6370	7395	8797	8141	7193	8486	7060	6310	5115	5335	4745

All figures refer to the dairy enterprise only (milk, calves, heifers, fodder).
Source: EDF-Analyses (1995-1999).

FAL-BAL
HEINRICH (2000)

Figure 2: Returns in the dairy Enterprise



Country	IRL	UK	F	B	NL	DK	S	D-West	D-East	PL	H	NZ
No. farms	8	6	17	6	20	2	3	9	9	4	5	55
Cows per farm	138	218	43	59	99	84	107	84	571	52	388	162

Source: EDF-Analyses (1995-1999).

FAL-BAL
HEINRICH (2000)

Four cost levels can be observed:

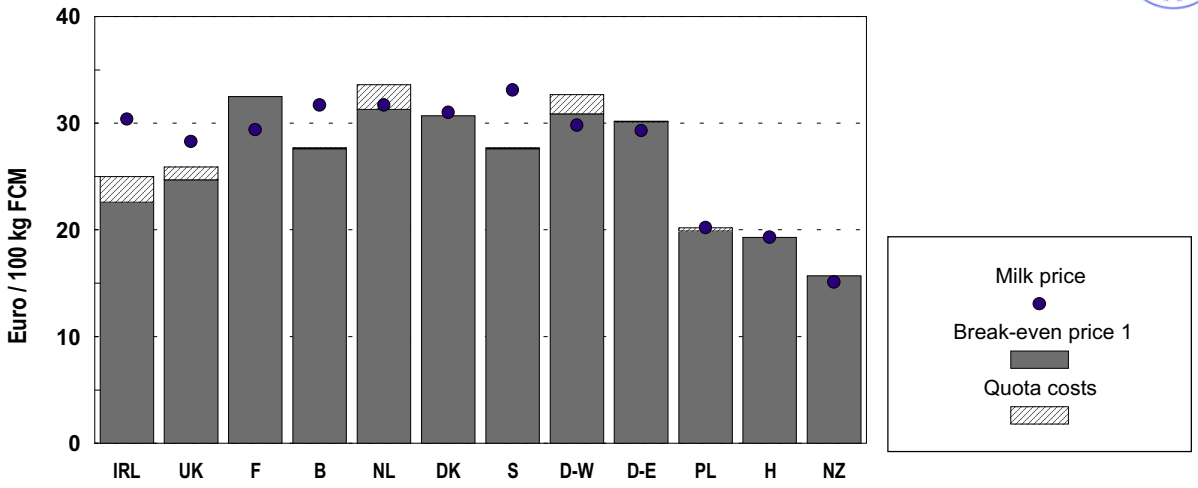
- Costs in countries on the continent range from approximately 35 to 40 EURO per 100 kg of fat corrected milk (FCM). With the exception of Belgium and Sweden, the milk price obtained is remarkably lower than the cost of production.
- Costs of production on Irish and British farms are about 5 EURO lower, with the result that most farmers make some profit.
- Hungarian and Polish farmers produce milk at costs below 25 EURO per 100 kg FCM. The average milk prices at that time, however, did not exceed 20 EURO.
- In this survey New Zealand farmers produce milk at the lowest total cost; approximately 15 EURO per 100 kg. However, very low milk returns restrict their chances of making a profit.

In addition to this, EU dairy farmers received subsidies and even benefited from high cattle prices throughout the sharp decline in prices which followed the BSE crisis.

The break-even points and milk prices

Figure 3 presents break-even points (profit thresholds) and milk prices. The break-even point is calculated by subtracting all non-milk-returns (slaughter cows, calves, direct payments and subsidies) from total costs and then adding the opportunity costs of farm-owned factors (labour, land and capital). The stacked bar marks the level of milk price required to cover these costs. The large dots indicate the milk prices actually received.

Figure 3: Break-even Point and Milk Price



Country	IRL	UK	F	B	NL	DK	S	D-West	D-East	PL	H	NZ
No. farms	8	6	17	6	20	2	3	9	9	4	5	55
Cows per farm	138	218	43	59	99	84	107	84	571	52	388	162
kg FCM / cow	5580	6370	7395	8797	8141	7193	8486	7060	6310	5115	5335	4745

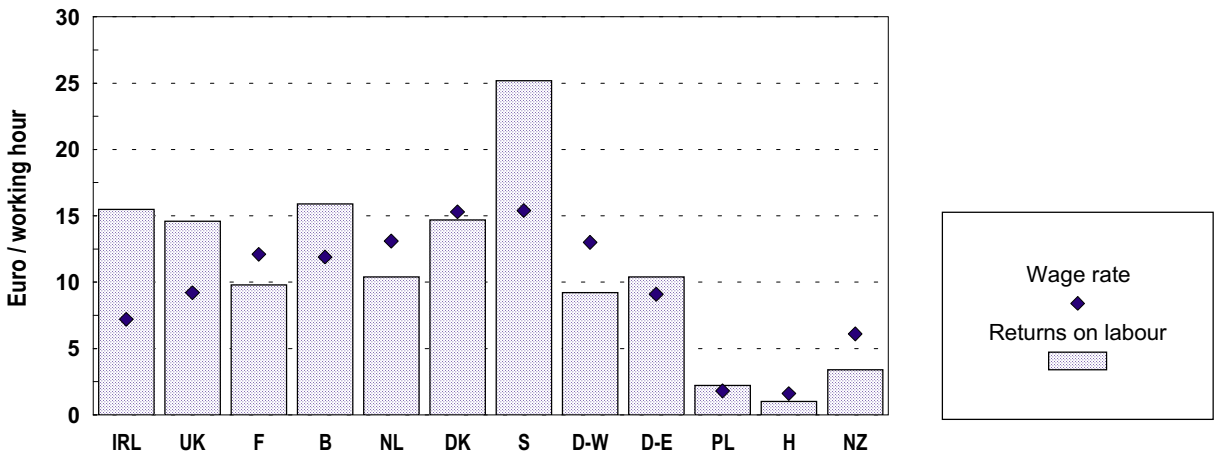
1 Total costs minus non-milk returns (cull cows, calves, direct payments)
Source: EDF-Analyses (1995-1999).

FAL-BAL
HEINRICH (2000)

Labour earnings

The indicator in Figure 4 represents the amount of money available for the payment of family workers after the deduction of all costs (except paid wages). To improve the income of dairy farming, the return to labour has been compared with the wage rate for qualified farm workers. The hourly returns on labour only exceed regional wage rates in Belgium, Ireland, the UK and Hungary.

Figure 4: Labour Earnings, Wages



Country	IRL	UK	F	B	NL	DK	S	D-West	D-East	PL	H	NZ
No. farms	8	6	17	6	20	2	3	9	9	4	5	55
Labour productivity 1	132	115	93	101	187	155	165	113	124	35	53	171
kg FCM per cow	5580	6370	7395	8797	8141	7193	8486	7060	6310	5115	5335	4745

1 kg FCM per working hour
Source: EDF-Analyses (1995-1999).

FAL-BAL
HEINRICH (2000)

Returns on capital

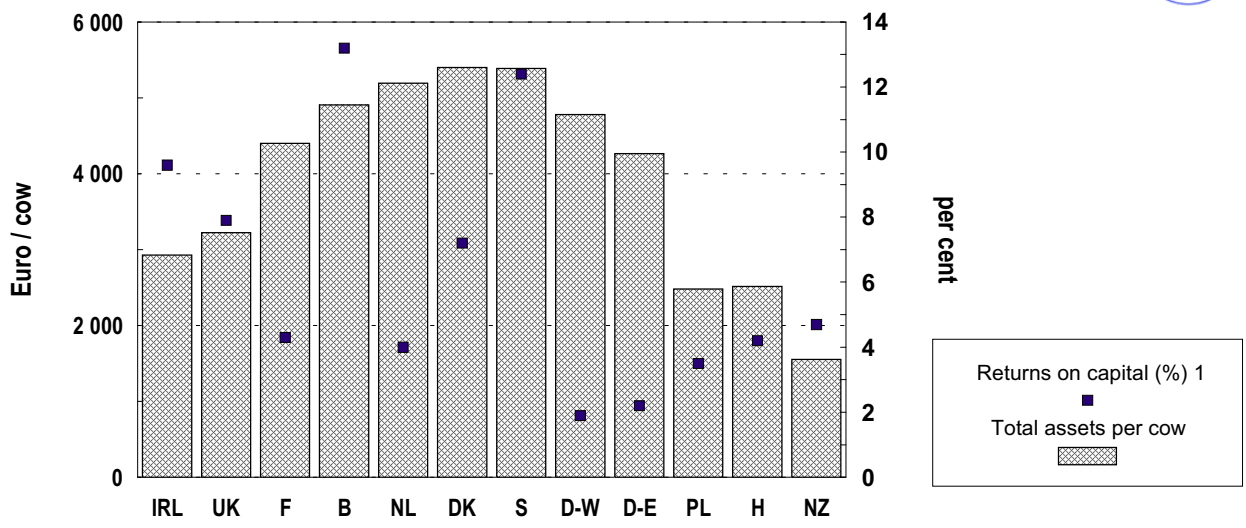
In Figure 5, the bars indicate the total amounts of capital per cow in each country. The large dots represent returns on capital (per cent). This indicator is used to assess the profitability of farmers' investments in dairy production. If profitability is below the interest rate level of long-term bank loans then investments will be risky.
In production systems on the European mainland much more capital is invested than in those ones of Ireland, the UK, Eastern Europe or particularly New Zealand. However, only in Belgian, Swedish and Irish farms, the calculated returns on capital substantially exceeded 8 per cent.

3. Characteristics of different dairy systems

Main factors of production: land, labour and capital.

We have chosen four countries as examples of how the differences in dairy farming and specific management systems should be defined. They each have different herd sizes, milk yields, milk prices and break-even points (i.e. costs which need to be covered by milk returns). (Table 1)

Figure 5: Return on Total Capital



Country	IRL	UK	F	B	NL	DK	S	D-West	D-East	PL	H	NZ
No. farms	8	6	17	6	20	2	3	9	9	4	5	55
Cows per farm	138	218	43	59	99	84	107	84	571	52	388	162
kg FCM / cow	5580	6370	7395	8797	8141	7193	8486	7060	6310	5115	5335	4745

1 Calculation: (Enterprise profit+interest)/total capital
Source: EDF-Analyses (1995-1999).

FAL-BAL
HEINRICH (2000)

The profitability of input use is determined by the ratio of input to output prices, the productivity of the factors listed above as well as by rates of substitution among the input factors.

Table 1: Characteristics of Dairy Farming Systems
Main Factors of Production

		Belgium	Ireland	Hungary	New Zealand
Herd Size	*(No of cows)*	*62*	*146*	*388*	*162*
Milk Yield	*(kg FCM/cow)*	*8570*	*5530*	*5335*	*4745*
Milk Returns	*(ECU/100 kg)*	*32,8*	*30,5*	*22,0*	*14,3*
Break-even point	*(ECU/100kg)*	*30,6*	*24,1*	*18,6*	*15,0*
Land Rents	(ECU/ha)	569	432	54	349
Productivity	(kg FCM/ha)	16904	13537	5189	8949
Land Costs	(ECU/100 kg FCM)	3,4	3,2	1,1	3,9
Wage Rates	(ECU/labour hour)	11,1	7,2	1,8	6,1
Productivity	(kg FCM/labour hour)	101	132	53	171
Labour Costs	(ECU/100 kg FCM)	11,0	5,8	3,5	3,6
Capital Requirements	(ECU/t FCM)	612	567	458	324
Return on total capital	(in %)	11,8	9,7	4,2	4,7
Capital Costs	(ECU per 100 kg FCM)	3,8	2,2	2,0	1,8

Source: EDF questionnaires 1997; own calculation

FAL-BW
HEINRICH (1998)

In Belgium, a country of high prices, land rents and wage rates are very high. Belgian farmers must, therefore, use land and labour very productively in order to keep their costs per kg FCM at reasonable levels. Prices in Ireland and New Zealand are much lower than in Belgium and, as a result, productivity also needs to be lower in order to achieve competitive cost levels. In Hungary, land rents are extremely low, so low in fact that land costs per kg FCM were the lowest of all the countries surveyed, despite low productivity.

A country-by-country comparison of labour costs yields different results. Belgian farmers are confronted by high wage rates, but they are not able to achieve high labour productivity in their relatively small herds. New Zealand farmers produce three times more milk per hour than Hungarian farmers, but the labour costs per kg of milk are the same in both counties due to the low wage rates in Hungary.

The level of capital costs, however, depends upon the farming system. Farmers in New Zealand have the lowest capital requirements both per cow and per 1000kg milk. This is a big advantage which results from the mild climate. An all-year-round grazing system without expensive housing facilities cannot be established on the European continent. On the other hand, as labour is very cheap, Hungarian dairy producers use more labour and less expensive equipment.

Other factors: grazing system, feeding concentrates, quota prices and rents.

Table 2 shows that the type of grazing system has a great impact on feed costs. Intensive grazing systems (i.e.: characterised by keeping cows outside for 24 hours and moving them to a new paddock every day) imply low forage costs and a high milk yield. On the other hand, efficient feeding systems with high feed conversion rates are applied if feed prices (e.g. concentrates) are high.

Table 2: Other Factors of Production

Grazing system		Semi-intensive (B)	Intensive (IRL)	No grazing (H)	Intensive (NZ)
Productivity	(kg FCM from forage)	2862	3263	822	4688
Forage Costs	(ECU/100 kg FCM)	9,5	6,4	5,5	3,6
Price Concentrates	(ECU/t)	180	175	145	185
Productivity	(g concentrates/kg FCM)	333	205	423	6
Concentrates Costs	(ECU/100 kg FCM)	6,0	3,6	6,1	0,2
Quota Rents	(ECU/kg FCM)	0,16	0,11	0,0	no quota
Share of Quota rented	(in %)	1,3	22,7	0,0	0,0
Quota Costs	(ECU/100 kg FCM)	0,2	2,5	0,0	0,0

Source: EDF questionnaires 1997; own calculation — FAL-BW HEINRICH (1998)

Agricultural policy also has a strong influence on production costs. Subsidies often raise land rents, and quotas produce higher costs. The price of rented quota is very high in Belgium. Therefore, the share of rented quota is very low. This may be one of the reasons for the small herd sizes. In Ireland, about 23 per cent of the total milk quota is rented. This translates as an extra cost of 2.5 EURO per 100 kg milk.

4. Conclusion

- Dairy production in Ireland and the United Kingdom benefits from relatively low labour, building and forage (grazing systems) costs. However, what is a clear advantage in the past may diminish if the British and Irish pounds continue to grow in strength.
- On the continent, Belgian and Swedish producers were most successful. Very high milk yields, good milk prices, due to a remarkable percentage of direct-marketing, and high heifer prices may have contributed to this result.
- In the other Western European countries surveyed, the average total costs, including opportunity costs for the farm-owned factors of labour, land and capital, exceeded the milk returns. However, great variation was observed between farms. This is also true for the dairy farms in Eastern Germany. Although on average, these farms were not profitable, some of the very large – and constantly improving - enterprises are now ranking among the best dairy farms in Europe.
- Hungary and Poland have the lowest wage rates and land rents in this cross-country comparison, and from this an advantage in labour and feed costs. On the other hand, productivity is relatively low.
- New Zealand farmers produce milk at very low costs, seemingly the lowest in the world. Due to the mild winter, dairy cows can be kept at pasture all year round. Investments are required only for the milking shed, fences, driveways and a freshwater supply. Most farms consequently practise a spring-calving pattern and by this reduce their costs of winter feed substantially.

References

HEINRICH, I., HEMME, T., ISERMEYER, F. AND MICHEL, C.: Milcherzeuger im EU-Vergleich.- DLG-Mitteilungen 12/1995, S. 20-22.

HEINRICH, I. AND HEMME, T.: A tejtermelés jövedelemzösége (The rentability of milk production). - Magyar Mezögazdaság (Hungarian Agriculture) 6/1996, S. 8-9

HEMME, T., HEINRICH, I. AND ISERMEYER, F.: Wo wird die Milch am billigsten produziert? – top agrar 12/1996, S. 26-30

HEINRICH, I. AND ISERMEYER, F.: The Development of 12 Selected EDF Farms 1993-1997.- Arbeitsbericht aus dem Institut für Betriebswirtschaft der FAL, Braunschweig, 1998

HEINRICH, I. AND HINRICHS, P.: "Inter-regional competitiveness: a cross-country comparison of dairy farming." In: S. M. Williams and I. A. Wright (eds.): ELPEN - Proceedings of Two International Workshops. Aberdeen 1999 (ISBN: 0 7084 0167 3), pp. 87 - 91