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A GLOBAL PROJECT FOR COMPARATIVE FARM ANALYSIS: THE INTERNATIONAL FARM COMPARISON NETWORK IFCN

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ABSTRACT

Before IFCN was founded, existing farm-level data sets for international comparisons – if there were any – were not comparable. Differences from country to country regarding methodology applied, extent of data sets (physical and financial figures), and availability of up-to-date figures caused the incomparability. The IFCN is a world-wide association of ag-ricultural scientists, advisors and farmers. Within the framework of this co-operation, farms and agricultural production systems are defined that are typical for their regions. Their eco-nomic situation is analysed, and the farms can be projected into the future. At present, the network, which is co-ordinated by the IFCN-centre in Braunschweig, Germany, operates for three branches: dairy (> 30 countries), beef and cow-calf (15 countries) and cash crop (13 countries). Funding of the network is organised via consortium fees from the partners as well as national and international supporters from agribusiness. The IFCN works on an annual schedule, organises annual conferences and annual reports for each product branch. With the existing data and information base, additional specific studies are carried out. Results comprise total cost, returns and profitability of dairy, beef and cash crop pro-duction, cost component analysis, benchmarking of single farms and farm groups, baseline projections, policy impact and farm strategy analysis as well as global sector and product information. The next steps foreseen are to extend the networks to more countries and more farms, to improve the supply reaction analysis on changing framework conditions, to intensify time series analysis of typical farms and prices, to strengthen sector and supply chain analysis, and to enter strategic partnerships with market and sector modelling pro-jects.

Keywords: Farm comparisons, typical farms, international competitiveness, International Farm Comparison Network

INTRODUCTION

The International Farm Comparison Network (IFCN) was first introduced to the International Farm Management Association during the 11th International Farm Management Congress in Calgary, Alberta, Canada, in 1997. Since then, the IFCN has grown from an initial idea with first steps toward a world-wide association for farm-level analysis. This paper provides an overview of the objectives, methods, the status-quo and the next steps of the IFCN. Three further papers provide details on selected results of the IFCN branches Dairy, Beef and Cash Crop.

Background, Motivation and Vision

Until the late 1980s, international farm comparisons were only carried out on an ad hoc-basis, mainly within the scope of Ph.D.-studies, some of which were performed by the au-thors

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of this paper (Isermeyer 1988; Deblitz 1994).

The results of these comparisons were recognised as being useful. At the same time they revealed the following problems:

- required data was either not available at all or not available in the scope required to perform total cost analysis
- available data did not allow costs to be differentiated into their price and their volume components to explain cost differences
- available data was usually not comparable across countries
- available data was very often outdated
- the organisational framework of the studies was not designed to be sustainable

The main conclusion from these experience was that the establishment of an own database for international farm-level comparisons is more efficient than the adjustment of exist-ing databases. As a consequence, in 1991, the network of the European Dairy Farmers (EDF) was founded to explore the feasibility of on-going farm comparisons in the European dairy sector. EDF is a club of individual dairy farms, the data of which are ana-lysed on an annual basis. Despite solving the above-mentioned problems, a number of challenges re-mained:

- The possibility for generalising results was limited because individual farm data were used
- The analysis was limited to dairy and to Europe
- Data collection and cost allocation were not checked by experts
- There was no possibility for simulating farms into the future

The International Farm Comparison Network (IFCN) was founded in 1997 to finally overcome the problems of the past as outlined above (see Hemme, 2000). The vision of IFCN is ‘to improve understanding of farming world-wide’. This implies the provision of facts, data and information in a structured, harmonised, comparable, long-term and sus-tainable way across countries world-wide.

Strategic approach

The IFCN is a world-wide association of agricultural scientists, advisors and farmers. Within the framework of this co-operation, farms and agricultural production systems are defined that are typical for their region. Their economic situation is analysed, and the farms can be projected into the future. The IFCN shall provide answers to the following questions for the most important agricultural products and production regions in the world::

- How is farming done (farming systems, production technology)?
- What is the level of variable and total production cost?
- What are the reasons for advantages and disadvantages in competitiveness?
- What is the future perspective of agricultural production at the locations considered?

Since 2000, we have been proceeding strictly in a branch-wise manner. In the first step, the Dairy Network was established. Those organisational and financial arrangements that proved

to be successful in ensuring a sustainable network development were transferred stepwise to other agricultural branches. The IFCN Beef branch was launched in 2001, the IFCN Cash Crop branch in 2004. In each of the networks, the participating researchers from abroad become members of a consortium that works on an agreed annual schedule. The group meets once a year in a conference to discuss results, prepare common publications and decide on the future projects of the network. The overhead costs at the IFCN co-ordination centre are financed through consortium fees, research projects and sponsoring from agribusiness and institutional partners.

At present, the IFCN Dairy network includes partners from more than 30 countries that account for more than 80 percent of world milk production. The IFCN Beef network comprises 15 countries, and the IFCN Cash Crop network started in 2004 with researchers from 12 countries. It is planned to extend the activities to sheep and pig production.

Although it is able to provide advice to policy-makers and actors in the supply chain, IFCN is not supposed to judge (in the sense of 'good' and 'bad') or to design policies. IFCN aims to understand the past and present situations of farms, to project their future and to create knowledge to help to validate/develop farm policy, technology and management strategies. In this way, IFCN can be seen as a navigation system in the rapidly changing global agricultural sector.

METHODS

For each location, models of typical farms are established and analysed using internationally harmonised methods. The application of harmonised methods is essential because our experience has shown that existing data sets – if there are any – show significant differences from country to country, regarding methodology applied, extent of data sets (physical and financial figures), and availability of up-to-date figures. The IFCN data for the typical farms is compiled in co-operation with local farmers and advisors. The definition of the farms follows a distinct pattern and is based on regional statistics, accounting data and expert assessments. A standard questionnaire is used in all countries allowing a very de-tailed specification of physical and financial farm and enterprise data. Data is generally collected on the whole farm level and – where necessary – whole farm figures are allocated to single enterprises for cost and enterprise analysis. Furthermore, the local experts cross-check results and discuss farm level strategies to adapt their farms to a changing technological, economical and political environment.

Status quo analysis, for example total cost of production, as well as analysis of the economic consequences of policy changes and farm adjustments, is carried out by using the simulation model TIPI-CAL¹ (10 year projection cycle), and results are returned to the local experts for assessment. TIPI-CAL is an Excel-based spreadsheet accounting and simulation model. It is multi-period, dynamic-recursive and can be operated in a deterministic or stochastic mode. With TIPI-CAL, an annual analysis is performed, the focus of which is on returns, cost, profitability and productivity of the enterprises mentioned above. A number of additional modules linked to TIPI-CAL allow policy, farm strategy and risk analysis. TIPI-CAL is shareware for all IFCN partners and clients. Regular model training is offered by the IFCN Centre.

¹ *TIPI-CAL: Technology Impact and Policy Impact Calculations*



Organisation and funding of IFCN

IFCN is a consortium of the IFCN-centre and the participating partner institutions. The IFCN is coordinated by the IFCN-Centre located at the Federal Agricultural Research Centre (FAL) in Braunschweig, Germany. The Centre consists of the Institute of Farm Economics (FAL) and management companies. While FAL has the scientific lead of the network and the method developments, the companies provide professional management of the IFCN Beef network. The network co-ordination is mainly funded by the consortium fee from the participating countries. Further, partnerships with agribusiness and global institutions re-lated to agriculture were established. All partners agreed on the vision, priorities and values of IFCN.

IFCN is a working network with defined topics, schedules and activities agreed upon by all partners. The annual activities comprise:

- Creating a harmonised database of farms.
- Analysing the farms using the IFCN methods.
- Providing up-to-date sector information.
- Validating the results in the annual IFCN Conference (one for each product).
- Publishing the results in the annual IFCN Reports (one for each product).
- Improving the IFCN methods continuously.
- Exchanging ideas on issues and research projects.
- Training in IFCN analysis tools and models for the partners

RESULTS

There are three papers presenting detailed results from the IFCN Dairy, Beef and Cash Crop branches (Deblitz et al., 2004, Hemme et al., 2004, Pleßmann et al., 2005) Here, we just provide an overview of the result-portfolio generated within IFCN.

Global sector and product information

Our experience has shown that the combination of farm-based data and in-depth analysis of the related commodity markets is necessary to fully understand the development of cer-tain agricultural branches. For this purpose, data and information from secondary interna-tional data sources (for example FAO, UNComtrade, FAPRI) as well as own data collec-tions within the IFCN is compiled and displayed in easily understandable world maps and charts. Within the annual special studies and country pages of the Reports, topics such as farm structures and their development, traceability in the supply chain, quota markets in the EU, legal framework conditions for genetically modified crops were and will be addressed.

Total cost, returns and profitability analysis

The total cost and returns analysis is one of the core results of IFCN. It is performed on typical farms on an international scale. Results are usually displayed per product unit (such as 100 kg milk, beef or crop produced) because products are what are traded internation-ally, but any other indicator can be chosen as a reference unit for the results (such as hec-tares, animals). Data and results are comparable because the same method for data collec-tion, processing and presentation is used world-wide. Cost analysis is on full economic costs, i.e., cash expenses, depreciation and opportunity cost for own production factors (labour, land and capital). This allows short-term, mid-term and long-term analysis of profit-ability and comparisons of family

farms and commercial farms.

Cost and return component analysis

Cost as well as return information can always be differentiated into a price and a volume component. This is particularly true for the production factors labour, land and capital where both volumes (hours, hectares and capital inventories or values) and prices (wage rates, land rents, interest rates) are collected. With this information, productivity analysis is performed, for example labour productivity in hours per 100 kg milk, beef or soybean produced per year. Further analysis is done by splitting up costs for means of production such as fertilisers, fuels and purchased animals into price and volume components. Cost component analysis particularly helps to understand reasons for cost differences and to identify possible fields for cost reductions.

Benchmarking of single farms and farm groups

IFCN tools allow the comparison of custom-specified sets of performance indicators of single farms or farm averages. This particularly helps to reveal specific strengths and weakness profiles of specific farms and farm groups compared with competitors.

Deterministic and stochastic baseline projections

A farm-level baseline can be described as ‘the projection of a chosen indicator under the present and most likely policy, market and technology framework conditions for a defined period of time’. The baseline is usually used to obtain information about the likely future, or as a reference system to analyse changes of the above-mentioned framework conditions. Adding stochastic information to the baseline helps to assess the risk involved and provides information on how probable the development considered is. Stochastic variables are for example: milk price, beef price, calf prices, heifer prices, grain price, soybean meal and compound feed price, milk yield and culling rate. The results show the indicator chosen in a deterministic projection plus confidence intervals as well as probabilities, for example probability of cash flow deficits.

Policy impact analysis and farm strategy analysis

TIPI-CAL allows dynamic farm projections for a period of 10 years which can be used for policy and farm strategy analysis. In recent years, policy analysis was performed on the income effects of the Agenda 2000, the possible elimination of the milk quota system and the latest CAP-reform of the Mid Term Review. Some examples for farm strategy analysis are: profitability of milking robots in dairy farms, management options for crop farms under the new framework conditions of the latest CAP-reform, conversion to organic farming.

Time series analysis

In the very beginning, every IFCN branch has to focus on cross-country and status-quo comparisons. The disadvantage of a status quo analysis is that it is only valid for the year considered. Due to domestic productivity and price changes, as well as to changes in exchange rates, results between years may differ significantly. Once a product branch is in operation for a number of years, time series analysis can be performed for identical farms. This has been done for the typical beef farms. Results reveal significant differences between the years and underline the necessity to exercise the comparisons on a regular basis to avoid misleading conclusions.



NEXT STEPS

More countries, more farms, more product-branches

Further growth of IFCN in all existing product-branches, as well as the opening of new product branches, is envisaged. New product branches (pig and poultry, sheep) require a committed person in the IFCN centre and funding for at least two to three years. For all product groups the primary country focus will be on global players in terms of production and trade, but smaller countries are welcome to participate. The definition of typical farms will be performed using a standard operating procedure for all countries, more focussed on statistics. The number of farms per country is limited for the Reports, but each partner is encouraged to increase the coverage of the network in his country by adding more farms, thus increasing representativity. Of these, a number of farms will be selected by the partners and the IFCN centre for the international comparisons. Databases will gradually re-place the presently prevailing Excel-based data management.

Modelling supply reaction on policy, technology and market changes

Policy and technology impact analysis has so far mainly been focused on the income effects of changing framework conditions. Yet we observe an increasing interest in using the IFCN for the assessment of supply reactions, too. For this purpose, linear programming will be introduced in the crop module of the model TIPI-CAL. With the help of the IFCN panels in different countries, an analysis will be made of how realistic the LP-results are and how the supply response projections on the farm level can be further improved. For the livestock branches, the feasibility of linear programming and other tools will also be considered.

Time series analysis

Once a product branch is in operation for a number of years, time series analysis can be performed for identical farms (see previous chapter). As farm structures usually change towards larger units over time, the typical farm data is frequently updated to reflect the changing structures. These farms can still be considered typical but one could argue they are not longer identical and can not be compared in a time series analysis. On the other hand, when looking at the total cost of production of a typical farm, others would argue that the results can be compared because the figures reflect the reality in terms of structural change. This issue will be discussed more deeply in the IFCN product branches.

Supply chain issues and sector analysis

The access of IFCN to world-wide data banks and to commodity-specific expertise in processing and trade allows the elaboration of maps and background information to be added to the farm level analysis. Within the annual special studies and country pages of the Reports, topics such as farm structures and their development, traceability in the supply chain, quota markets in the EU, legal framework conditions for genetically modified crops were and will be addressed.

Strategic partnerships with market and sector modelling projects

The IFCN costs of production and benchmark analysis can serve as an important input for higher aggregated models like general equilibrium models. Information on price and volume components on cost items can help to assess supply reactions when framework conditions change. Once supply reactions can be simulated with the IFCN tools, they can serve as a model

input for aggregated models. At present, panel-based estimation of supply response (to policy changes) in typical farms can be used for the same purpose. Finally, TIPI-CAL could calculate 'exit thresholds' for typical farms in the case of drastic price changes.

On the other hand, the quality of farm-level projections of the IFCN is highly dependent on the projections of prices that can only be supplied by highly-aggregated equilibrium models. To a certain extent it seems to be possible to organise an iterative procedure for supplying information from one network to the other. At present, a possible co-operation with the GTAP² model is being evaluated.

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² GTAP: *Global Trade Analysis Project*.