agri benchmark Beef

A standard operating procedure to define typical farms

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Content

A standard operating procedure (SOP) to define typical farms

1 Summary (see also Annex 5 for a list of summary steps)

The process to define typical farms described in this paper refers to farm data collected for the purpose of the analysis of competitiveness and potentials of typical farms and regions. Other purposes of the analysis and the consequences for the definition of farms are briefly touched upon in chapter 9. In the following a brief description of the necessary steps for the definition of typical farms is provided. All steps are based on the assumption that all required statistics are available. In case statistics are not available, chapter 7.4 provides a minimum standard to define farms.

Select regions and locations

In this step the most important regions and locations for the raw-production of the product considered are identified. For this purpose, maps showing the spatial distribution of production are created. Different regional reference units of the production are considered to come to a conclusion.

Identify the prevailing production systems

Once the regions are identified, the relevant farm population, the production systems and farm types to be analysed must be determined. This step can be done by a scientist based on literature and statistics analysis and/or together with local advisors. For this purpose a check list is used to identify the degree of specialisation, the capital and labour structure and organisation, productivity levels, technologies, intensity levels and further indicators.

Define the size and management level of the typical farms

Size is defined as total animals sold per year for beef finishing and average number of suckler cows for cow-calf. The typical farms should have less than 50 % off-farm income and/or sustain at least the living of one person. As a standard, ***agri benchmark*** defines a moderate size and a large size farm in the region identified. This allows to reflect a large number of farms and a major share in production. Both farms should represent an average level of management (average profit level). Regional statistics on farm size distribution are used to determine the position of the farms in the distribution of the farm population or representative surveys. In order to reflect the region's potential further to the two farms a third farm with top management will usually be defined.

Data collection, cross-checking and updating

Data are collected in so-called full panels or pre-panels with participation of farmers and advisors. A standard questionnaire covering production and economic figures is used and for each figure it is checked and made sure that it reflects the typical situation. Once the data are collected, they are computed and the results are returned to the panel for cross-checking. Further, their economic performance is cross-checked against other economic analysis. Updating of prices and yields is done annually, the whole data set is updated every 2-4 years, depending on the speed of structural change and productivity increase.

2 Introduction

This paper describes the approach used in the ***agri benchmark*** for the identification and definition of data sets of typical farms. It is based on the experience gained in the ***agri benchmark*** and questions raised by ***agri benchmark*** partners and supporters during the existence of the network.

The purposes for this SOP are:

1. Make transparent to the network and the outside world, how typical farms have been **selected**.
2. Make transparent to the network and the outside world, how typical farms can be **described** relative to the rest of the farm population.
3. Make sure that irrespective of the availability of statistical data a **minimum level** of scientific standard in selecting farms has been respected.
4. In the long run: allow to draw conclusions regarding the **entire sector** based on results derived on farm level analysis.

In order to keep it simple, the SOP refers to (a) the standard situation, in which data from the farms selected will contribute to the global network and (b) to the presently less frequent situation where data have to serve specific purposes, which go beyond the scope of the overall standard within ***agri benchmark***.

This paper will not answer all potential questions. Therefore every partner is kindly invited to get back to ***agri benchmark*** Centre in Braunschweig and ask for advice.

3 Define the purpose of your exercise/analysis

Since the purpose of an international farm comparison analysis has a major impact on the selection process for typical farms, it is assumed that competitiveness and potentials of regions are the objectives of the research.

In section 8 of this paper we will talk about other purposes of the comparison and their implications for the selection criteria regarding farms and regions in greater detail.

4 Select regions and locations

This step can be done by the ***agri benchmark*** scientist using statistics available. You need to know which regions in your country produce **most of the product** (beef, cow-calf) you are looking for.

This means that you are looking for the **spatial distribution** of the product and/or the farms producing it. You are probably looking for regions with a substantial size and a relatively high cattle density.

4.1 Make sure you consider the appropriate sector level

As we analyse agricultural production (of raw materials like milk, beef and wheat), we need to look for indicators reflecting the **on-farm production** and **not** the first step of **processing** because the locations of production (farms) and processing sites (e.g. slaughterhouses) may diverge from each other. **Examples:**

- In **Argentina**, for example, 45% of the slaughter takes place in the Greater Buenos Aires area whereas farm production is spread around an area of a few hundred kilometres. Choosing the slaughtering as an indicator of beef production would therefore produce misleading results.
- A similar situation can be found in **Spain** with slaughtering concentrated in the Barcelona area on one hand and Aragón where animals are finished and then send for slaughter to the Barcelona region on the other hand.

4.2 Find the appropriate indicator

Taking the above said into account, we need an indicator that reflects on-farm production. This will usually be a figure showing the **inventories** of cattle to be finished. The choice of the indicator depends on the data availability, too. If available, the '**cattle on feed**' can be chosen (like in the US). If not, help indicators need to be constructed. **Examples**:

- In **Germany**, the vast majority of finished beef comes from bulls. They are ready for slaughter between one and 2,5 years of age. Dairy cows have a share of 86% in the total cows. Thus, most of the beef comes from the dairy herd. Breeding bulls are not relevant in the dairy herd. The German statistics provide the **number of male cattle of more than one year** on county-level. Thus, this figure can be used to determine the spatial distribution of beef production in Germany. Cull cows or heifers are not reflected in this figure as they are not finished before slaughter.
- **Organic beef** production in **France** is closely linked to cow-calf production. Specialised beef finishers do not exist and organic dairy farms only sell cull cows as organic beef. Thus the **number of suckler cows in organic farms** can be chosen as an indicator for organic beef production in France.

4.3 Use the appropriate reference unit

In this step it is necessary to refer the indicator specified above to an appropriate reference unit. The following examples refer to the Type 1 analysis (see chapter 1).

- Number of cattle [on feed] **per region**: This indicator can be misleading if sizes of regions differ substantially. Large regions appear important whereas small regions appear unimportant although the latter might have a higher cattle density (higher relative importance of beef production). The same applies if the share of a region in total cattle number in a country is chosen as an indicator.

- Number of cattle **per ha agricultural land**: This indicator comes closer to farming. It does not take into account non-agricultural land where beef production usually does not happen. However, a region with a very small share of agricultural land and just a few but large farms (which are producing beef) will appear to be very important for beef production whereas regions with more agricultural land and a higher diversity of products appear less important. Using **forage area** instead of total agricultural land basically creates the same situation, in particular if beef farming coincides with other activities using forage (like dairy or sheep farming).
- Number of cattle **per square kilometre**: This is an absolute density measure taking the different sizes of regions into account and avoiding the disadvantages of using agricultural land as a reference unit. It does however, not measure the importance of beef production relative to other farming systems and it might be misleading in cases when the region is relatively small and surrounded by non-beef-producing areas. However, using square kilometres probably provides the best indicator for the standard ***agri benchmark*** analysis as defined in section 3.

Due to the pros and cons of each indicator, it is advisable to produce tables or maps for all three reference units.

An example for Germany is provided in Figures 1 and 2. The maps show the regional density of male cattle with more than 1 year of age per square kilometre and per 100 ha agricultural area. In this case, basically the same conclusion can be drawn from both maps. Main beef finishing areas can be found in centre Bavaria as well as in North-West Germany.

5 Define the relevant farm population

Once the relevant regions have been identified, it needs to be checked whether the entire population of farms is considered to be relevant for the analysis. Because ***agri benchmark*** is aiming to focus on those farms which are producing the bulk of products, the relevant farm population is characterized by the ability to generate at least 50 % of the farm income or to feed at least one person/family.

Figure 1: Male cattle of more than 1 year per 100 ha total acreage in 2003

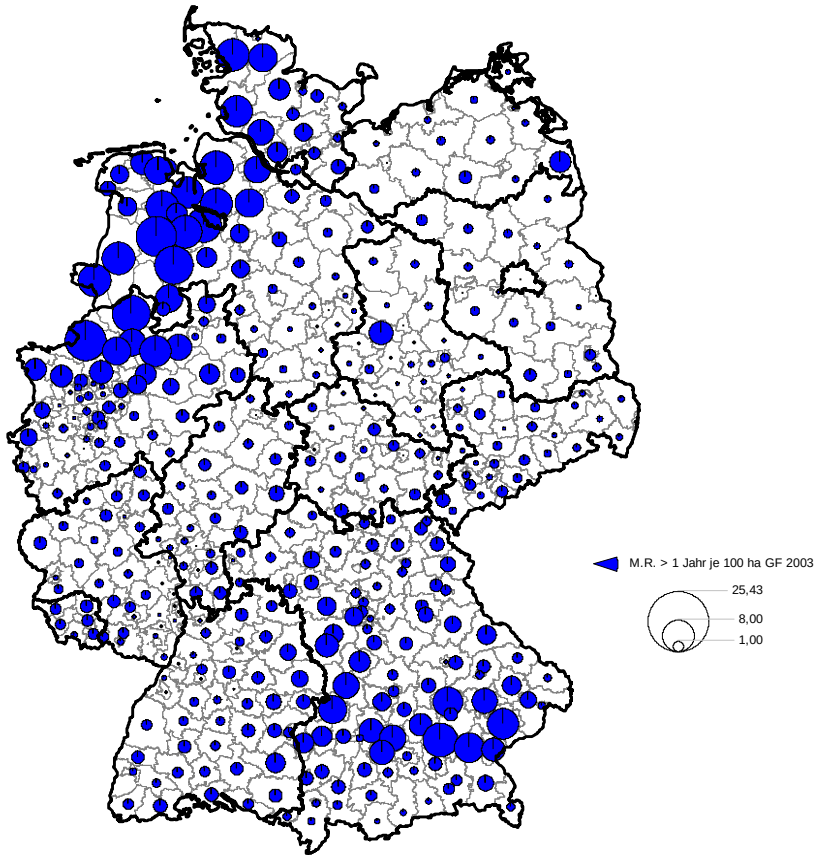
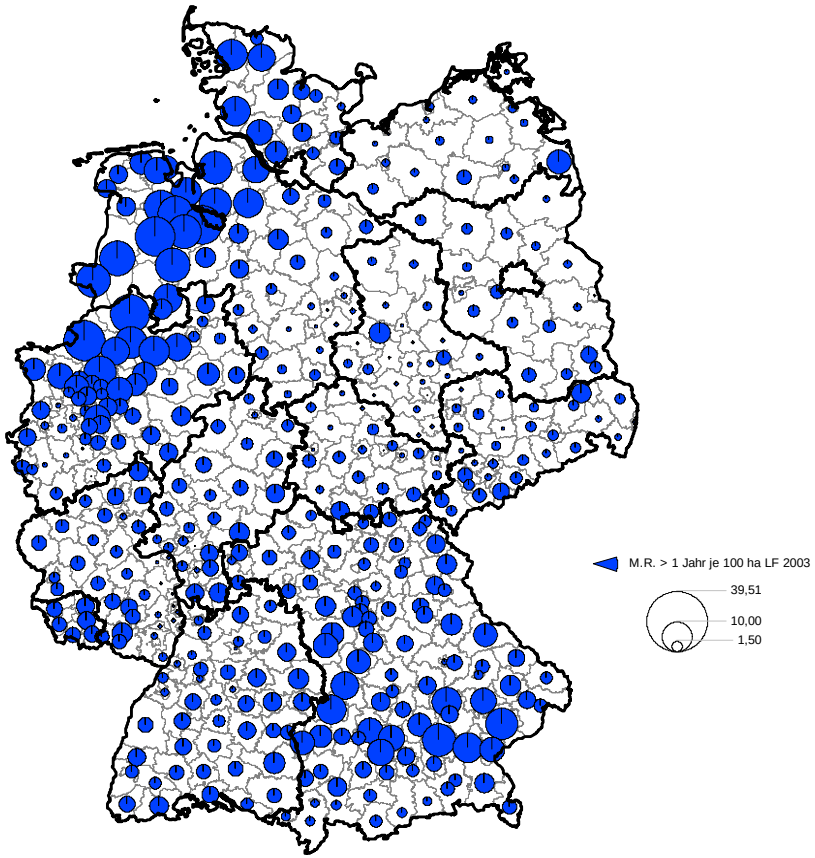


Figure 2: Male cattle of more than 1 year per 100 ha agricultural land in 2003



6 Identify the prevailing production systems in the country and the regions chosen

Once the relevant regions have been identified, the question arises what type(s) of farm(s) should be selected. In order to make sure that the most important production systems are represented in the typical farm network, a number of different systems need to be checked whether or not they make a difference in the data base.

This step can be done by the scientist based on literature and statistics analysis and/or together with local advisors. A stepwise approach appears to be appropriate, starting with a rather rough classification and refining it in the next steps.

The following list of criteria is meant to be a proposal for a check list, which should be amended depending on the regional conditions in the different member networks. In many cases a number of these criteria will be meaningless for the selection procedure and should therefore simply be ignored (see also indicator list in Annex 1).

- Specialised beef finishing or cow-calf farms vs. mixed systems, examples:
  - specialised beef finisher (incl. feedlots), perhaps with some cash crop farming
  - dairy farms + beef finishing
  - cow-calf farms + beef finishing
  - dairy and cow-calf farms + beef finishing
- Dairy breed based vs. beef breed based farm (see also figure in Annex 2)
- Capital and labour-intensive vs. low capital/low labour input systems (e.g. pasture vs. stable)
- High productivity vs. low productivity farm (in terms of physical productivity)
- Extent of purchase feed
- Family labour vs. hired labour farms

The **result** of this clarification procedure could look like this: We go for a farm with a mixed system of cow-calf and beef finishing enterprises. The farm runs a pasture based, capital and labour extensive system. This typical farm in region xyz has established a hired labour regime. This characterisation of the typical farm identified will be communicated to the network in order to allow a better understanding of the cost calculation and cost comparison as well as gross margin based analysis.

In a further step, the share of each production system in the total beef production should be measured or estimated. Annex 3 and 4 provide procedures, examples and results of this step for Germany and France.

Products and types of animals to be included in the calculation

The question is whether all animal categories producing meat should be taken into account or only those which are kept with the explicit purpose to be finished. The categories can be distinguished as follows:

- Group1: Finished cattle: Bulls, Steers, Heifers, Cows, Calves
- Group 2: Other cattle producing meat: Cull breeding bulls, cull heifers, cull cows

For the time being, only animals from Group 1 are considered in the ***agri benchmark*** Beef Network. The main reason is that the main economic purpose to keep animals from Group 2 is not producing beef but producing milk or calves. Consequently, the beef produced by these animals is a by-product of the main production of milk and calves. These by-products are reflected in the dairy and the cow-calf enterprises.

7 Define the farm sizes of the typical farm(s)

Once the relevant type of farms producing beef and the respective production systems are identified, a decision regarding the farm size of the typical farm has to be made. **Size** in the curse of this paper shall be measured as follows:

- in beef finishing: **total number of cattle sold** per year
- in cow-calf production: average annual **number of suckler cows**

Following there is a list of issues that must be addressed when defining typical farms and collecting their data. We should be aware that due to the voluntary participation in ***agri benchmark*** we will – irrespective of the specific sampling rules – probably get a **bias** towards farms with above average size, management and performance.

Further, we should make the **position of our typical farms** in the total farm population transparent. How many farms are in the same size category and how many are larger or smaller than the typical farm? This can be done by using data of the farm population (which will usually not be available to the detail required) or using representative random samples providing key indicators to measure the frequency of certain farm types and sizes (like the Farm Accountancy Data Network of the EU).

7.1 Different farm sizes and different production systems

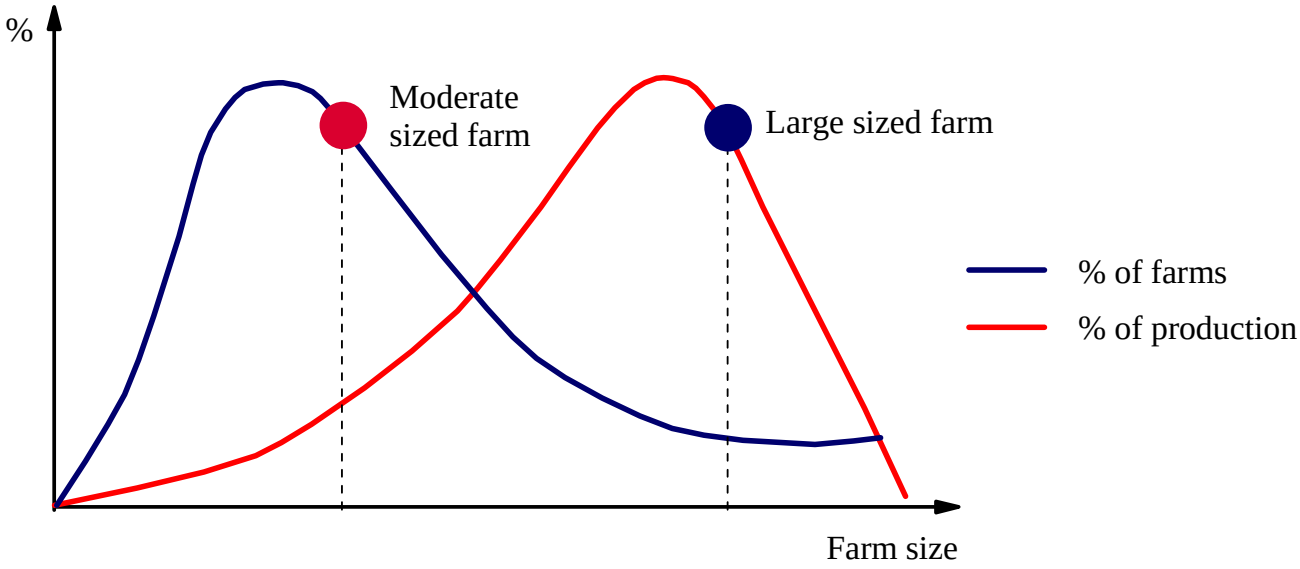
As time and resources are usually limited, it is not always possible to reflect all farm sizes and production systems in a region. Based on the experience of ***agri benchmark*** work, the following recommendations can be given:

- In a region with **minor differences between production systems** (for example in the Buenos Aires Pampa region in Argentina), **two different farm sizes** with the same production systems should be chosen. One farm should have a moderate size (usually slightly above average), the other farm should have a large size. This should be reflected by the fact that the farm belongs to the 20 % largest farms of the whole farm population. Given the typical distribution of farm size classes (many

small farms with relatively little share in production and few large farms with relatively high share in production, see Figure 3), this allows to reflect a large number of farms and a major share of production. Further it allows showing size effects.

- If possible, ***agri benchmark*** uses **regional statistics** regarding farm size distribution to assist the definition of appropriate farm sizes. It is obvious that the availability of reliable statistical data is a precondition for this step. Problems occur in parts of Central Europe, in Eastern Europe as well as in some countries in Asia and the Southern Hemisphere.
- In a region where a) size differences are either not pronounced or appear to be of less relevance for the results and b) there are significant differences in production systems (e.g. intensive and low-input systems), two farms of rather the **same size** reflecting the **different systems** should be chosen.

Figure 3: Farm size distribution and selection of typical farm sizes



Basis: All farms in a region

Source: Own illustration

7.2 Management, performance and yield levels

The typical farm should have an **average level of management**, this allows us to draw conclusions regarding the **bulk of the output** generated in a given region.

In order to explore the **potentials of a region/country** we strongly recommend to add one large farm with **top management** to the set of farms, if possible. The definition of top management is based on the economic success. The top management farm should belong to the top 10 % performers in terms of economic success. Economic success should be measured in terms of profit. If this information is not available, gross margins or even productivity measures can be used as a proxy.

These additional farm data from a producer which probably will dominate in future tells us a lot about the perspectives of a region in the respective global beef sector. The standards these top farmers realise today provide some inside view into structures and procedures (especially when data for the production system are available as well) which are technically possible when limitations caused by average management are lifted.

7.3 Number of farms required per country

The question of how many typical farm models are required to represent the beef production of a country given is frequently asked. In quantitative terms, there is no general answer to this question. Own experience from the ***agri benchmark*** Dairy Network in Germany indicated **diminishing returns of knowledge and discoveries** with increasing typical farm numbers.

In order to allow participation in the global ***agri benchmark*** analysis three farms are defined to be the standard: one average farm and one large farm both with average management and one large farm with top management.

Beyond this general rule the number of farms required per country mainly depends on

- Diversity of **production systems** (natural conditions, economic conditions, infrastructure conditions) – usually the more diversity the more farms required.
- Diversity of **farm size structure** – usually the more diverse the more farms are required.
- **Size** of the country – usually the smaller the country, the less farm types required.
- On the other hand, very big countries with a great variety of farming systems might be **subdivided into different regions**, to be probably required in the U.S., Brazil, Russia, China and Australia.
- **Regional level of analysis** – usually the more international, the less farms are required (usually 2-4 farms per country, exceptions see previous point).
- **Type of analysis** you perform – usually the more farm adjustments you analyse the more farms you need.
- **Financial resources** to set up and maintain (!) a network of typical farms in a country (feasibility)

The experience so far revealed that establishing a national network of typical farms in each country is the best way to get a more detailed differentiation of production systems and a higher number of farms. Based on the national network a procedure with the ***agri benchmark***-centre to select a number of farms from your national network for the international comparisons must be implemented to ensure the selection of the most relevant farm types for the international comparison.

7.4 Minimum-standards to define typical farms

In case statistics and resources to define typical farms are not available, a minimum criteria-list is defined here to allow the first steps in defining a typical farm.

1. Select the **region** with the **highest importance** of beef production in terms of volume produced.
2. In the region identified, select the **production system** with the highest share in regional beef production.
3. Select the **farm size** that produces the highest share of beef within the production system identified.
4. In any case, try to make **transparent** where on the **distribution** the typical farm sits (in the sense of points 6.1 and 6.3).

It is obvious that this procedure must be revised over time to improve accuracy and relevance of the data.

8 Data collection and updating

Data collection is done together with a local advisor and farmers knowing the region, the farms and the production systems. ***agri benchmark*** uses the so-called **'panel'** consisting of the responsible scientist, an advisor and one to six farmers. The panel is a round table meeting where all required farm data are collected based on a **standard questionnaire** available in 11 languages and used in all ***agri benchmark*** countries. The panel creates a **consensus** on each figure to properly describe how a typical farm would look like. The most frequent question raised in the panel is: **'Can this figure be considered typical for the type of farm we want to describe?'**.

Depending on the aim of the analysis, there are different intensity levels of farmers' participation:

- A so called **'pre-panel'** with only 1-2 farmers appears to be sufficient for status quo analysis of economic performance and production cost. Often it is also possible to base the typical farm data on individual farm data. In any case it is necessary (a) to identify and correct the particularities of individual farm data (to make individual farm data typical farm data) and (b) to make farm visits to two to three farms coming close to the typical farm.
- A '**full panel'** with 4-6 farmers is required when farm adjustments to changes in the framework conditions or farm strategies are to be discussed and defined. The main reason is that probably more options to act can be captured with a larger group. For this purpose, the data and the analysis derived from the pre-panel can be used as a basis for discussion.

In any case, the farmer involved have to run farms themselves which are similar to the envisaged typical farm.

The **panel procedure is strongly recommended** because in mid-term perspective existence and experience with a full panel will allow ***agri benchmark*** to fully benefit from

our interaction with the farming community and hence to come to up-to-date projections. However, in case a full panel is not manageable, a **pre-panel is a prerequisite** for any farm data that enters into the ***agri benchmark*** network. Whenever this was not the case in the past, the updating of farm data has to be based on a pre-panel at least.

Once the data are collected, they are **computed** with the analysis tools used in ***agri benchmark*** (mainly the simulation model TIPI-CAL) and results are returned to the panel and the advisor. This process is repeated until the panel agrees on the results obtained. At the end of this process there is a typical farm model.

In a final step the results have to be confronted with results from other economic analysis, for example by comparing the whole-farm profit of the typical farms with representative survey results. By doing this cross-check we can make sure that our calculation and the selection of the typical farms are in line with other scientists' results.

Updating of typical farms must be done annually according to changes in prices and productivity levels. Updating (= projecting the farm into the next year) is be done in two different ways:

1. Prices for inputs and outputs of the farm as well as yield increases reflecting the usual technical progress are updated annually. This is be done by using regional or national statistics on price and yield developments. **Indices** are calculated and the first year's values are indexed to achieve the current year prices and yields. This kind of update can be done by the scientists involved.
2. Depending on the speed of **structural change** and the extent of **technical progress** a complete update of the entire farm data set is necessary. Usually such an update has to take place every 2-4 years.
3. In case the updated typical farm is not derived from an existing former one but is a totally new one this has to be communicated to the ***agri benchmark*** Center in order to manage respective data in time series analysis. In any case the updated farm reflecting a change in size has to be documented to the network by using a new farm code.

9 Advanced studies based on typical farms

Up until now is has been assumed the purpose of the selection process is to contribute standard data to the ***agri benchmark*** network, focusing on competitiveness and potentials. However, the concept of typical farms and the respective model TIPICAL is able to tackle a number of other analytical issues. A selection of these other issues is displayed in Figure 4.

Figure 4: Analytical questions suitable for typical farm based methods

Type	Purpose	Farm
1	Income or social problems of farms	• Small family farms· • Commercial farms with cash problems
2	Policy analysis	• Farms mainly affected by policy under analysis
3	Farm strategy analysis	• Reactions of farms that are faced with new technological or organisational options
4	Production potential of regions / farms	• Non-typical farms with features indicating substantial future growth in output

In these cases selection of relevant farms has to be made in a different way. Suppose a study on the competitiveness of a new harvestor has to be made. Like in the standard routine for the farm selection process the relevant region has to be identified. Regarding the size of the farm the “average” criteria probably won’t work because such a farm will usually not buy such technology.

On the other hand for Type 2 kind of project the spatial distribution and the selection of a certain region might be of less relevance in case the specific policy under review is not linked to certain crops or products.

For the Type 2, 3 and 4 analysis it might be appropriate to replace the animal numbers / inventories by number of farms with beef cattle, for example:

– **Number of beef farms as a percentage of total farms per region:** This indicator provides an idea of the relative importance of beef farms. It could help to define locations of typical farms if these face specific income problems or are mainly affected by policy changes.

– **Share of regions in the total number of beef farms in the country:** This indicator provides an idea about the relative cross-country regional importance of beef farming.

Annex

Annex 1
Indicator lists

Dairy farm	Crop farm	Beef finishing farm	Cow calf farm
Whole farm level Fully specialised Combination with other enterprises *Crop* *Beef fattening* *Cow calf* *Pig production* *Other* Herd size Labour organisation *Mainly family labour* *Mainly paid labour* *Extent contractors used* Capital input *Old or new buildings* *Type of buildings* *Own machines or contractor* *Loan level*	**Whole farm level** Fully specialised Combination with other enterprises *Dairy* *Beef fattening* *Cow calf* *Pig production* *Other* Acreage Labour organisation *Mainly family labour* *Mainly paid labour* *Extent contractors used* Capital input *Old or new buildings* *Type of buildings* *Own machines or contractor* *Loan level*	**Whole farm level** Fully specialised Combination with other enterprises *Dairy* *Crop* *Cow calf* *Pig production* *Other* Herd size Labour organisation *Mainly family labour* *Mainly paid labour* *Extent contractors used* Capital input *Old or new buildings* *Type of buildings* *Own machines or contractor* *Loan level*	**Whole farm level** Fully specialised Combination with other enterprises *Dairy* *Crop* *Beef fattening* *Pig production* *Other* Herd size Labour organisation *Mainly family labour* *Mainly paid labour* *Extent contractors used* Capital input *Old or new buildings* *Type of buildings* *Own machines or contractor* *Loan level*
Enterprise level Natural conditions *Soil type* *Climate* Breeds Own replacement Stocking rate Milk yield Extent purchase of feed Feed base *Pasture* *Silage and hay from grass* *Other silage and hay* *Grains and others* Sale of milk *Domestic/Export* *Direct sale to consumer*	**Enterprise level** Natural conditions *Soil type* *Climate* Land use *Cereals* *Feed grains* *Oilseeds* *Protein plants* *Potatoes and sugar beet* *Permanent crops* *Industrial plants* Intensity of means of production *High intensity* *Low intensity* *GMO* Tillage systems *No till* *Minimum till* *Ploughing* Yields Sale of crops *Domestic/Export* *Sold at harvest or storage* *Direct sale to consumer*	**Enterprise level** Natural conditions *Soil type* *Climate* Breeds Origin of animals *Dairy* *Cow calf* Category *Bulls, Steers* *Cows, heifers, calves* Stocking rate Final weights Daily weight gain Extent purchase of feed Feed base *Pasture* *Silage and hay from grass* *Other silage and hay* *Grains and others* Sale of beef *Domestic/Export* *Direct sale to consumer*	**Enterprise level** Natural conditions *Soil type* *Climate* Breeds Own replacement Stocking rate Weaning weights Weaned calves per cow and year Extent purchase of feed Feed base Pasture *Silage and hay from grass* *Other silage and hay* *Grains and others* Destination of the weaner calves Slaughter *Finishing* *Breeding* *Live export*

Source: Own elaboration

Annex 2
Beef and dairy countries

Finished beef cattle have their origin either in the dairy herd or in the cow-calf herd. The first step is to identify which proportion of finishing animals comes from the dairy herd and which proportion comes from the cow-calf herd. In most cases, statistics do not indicate the origin of the cattle. As a consequence, the number of dairy cows and suckler cows or the total dairy herd and total beef herd can be taken as an indicator.

Number of dairy and beef cattle/cows and share of beef cattle/cows in total cattle/cows

	Dairy cows/ herd	Beef cows/ herd	% Beef cows in total
Uruguay	412.732	3.688.268	90%
Argentina	2.243.000	19.740.000	90%
Australia	3.120.000	23.600.000	88%
China	8.300.000	59.000.000	88%
Canada	1.077.000	5.021.000	82%
Brazil	34.252.681	132.769.839	79%
South Africa	2.020.000	7.600.000	79%
USA	9.075.000	31.000.000	77%
Colombia	2.735.000	7.385.000	73%
South Korea	296.000	543.000	65%
Spain	1.156.000	1.974.000	63%
France	4.413.000	4.101.000	48%
Ireland	1.238.000	1.121.000	48%
New Zealand	5.161.589	4.494.678	47%
UK	2.334.840	1.829.460	44%
Japan	960.000	640.000	40%
Austria	621.212	252.792	29%
Germany	4.283.900	663.400	13%
Czech Rep.	547.500	67.300	11%
Hungary	380.400	25.000	6%
Pakistan	23.656.000	1.479.000	6%
Poland	2.527.000	45.700	2%

Source: National Statistics, USDA

Annex 3
Measure the relative importance of the farm types

A. Total live weight sold

This would be the appropriate unit if only finished animals were measured. Taking intermediate animals like weaners and backgrounders (stores) into account, the shares of the different steps in the production chain will be over- or underestimated. The error increases with the increase in the share of intermediate animals and their weight in the total weight of the final product, respectively.

Example: A weaner calf from the cow-calf herd will be counted once when it is sold from the cow-calf enterprise at let's say 230 kg LW. This calf will be transferred to a backgrounder who takes it to a weight of 450 kg LW. It will then be sold to feedlot and finished and sold at 550 kg. The total weight sold is 230 + 450 + 550 = 1,230 kg and the shares of each step of the chain 19 %, 37 % and 44 %, respectively. However, there were only 550 kg LW produced.

B. Total live weight gained

This appears to be the appropriate unit to overcome the problem from above. Taking the example from above, the calculation would be as follow (case A):

	Case A Calf weight at birth included		Case B Calf weight at birth excluded	
Weaner calf	230 kgs	42 %	230 – 45 = 185 kgs	37 %
Backgrounder calf	450 – 230 = 220 kgs	40 %	220 kgs	44 %
Feedlot	550 – 450 = 100 kgs	18 %	100 kgs	20 %
Total	550 kgs	100 %	505 kgs	100 %

One could additionally deduct the birth weight of the calf from the weaner calf if one does not consider the calf as adding weight to the final weight. Assuming a birth weight of 45 kgs this would lower the total weight gained to 505 and alter the percentages as shown in the table (case B).

C. Total live weight sold divided by the average live weight kept on the farm (France)

The French Institut de l'Elevage developed a sophisticated system to classify different types of beef producing farms. This system requires very detailed data from the population of farms or from a representative survey of farms. The basic classification into farm types is done by using standard gross margins, then further differentiating by forage base (in case of dairy farms) and the destination of male cattle (in case of cow-calf farms) and finally calculating relations between animal categories and using additional variables such as:

- land use broken down into single crops
- composition and size of herd
- labour intensity
- intensity level in forage and livestock production
- amount of production rights, quota of the farm
- organisational structure (joint venture type), part-time farming
- age of the farmer and succession probability
- marketing activities
- activities in other para-agricultural enterprises (direct sale, tourism)

It is obvious that this kind of data is most likely not available in many countries.

Once the production systems are defined, further subdivisions can be made by breaking up the farm types into cattle categories finished and the origin of the cattle from dairy or cow-calf. The conclusions from above can also be applied on these subdivisions. A complete list could look like in table 1 shown in the Annex

Example: Germany

For Germany, the representative FADN-date were used to make a first step in classification. The following steps were undertaken:

Male cattle > 1 year were chosen as an indicator for beef finishing farms. For the year 1999, the total number of male cattle > 1 year, dairy cows and suckler cows from the sample were aggregated to regional level applying regional aggregation factors. The result was compared with regional statistics of cattle inventories. It could be shown that the sample under- or over-represented the total cattle number as follows:

- *male cattle > 1 year*: average for Germany 61% (min 43%, max 90%)
- *dairy cows*: average for Germany 92% (min 77%, max 149%)
- *suckler cows*: average for Germany 45% (min 30%, max 101%)

This means that the accuracy of the FADN data set is limited, particularly for bull finishing and cow-calf operations. Within the FADN data set, a total number of 3.699 farms keep male cattle > 1 year. For the FADN-sample, the relative share of the enterprise combinations from above were determined and are shown in the table.

Enterprises	Stratification indicators Farms with …			% share of male cattle > 1 year	
	No. of male cattle > 1 year	No. of dairy cows	No. of suckler cows	Farms %	Cattle %
Beef finisher without cows	> 1	0	0	14 %	14 %
Dairy farms + beef finishing	> 1	> 1	0	67 %	32 %
Cow-calf farms + beef finishing	> 1	0	> 1	12 %	18 %
Dairy + cow-calf farms + beef finishing	> 1	> 1	> 1	6 %	37 %

Source: Own calculations based on FADN data for Germany

Annex 4

Beef production systems in France

Farm type	Most important region (départements)	Main breeds	Share in total beef production	Particularities	Statistical classification
Specialised finisher					
Specialised finisher (engraisseur specialisé)	"Le Grand Ouest": Normandy, Brittany, Pays de la Loire East and North Crop areas: Nord, Bassin parisien, Lorraine, Alsace South West France	Charolais Limousin Cross-breds (beef x dairy breed dual-purpose breeds)	2%	Mixted crop and beef fattening systems with lots from 80-100 to 200-300 bulls intensive fattening of young bulls (dairy or cow-calf origin)	n.a.
Beef systems in dairy farms					**n.a.**
Dairy + intensive beef production (young bulls with or without suckler cows)	Grand Ouest and North and North East (like bull finishers)	Holstein Normand Charolais	17%	Young bulls are finished, intensive, origin of young bulls from dairy enterprise or beef calves from separate cow-calf enterprise	n.a.
Dairy + beef on grassland (steers and/or suckler cows)	**Steers:** Normandy (Pays d'Auge, Ardennes) **Suckler cows:** Grand Ouest, Nort East	Holstein Normand Charolais Limousin	15%	Steers are finished on grassland (male dairy calves or beef calves from additional cow-calf enterprise)	n.a.
Beef systems in cow-calf farms					**n.a.**
Veau sous la mère (milk calf)	South-West of Central Massif (Corrèze, Dordogne) South-West France Pyrennees	Limousin (42%) Blonde d' Aquitaine (15%) Cross-breeds and dairy breeds (32%)	1%	5 month old calves which are finished through suckling	02=< slaughter calves/suckler cow< 1
Naisseur (cow-calf producer)	Central Massif Pays de la Loire	Charolais (33%) Limousin (25%) Blonde d' Aquitaine (18%)	16%	Male animals sold as weaners (mainly Italian and Spanish export market), heifers and cows finished	No. BSPB/suckler cow<0,2
Naisseur mâles primés (weaner producer with first bull special premium)	North Massif Central plain (Allier) and mountaineous zones in Central Massif (Cantal, Aubrac)	Charolais (64%) Limousin (13%) Salers / Aubrac and Gasconne (13%)	14%	Large herds (50-65 suckler cows) compared to the country's average (20-30), good forage supply	No. BSPB/suckler cow>=0,2
Naisseur engraisseur taurillons (weaner producer + young bulls)	Grand Ouest, mainly Pays de la Loire Limousin	Charolais (46%) Limousin (30%) Cross-breeds and dairy breeds (12%)	13%	Large herds (50-65 suckler cows) compared to the country's average (20-30)	finishing capacity for young bulls/suckler cow>=0,2
Naisseur engraisseur boeufs (weaner producer + steers)	Normandy North Massif Central Nord-Ouest	Charolais (49%) Limousin (8%) Cross-breeds and dairy breeds (34%)	3%	Finishing of steers on grass land, 30-32 month old, medium - large sized farms with low cattle density, partly label production or traditional production zones	male cattle => 2years/suckler cow>= 0,2

Source: Institut de l'Elevage (2003): L'Elevage bovin, ovin, caprin – lait e viande – au recensement agricole de 2000 – cheptels, explotations, productions

Annex 5
Summary steps to specify a typical farm

I. Identification phase (scientist + advisor)

Go strictly branch-wise (e.g. beef, dairy etc.)

Select important regions

Analyse regional farm structure

Define features of two or three typical farms

Crosscheck with population and/or survey data

II. Data collection phase (scientist, advisor, farmers)

Contact farmers who operate such farms („panel“)

Collect full set of economic and physical farm data

III. Processing and crosschecking phase

Compute results for the virtual typical farms

Cross-check with advisor (farmers); make improvements