LEI
WAGENINGEN UR

Quick scan developments dairy markets

for GDF-business partner BASF

Global Dairy Farmers/Global Dairy Research

Co Daatselaar
Alfons Beldman
Bram Prins

Table of contents

Introduction

BASF has asked the network Global Dairy Farmers (GDF), as one of the business partners in this network, to do a quick scan on developments in dairy markets given the following background.

Background

Reason

With the increasing consumption of milk and dairy products in some of the major developing markets and the fall of the quota system in the major milk producing region, Europe, milk producers are getting ready for the new opportunities. Simultaneously China, as a state controlled economy is publishing that new mega farms are being built to fulfill the production as outlined in the 5-year plan. Developments in other countries are not so obvious. However it is heard from India, Australia, Chile, Egypt, Russia and others that the number of high performing dairy cows under intensive husbandry and feeding conditions is increasing.

In order to fully understand how that change is impacting the business of business partners of GDF and possibly opens up new opportunities for the business partners, an accurate analysis of the actual status and the development process is necessary. In this analysis BASF asks for putting a specific focus on the development of the feeding options which are going to be built into the new farm structures.

Problem definition

What will be the global developments of the dairy markets? Where will growth in milk production take place? Connected to these questions are the developments in herd structures and feeding systems around the world.

Objectives

Getting insight in the global development of the dairy markets and adjacent topics as where growth will take place, the impact of animal welfare criteria and developments in herd structures and feeding systems.

Setup of the report

The following questions, asked by BASF, will be answered. These questions structure the report:

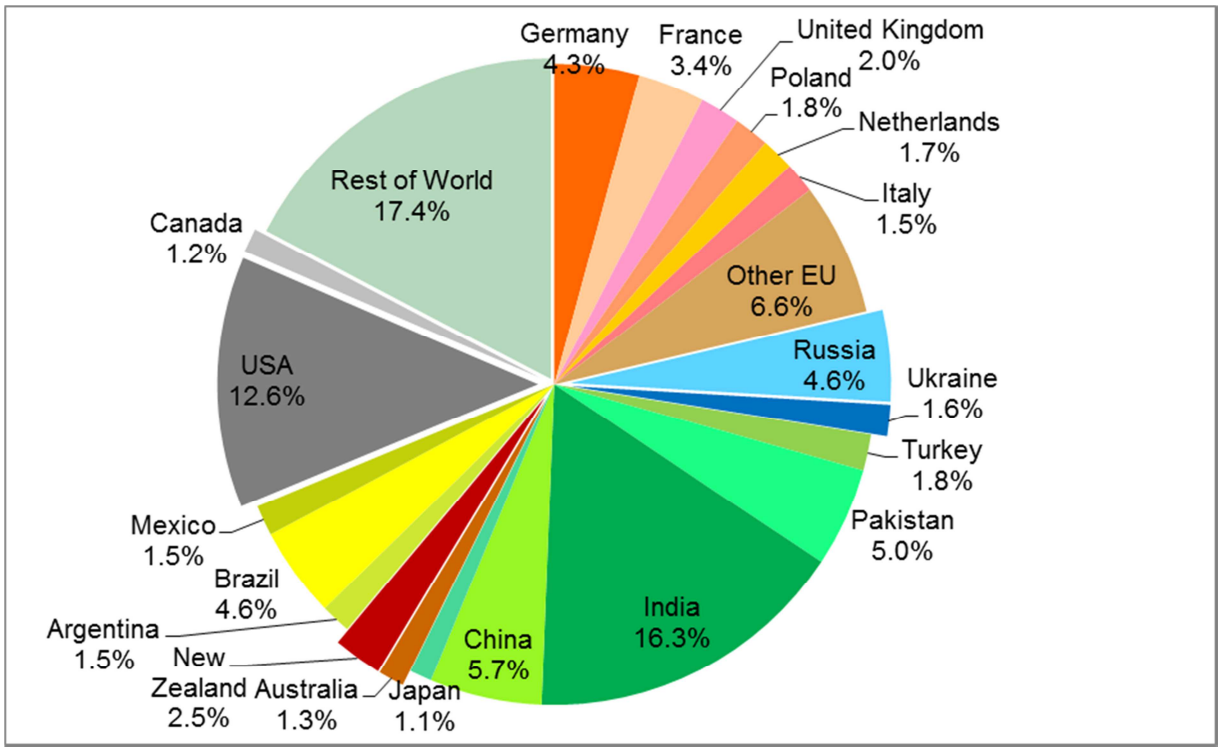
1. What will be the global development of the dairy market?
2. Which are the countries where growth in milk production will be seen?
3. What will be the impact of the animal welfare criteria, as they are evolving in most of the Western countries and as they are influencing BASF's way of doing business through the "Sustainability" standards?
4. How will the herd structures develop per country?
5. How will the feeding systems develop per country from today over the next 5 years?
    a. What will be the development of the share of cows which can be reached individually with specific feeds – e.g. via robots, parlour feeding or transponder feeding?

Each of the five next chapters will answer one of the questions above.

Global development of the dairy markets

Current shares of different regions in the worldwide milk production

Figure 1 shows the shares of different countries and regions in the worldwide milk production for the year 2010. Total worldwide milk production in 2010 is estimated at 692 million ton including million ton from buffalos.



Data source: www.faostat.org

Figure 1 Shares of different countries and regions in worldwide milk production in 2010: total 692 million ton including 93 million ton milk of buffalos

Table 1 shows the countries with a considerable share of their milk production from buffalos in 2010.

Table 1 Milk production from buffalos and dairy cows in countries with a considerable share of their milk production from buffalos in 2010

Country	Total milk prod (1000 t)	1000 ton buffalos	% milk Buffalos	1000 ton dairy cows	% milk dairy cows
India	112270	62400	55.6	49870	44.4
Pakistan	34716	22279	64.2	12437	35.8
China	39136	3100	7.9	36036	92.1
Egypt	5643	2725	48.3	2918	51.7
Nepal	1496	1067	71.3	429	28.7
Rest of World	498694	946	0.2	497748	99.8

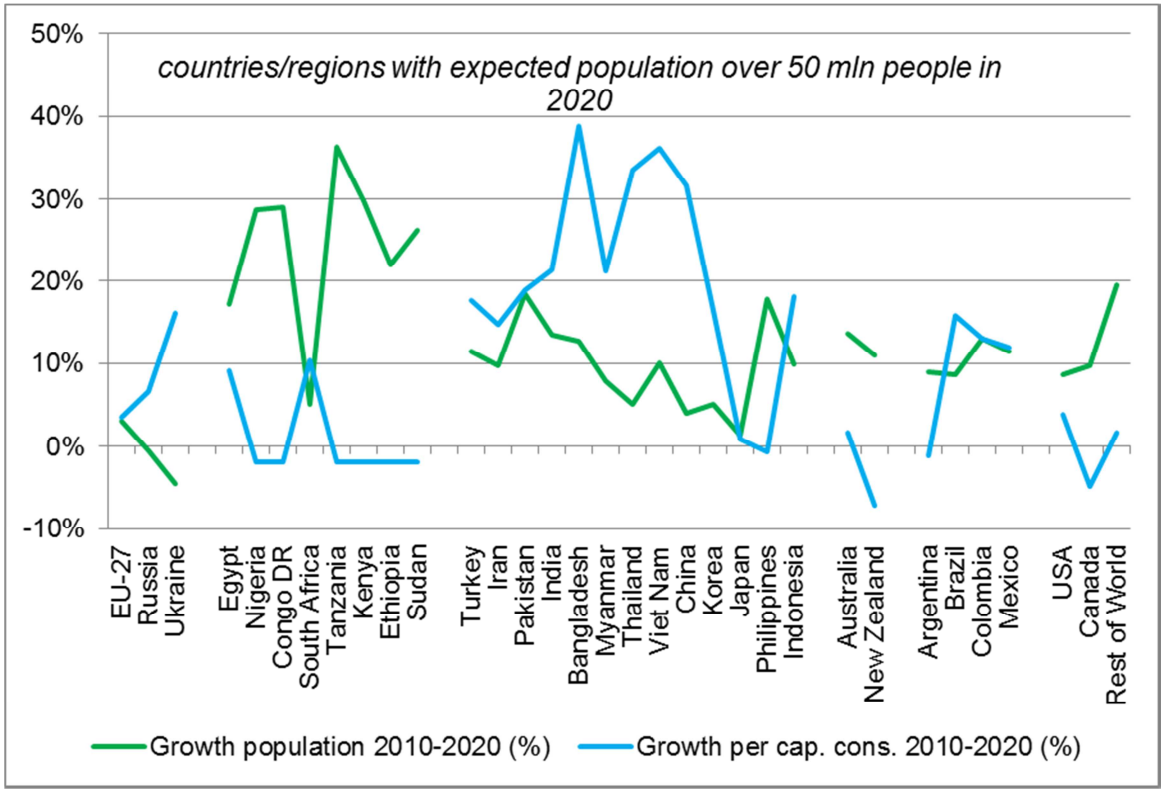
Data source: www.faostat.org

India, Pakistan, China, Egypt and Nepal are responsible for about 99% of the production of buffalo milk in the world which is estimated at 93 million ton in 2010. Of these five countries

the production of buffalo milk is bigger than that of cow milk in India, Pakistan and Nepal. India and Pakistan are the first and fourth milk producer in the world when adding the amount of buffalo milk to the amount of cow milk.

Change in population and per capita consumption of milk

Figure 2 shows the expected growth in the period 2010-2020 in population and per capita consumption of milk. Growth rates are given for those countries or regions where a population of 50 million people or more is expected for 2020. Countries with fewer expected people, except the EU-countries, are part of Rest of World.



Data source: www.faostat.org

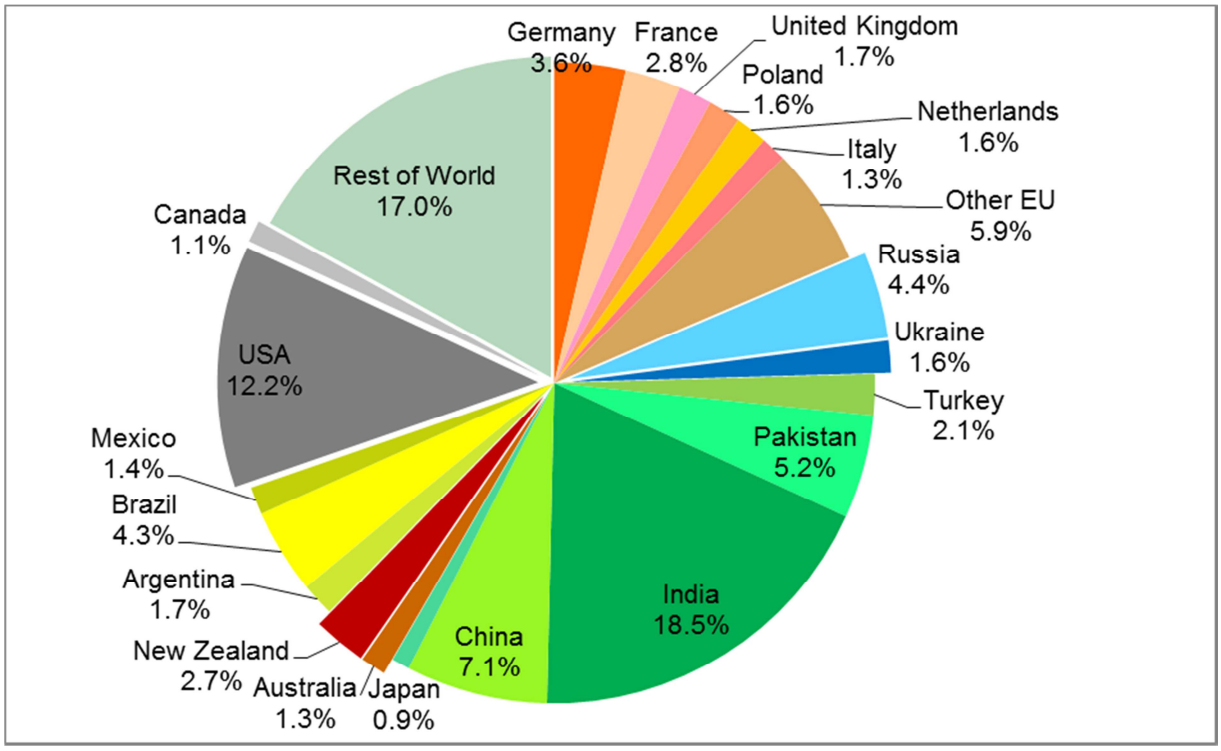
Figure 2 Growth in population and per capita consumption of milk in the period 2010-2020 for countries and regions with an expected population of 50 million or more in 2020

As figure 2 shows nearly everywhere both population and per capita consumption of milk grow in the period 2010-2020. Only in Russia and Ukraine the population is expected to shrink while the per capita consumption of milk is expected to decrease only in New Zealand, Canada and (slightly) in parts of Africa and Argentina. As a result of these growth rates worldwide milk production will grow considerably as will be outlined in the next pages.

Change in milk production between 2010-2020

Projected shares of different regions in the worldwide milk production

The OECD and the FAO have made projections for the milk production in 2020 in their outlook of 2012 (www.oecd.org). Total milk production is projected at 827 million ton (botch cow milk and buffalo milk), an increase of 1.8% per year. Figure 3 shows the projected shares of different countries and regions in the worldwide milk production for the year 2020.



Data source: www.faostat.org

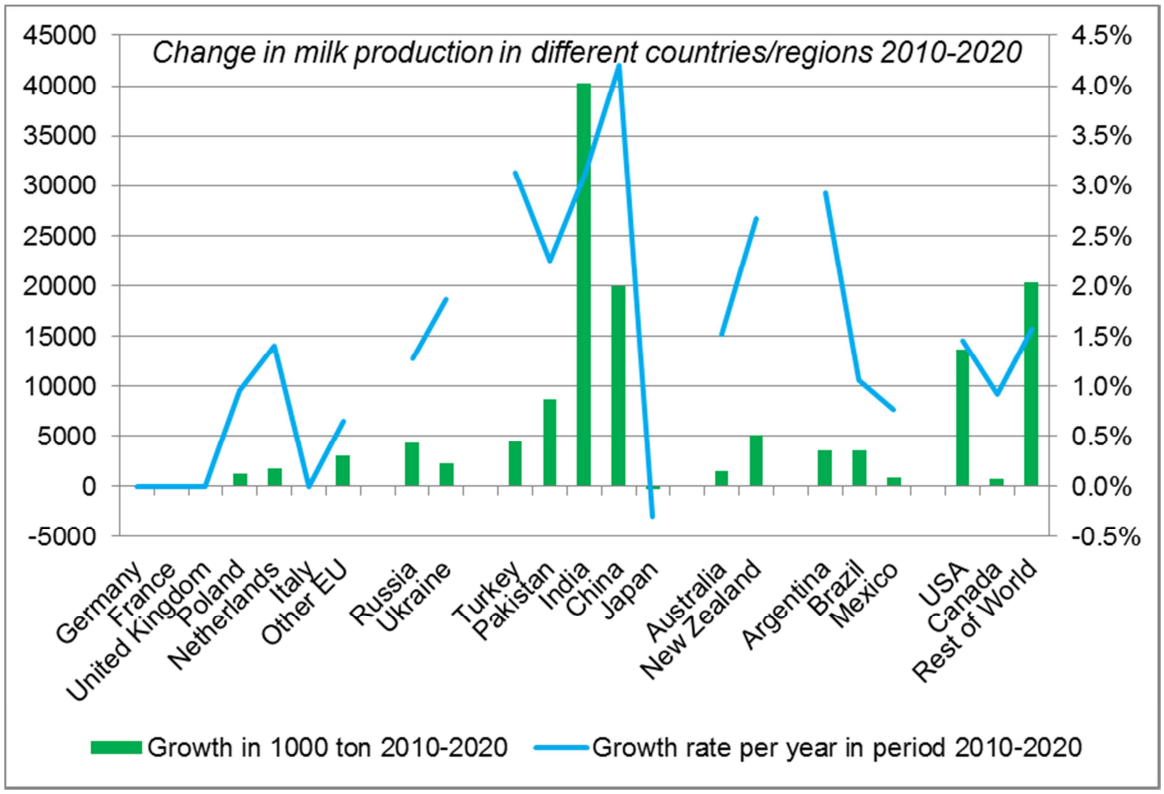
Figure 3 Projected shares of different countries and regions in worldwide milk production in 2020: total 827 million ton including 93 million ton milk of buffalos

When comparing the figures 1 and 3 different countries and regions like the EU, USA, Rest of World, Mexico and Brazil loose share in the worldwide milk production between 2010 and 2020. In absolute volume only Japan goes back as is shown in figure 4. Because the total milk production in the world is estimated to grow from 692 to 827 million ton between 2010 and 2020 countries or regions can both loose share and grow in absolute volume.

Figure 4 gives insight in milk production growth per country or region. Both the estimated growth in 1000 ton milk production between 2010 and 2020 and the growth rate per year in this period are shown. OECD/FAO does not distinguish between cow milk and buffalo milk in the projections: it is assumed that all growth comes from cow milk.

OECD/FAO makes projections for the European Union as a whole and predicts a growth of about 6 million ton for the EU. For some EU-countries projections on the milk production in 2020 are available: for Poland +1.23 million ton, for the Netherlands +1.75 million ton and for Ireland about +2 million ton. This results in a growth in milk production in the other EU-countries together of about 1 million ton. Some of those other EU-countries will decrease the milk production; especially this is expected for some Southern (Spain) and Eastern (Slovakia, Slovenia) European countries. But it is quite difficult to translate these expectations in

concrete figures. So we estimate a growth of zero for Germany, France, United Kingdom and Italy. With the already mentioned growth in milk production in Poland and the Netherlands figure 4 shows a growth in milk production in other EU-countries, among which Ireland, of 3 million ton.



Data source: www.faostat.org

Figure 4 Projected growth in milk production and yearly growth rate in different countries and regions in the period 2010-2020

India is expected to be the biggest grower in milk production in the period 2010-2020 as figure 3 shows. Of the total expected growth of 135 million ton India takes 40 million ton which is about 30%. China is the number two with 20 million ton. In yearly growth rate the sequence is just the opposite: China has the highest estimated yearly growth rate (4.2%) and India is the second with 3.1% growth per year. Argentina with 2.9% and New Zealand with 2.7% are the numbers three and four in yearly growth rate.
Except Japan, the EU as a whole has the lowest yearly growth rate (0.4%) of all shown countries and regions in figure 4.

Impact of animal welfare criteria

General

Within dairy farming there are a number of animal welfare issues:

- Grazing: there is some discussion if this is really an animal welfare issue but in some regions in the world this is (becoming) an important issue (discussion mainly in Western Europe with focus on Netherlands, Scandinavia and UK).
- Mutilations or surgical practices, like de-horning or tail trimming
- Use of hormones like BST.
- Mastitis: one of the main health problems for dairy cows is mastitis. This is also connected to food safety, because a lot of antibiotics are used to cure or prevent mastitis.
- Leg problems or lameness: the other big health problem for dairy cows are leg problems.
- Bull-calves: young bull calves are a by-product of the dairy farms. In some regions the young calves are killed shortly after birth. This is quite a discussion point in Australia, but also in the UK.

Table 2 Coverage of governmental non-organic animal welfare legislation related to different animal groups in selected third countries & trading partners with EU

	EU	CH	AR	AU	BR	CA	CN	NZ	USA
Legal Framework	Leg	Leg	Leg	VCoP Leg in states	Leg	VCoP Leg in provinces	Leg	Leg	VCoP
Calves	Leg	Leg	Leg	VCoP	Leg	VCoP	nA	MCoR Dairy cattle / bobby calves	VCoP
Dairy cows	Leg	Leg	Leg	VCoP	Leg	VCoP	nA	MCoR Dairy cattle	VCoP

EU = European Union, CH = Switzerland, AR = Argentina, AU = Australia, BR = Brazil, CA = Canada, CN = China, NZ = New Zealand
Leg = Legislation VCoP = Voluntary Code of Practice, MCoR = Mandatory Codes of Recommendations, nA = no answer
Source: Schmidt, 2010[1]

The current situation and outlook will first be discussed for Europe and afterwards shortly for the rest of the world.

Europe

Within the EU general standards have been defined for animal welfare (EU-legislation), with some extra rules in specific countries. The EU has no specific animal welfare standards for dairy cows as opposed to e.g. pork or poultry production.

Grazing

Mainly the Scandinavian countries have extra national requirements for animal welfare for dairy cows. In Norway, Sweden and Finland there is legislation in place that makes grazing obligatory. The goal of this legislation is to improve animal welfare by grazing (so not from a

[1] Schmidt, Otto and Rahel Kilchperger. Overview of animal welfare standards and initiatives in selected EU and third countries. FiBL, April 2010

point of view of landscape or image of the dairy sector). The rules on grazing are different within the Scandinavian countries differing from about 2 – 4 months grazing. Actually the cows still get quite a big part of their feed as silage or concentrates. In the Netherlands the total sector (processors and farmers' unions) have set targets for grazing to keep it at the same level as in 2010.

Mastitis and leg problems

In the Netherlands the total dairy sector (processors and farmers' unions) has set as target to improve the longevity of the dairy cows. In the explanation of this goal it is mentioned that the focus should be on reducing mastitis and leg problems to achieve this goal.

Standards

The standards for animal welfare are probably highest in the Scandinavian countries. In Sweden standards have been developed for accommodation (e.g. number and size of lying boxes and feeding facilities), calving, grazing, drinking, breeding and mutilation/surgical practices. In many European countries the industries have developed their own standards on animal welfare which are more detailed and more strict than the national or general EU standards. Some examples of these standards can be found in the appendix.

Outlook

Animal welfare will gradually become more important within Western Europe. Standards for animal welfare will gradually be implemented for the dairy sector. The NGO's play an important role in this issue. NGO's like WSPA (World Society for Protection of the Animal) and Compassion in World Farming are addressing animal welfare problems within the dairy sector and are trying to find ways to get EU-standards for animal welfare for dairy cows. WSPA is campaigning for grazing of dairy cows in several European countries (e.g. Netherlands, UK, Denmark, Germany, Sweden). The strategy of WSPA is to create awareness with consumers and use that to influence the dairy industry (e.g. cheese producers) to work with milk of grazing cows. The other side of this strategy is the shaming strategy, that is to publish names of processors or retailers that sell fresh dairy products or cheeses from non-grazing cows.

Other regions

USA

The main animal welfare topics in USA are tail trimming or tail docking, lameness and tethering of calves. Special about the USA is that some NGO's like PETA have a strong focus on the large dairy farms. They make undercover videos of abuse of animals and publish them on the internet. The dairy sector is working with codes like the National Dairy Farm program supported by a large group of processors. This program has defined best practices. This is a nation-wide with third-party verification.

New Zealand and Australia

New Zealand has a national animal welfare code for dairy. This contains a large list of best practices on different topics, food, feeding and rearing calves, water, shelter, farm facilities, housing, stock handling, milking, health etc. A special focus point compared with other countries is BCS or body condition score. Because of the New Zealand grassland based farming system the risk is quite high that cows loose too much condition. New Zealand is intensifying dairy production which means that more cubicle barns will be built. This will probably lead to new animal welfare standards. Australia also has a national animal welfare code. An important point for discussion in Australia is the bull or bobby calves. A lot of them are killed shortly after birth.

South America and Asia

Animal welfare is not a major issue. There is no specific regulation from the national governments. Internationally operating processors will however introduce international standards for animal welfare.

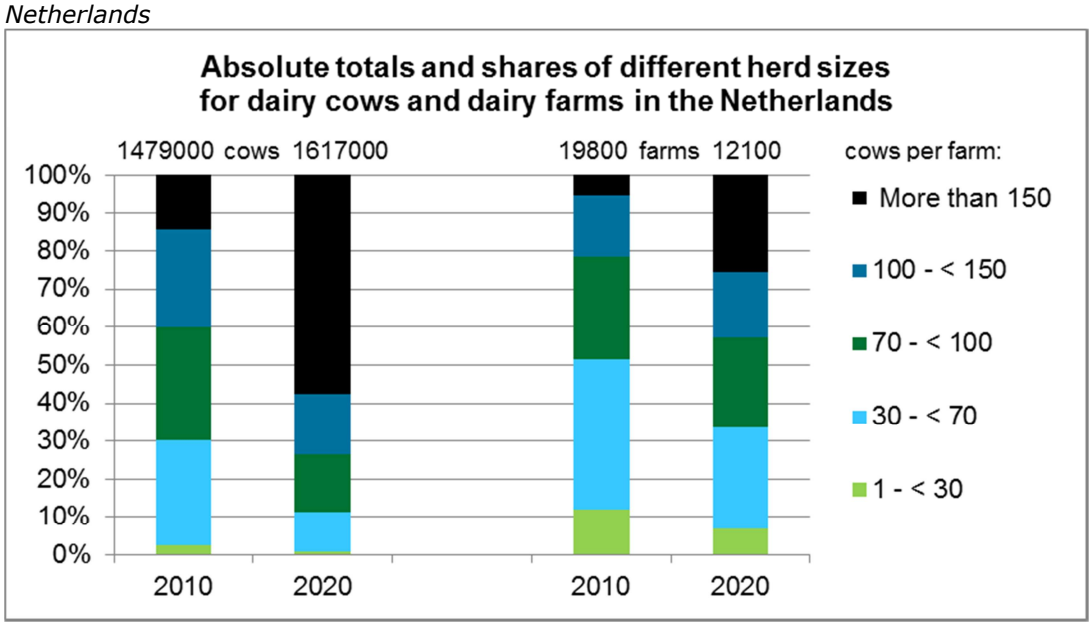
Development herd structure in some countries

Current (2010) and projected (2020) herd structures in some countries
The next graphs show the distribution of dairy cows and dairy farms for the years 2010 and 2020 in some major milk producing countries. The figures of 2010 are derived from different sources (OECD/FAO, IFCN, Dutch Dairy Board (PZ), Dairy Australia, DairyNZ, USDA). The figures for 2020 are estimated, mainly based on the projections of OECD/FAO. Supporting information for these estimations originates from USDA, Agricultural Economics Research Institute (LEI Wageningen-UR, for the Netherlands) and the Irish government (Food harvest 2020, for Ireland). So the figures for 2020 have to be considered as a best professional judgement. Models at the micro-level (farm level) are hardly available (and if only for a few countries) and also rely on assumptions (especially in the development of the number of farms).

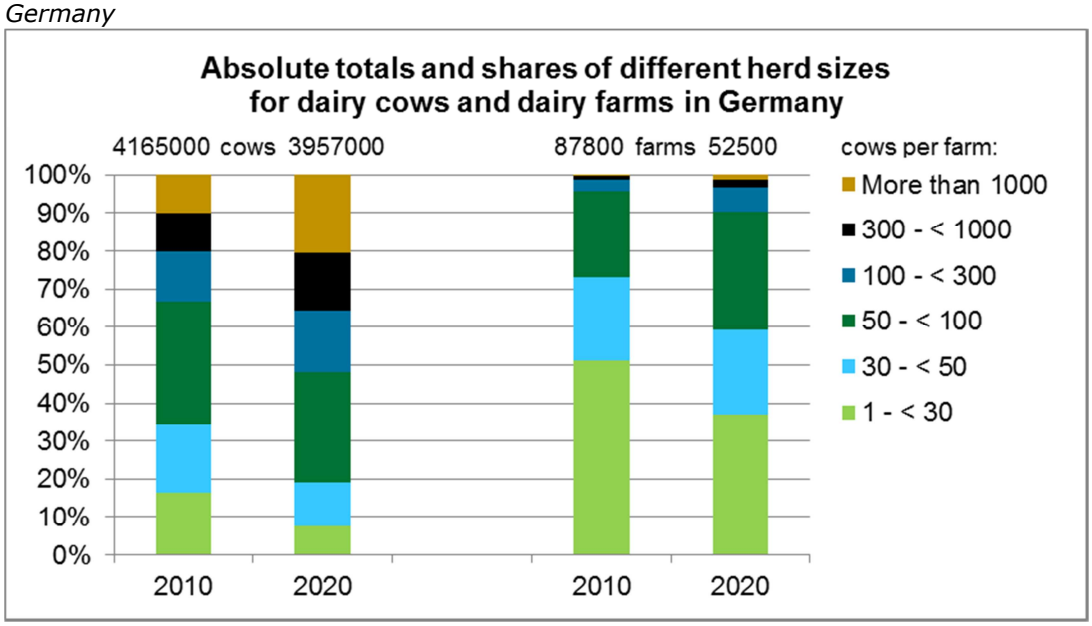
The growth in milk production can come from more dairy cows and/or more milk per dairy cow. In most cases it will be a mix of these two factors: only USDA explicitly addresses more total milk production to only more milk per dairy cow. In countries like the BRIC (Brazil, Russia, India and China) the share of more milk per cow will be bigger than in a country like Denmark or the Netherlands: in the latter countries more dairy cows will contribute more to a growth in milk production than more milk per cow. This is taken into account, as good as possible, in the projections.
Because of the different used data sources and the current herd size distributions the classes with the highest dairy cow numbers per dairy farm (300-<1000, more than 1000) are not always shown but included in the preceding class.

It is expected that the number of dairy farms will decrease considerably in many **EU-countries**. In most EU-countries the decrease will be around 5% per year. In Ireland the decrease will be smaller because of the high expansion of total milk production: some beef farms will change to dairy farming. In countries with many very small farms like Poland the decrease in the number of farms will be bigger unless the fact that Poland is expected to have some more dairy cows in 2020 than in 2010.

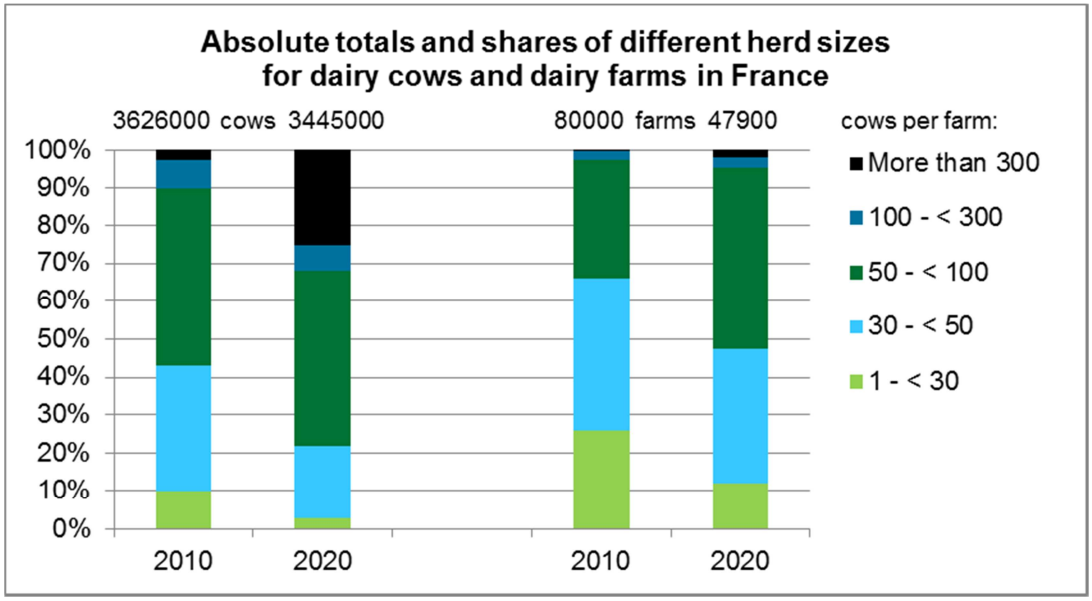
Netherlands



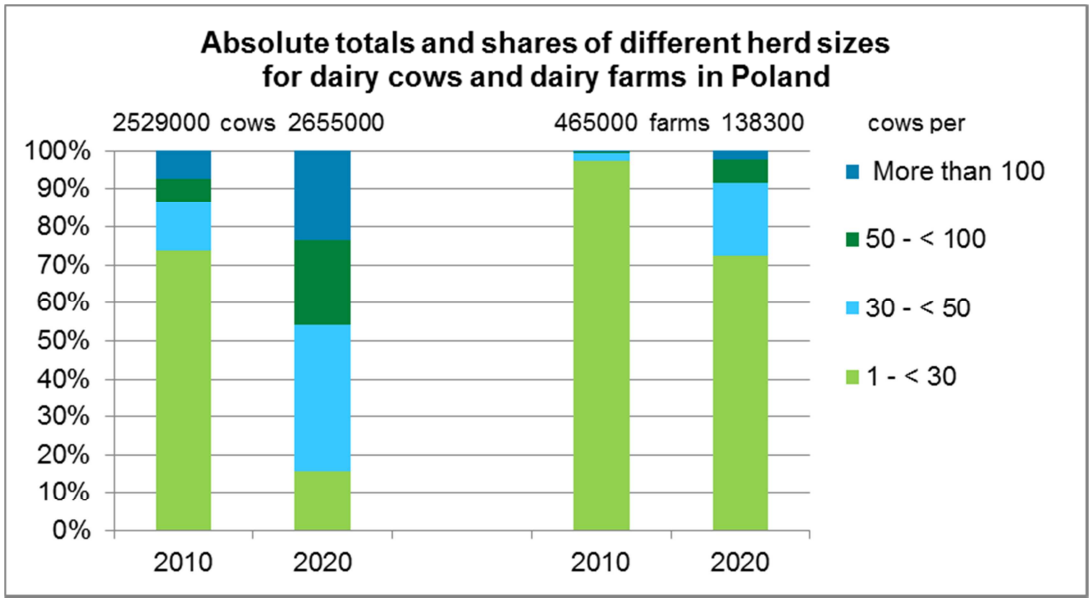
Germany



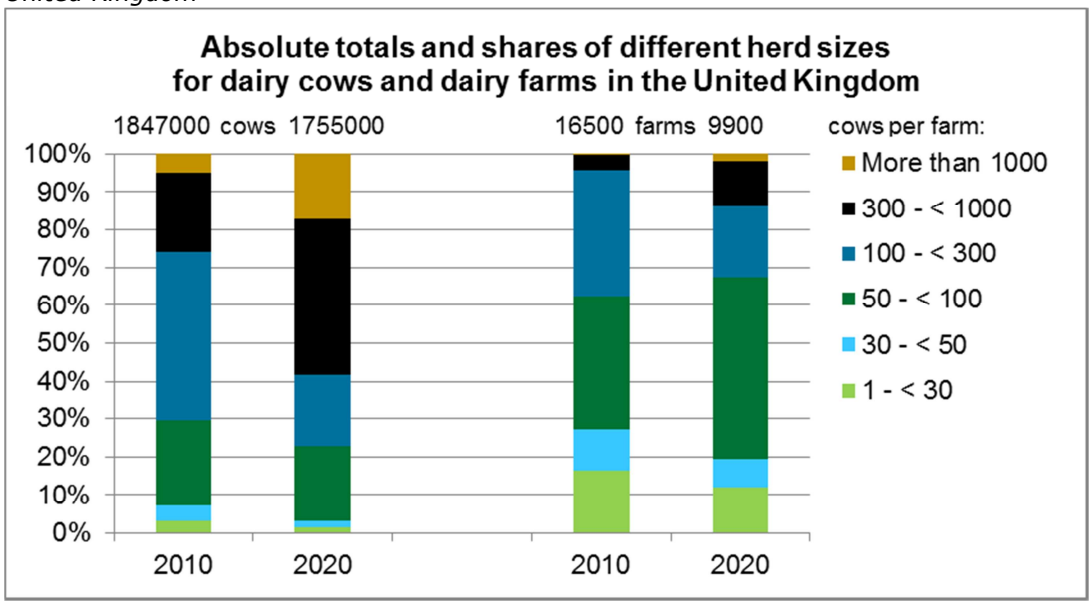
France



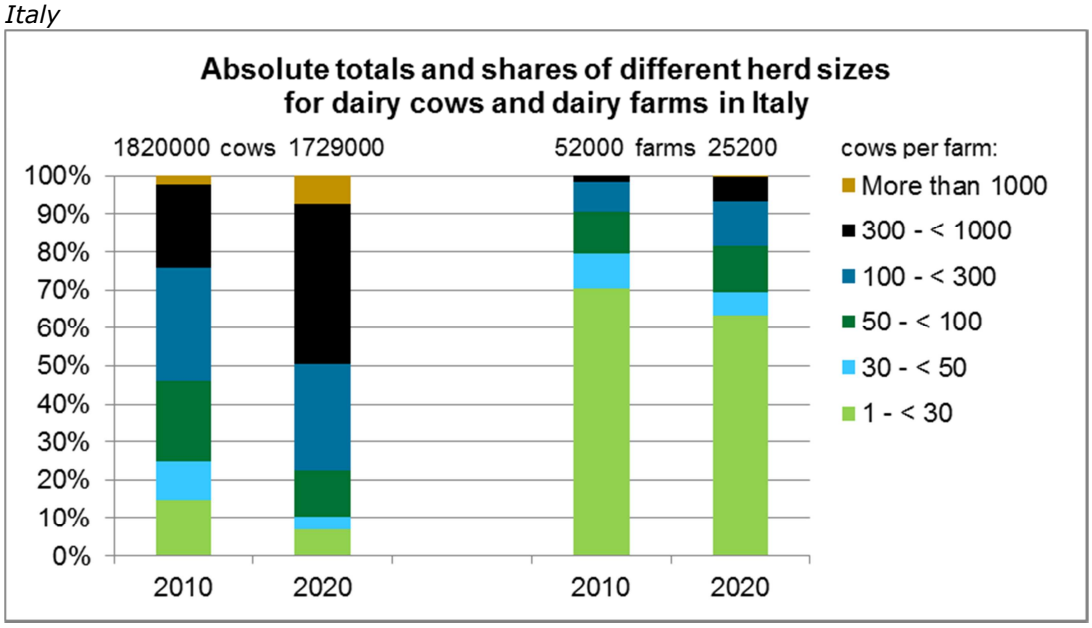
Poland



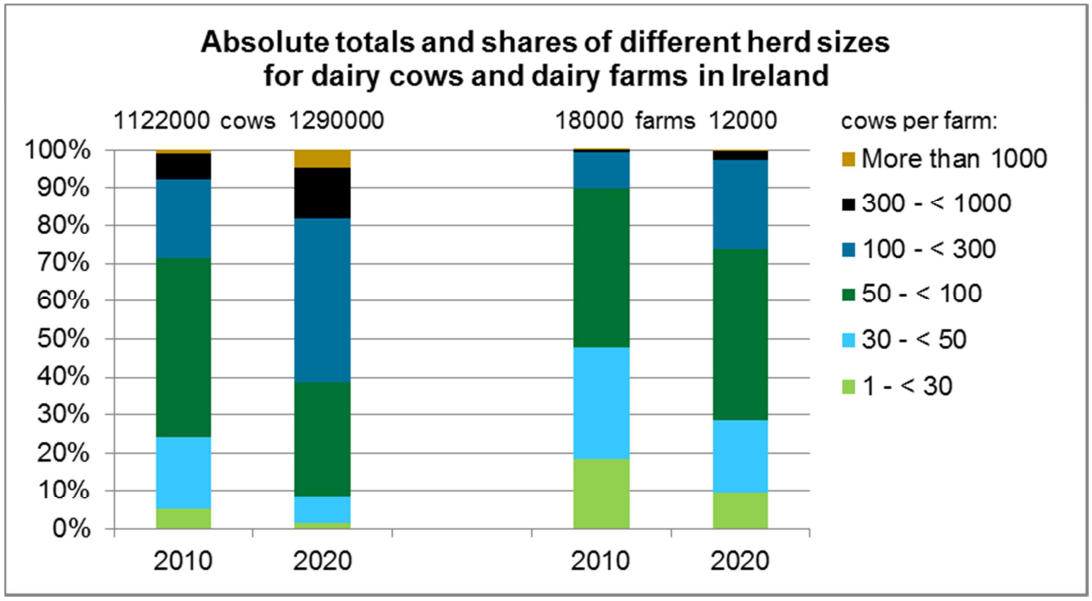
United Kingdom



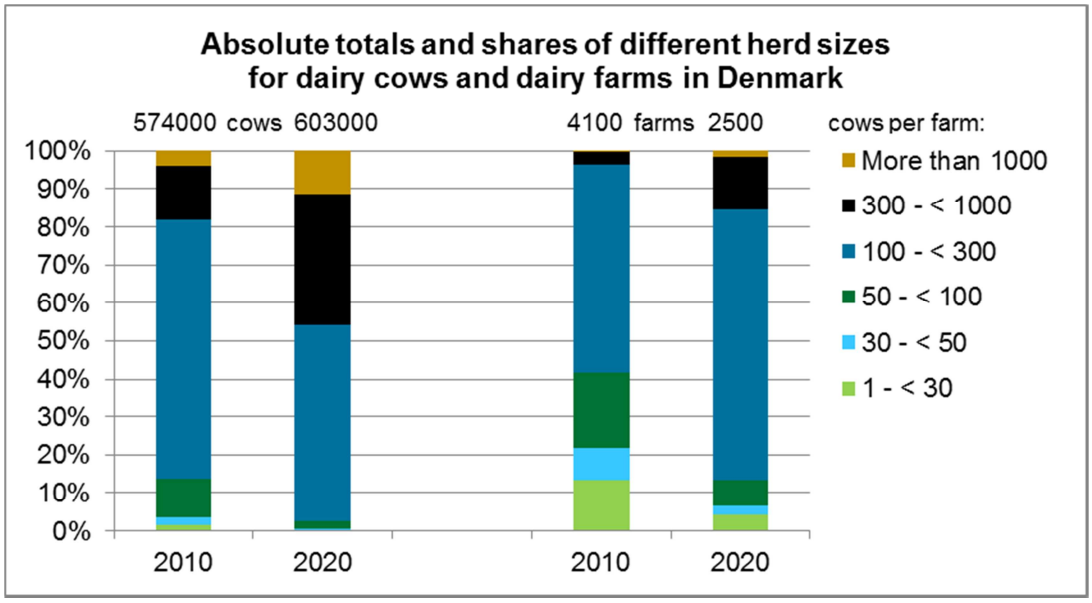
Italy



Ireland

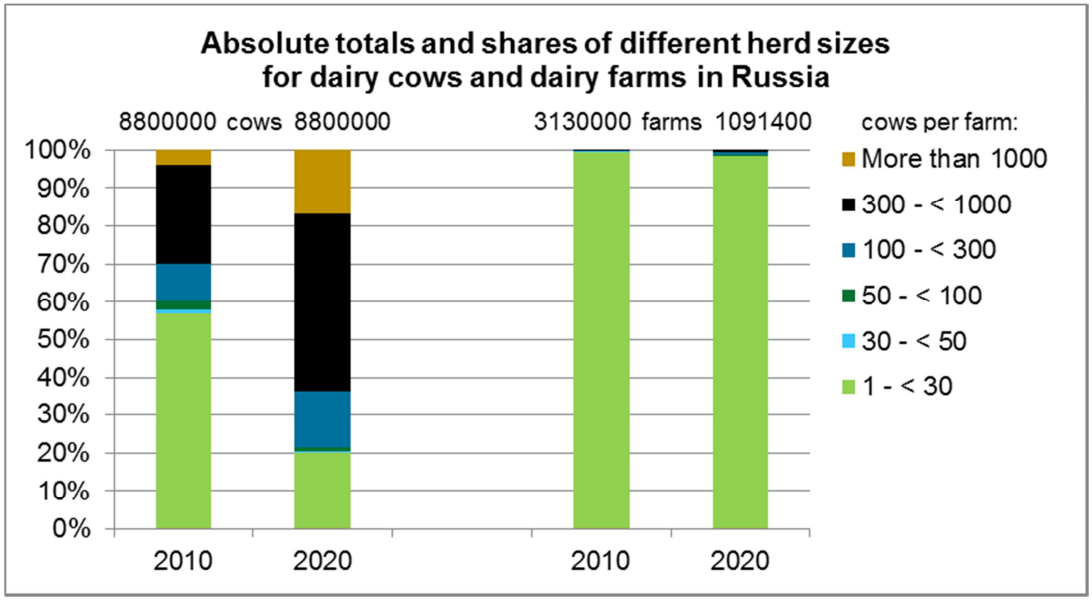


Denmark

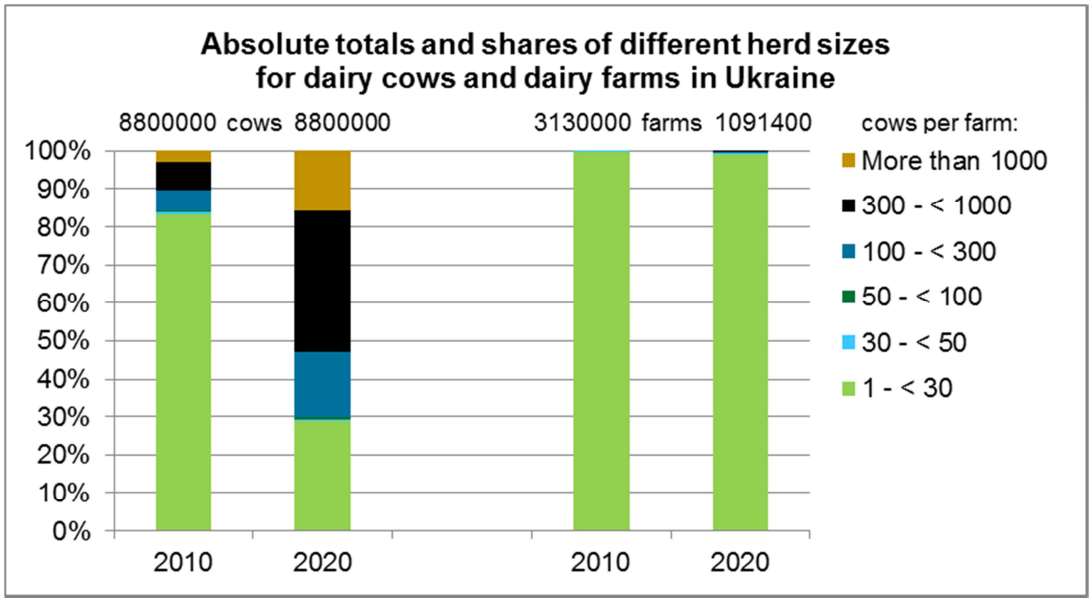


Both **Russia and Ukraine** have very many small farms with one or two dairy cows. Milk of these farms is mostly not going to a dairy processor but used in the own household or sold to neighbors. Growing emphasis on milk quality will discourage this way of dairy farming; nevertheless a large number of these farms still is expected to exist in 2020.
On the other hand some investors from outside agriculture will invest in big dairy farms of over 1000 dairy cows. Because these investors quite easily switch between activities (depending on expected return on investment) the development towards those big farms is quite uncertain.

Russia

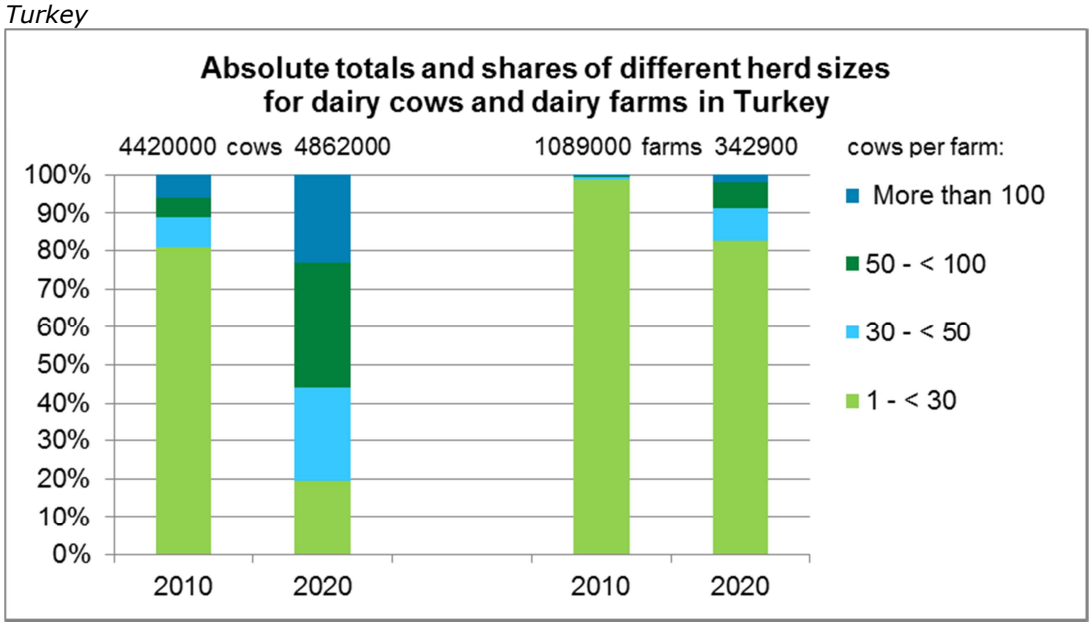


Ukraine

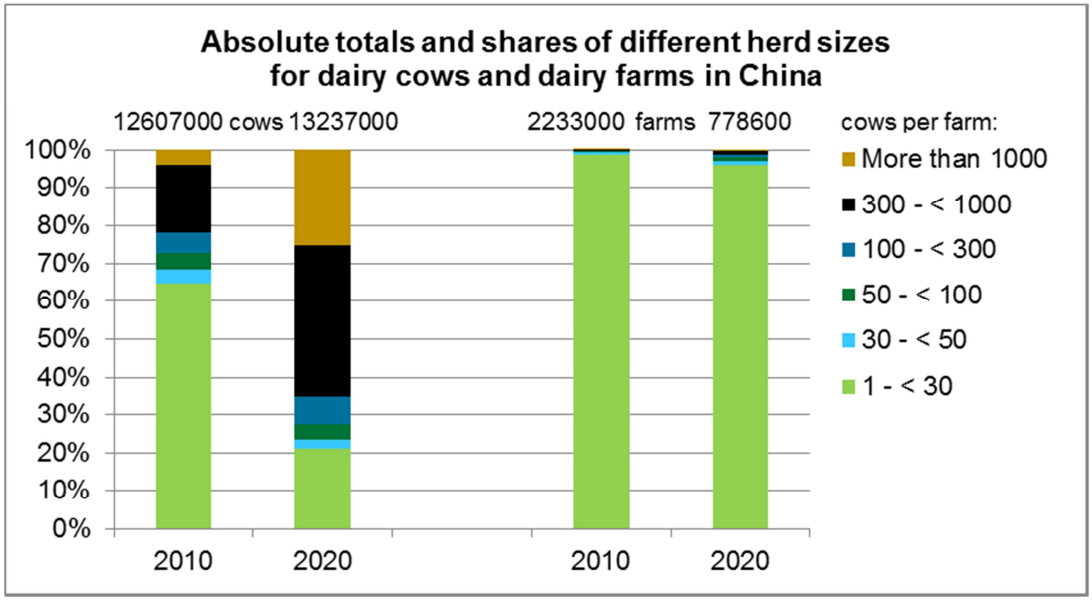


Many countries in **Asia** face the same structure as in Eastern Europe: very many small dairy farms with one or two cows. Unfortunately for India and Pakistan no herd size distribution could be found so these two countries are not presented yet. Complicating for these two countries is the fact that a considerable part of their milk production comes from buffalos. Besides questions what will happen with dairy cows (change in number, change in production per cow) the question will raise what will happen with the shares of buffalos and dairy cows in total milk production.
India currently follows a policy where it is difficult for foreign parties to invest or to take part in dairy farming.
The structure of dairy farming in Turkey is similar to that of Eastern Europe. Today Turkey is quite stable and has a good economic development with yearly growth rates of 5% or more. Turkish agricultural society is quite traditional but younger farmers have on average good education so good progress is possible. Availability of water is a complicating factor.
China follows a policy to decrease heavily the number of small dairy farms ('backyard farmers') because these farms are seen as a heavy threat for the milk quality. The melamine-scandal of 2008 has been addressed to this farming structure. Backyard farmers are stimulated or even nearly forced to enter dairy villages. There they can still take care for their few cows but especially milking is more centralized.
Big dairy companies like Mengniu and Yili and also New Zealand-company Fonterra even take more control of their milk by setting up dairy farms of 500 or more dairy cows. Sometimes they take over dairy villages in which case the dairy farmers become employees of the farm. Like in Eastern Europe also investors from outside agriculture start dairy farms.
Given the high growth in demand for dairy in China both dairy imports and internal milk production (see figure 4) have high growth rates. Australian dairy farmers complain about high prices for heifers because of the high demand from China.

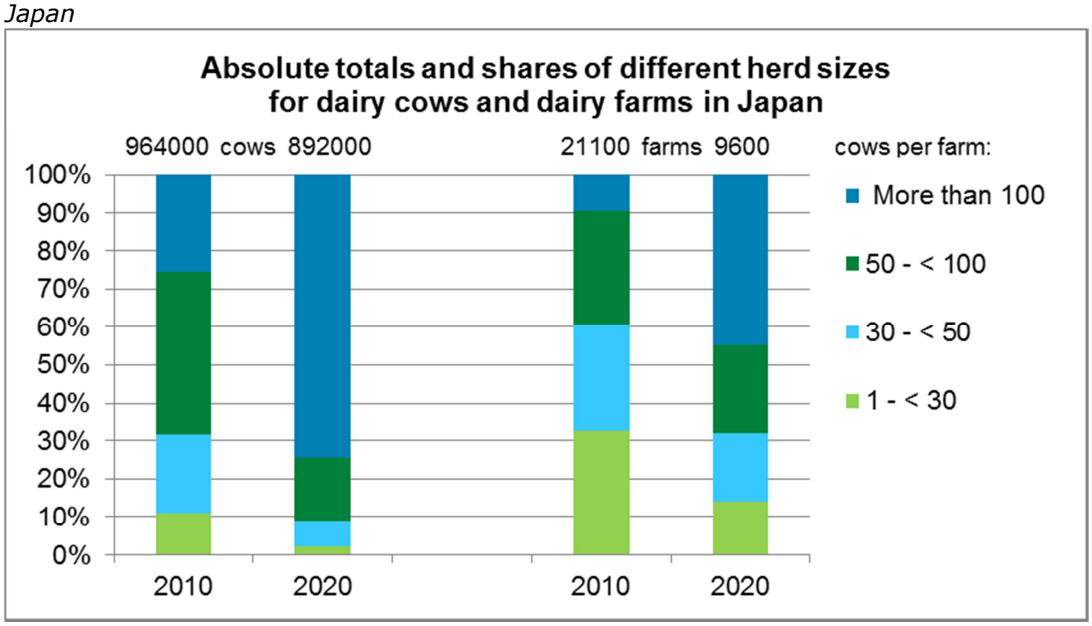
Turkey



China



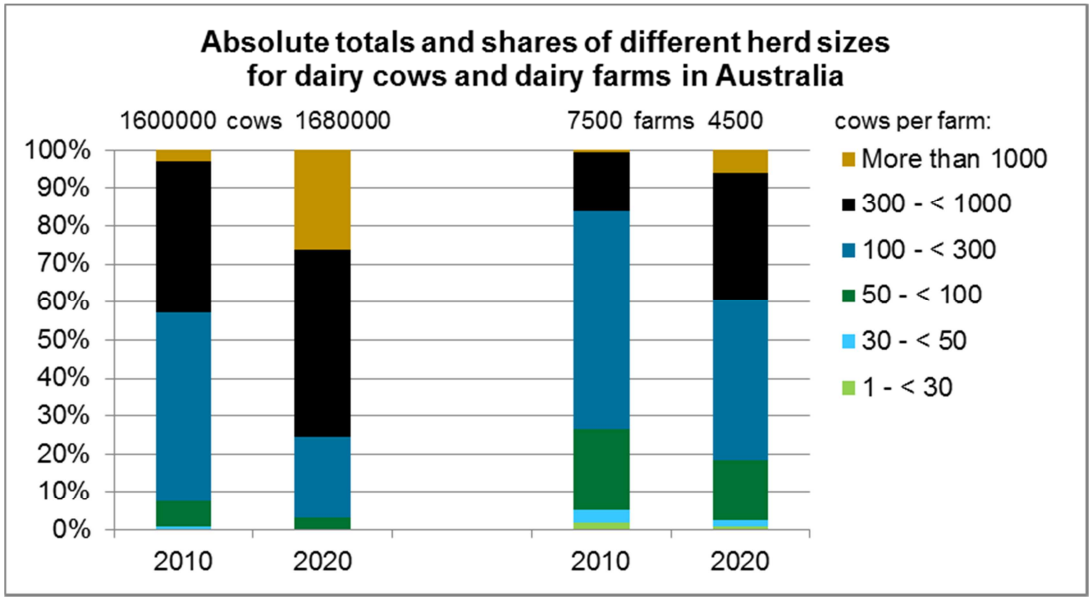
Japan



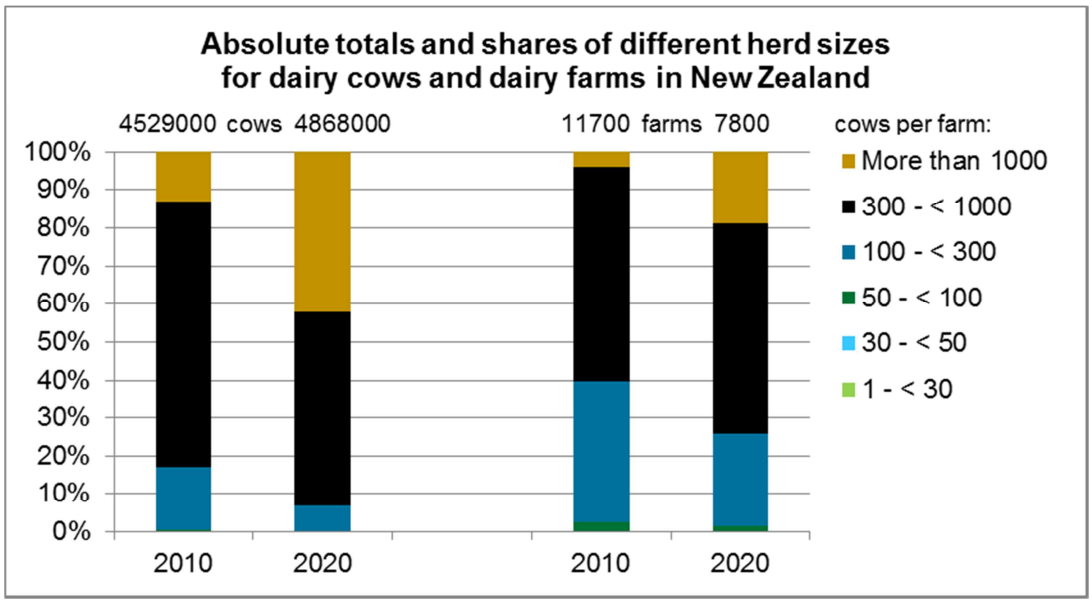
Japan (and also South Korea) is quite comparable with countries like Norway and Switzerland. Dairy farming is quite small-scaled and farmers receive milk prices far above world market level. Except specialties these countries are not able to compete on the world market. With little growth in population (or even decrease as is expected for Japan) and small potential growth in per capita consumption these countries are expected to produce less milk in the coming years.
On the other hand these countries are well developed which opens opportunities for products on a high technology level. But the markets are quite small.

Currently **Australia and New Zealand** have on average the biggest dairy farms in the world. Especially New Zealand already has a lot of dairy farms over 1000 dairy cows when related to the total number of dairy cows in that country.
New Zealand will grow considerably in milk production. It is expected that more dairy cows will be kept indoors in New Zealand in combination with feeding more concentrates per dairy cow. This will raise the average cost price of milk in New Zealand but also higher milk prices on the world market are expected and will stimulate these developments. That opens opportunities for more milk per dairy cow so the growth in dairy cows is much smaller than the growth in milk production.

Australia

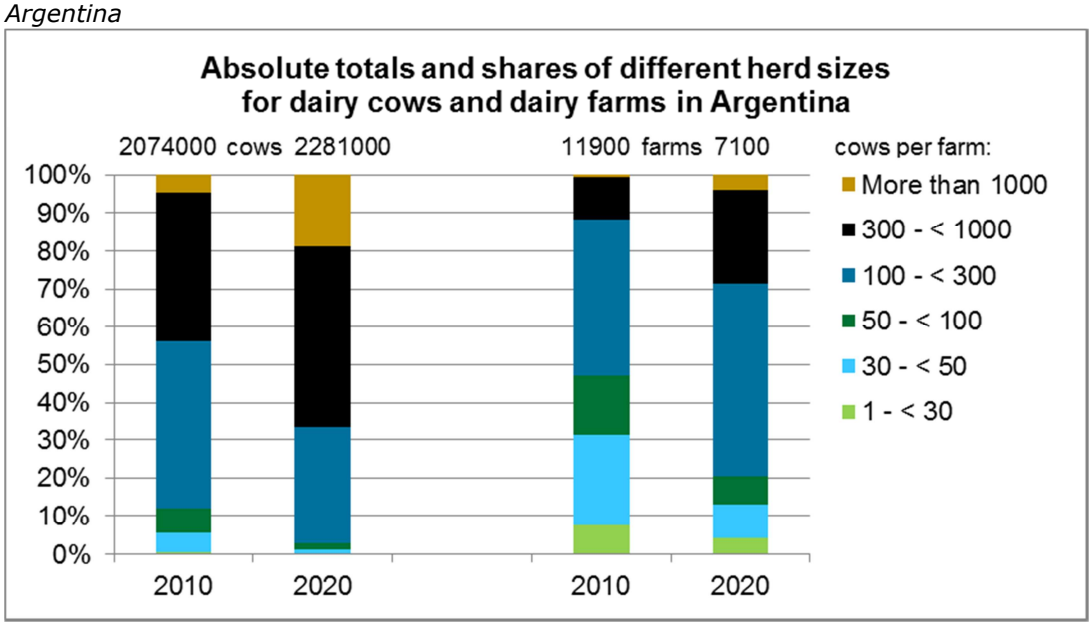


New Zealand

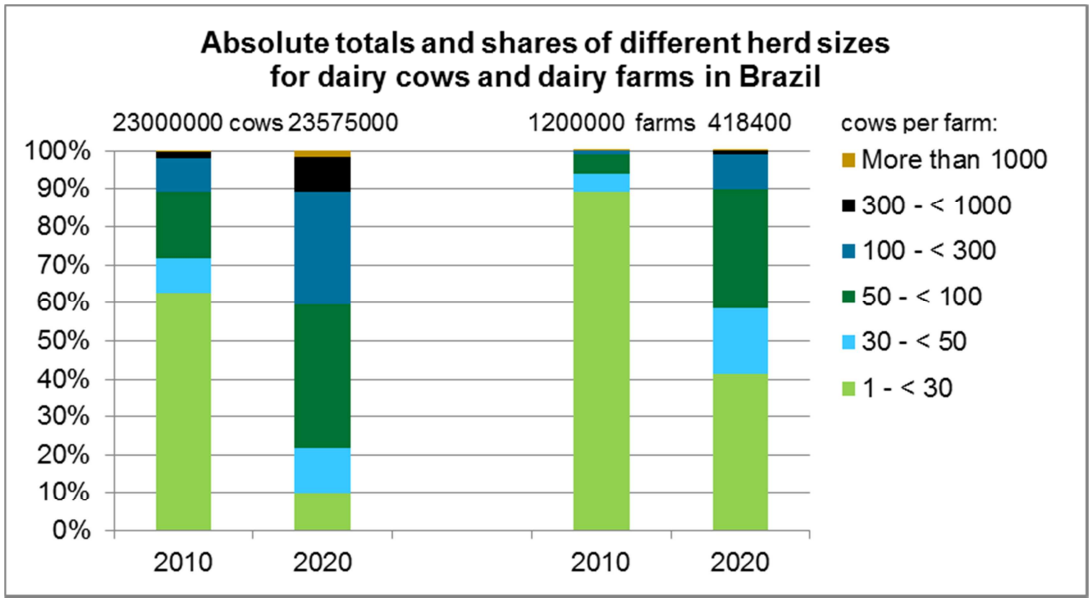


In **South and Central America** the herd size distribution varies over countries. Argentinean dairy farms had already on average nearly 200 dairy cows in 2010 while Brazil was just under 20 dairy cows per dairy farm. Concerning size Mexico had an intermediate position while having the highest milk production per dairy cow of these three countries.
Both Brazil and Argentina have big potential for growth in milk production but less stable policies and rather easy mutual exchange between agricultural sectors discourage full use of this potential. Currently soy sets the standard in Argentina, causing some big dairy farmers to change to soy production instead of milk production.

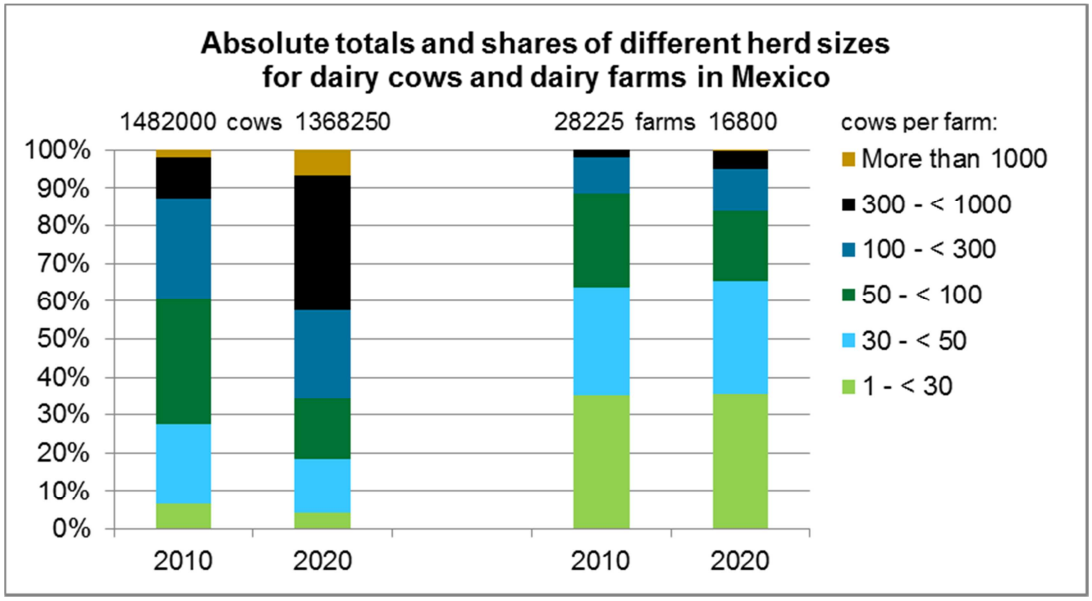
Argentina



Brazil

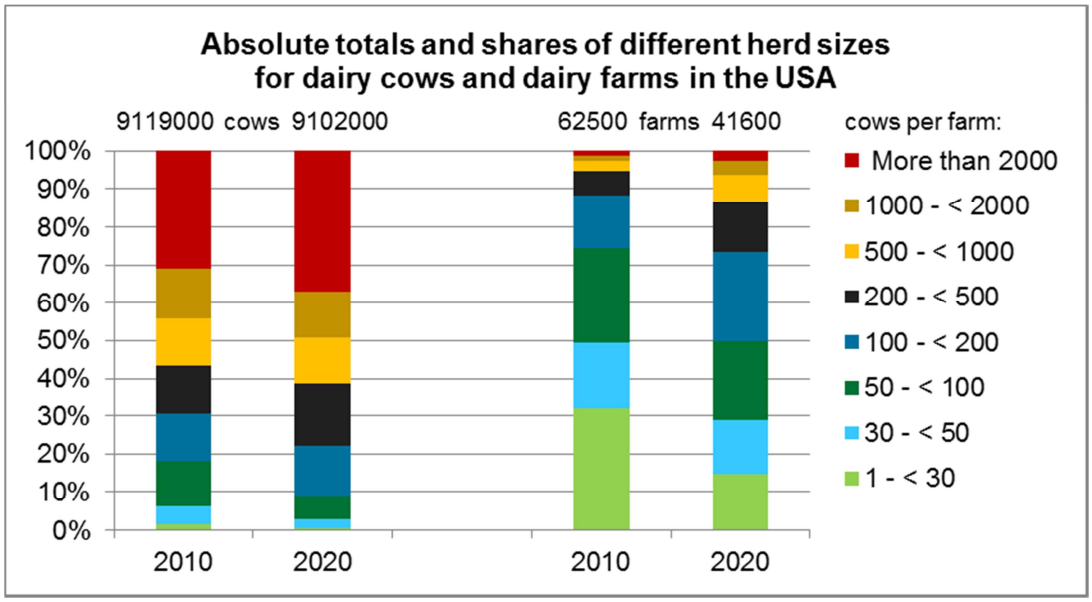


Mexico

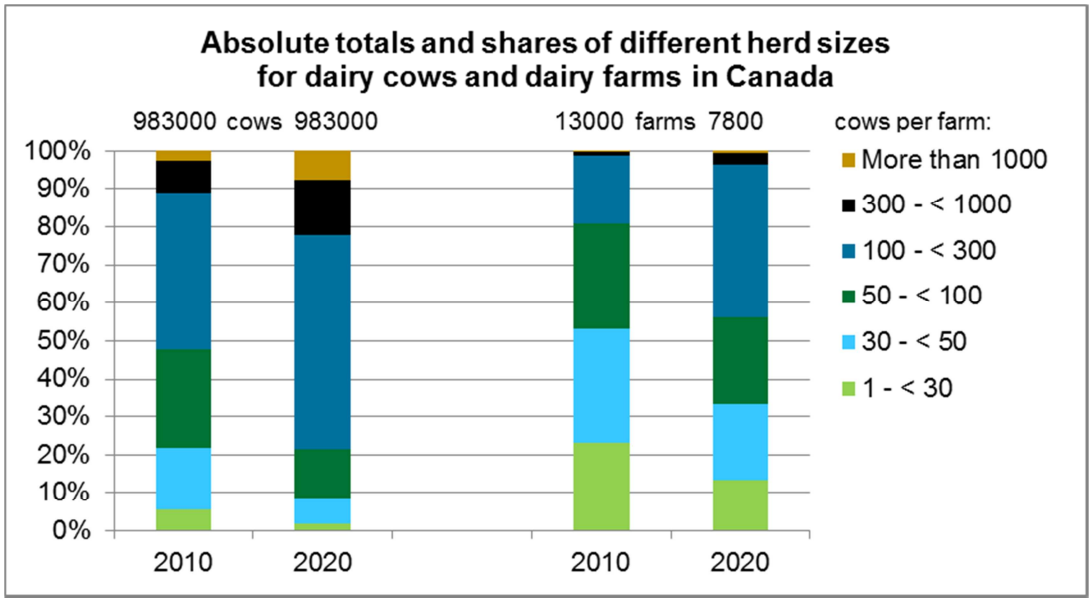

Absolute totals and shares of different herd sizes for dairy cows and dairy farms in Mexico
1482000 cows 1368250
28225 farms 16800
cows per farm:
More than 1000
300 - < 1000
100 - < 300
50 - < 100
30 - < 50
1 - < 30
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
2010
2020
2010
2020

In **North America** the USA and Canada differ quite a lot in dairy farming. On average the dairy farms in the USA are twice as big as in Canada. For already many years Canada has a limited milk production by means of a system with milk quota. There are no signs that this system will vanish soon in contrast with the European Union where the milk quota will be abolished in 2015. For milk above the milk quota a lower price is paid. Canada is expected to grow slightly in milk production.
USDA expects a higher milk production in the USA only by a higher milk production per dairy cow, based on the facts that bigger farms have a higher milk yield per dairy cow than smaller farms and that the share of bigger farms in the total number of dairy farms will increase. In many other countries with high milk yields per cow (e.g. Denmark, the Netherlands) the relation between farm size and milk yield per cow is not that strong.

USA



Canada



Development feeding systems for dairy cows in some countries

Current situation

Currently there are three main systems of feeding:

- Pure grazing:
  - Cows get nearly only grass in the diet by grazing during the whole year; only a small amount is harvested for silage to overcome short periods of grass shortage.
  - (nearly) no barns and very few or even no concentrates.
  - The system nearly completely runs on home grown feed (fresh grass).
  - Common system in Oceania and parts of South America (especially Argentina, Uruguay). In Europe, Ireland and Southwest England come close to this system.
- Mixed systems:
  - Fresh grass, by grazing, has a considerable share in the diet during summer.
  - During the winter cows are inside and fed with grass silage, often added with other roughages.
  - Concentrates form 10-30% of the energy intake of the dairy cows. In many cases individual feeding of concentrates is more or less possible.
  - 50 till 75% of total energy comes from home grown feed (own grass and own other fodder crops).
  - These systems are quite common in Western Europe (UK, Netherlands) and coming up in Oceania. Also in parts of South America (e.g. southern parts of Brazil) and North America (around the Great Lakes) these systems are applied.
- Foot loose system:
  - Dairy cows are kept indoors during the whole year.
  - (nearly) no fresh grass: silage with concentrates. Most of times he share of concentrates in total energy intake is higher than in the other systems.
  - Total Mixed Ration (TMR) is more common than in the other systems. Nevertheless a considerable share of the dairy farmers with this system has possibilities to feed concentrates to the individual cows.
  - Although the share of home grown feed can be as high as in the other systems there are also dairy farmers with this system who feed nearly only purchased feed.
  - Foot loose is common in areas with little rainfall (e.g. parts of the USA, parts of China), high temperatures (tropical regions) or just a long period with low temperatures (Eastern Europe). It is also often linked to big farms although especially New Zealand proves that pure grazing is possible with big farms.

It can be said that individual feeding of concentrates is possible in all systems just described but for the use of the additives of BASF the pure grazing system offers few possibilities because of the low amounts of concentrates fed per cow. Because this system is often a low cost system the milking system is quite simple in many cases with little or no automation. Another limitation for the use of the additives of BASF can come up from TMR-feeding. Then not the individual cow but a group of cows is reached. If the total dairy herd is big enough there are opportunities to form a lot of uniform groups of cows (heifer/not heifer, same stage of lactation, same daily production) with for each group its own specific TMR. Subsequently it can be decided in which of the different TMR's an additive of BASF will be supplied.
Very generally said dairy farms between 30 and 300 cows with a mixed or foot loose system are most in the picture for individual feeding of noticeable amounts of concentrates which offers the best possibilities for supplying the additives of BASF. The graphs in the previous

chapter give an estimation of the number of dairy cows and the number of dairy farms for the year 2020 (by multiplying the total number of cows or farms (just above the bars) with the share of the cows/farms between 30 and 300.

(near) future

The trend to bigger farms in all countries (as shown in the previous chapter) causes a higher share of cows on farms with more than 300 cows in nearly all countries, mentioned in the previous chapter. Basically this would mean less opportunities for individually feeding of concentrates. But at the same time automation can offer new opportunities to reach the individual cow in a big herd. Especially automatic milking systems offer this opportunity but also big carousels for milking can have possibilities to feed different concentrates to the individual cows.

In the recent past, many concentrates were fed as classical concentrates, manufactured by feed compounders. Especially on bigger dairy farms there is a development to the use of individual (or simple) ingredients as the picture below shows.

This picture of a Hungarian dairy farm with about 500 dairy cows (in 2010) shows a storage for individual ingredients on the left hand side. The storage has 12 compartments so 12 different individual ingredients (or mixes of ingredients) can be stored and mixed into a TMR (or fed separately but that is less likely in this case given the mixer on the picture).

Also on smaller dairy farms there is a change from classical concentrates to more individual ingredients. Even average dairy farms in the Netherlands (about 70 cows) already use 30-40% simple ingredients and no more than 60-70% classical concentrates. Both the classical concentrates and the simple ingredients can be fed individually per cow by 'concentrate computer'/'concentrate boxes' in many cases. The growing use of automatic milking systems increases this possibility. The supplier of the simple ingredients often delivers 2 or 3 simple

ingredients in the wished proportions because the number of available silos on the farm is 3-5, not the 12 compartments as on the picture. Reasons for the use of individual ingredients are:

- Better tuning possible to the available roughage (especially grass silage often differs in quality and components within and between years) than with only classical dairy concentrates.
- On average cheaper than 100% classical dairy concentrates.

The role of the feed compounder will change. He will deliver less classical concentrates and, if he wants to change in that direction, supply more individual ingredients and different mineral mixes, fitting to the different needs in the herd. Feed additives then will be sourced mainly via basemixes (mineral feed).
It can be expected that individual ingredients will be fed on nearly all farms above 100 cows so that will be the majority of the cows in 2020 in many countries mentioned in the previous chapter. Even in countries with pure grazing this can be possible by automation around the milking place and, in New Zealand, some change to a system with more silage and concentrates.

If more automation takes place on farms with big herds, especially around milking, dairy cows can be reached individually by feeding at the place where the cows are milked. Then the share of dairy cows that can be reached with feed additives grows substantially.
When automation nearly doesn't come in on big dairy farms, the share of dairy cows for feed additives could decrease: the graphs in the previous chapter show the biggest growth in the classes above 300 dairy cows per farm. This especially holds for the USA, Argentina, Oceania, China, Russia/Ukraine and maybe Denmark.
Many other countries will have the majority of the dairy cows on farms between 30 and 300 cows. This holds for most European countries, Turkey, Japan, Brazil, Mexico and Canada. Most of these countries face quite high labor wages per hour which stimulates automation which is in favor of individual feeding.

Overall summarized: automation will proceed in dairy farming which is in favor of individual feeding so the share of cows that can be reached with individual feeding will grow.

Appendix: Aspects for husbandry of cattle in non-organic and organic private standards within Europe

	CATTLE - Private standards EU	Neuland **	Agriqualita	LAIQ	Marks and Spencer	RSPCA dairy cattle	RSPCA beef	Better life hallmark for veal	EU Bio	Bioland	Naturland	Demeter	SKAL	KRAV	Soil Association
		DE	IT	IT	UK	UK	UK	NL	EU Org	DE	DE	DE	NL	SE	UK
Chapter	Relevant aspects	Private non-organic standards								Private organic standards					
Conditions that apply to the keeping of cattle															
Group keeping	Maximum herd size	n													
	Mixing of animals	n													
Stable systems	Allowance of tethering	d	d	p	d	d	d		d	S	S	S	S	S	S
	Space requirements in different systems *									n					
	Use of electric cow trainer									n	n	n		n	
	Housing with / without outdoor access	n			n				n	S	S	S	S		
Barn environment	Natural daylight	n							d	S	S	S	S	S	S
	Duration of light phase			n		p	p								
	Light intensity			n		n	n								
	Twilight period					n	n								
	Ventilation	p	s	s		p	p								
	Air space					n	n								
	Gas concentration					p	p								
	Air humidity					p	p								
	Sound level and noise			n			n								
Freestall barns	Space requirements *	n				n	n		n	S	S	S	S	p	n
	Floor surface					n	n								
	Slatted floors	n	n				n		n	S	S	S	S	S	S
	Structure/elements in barn	n													
	Space for avoidance						n			n					
	Feeding area					n				n					
	Bedding in lying area	n			n	n	n		n	S	S	S	S	S	S
	Number of lying boxes					n	n			n	n				n
	Dimensions of lying boxes					n	n			n					n
	Details on lying area						n								
	Electric wires indoor	n													
Outdoor access	Duration of access	n				n			n	S	S	S	S	S	S
	Dimensions of open run	n				n									
Pasture	Frequency of access	n				n			n	S	S	S	S	S	p
	Exception from grazing	n													

	CATTLE - Private standards EU	Neuland **	Agriqualita	LAIQ	Marks and Spencer	RSPCA dairy cattle	RSPCA beef	Better life hallmark for veal	EU Bio	Bioland	Naturland	Demeter	SKAL	KRAV	Soil Association
		DE	IT	IT	UK	UK	UK	NL	EU Or	DE	DE	DE	NL	SE	UK
Chapter	Relevant aspects	Private non-organic standards								Private organic standards					
Feeding	Feed composition	n	s	s		s	s		p	S	n	n	S	S	S
	Feeding frequency	d	s	s		p	p								
	Feeding facilities	n				n					n	n			
	Feeding trough width			n		n	n								
	Roughage*	n				n	n		n	S	S	S	S	S	S
	GMO feed	n	n	n											
	Feed additives	d	d	s		d	d								
Drinking	Access to fresh water *					n	n								p
	Drinking facilities						n								
	Number of drinking spots			n		n	n								
Calving	Provision of calving pens					n	n			n		n		n	
	Size of calving pens														
	Inspection of calving cows and heifers						n								
	Calving aids														
Health care	Medicine and methods	n				s	s								
	De-worming	p				n									
	Hormonal treatments	p							p	S	S	S	S	S	S
	Prophylactic treatments	n	n												
	Veterinary visits					n	n								
Regular visits	Frequency of inspection by farmer			n		n									
Cleaning	Frequency	n				n	n								
	Keeping cattle clean					n									
Breeding	Recommended races/breeds	n							p	S	S	S	S	S	S
	Double-muscled breeds				n		n								
	Keeping of male sires											p			
	Protection of heifers														
	Conditions for mating														
	Prohibited Methods					n	n		n	S	S	S	S	S	s
Mutilations/ surgical practices	Castration	n		n		n	n		n	S	S	S	S	p	p
	Tail trimming	n		n						d	S	d			
	Dehorning	n		n		n	n		p	S	S	d	S	S	S
	Removal of teaths					n	n								
Handling	Rules for moving						n								
	Rushing						n								
	Sensitive parts						n								
	Handling unit						n								
	Use of sticks and electric goads	n					n		n	S	S	S	S	S	S
Identification	Marks						n								
Emergency slaughter equipment	Emergency slaughter equipment						n								
Bull pens	Design						n								

** Neuland no dairy standards

Legend

	Important aspect (Questionnaire 3rd countries)
s	Same as EU general legislation
S	Same as EU -Bio/Organic
p	More precise than EU
d	Stricter than/beyond EU-rule
n	Topic not regulated by EU
	Standard does not cover category of species
p	More precise than EU-Bio/Organic
d	Stricter than EU-Bio/Organic
n	Topic not regulated by EU-Bio/Organic
o	Other approach to same topic
*	Important aspect for EconWelfare experts