

# Possibilities for technology to strengthen Brazilian dairy chain

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Goal and scope

Brazilian dairy sector

Dairy farms

Technology

Driving forces

Conclusions

Please use the buttons above to navigate directly to the chapter of your choice.

# Goal and scope of the project

General idea: huge untapped potential for Brazilian dairy sector

- Brazil is a net importer of milk
- Can (Dutch) technology and knowledge help to further develop and strengthen the Brazilian dairy sector?

In line with existing connections between Brazil and the Netherlands (e.g. Wageningen University, Embrapa, Vicosa)



# Goal and scope of the project

## Goal of project

- *Main question:* What is the current situation of the Brazilian dairy sector (SWOT) and what technology could further strengthen the Brazilian dairy chain in terms of productivity and sustainability?
- *End product:* a presentation outlining how (Dutch) technology and knowledge can contribute to the goal of the Brazilian government to improve both productivity and sustainability in the dairy sector.
- Focus on the primary sector in the following states: Parana, Minas Gerais, Sao Paulo, Rio Grande do Sul and Santa Catarina.

# Goal and scope of the project

## Activities and methodology

- Desk study: general picture of the dairy chain in Brazil (SWOT) based on available information.
- Mission to Brazil: mainly interviews with representatives involved in the dairy industry.
- Analysing information to identify opportunities to fill the technology gaps.
- Presenting and discussing preliminary results in a workshop with representatives of the Dutch agro-industry and the Dutch Ministry of Economic Affairs.

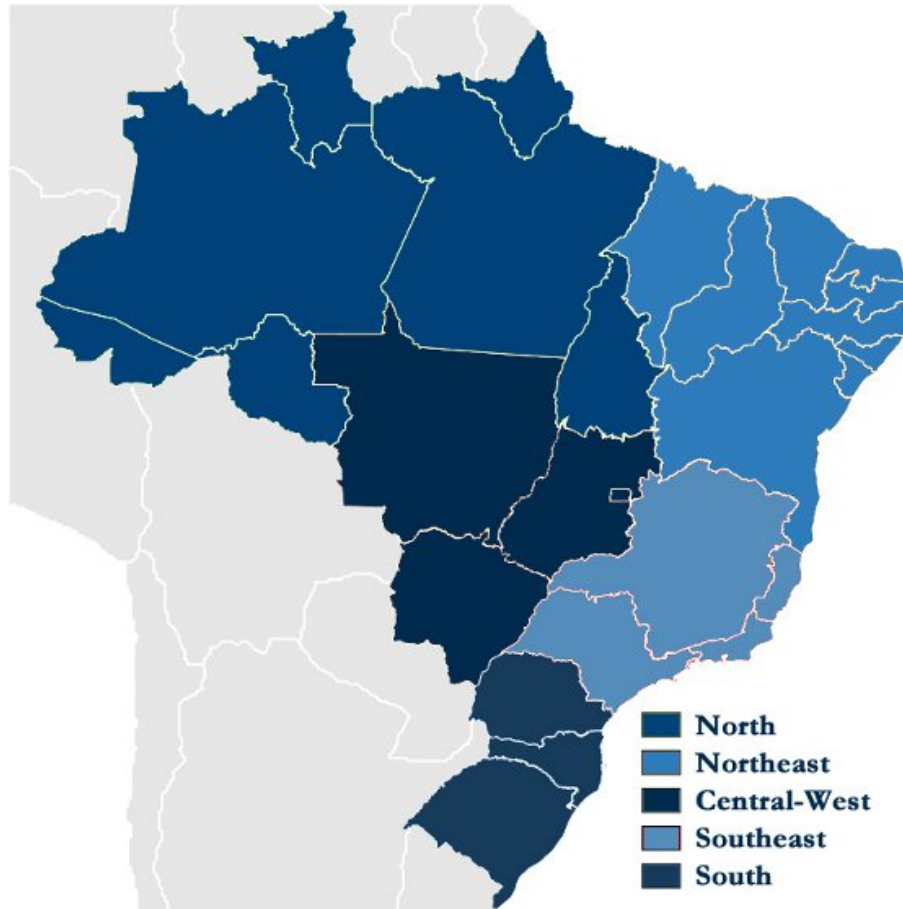


# Brazilian dairy sector

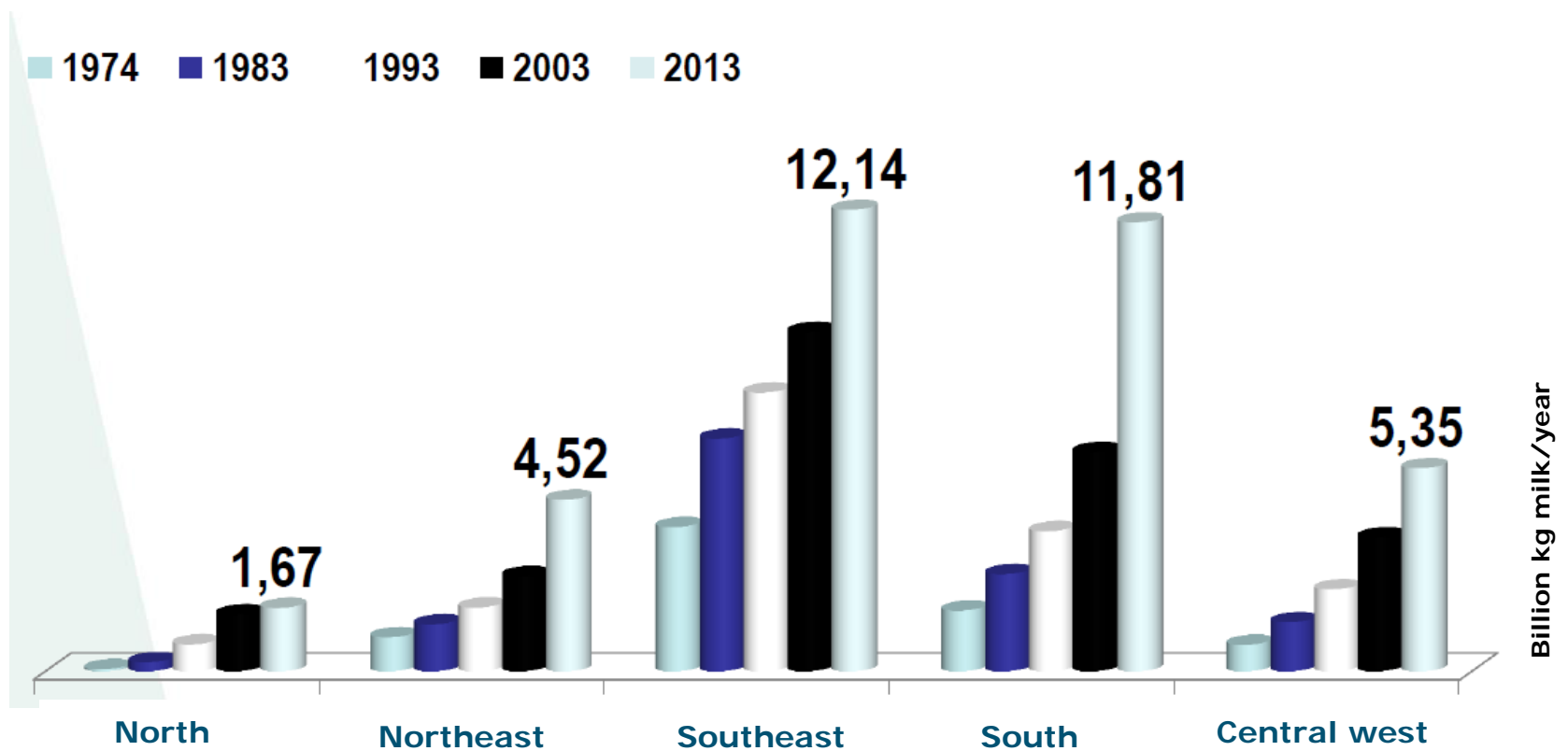
- Total and regional milk production
- Farm types and expected development
- Import, export and consumption
- Processing



# Regional milk production



# Regional milk production



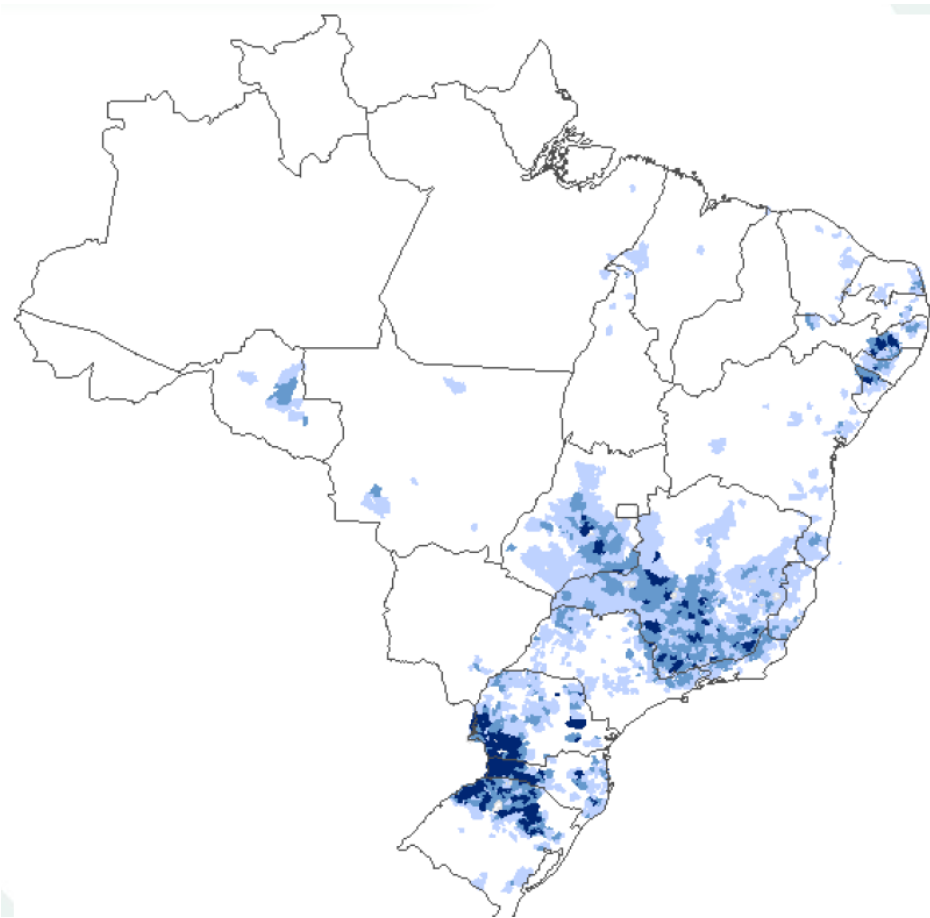
Source: IBGE 2013, processed by Embrapa.





# Regional milk production

Milk production, blue colours represents 75% of total Brazilian milk production

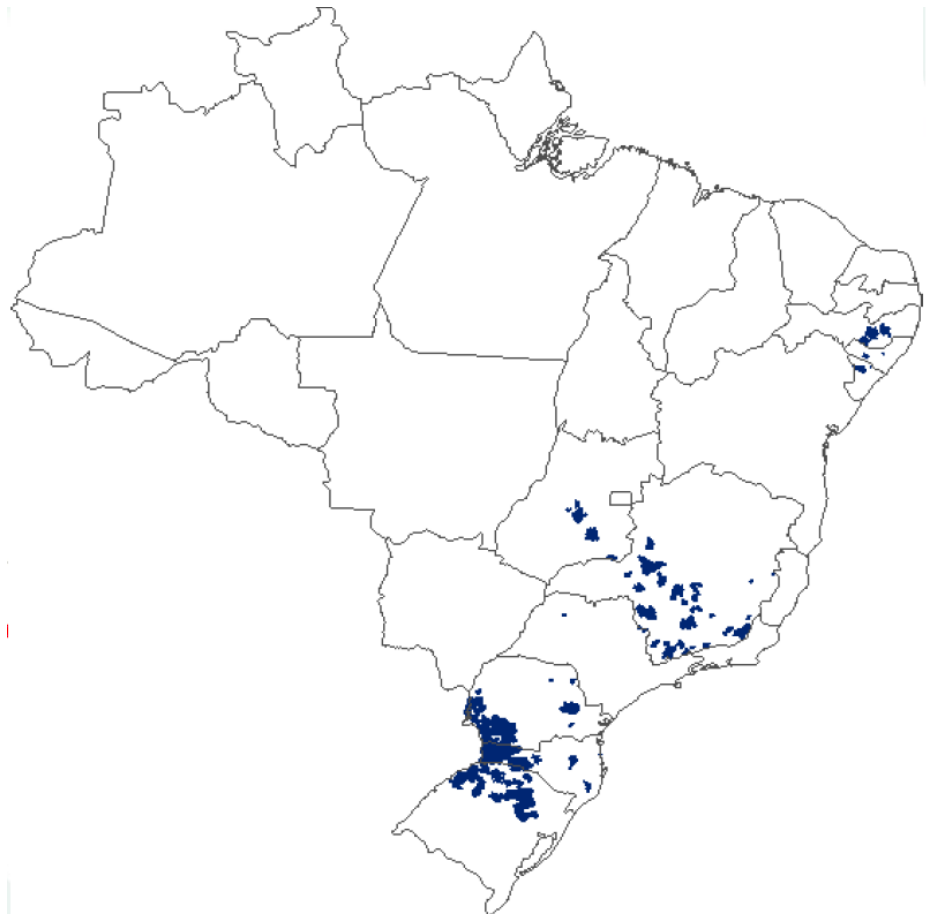


Source: IBGE 2013, processed by Embrapa.



# Regional milk production

Blue colour represents most intensive milk pockets, which cover 25% of total Brazilian milk production.



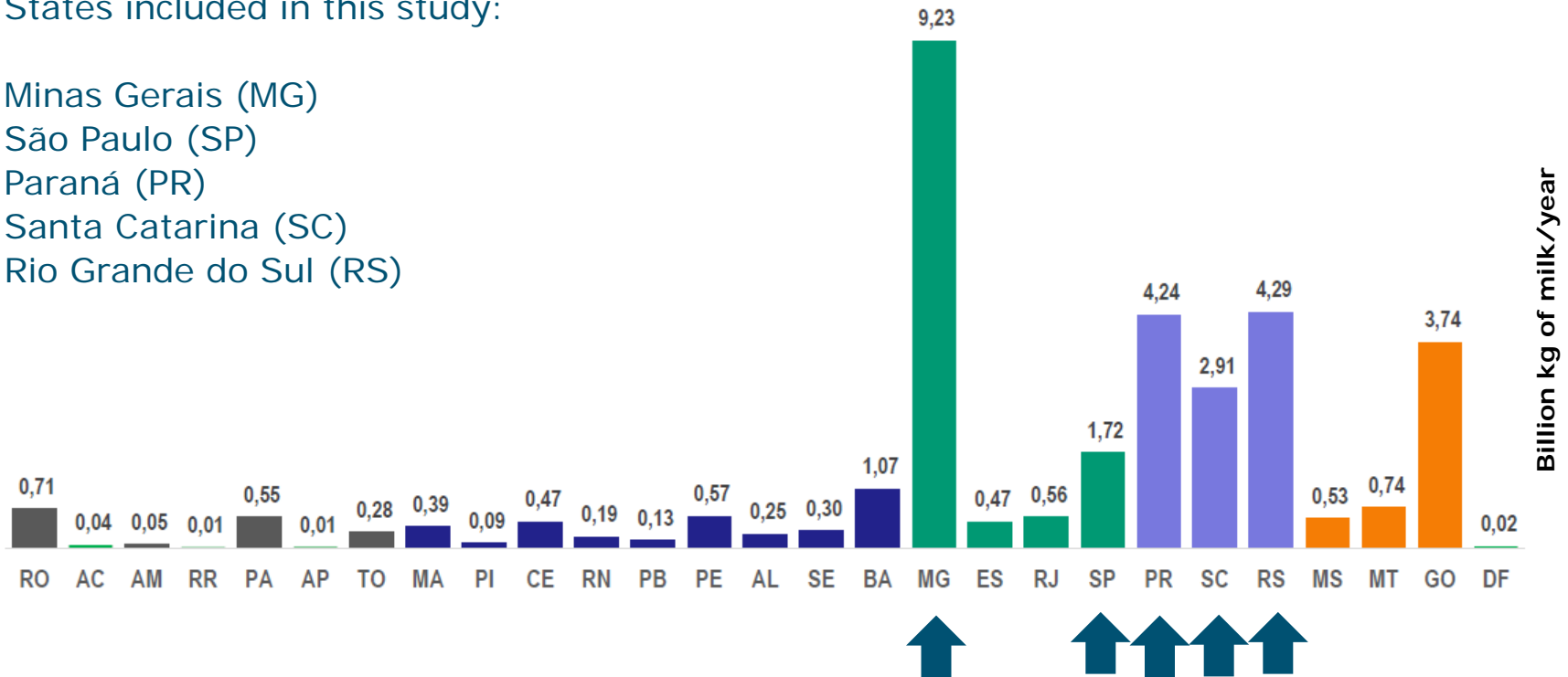
Source: IBGE 2013, processed by Embrapa.



# Regional milk production

States included in this study:

- Minas Gerais (MG)
- São Paulo (SP)
- Paraná (PR)
- Santa Catarina (SC)
- Rio Grande do Sul (RS)



# Regional milk production

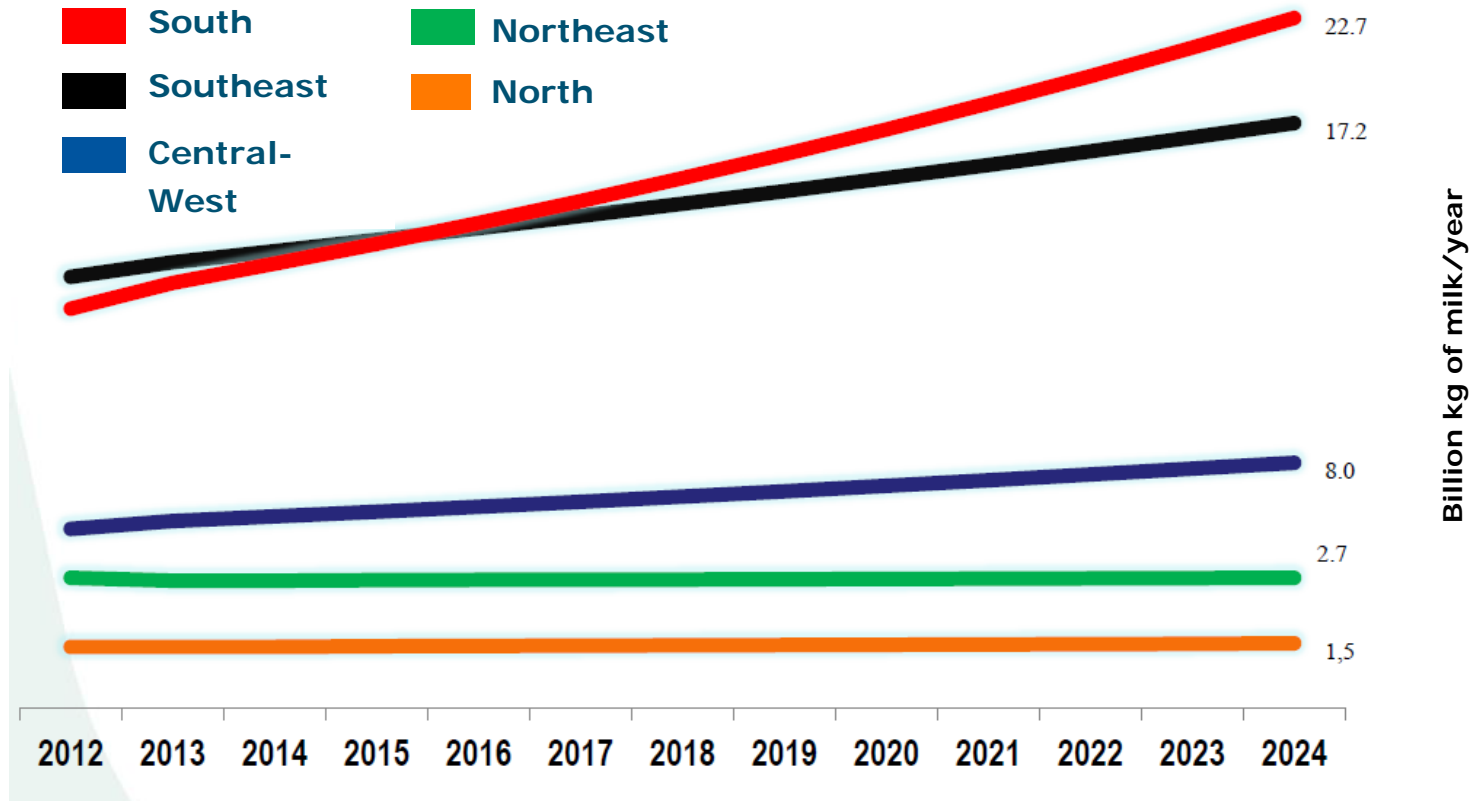
## Top 7 milk-producing states

State	Total milk production (billion kg 2011)	Compared with 2010 (%)	% of total	Included in study
Minas Gerais	8.77	+4.5	27.3	Y
Rio Grande do Sul	3.90	+7.2	11.8	Y
Paraná	3.93	+9.3	11.7	Y
Goiás	3.37	+5.4	10.4	N
Santa Catarina	2.57	+8.1	7.8	Y
São Paulo	1.59	-0.8	5.2	Y
Bahia	1.35	+9.4	4.0	N

Source: IBGE 2013, processed by Embrapa.



# Regional milk production



# Regional milk production

## Development production towards future:

- Growth in total milk production from 33bn kg in 2013 to 44bn kg in 2020 = + 3.7%/year.
- Projections in different studies fluctuate between 41.3bn kg and 52.3bn kg in 2023/2024.

## Development depends on

- Market, mainly internal consumption
- Competition with other agribusinesses: soy, coffee, pork, poultry.

Source: IBGE 2013, processed by Embrapa.



# Number of farms

Size (cows)	Tonnes of milk	Dairy farms	Dairy cows	Cows per farm	kg of milk per cow
1-10	1,710,000	1,000,000	3,800,000	3.8	450
11-50	5,000,000	200,000	5,600,000	28	900
51-100	8,640,000	70,000	4,920,000	70	1,750
101-200	5,437,500	15,000	2,175,000	145	2,500
201-500	5,110,000	5,500	1,580,000	287	3,300
>500	4,800,000	1,500	1,200,000	800	4,000
Total	30,697,500	1,291,000	19,275,000	14.9	1,593

Source: IFCN 2013.

Please note that it is difficult to find consistent data on farm size, number of cows, hectares and total milk production for Brazil, as opposed to standardised and consistent data for The Netherlands and Europe.



# Dairy farms Brazil in 2020

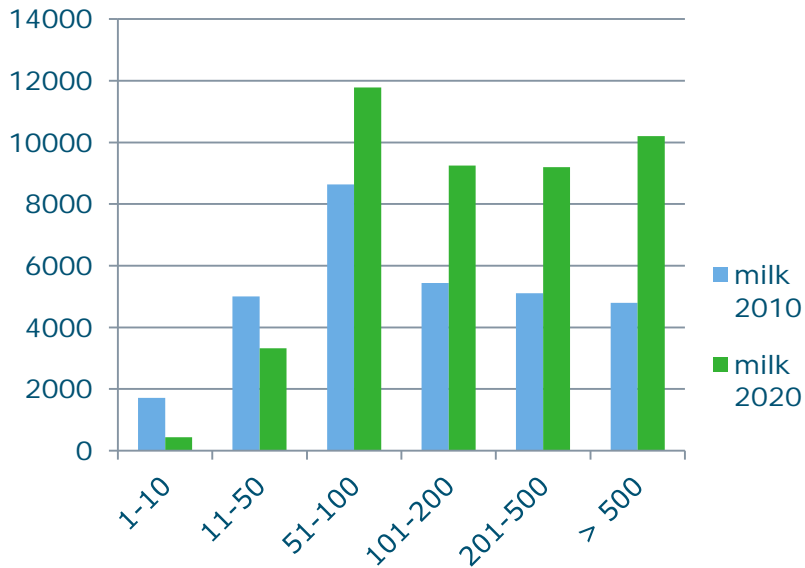
- Figures for 2020 are rough estimates, based on common trends worldwide as observed by LEI.
- Projection of total milk production from other sources is about 45m tonnes (an increase of 3.7%/yr).
- Size classes up to 100 cows/farm will shrink; size classes above 100 cows will expand for a number of farms.
- Expected development: gradual growth of most farms, establishment of some new large-scale farms.



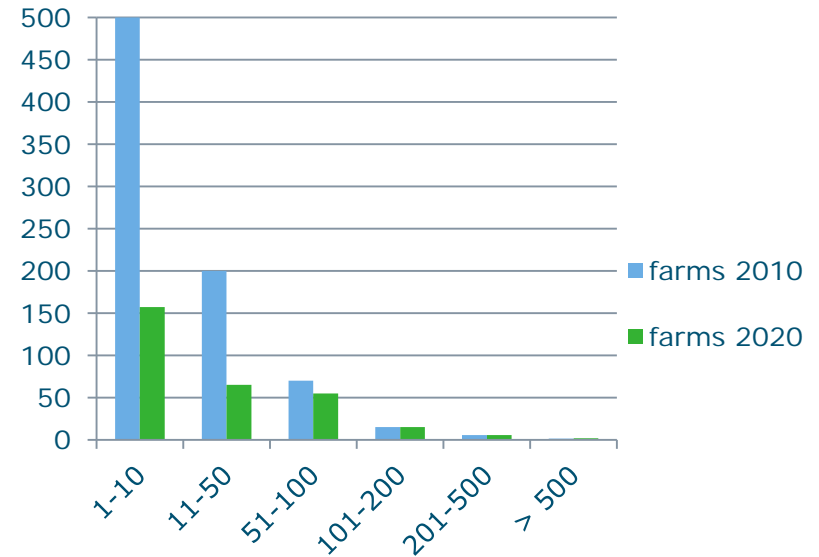


# Dairy farms Brazil in 2010-2020

Total milk production (\*1,000 tonnes) per farm type (no. cows/farm)



No. of farms per farm type (no. cows/farm)



2010: Embrapa

2020: Estimates by LEI



# Dairy farms Brazil in 2020

Size (cows)	Tonnes of milk	Dairy farms	Dairy cows	Cows per farm	kg of milk per cow
1-10	432,019	157,250	591,375	3.8	730
11-50	3,323,750	65,000	2,035,000	31	1,635
51-100	11,775,000	55,000	3,870,000	70	3,075
101-200	9,243,750	15,000	2,175,000	145	4,250
201-500	9,196,250	5,750	1,737,500	302	5,300
>500	10,200,000	2,000	1,700,000	850	6,000
Total	44,170,769	30,000	12,108,875	40.4	3,648

Estimation by LEI



# Farm types/size classes

Considerable diversity in farm types in Brazil

Classification mostly based on milk production per day

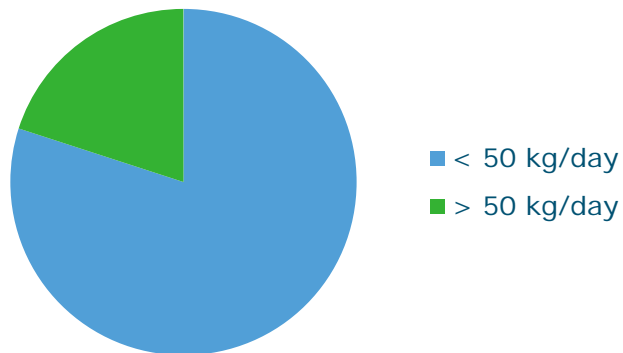
- <50 kg/day
- 50-200 kg/day
- 200-500 kg/day
- 500-1,500 kg/day
- >1,500 kg/day



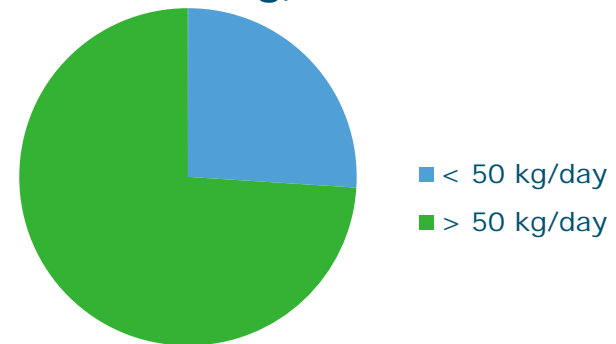
# Number of farms

- Total of 1.35m farmers produce 32.3bn kg of milk
- Large share (80%) of small farms (< 50 kg milk/day) produce 24% of total milk production

Nr of farms (m)



Total milk production (bn kg)



# Diversity in productivity

Milk yield per cow per year (kg)

Region	< 50 kg/day	200-500 kg/day	+ 500 kg/day
North	717	1,008	889
Northeast	833	1,293	1,802
Southeast	991	1,959	3,040
South	2,025	4,671	6,081
Central-West	972	1,824	2,648

Source: IBGE 2013, processed by Embrapa.



# Brazilian dairy farms

Most of the milk comes from extensive grazing systems, i.e. a high percentage of feed intake through grazing, and a low input of silage and concentrates. Even some big farms use this extensive system.

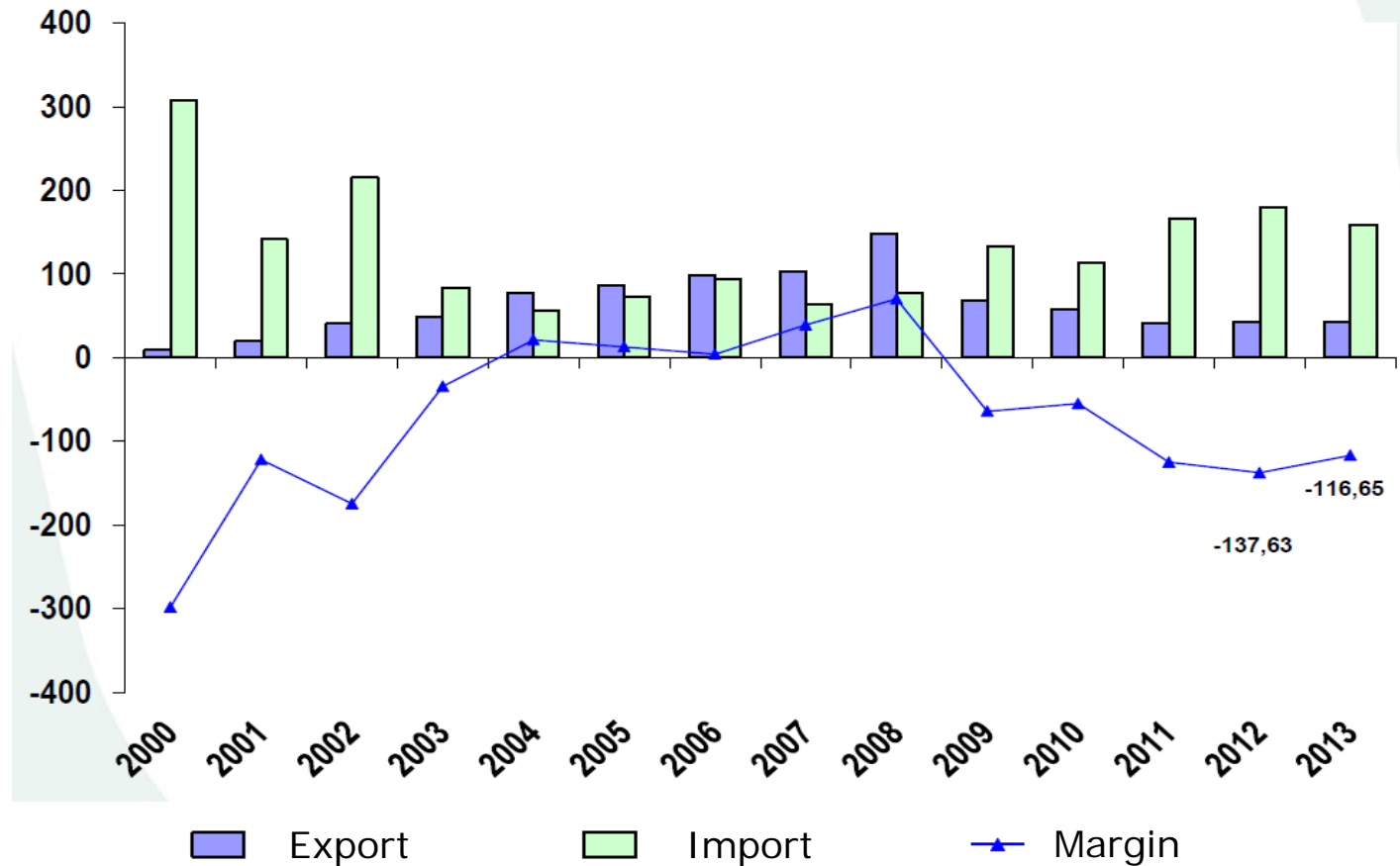
Semi-extensive/semi-confinement grows fastest in total milk production

Full confinement is often considered as too vulnerable for volatile feed prices because these farmers have to buy a relatively large percentage of their feed.

Operating costs (e.g. labour) and land prices have increased much (>20% in last 2-3 years), making Brazil the country with the highest cost price for milk in the Southern hemisphere.



# Import/export



Source: Embrapa.



# Dairy consumption

- 173 kg of milk (milk equivalents) per capita in 2012
- Compound Annual Growth Rate of dairy consumption over the period 1971-2011 is 2.1%: over a 40-year period this means an average annual growth rate of 3.1%.
- 2008-2012 period has a higher CAGR because of rapid economy growth (see next slide)
- Population growth in last 10 years is about 1%
- If the consumption will develop at the same level in the near future, the national dairy consumption will increase 3% per year
- Expected increase in production is about 3.7% per year

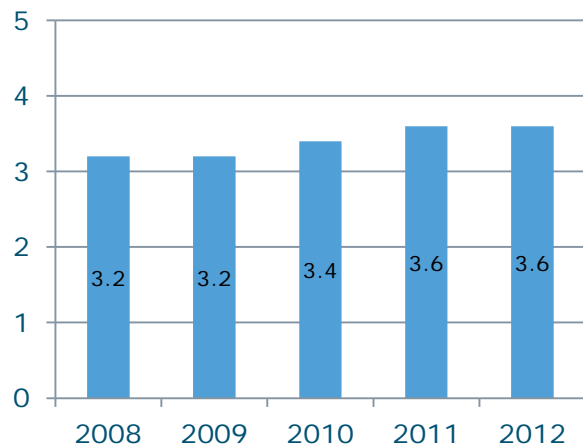
Source: Rabobank 2013.



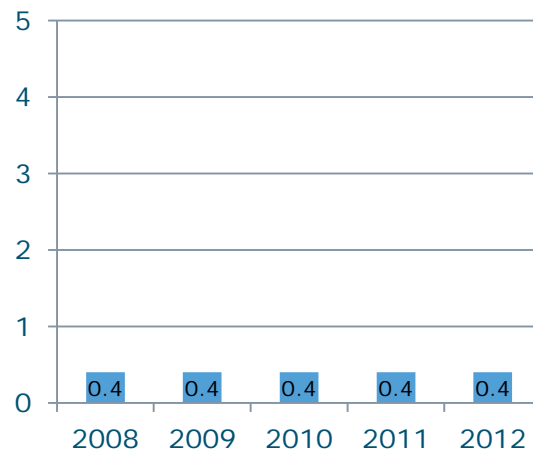


# Dairy consumption per capita

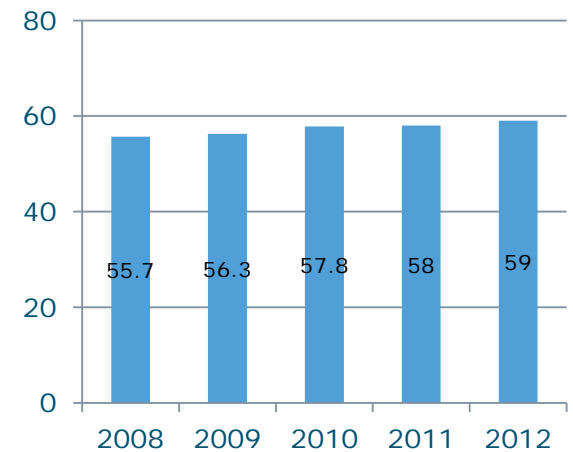
**Cheese (in kg)**



**Butter (in kg)**



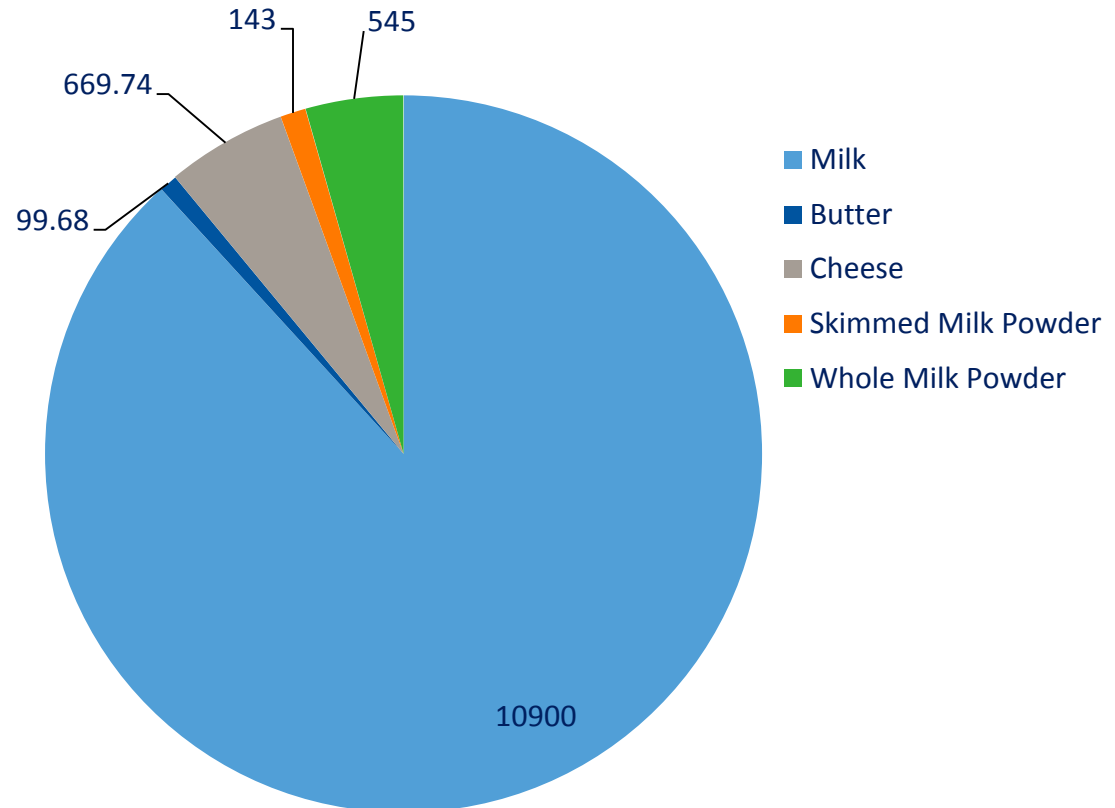
**Fresh milk (in kg)**



# Consumption of dairy products in 2009

*In kg of product, NOT kg of milk equivalents (1,000 tonnes)*

Even in kg of product, (fresh) milk is the main product

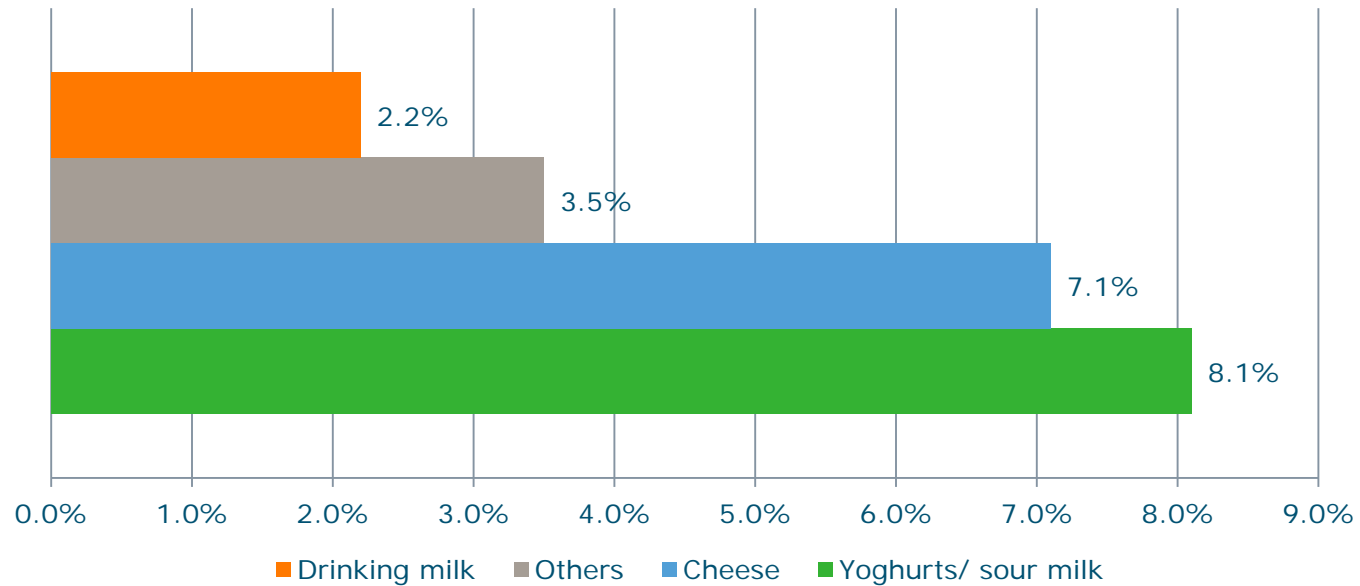


Source: Rabobank 2013.



# Brazil's CAGRs for 2008-2012

*For key dairy products*



Source: Rabobank 2013.

CAGRs of volumes



# Dairy consumption

Expected CAGR **value** for dairy consumption in Brazil, 2013-2018. (Source: Euromonitor, processed by Rabobank.)

CAGR in volume can be different

- Higher prices (e.g. more added value, more niche markets): value grows more than volume.



# Dairy consumption

*Expected CAGR value for dairy consumption in Brazil, 2013-2018*

- Cheese: 6-7%, both more volume and higher prices
- Drinking milk products: 6%, mainly higher prices
- Yoghurt and sour milk drinks: 8%, mainly more volume
- Other dairy: 5%, both more volume and higher prices
- Volume growth tends to be smaller than in 2008-2012
- CAGRs highly depend on consumer trust in economy: figures above depict rather good consumer trust.

Source: Euromonitor, processed by Rabobank.

# Dairy consumption

- Expected increase in production: 3,7%/year
- Expected increase in consumption: + 3% per year
- Brazil will have to export. Can Brazil compete on quality and costs on the world market?



# Biggest dairy processors 2013-2014

Rank	Processor/brand	Milk supply (m ltr)							Diff 2014 - 2015 (%)	Milk producers (nr)			Milk supply per day per producer (ltr)		
		2013			2014					2013	2014	Diff 2014 - 2015 (%)	2013	2014	Diff 2014 - 2015 (%)
		From produce rs	From third parties	Total	From produce rs	From third parties	Total								
1	DPA	1080	953	2033	1150	850	2000	-1.6	4320	5100	18.1	685	618	-9.8	
2	BRF	1192	185	1377	1195	230	1425	3.4	11084	13277	19.8	295	247	-16.3	
3	CCPR/Itambé	887	169	1056	1023	200	1222	15.7	7397	6614	-10.6	329	424	28.9	
4	Laticínios Bela Vista	523	305	829	630	402	1032	24.6	4537	5589	23.2	316	309	-2.2	
5	Coops Castrolanda, Batavo, Capal	434	114	549	618	148	766	39.6	1050	1819	73.2	1133	931	-17.9	
6	Embaré	371	157	528	392	172	564	6.9	1611	1730	7.4	630	621	-1.4	
7	Aurora	445	55	500	485	34	519	3.9	8100	8240	1.7	151	161	7.1	
8	Danone	266	183	449	295	163	458	2.0	510	516	1.2	1429	1564	9.4	
9	Confepar	347	64	411	355	64	419	1.9	6313	5914	-6.3	151	164	9.2	
10	Jussara	242	88	330	291	58	348	5.4	2887	3503	21.3	230	227	-1.1	
11	Vigor	217	63	280	221	49	270	-3.6	1482	1655	11.7	402	366	-8.9	
12	Centroleite	246	0	246	261	0	261	5.8	3774	3702	-1.9	179	193	7.9	
13	Frimesa	193	27	220	242	17	259	18.0	3783	4785	26.5	140	139	-0.6	
Total		6444	2193	8637	7158	2253	9410	8.9	56848	62444	9.8	311	314	1.1	

Estimation of total processing capacity of ranked processors: 14.219 m ltr

Source: Milkpoint 2015.



# Biggest dairy processors 2013-2014

- Very fragmented industry: less than 30% of milk production (>32m tonnes) is represented in the previous slide (8.3-8.4m tonnes), although it concerns the 13 biggest companies.

Often new combinations, joint ventures, etc. between different dairy processors, so ranking and shares often change.

- DPA: was a joint venture of Fonterra and Nestlé. DPA decided in 2014 to split up into two parts: a Fonterra and a Nestlé part.
- Large Brazilian food companies like JBS (turnover of \$41bn) and BRF (turnover \$19bn) are entering (and leaving) dairy in Brazil. The ambition of JBS is to be world leader in the production of animal proteins (meat and dairy).







# Biggest dairy processors 2012-2013

Solidarity of dairy farmers with dairy companies tends to be low. Scalco and Braga (2014) conclude that the Brazilian raw milk market is very close to a perfectly competitive market.



# Common farm types in Brazil

Diversity in farm types is big in Brazil!

Classification based on milk production per day

- <50 kg/day
- 50-200 kg/day
- 200-500 kg/day
- 500-1,500 kg/day
- >1,500 kg/day

Also differences between regions with farm types:

- Central Brazil (Minas Gerais and São Paulo) have more tropical grasses, higher temperatures
- Southern Brazil (Paraná, Rio Grande do Sol and Santa Catarina) more perennial grasses, better fit with Dutch farming systems and technologies



# Common farm types

Description is mostly qualitative because of lack of data:

- Structure - (no. of farms, cows, ha, labour, access electricity, water, technician, veterinarians and credits)
- Farm performance - (milk price, qualitative income not dairy, room to invest, management level, social life)
- Feeding - (ration summer and winter, feeding system, calves)
- Animal production - (yield, breeding, health)
- Milking and milk storage - (machine milking, cooling, quality, collection)
- Housing and manure handling



# Farms < 50 kg/day

- Large number of farms (>250,000)
- Average 9 cows, 20 ha of land, mostly grassland based, family labour
- Low access to technicians and credits
- Low milk price, high part of income from outside dairy
- Feeding: grazing and in winter cutting sugarcane and elephant grass by hand
- Low milk yield per cow, low milk quality, several health problems
- 80% machine milking, 80% milk cooling (sometimes communal or simple water tanks)
- Simple housing and manure handling
- Expected development:
  - Quit or grow (in southern states mostly development towards modernisation)
  - Depends mostly on alternatives for dairy



# Farms with 50-200 kg/day

- Large number of farms (> 170,000) responsible for about 30% of production
- 15 cows, 20 ha of land for dairy, mostly grassland based, family labour
- High access to technicians and veterinarians, 50% make use of credits
- Average milk price, variable part of income from outside dairy
- Feeding: grazing and in winter maize silage next to grazing
- Low milk yield per cow, working on milk quality and improving productivity
- 90% machine milking, 90% milk cooling (sometimes communal)
- Simple housing and manure handling
- Expected development:

Expected to grow in number of cows per farm and in productivity



# Farms with 200-500 kg/day

- About 60,000 farms, number increasing, production of farms increasing
- 25 cows (in lactation), 30 ha of land for dairy, mostly grassland based, not all crops for dairy, family labour
- High access to technicians and credits
- Good milk price, based on working on milk quality, better performing farms have a net margin so room to invest
- Feeding: 60-100 % grazing in summer, with feeding of maize silage. In winter time 10% grazing.
- Low milk yield per cow, relative good milk quality
- 95% machine milking, about 50% milking parlour, 100% milk cooling
- Better housing and milking parlours, some cubicle barns.
- Expected development:

Growing of farms, more mechanisation (feeding, feed production, milking parlours)



# Farms with 200-500 kg/day

## Minas Gerais case: high-level farm and farmer

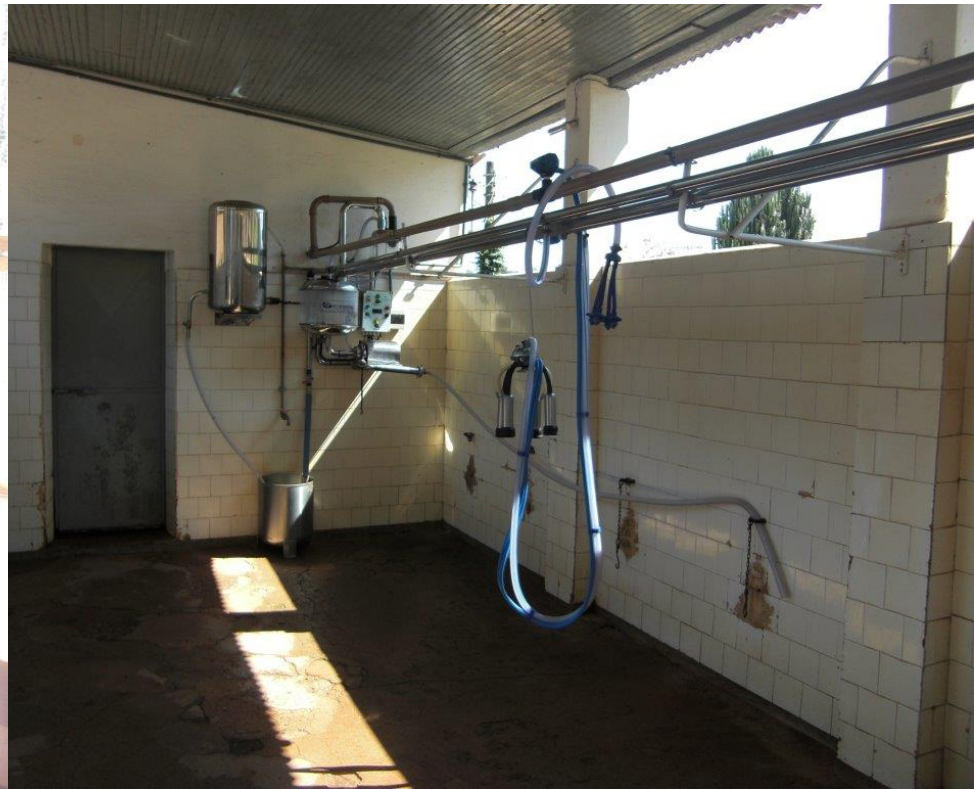
- High productivity of grassland and cows, good management
- 22 cows, 400 kg/day
- Multifunctional farm: with fishing pond and restaurant
- Participant programme 'Full Bucket', focusing on improving productivity
- Intensive grazing including irrigation, 20 paddocks of 600 m<sup>2</sup>
- Intensive administration, including weighing of animals
- Good financial results: investments from cash flow.
- Goal: 1,000 kg/day with clear steps (first investing in own tank, new milking parlour, etc).





Goal and scope	Dairy sector	Farms	Technology	Driving forces	Conclusions
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Goal and scope

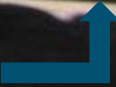
Dairy sector

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# Farms with 500–1,500 kg/day

- About 25,000 farms, production of farms increasing
- 80 cows (in lactation)
- High access to technicians and credits
- Good milk price, based on working on milk quality, better performing farms have a net margin so room to invest
- Feeding 70% grazing in summer, with feeding of maize silage. In winter time 50% grass 50% maize silage.
- Milk yield 10-12 kg per cow per day, relative good milk quality
- 100% machine milking, about 50% milking parlour, 100% milk cooling
- Better housing and milking parlours, 30% cubicle barns, 50% loose housing, working with liquid slurry.
- Expected development: growing of farms, more mechanisation (feeding, feed production, milking parlours), more confinement, more manure handling

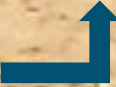
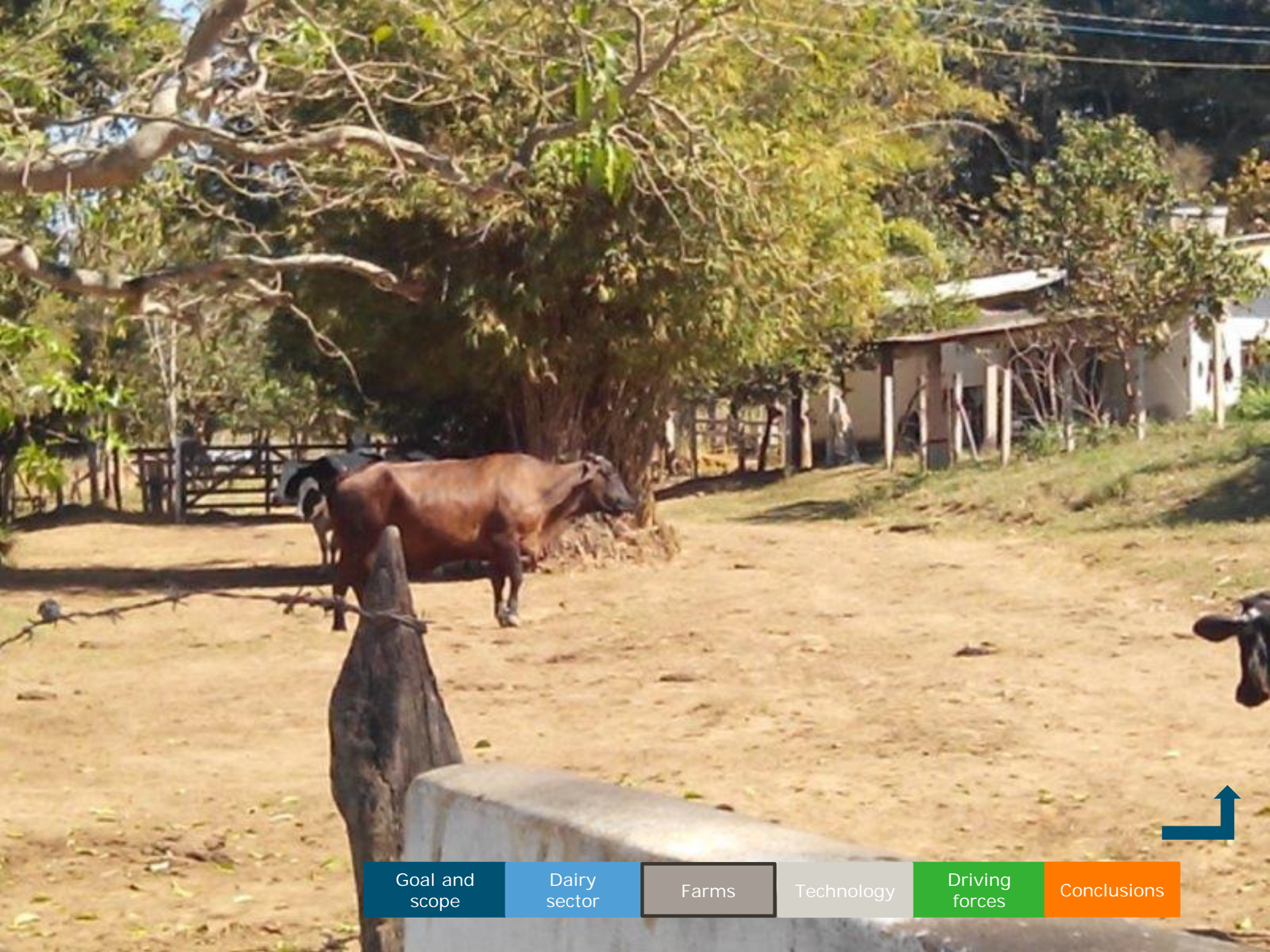


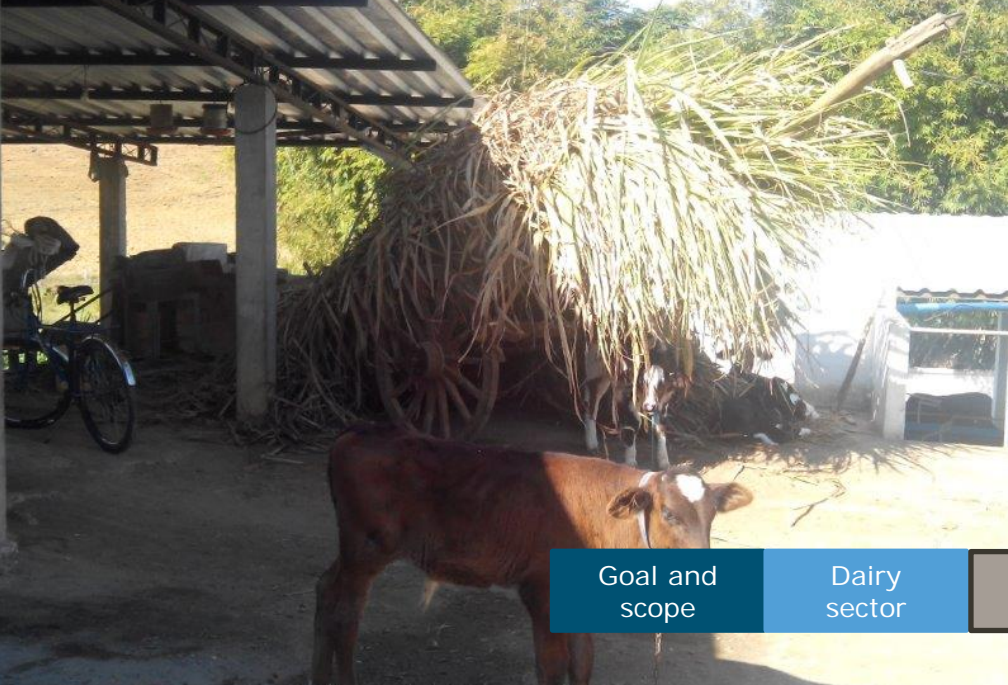
# Farms with 500-1,500 kg/day

## Case Minas Gerais:

- 80 cows, 1,200 kg of milk/day
- 221 ha of land
- Milking parlour, milk tank
- Future plan to grow productivity of pastures and forage production, genetics. No clear steps.







Goal and scope

Dairy sector

Farms

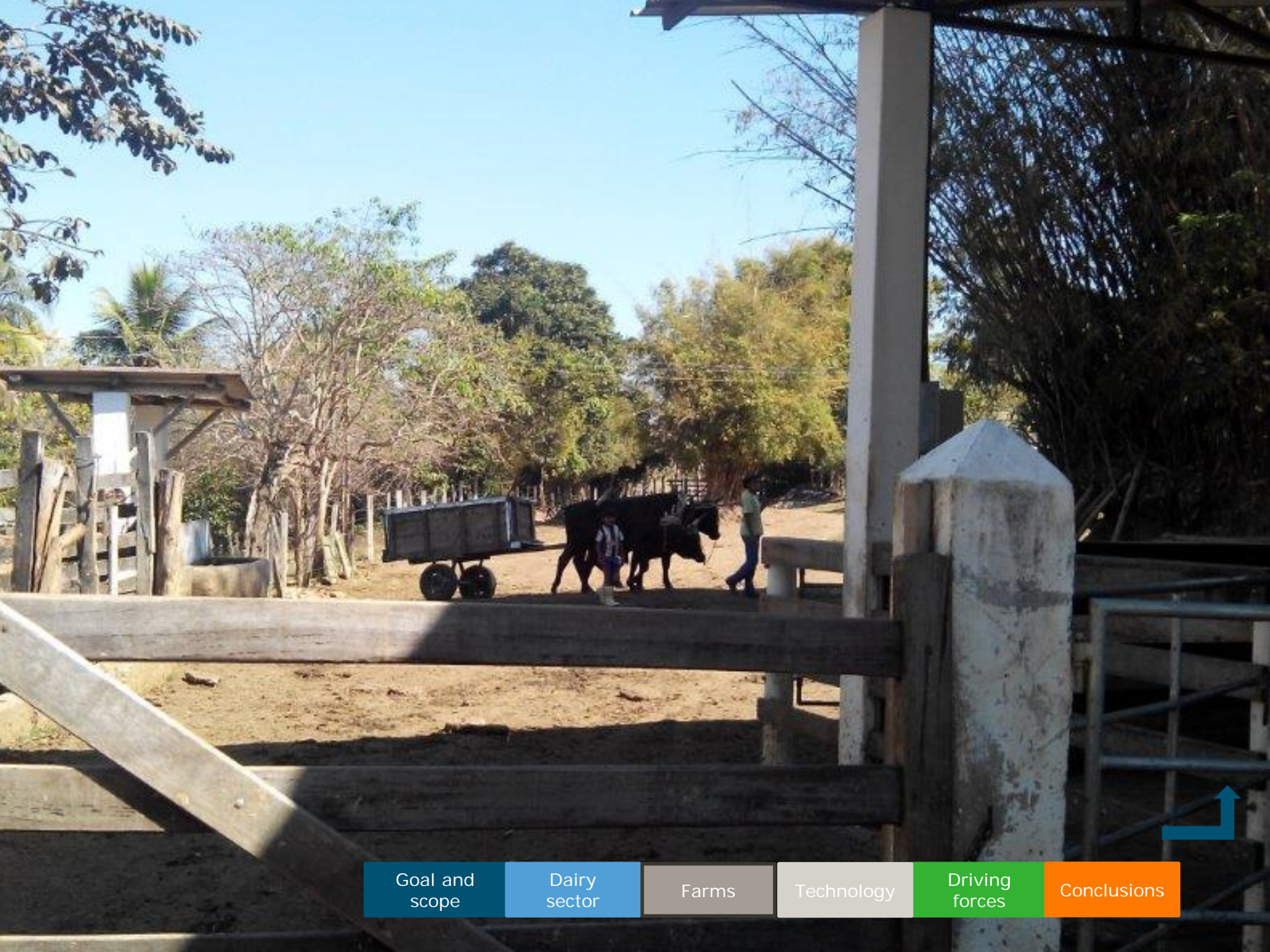
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# Farms > 1,500 kg/day

- About 1,200 farms, number increasing by 5% per year, production of farms increasing
- 120 cows (in lactation)
- High access to technicians and credits
- Good milk price, based on working on milk quality, better performing farms have a net margin: milk price R\$1.00–1.20, costs of best farms R\$0.84, leaving room to invest
- Feeding 40% grazing in summer, with feeding of maize silage. In winter time 60% grass, 40% maize silage. Feeding system 10% TMR, still a lot by hand.
- Milk yield 12+ kg per cow per day, relative good milk quality
- 100% machine milking, about 50% milking parlor, 100% milk cooling
- Better housing and milking parlors, 30% cubicle barns
- Expected development: growing of farms, more mechanisation (feeding, feed production, milking parlors), more confinement, more manure handling

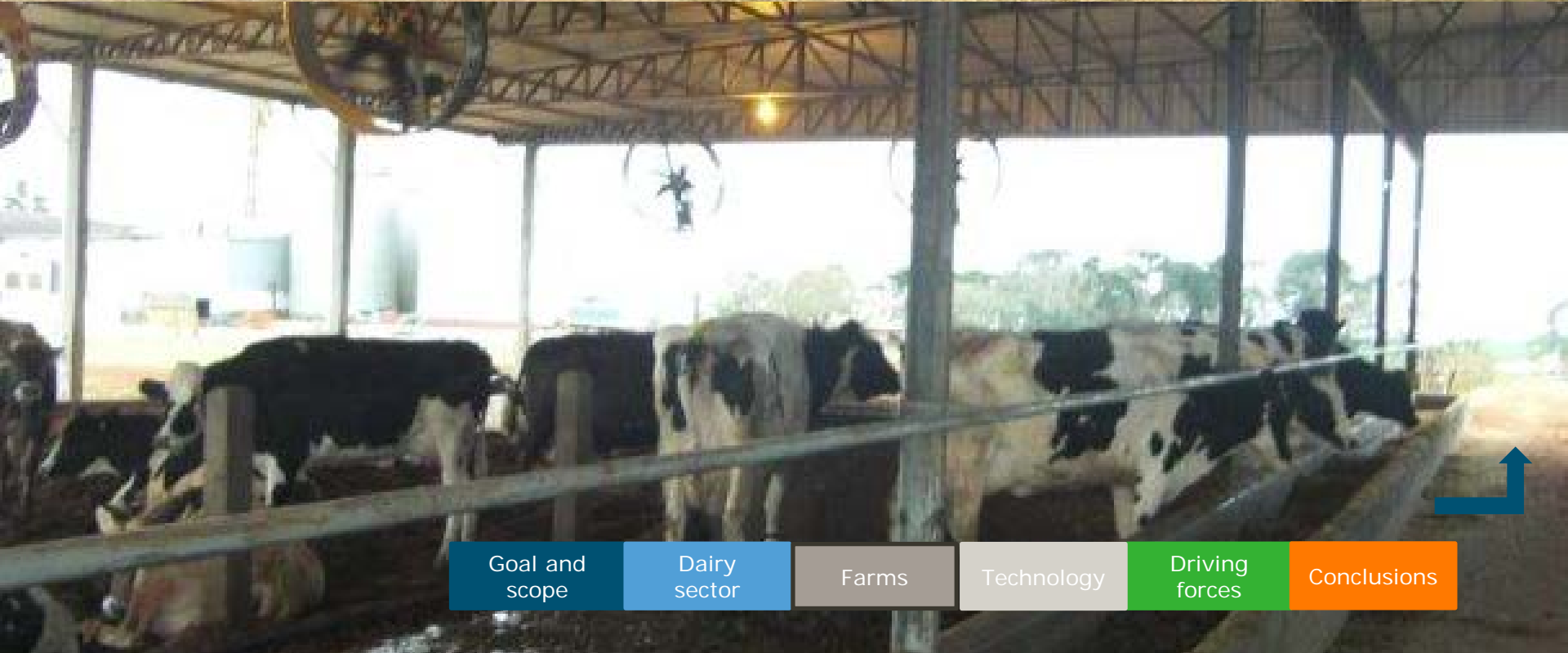


# Farms > 1,500 kg per day

Paraná case:

- Castrolanda
- 800 cattle, 380 dairy cows
- 8-10,000 kg of milk/day
- 750 ha, also cash crops (beans, soy)
- 14 persons for dairy
- Working on manure handling and bio digester





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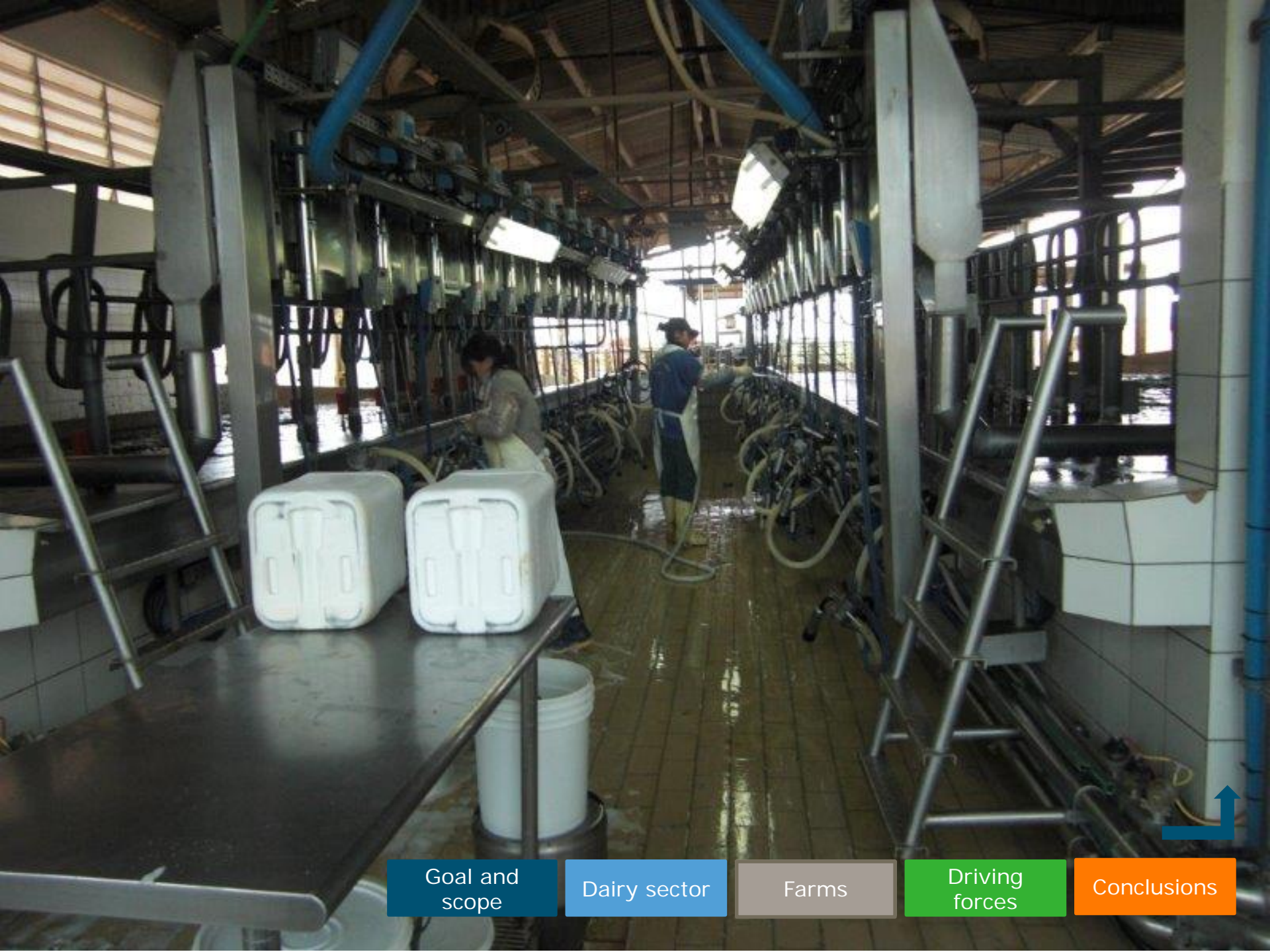
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# On farm processes

Description of strong and weak points of farm processes  
(mainly based on interviews)

- Grassland, fodder crops
- Feeding
- Milking, cooling and milk quality
- Animal health and welfare
- Manure handling
- Labour
- Ambition, attitude and skills of farmers



# Grassland, fodder crops and feeding

- Grassland and grazing basis of most farms
- Additional feeds: corn, sugar cane, grains
- Feed storage: no feed storage, concrete silos, bunkers
- Feeding often by hand, in general low level of feeding management
- Trend towards confinement and **machine feeding**. Big potential market
- Crops: high yields, up to 5 crops in 2 years, **need for varieties of corn for silage**
- Grassland: **need for better varieties**, need for improvement grassland management. **Opportunity for silage making**. Not all Brazilians are convinced of the added value of silage. If so, then there is big potential market for technology related to silage making and feeding.
- Many suppliers of equipment, both national and imported
- Use of milk replacer at low level: 10-15% at bigger farms (>500 kg /day)



# Milking, cooling and milk quality

- The last decade, a large shift towards machine milking and cooling took place with the help of credits, in some regions in the south also on many small farms
- Farmers who haven't switched yet are very traditional
- Because of an increase in farm size, farms are an interesting market for cooling tanks (replacement investments).
- Tendency towards investing in a milking parlour, for small groups in automatic milking systems
- Milk quality is still a big issue: bacterial count (small farms) and somatic cell count (bigger farms)
  - Could be better organised, also post farm (milk arriving at processor sometimes has worse quality than on farm)
  - Is also related to institutional issues (checks, penalties, supervision by independent party) and market (high need for milk, lower quality demands)
  - If Brazil will be exporting, then there are higher demands for milk quality
- Technology could perhaps help → automated milk sampling combined with GPS technology?



# Animal health and welfare

- Breeding
  - Great variety in breeds and crossbreds
  - From tropical breeds with low yields to pure bred Holsteins with yields > 10.000 kg.
  - Large number of breeding companies available
  - In some cases better breeding standards needed (Girolande)
- Data availability is very low, low participation in milk recording and breeding programmes.
- Diseases are an issue (e.g. ticks, Leucose)
- Trend towards confinement: **more attention to cow comfort (cubicles, beddings etc.)**
- Solution needed for bull calves



# Manure handling

- Traditionally not much attention because of grazing systems
- More attention now due to trend towards confinement
- No regulation (yet)
- **Likely future issue**, especially for bigger farms. In pork production rules are being implemented.
- Opportunity: soils are poor in P and organic matter, so manure has value.



# Labour

- Availability and quality is considered to be a problem
- Increase in minimum wage in the last decade
- People not motivated to work in dairy
- This will be the main driver for adoption of technology according to many people.
  
- However, some farmers have a different view: 'Labour is not a big problem':
  - These farmers offer a reasonable wage, housing and job for husband and wife
  - And educate and coach employees to improve quality



# Ambition, attitude and skills of farmers

- Key factor for adoption of technology
- Big differences between farmers but also between regions (small farmers have adopted technology in Rio Grande do Sul, but less so in Minas Gerais)
- Usually strong and long relation with supplier of technology
- Some groups of Brazilian farmers are also sensitive to new trends (e.g. compost barn)
- Tactical and operational management often at low level. A national programme such as 'Full Bucket' tries to improve this. Outreach seems limited. **Higher level of management will generate more cash flow.**
- There is no culture or knowledge on cost awareness. Farmers tend to look at cash flow and expenditure and not at costs and returns.



# Ambition, attitude and skills of farmers

Results from a questionnaire among a group of 615 dairy farmers (Educampo):

- 46% of investment in land, 24% in cattle, 16% in 'improvements', 11% in machinery
- Gross margin 0.20 R\$ (is around 0.06 euro) per kg in season 2009-2010 (period with rather low milk prices)
- In general: the bigger the herd the longer the farmer followed education
- Farmers' wives mainly assist during milking
- Only 30-40% of farms has successor: doesn't depend on farm size: will be an increasing problem
- Technical advisors of cooperatives/industries main source of information





# Ambition, attitude and skills of farmers

- Survey Rio Grande do Sul
- Opinion in survey: milk quality most important theme in trainings, followed by feeding, genetic improvement and management of the herd
- On semi-confinement systems 4-5 visits/year of technicians, on pasture systems 2-3 visits/year
- Opinion in survey: lack of qualified labour, technical information on milk production and market information are main factors hampering quality and quantity of milk production (milk price was excluded)



# Availability of technology

*Impression from Agroleite 2014*





Goal and scope

Dairy sector

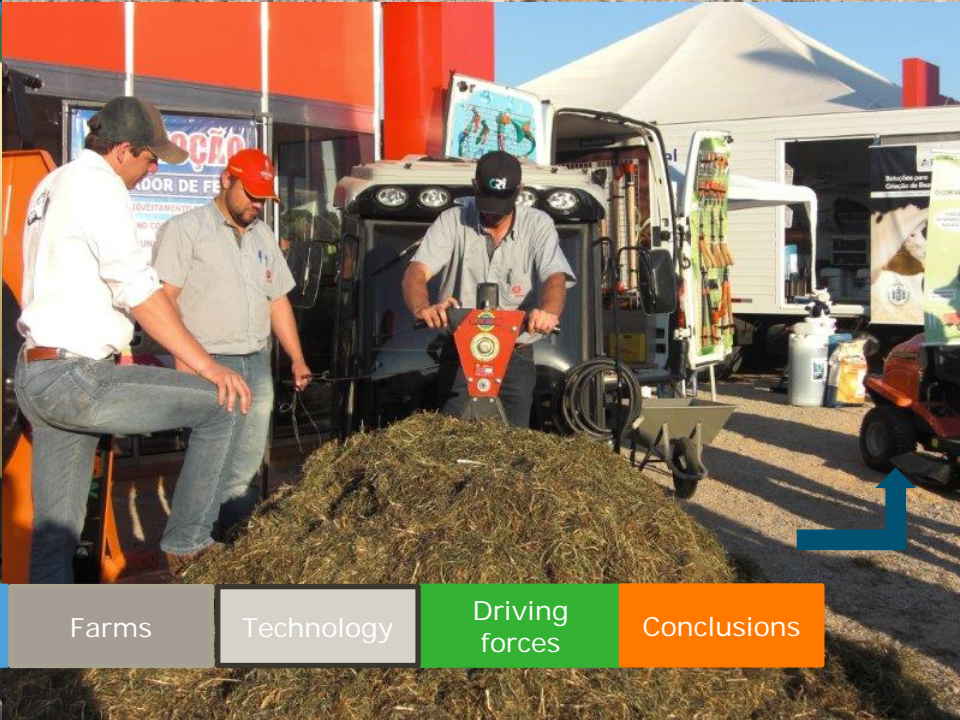
Farms

Technology

Driving forces

Conclusions





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Goal and scope

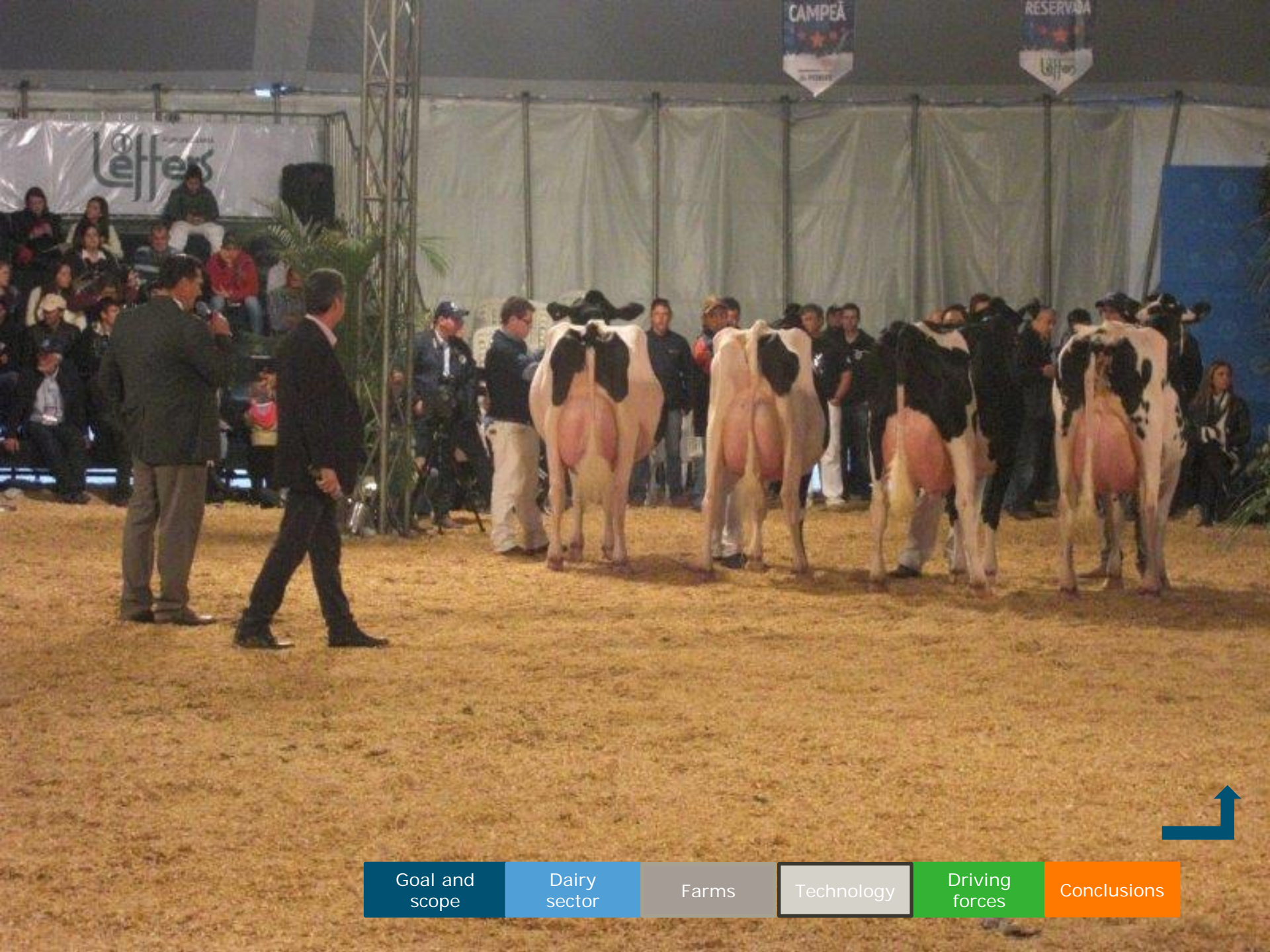
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# FÁBRICA DE FARELO DE SOJA



# Driving forces for development

- Infrastructure
- National government and policy
- Dairy chain



# Brazilian Infrastructure

## Major challenge!

- Transport is expensive and is expected to become more expensive because of legislation on conditions of employment truck drivers
- Organising support and service on a national level very complicated  
→ focus on regions.
- From farmers' point of view:
  - Access to technology is key issue (including capacity building, training)!
  - E.g. to get credits a farmer needs access to advisor
- Institutional organisation of dairy sector is weak



# National government and policy

- General situation economy rather poor (low growth, high inflation)
- No clear direction or policy
- Influence
  - Import levies (different levels depending on availability of technology in Brazil)
  - Credit programs (more detailed information available)
  - Research and extension
    - For bigger farmers research and extension is too close to government, not enough business oriented
    - Link research – practice
    - Extension not available, not functioning or difficult to access
    - Dutch colonies have their own joint foundation for research



# National government and policy: import levies

## ■ Import levies

- No or low levy if 60% of weight and value is from Brazil
- If technology is not available then also low levy: extarrifico
- Assessment for extarrifico by Brazilian Association for Machine Industry (ABIMAQ) [www.abimaq.com.br](http://www.abimaq.com.br) Assessment had to be paid for

## ■ Use of imported technology

- More expensive because of extra levies
- But also slows down innovation by Brazilian suppliers and is not an incentive to make high quality products. Brazilian suppliers seem to adapt prices to imported products (- 20%)
- “If farmers would make a good calculation of costs they would often still buy the more expensive imported technology, but they tend to look at short term cash flow”



# National government and policy: import credits

Credits several programmes in place:

- PRONAF: in place since 1990's, to support family farms. Low interest rates. Up to seven years,
- Inovagro: for new technology, if imported technology is classified as extarrifico then farmers can apply for Inovagro
- Several other programmes available
- 'No subsidised credits no sales'



# Dairy Chain

- No strong dairy chain structure: usually no contracts with supplier
- Field organisation available: focus on milk quality.
- Processors consider each other as competitors, no national programs.
- Brazil still net importer is important for further development of dairy sector, some processors see opportunities for export to world market.



# On dairy farmers' level

- Credit programmes are very important for farmers, and have improved. More long-term credits available now up to 10 years.
- Political situation creates uncertainty, no trust in government to come up with a policy that is favourable for professional dairy farmers
- Higher quality of decision making required → training of farmers and training of technicians
- Large-scale farmers focus on US systems (towards total confinement)





# Conclusions

- There is no clear development direction from government or industry, which means this direction can be influenced!
- You cannot do it on your own: you have to work in the Brazilian way, you need friends
- Focus: regions/type of farms
- Integrative approach needed: improvement is needed in different fields: grassland management, feeding, cow management etc.
- Farmers and technicians need more knowledge on investment decisions, otherwise they will not buy the more expensive imported machines → training programme required



# Conclusions

- Production will continue to increase
- This will be a gradual process:
  - Small farms up to 10 cows will diminish because of too bad economics (speed depends on alternatives)
  - Farms with 200-500 kg of milk per day (20-30 cows) with cooling tank, gradual growth
  - Gradual growth can continue until the number of cows that a family can handle, next step is more difficult.
  - Bigger farms will work more with confinement and less with grazing
- Production is moving to the south
- Medium scale farms 200–1,500 kg/day most interesting for Dutch agro industry
  - In total about 40,000 farms in southern states



# Grassland, fodder crops and feeding

- Opportunities for technology related to silage making
  - Mainly in southern states
  - Brazilians are not all convinced of added value: pilot or programme required
- Opportunity for variety of corn suitable for whole crop silage.
- Currently low use of milk replacer; opportunity for bigger farms
- Big market for feeding equipment especially for medium scale farms, lot of suppliers already in the market.



# Milking, cooling and milk quality

- Milk cooling is obligatory but there is still a big market because of growth of farms and replacement investments. There are many suppliers in the market.
- Milking equipment: big market for milking parlours, many suppliers in the market, often with long-term relation with dairy farmers, mostly on a regional level (a good dealer is crucial)
- Milk quality control related to transport is an issue: opportunity for automated sampling combined with GPS tracking.



# Animal health and welfare

- Several animal health issues: opportunity for development and implementation of national or processor programmes. A problem is the weak organisation of the sector. Who can organise this?
- Animal welfare: confined systems will increase. This gives opportunities, since there are not many suppliers in the market. Quality of cubicles etc. seems rather poor.



# Manure handling

- Will be an issue, not in the short term
- Not many suppliers in the market, and their quality is poor.



# Skills

- Increase in farm size and necessary increase in productivity requires higher skills of the farmers. Some national programmes are in place but the outreach seems limited and top-down.
- Opportunity (and interest from Embrapa) for closer co-operation with farmers, field evaluation of technology and trainings of farmers and advisors.
- There is an opportunity to sell a complete farm system: consisting of technology and management support/knowledge to make it work. Cooperation with processors and local organisations is necessary.



# For discussion

## Strategy to enter the market

- Own brand/export or local production?

## Opportunities for cooperation as Dutch industry

- Some Dutch companies already there and successful
- System approach
- Combined with knowledge development, management practices and training





# Appendices

1. References
2. Acknowledgements
3. Interviewed persons



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# Interviewed and consulted persons

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- Bernardo, William Fernandes (Embrapa)
- Borg, Roberto (dairy farmer, Castrolando)
- Claessens, Jerry (Lely)
- Elshof, Peter (Potato grower and producer of crisps, Curitiba)
- Ferreira, Fernanda (Embrapa)
- Homero, Fabio (Embrapa)
- Koning, Kees de (Dairy Campus Wageningen UR)
- Kramer, Joseph (consultant)
- Martins, Paulo (Embrapa)
- Padilla, Andres (Rabobank)
- Passos, Leônidas (Embrapa)
- Pauls, Diethard (BRF, dairy processor)
- Pires, Maria de Fátima Ávila (Embrapa)
- Salomons, Jan Willem and Marika (dairy farmer, Arapoti)
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- Tolsma, Fokko (CRV Lagoa and consultant)
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