

INFLUENCE OF LEGISLATION/SUBSIDIES, TO HELP AGRICULTURE AND/OR AGRICULTURAL MECHANISATION, ON THE MARKET OF AGRICULTURAL MACHINERY (The case of ARGENTINA)

Agricultural and food markets

Within the general expansion of the market, we can observe the particularly strong growth of farming products during the 2002-2005 period (fig. 1).

Agricultural areas

Because 60% of Argentina's territory consists of arid regions, agricultural

production is not distributed equally among the various regions of the country. The greatest agricultural productivity is found in the Pampas region (tab. 1).

As table 2 shows, there has been a clear trend toward increasing the planted area devoted to annual crops, at the expense of that devoted to forage crops, making it necessary to augment the intensiveness of livestock farming in order to maintain the same levels of livestock production.

Evolution of the principal crops

Looking at the trends for the various crops, we note the strong performance of soybean (a consequence of the high price which it commands on the international market and its suitability for no till cultivation methods) as also the improvement in maize yields (fig. 2).

The distribution of areas devoted to the principal crops is shown in figg. 3 to 6.

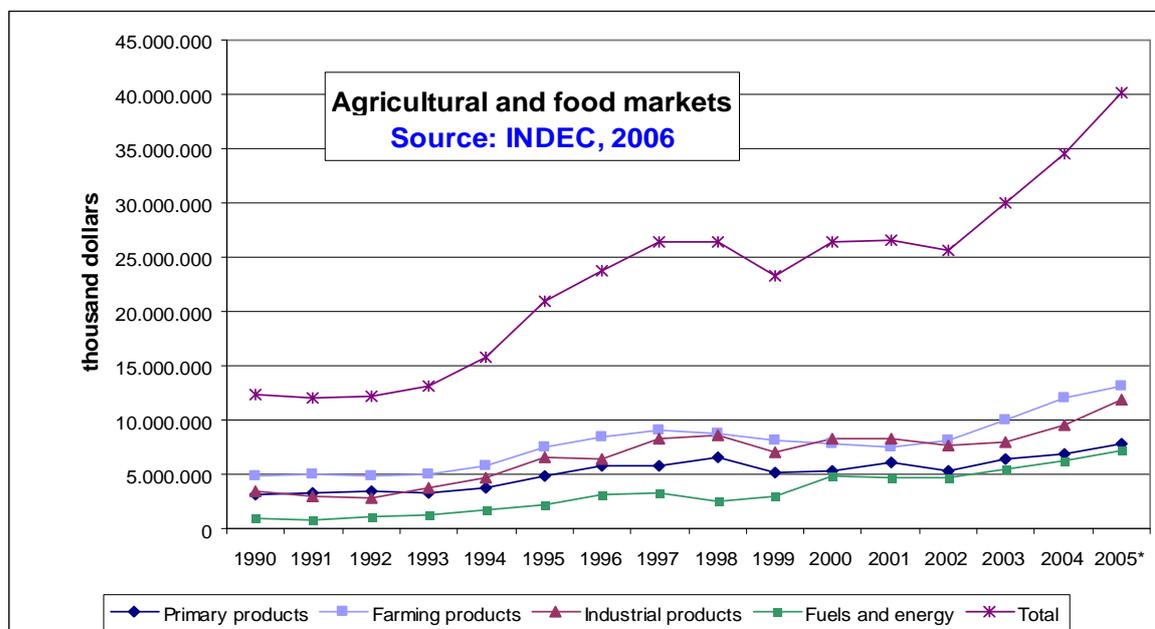


Fig. 1: Agricultural and food markets (source: INDEC, 2006)

Tab. 1 – Main agricultural regions

Humid region:	68 Mha (25 % area)
Semiarid region:	48 Mha (15% area)
Arid region:	170 Mha (60% area)
Region of the Pampas	(Buenos Aires, Cordoba, Santa Fe) (Rainfall from 1000 to 800 mm)
North region (two subregions)	Subtropical climate with rains in spring and summer (1 500 mm). Yearly average temperature of 20.7 °C.
Irrigated valleys	(western area). Accounts for 41.5% of the irrigated area of the country
Annual crops	(maize, wheat, sunflower, soybean) predominate in the region of the Pampas

Tab. 2 – Agricultural areas (source: INDEC, Censo Nacional Agropecuario, 1998 and 2002)

	Year 1988 [ha]	Year 2002 [ha]
Total area of farms	177,437,397.70	174,808,564.10
Total planted area	30,766,460.50 ↑	33,491,480.20
Annual crops	13,804,777.80 ↑	19,338,602.10
Perennial crops	1,024,720.20	999,680.40
Annual forage crops	5,788,949.80 ↓	4,007,530.50
Perennial forage crops	9,141,215.60	7,878,499.80
Forests and/or scrubs	719,268.60	1,021,924.60
Without discrimination	287,528.50	245,242.80

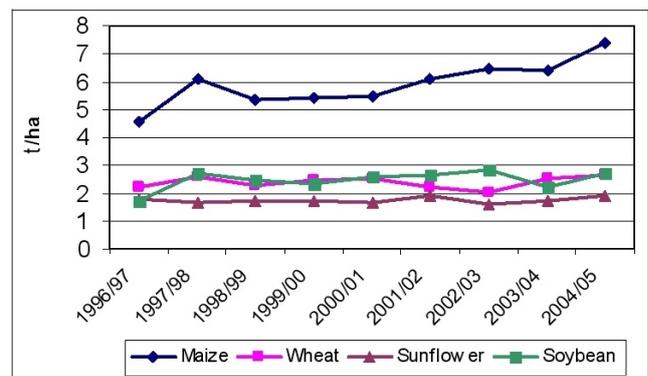
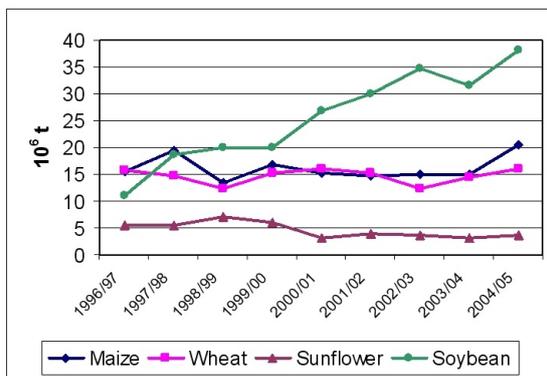


Fig. 2: Evolution of main crop productions (on the left) and evolution of main crop yields on the right (Source: SAGPyA, 2006)

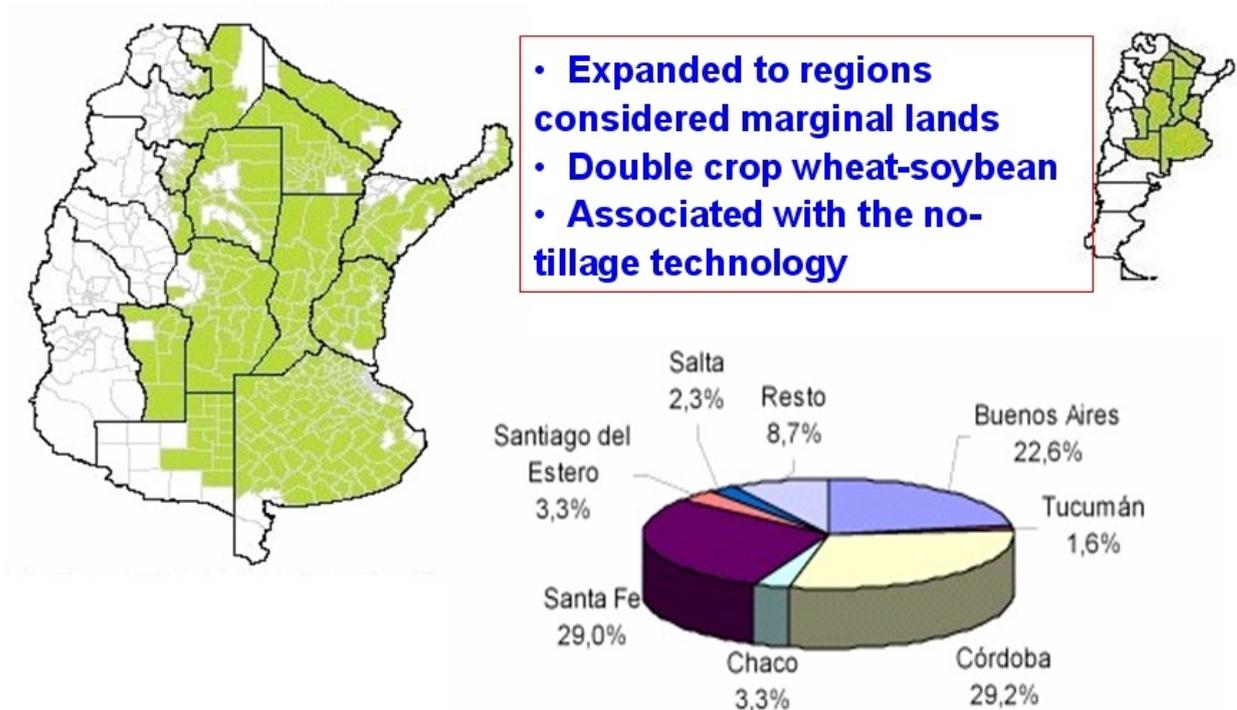


Fig. 3: Soybean: distribution of crop areas (source: SAGPyA, 2006)

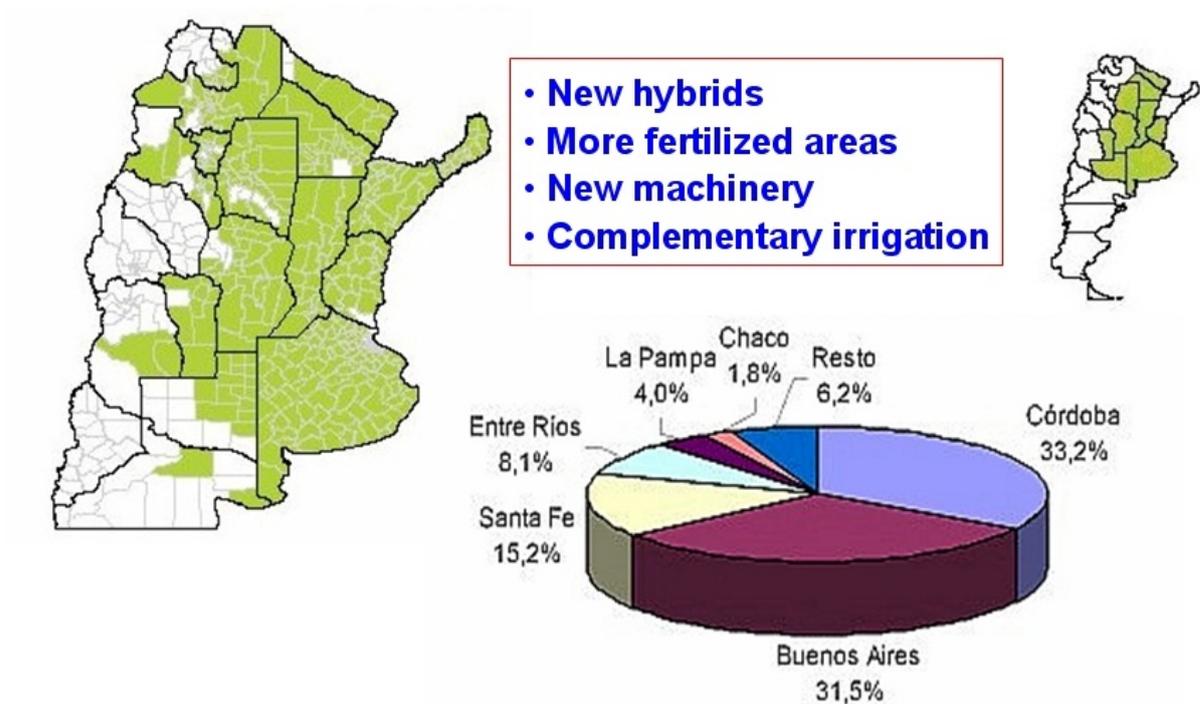


Fig. 4: Maize: distribution of crop areas (source: SAGPyA, 2006)

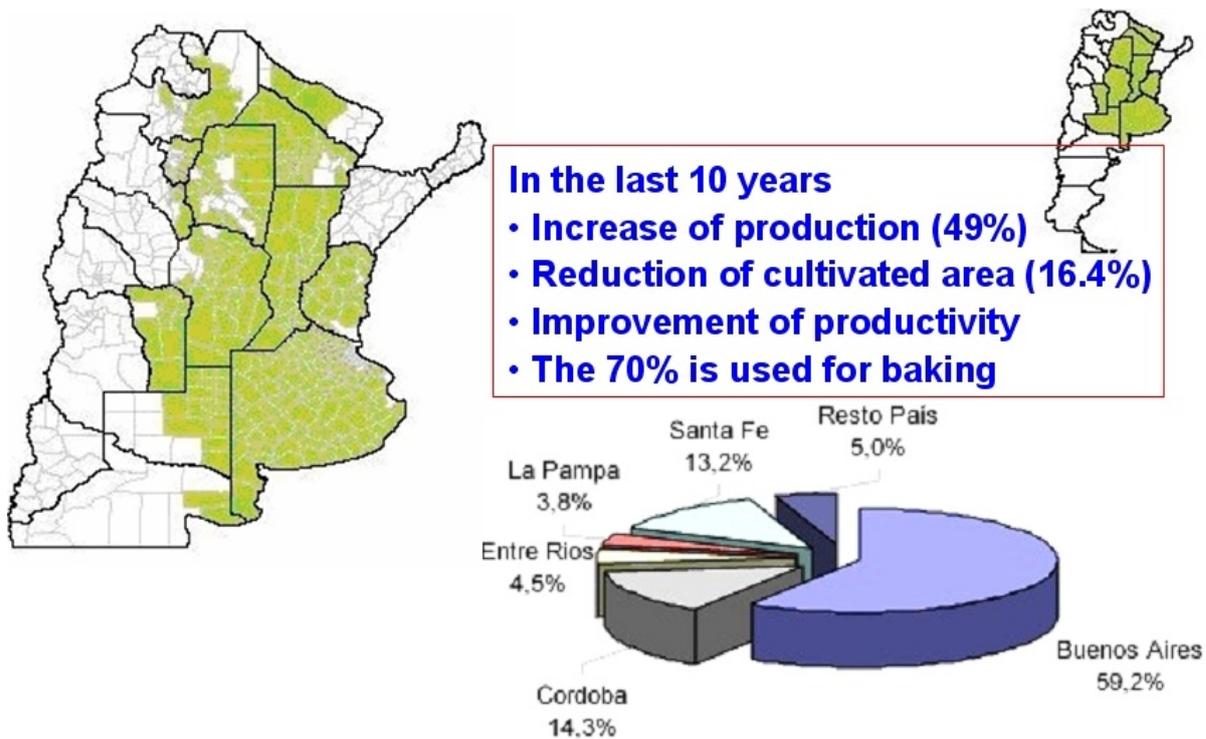


Fig. 5: Wheat: distribution of crop areas (source: SAGPyA, 2006)

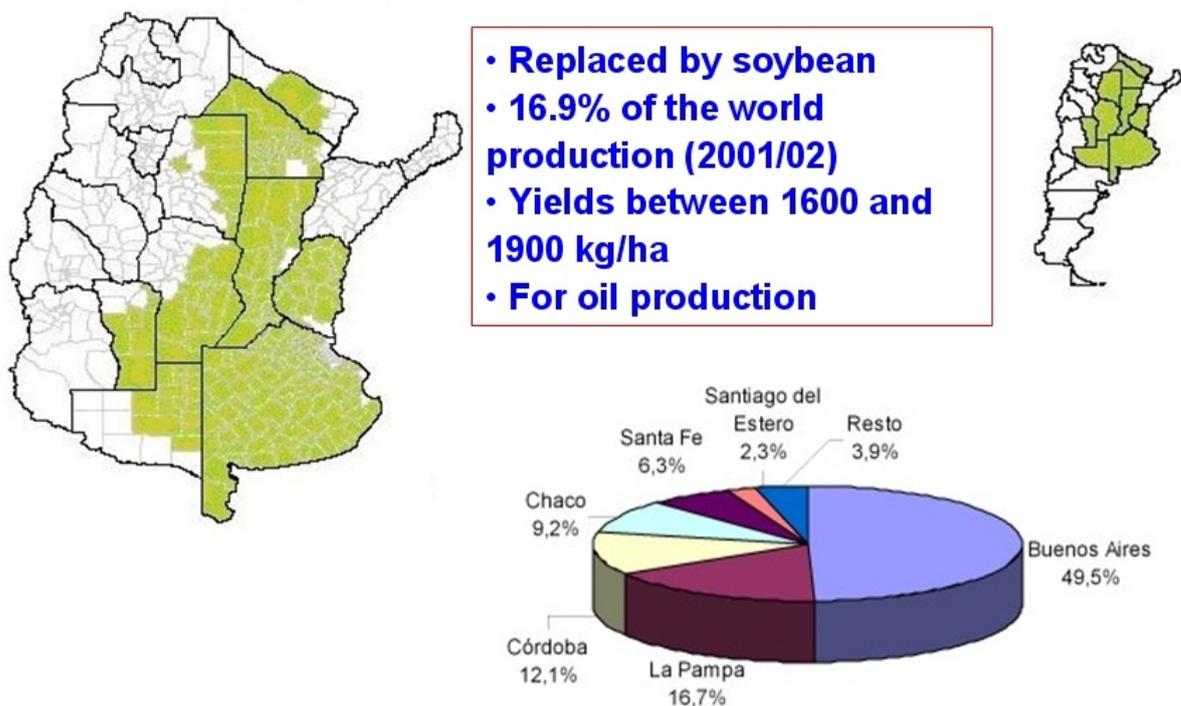


Fig. 6: Sunflower: distribution of crop areas (source: SAGPyA, 2006)

We note the use of complementary irrigation for maize, the reduction in the cultivated areas devoted to wheat, compensated by an increase in the yield per unit area, and the importance of sunflower in the world oil market.

Other important crops, though in some cases characterised by low mechanisation levels, are:

- **industrial crops:** sugar cane, cotton, peanut, tea, mate... Basis of regional agricultures (North and West).

- **Fruit growing:** 270,000 ha, especially in the irrigated valleys (Mendoza).
- **Horticulture:** 291,000 ha, in the vicinity of the main cities.

Animal Production

It can be observed (tab. 3, fig. 7) the relative importance of cattle farming, as also the reduction in the number of head of livestock. Sheep farming too has suffered a decline, going from 50 million head in the 1960s to only 14 million today.

Tab. 3 – Animal production

Livestock farming (EAP)						
year	EAP/head	Cattle	Sheep	Goats	Horses	Pigs
1988	EAP (no.)	249984	83581	50152	235867	100972
	Head	47075156	22408681	3710065	1994241	3341652
2002	EAP (no.)	193886	55843	46766	171338	62313
	Head	48539411	12558904	4061402	1517143	2184804
Cattle:	Reduction of 4 M head in 10 years (10%) 30% reduction in the area devoted to livestock farming Increase in productivity, use of forage Dairy farming: 2.5 M head of livestock					
Sheep:	Reduction from 50 M head (1960's) to 14 M head					

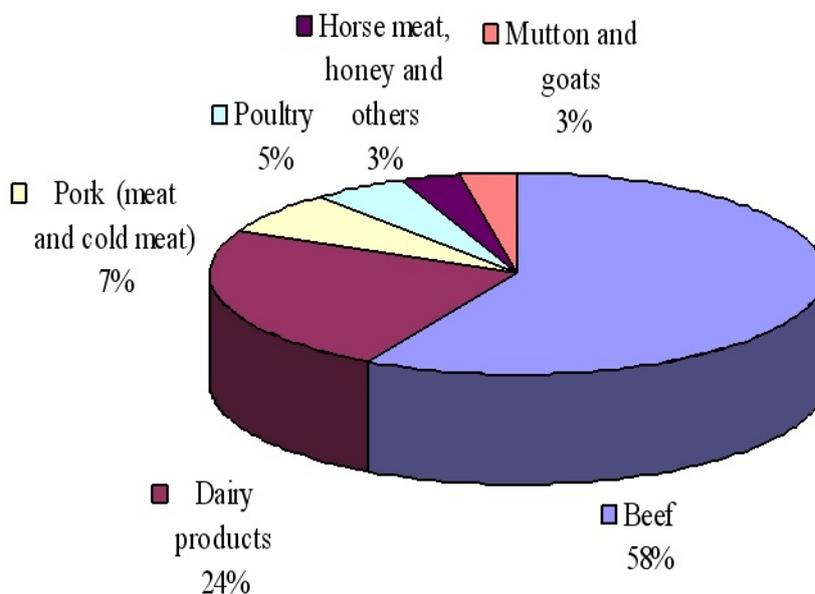


Fig. 7: Share of livestock activities in the GVP (2004) (source Regunaga, et al 2006)

Employment and training

level of the principal crops, is shown in tabb. 4 and 5.

The occupation of manpower in the agricultural sector, and the technological

Tab. 4 – Manpower in the agricultural sector (source: Llach, J. Harriaguem, M. O’ Coonor, 2006)

During 2003, the employment generated by agro-industrial chains was equivalent to:	- Total Employment: 5.203.800 jobs - Direct Employment: 2.751.200 jobs - Indirect Employment: 2.452.600 jobs
Regarding the total amount of jobs, it is estimated that:	- the 27,6 % corresponds to the primary sector - the 28,1 % corresponds to the secondary sector - the remaining 55,7%, is equivalent to tertiary sector, which includes state employment (4%)

Tab. 5: - Technical capacity and level of manpower (source FAO, made with data of INTA 2002)

Crop group	Technological level	Area (k ha)	Producers (thousands)	Production (k t)	Main crops
Cereals and oil crops	Low	3 187	38	7 015	Soybean Wheat Maize Sunflower
	Medium	8 413	75	24 564	
	High	5 103	28	19 545	
	Total	16 703	141	51124	
Fruit crops	Low	64	14	532	Citrus Vineyard Apples Pears
	Medium	80	8	1 864	
	High	75	2	1 751	
	Total	219	24	4 147	
Industrial crops	Low	361	31	3 733	Cotton Sugar cane Tobacco Mate
	Medium	543	22	8 761	
	High	370	9	12 318	
	Total	1274	62	24 812	
Horticultural crop	Low	27	4	516	Potatoes Garlic Onion Tomato
	Medium	23	3	533	
	High	48	1	2 036	
	Total	98	8	3 085	

Differences in crop yields as a function of technology levels

- 14% use high technology
- Account for 50% of production

Extensive production of grain:

- Medium and high technology: 82% of the area
- Production: 86% of total

Fruit crops:

- 8% use state-of-the-art technology
- Account for 42% of production

Industrial crops:

Evolution of production methods affecting mechanisation

There has been a notable increase in the adoption of no till cropping systems, using own technology and with abundant surface residues, as shown in figures 8 to 10 and tables 6 to 8.

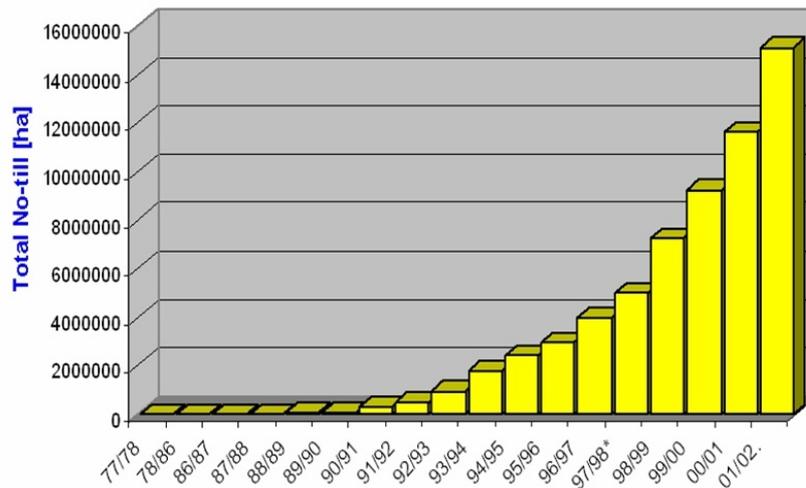


Fig. 8: Increase of no-till areas (1977-2001) (source AAPRESID)



Fig. 9: no-till crops

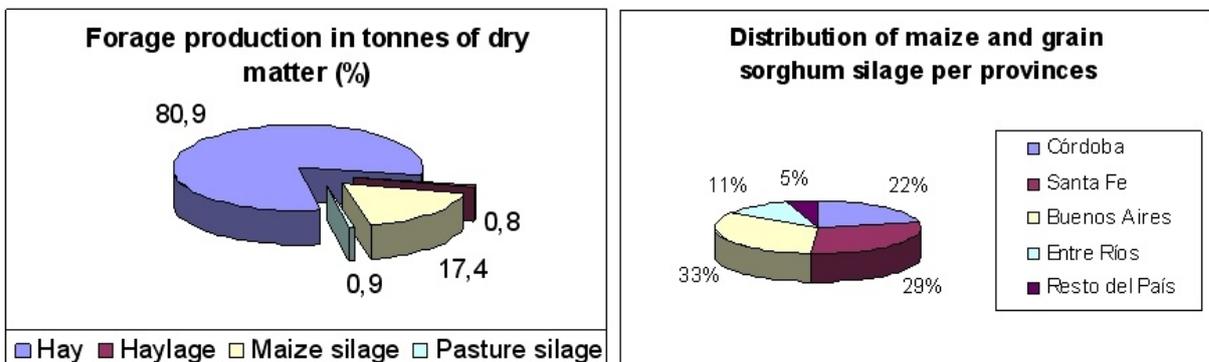


Fig. 10: Evolution of production techniques affecting mechanisation: Changes in the use of forage (source: INTA PROPEFO – Manfredi)

Tab. 6 – Increase of no-tillage area (source AAPRESID)

	Wheat	Soybean	Maize	Sorghum	Sunflower	Pastures	Total
Total No-till [kha]	1267	3782	1148	238	356	477	7270
Total agric. area [kha]	5870	6873	3522	809	3302	2517	22896
No-till percentage	22	55	33	29	11	19	32

Tab. 7 – Regional distribution of no-tillage area (source: AAPRESID)

Regional distribution	[%]
Entre Ríos:	50
N. O. A.	50
Santa Fe	47
Córdoba	41
Buenos Aires	20
La Pampa	15
Otros	15

Tab. 8 – Marketing season (source: INTA PROPEFO – Manfredi)

Marketing season	94 / 95	98 / 99
Maize (complete plant)	76 000	330 000
Grain sorghum	4 000	130 000
Pastures	3 000	80 000
Moist grain	1 000	120 000
TOTAL	84 000	660 000

No-till methods are not equally prevalent for all crops or in all regions, because their uptake depends on the suitability of both the crop and the agricultural environment to this system.

There have also been major changes in the production of forage affecting the technology employed for harvesting the grass, which has until now relied on a "shear" type mower without any conditioning system.

Influence of aid on agriculture, markets...

- The Argentine agricultural sector bears a heavy tax burden. It is one of the main sources of government income, with numerous taxes which overlap each other.
- A VAT rate of 21% is applied to sales of agricultural products such as cereals, legumes, dried fruits, etc.
- A reduced VAT rate of 10.5% is applied to some products, such as live cattle, fresh fruit and vegetables, as well as to mechanical works hired by farmers.

- An export tax of 20% is applied to primary products and to oils and by-products derived from soybean and sunflower. Argentina is probably one of the few countries in the world which taxes the exporting of agricultural products.
- Other general taxes are applied to: profits, fuels (0.15 US\$/l of diesel oil), personal goods, financial transactions. In addition to this there are also provincial taxes (stamp duty, tax on real-estate, yield rate).

Market of agricultural machinery and tractors

The domestic market for tractors and agricultural machinery increased strongly until 2004, and has since remained stable or with some slight downward fluctuations. The higher unit value of tractors and cereal combines, which are for the most part imported, means that the national production accounts for approximately one fourth of the total volume of this market (figg. 11 to 14).

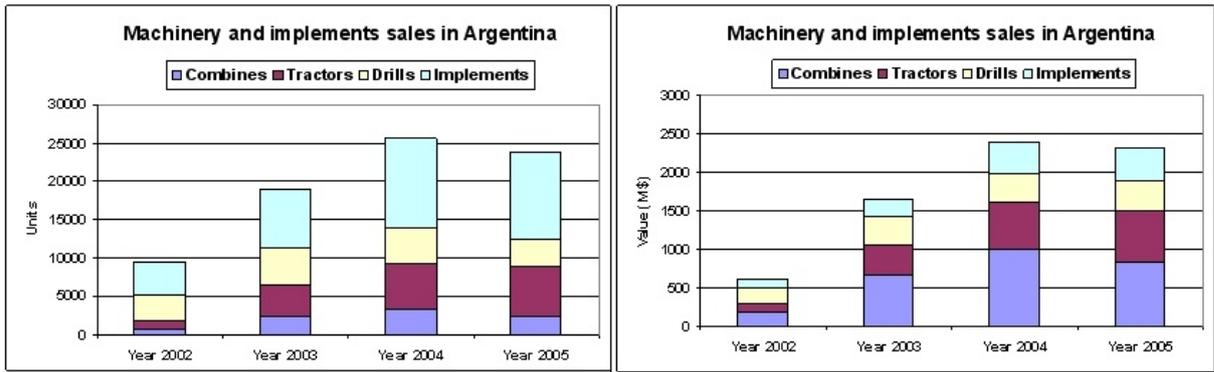


Fig. 11

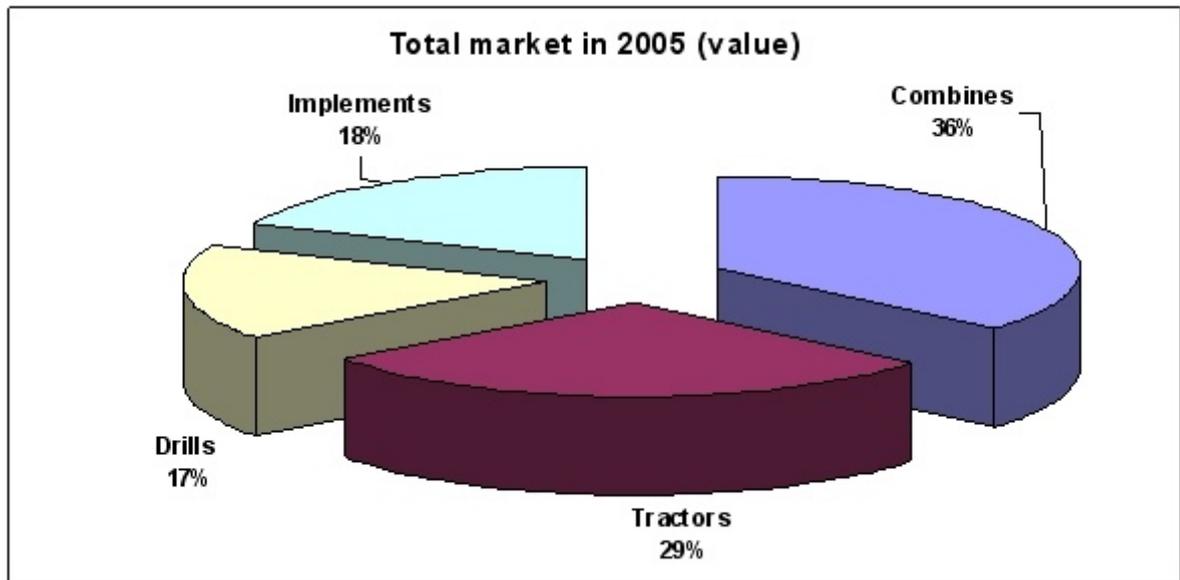


Fig.12

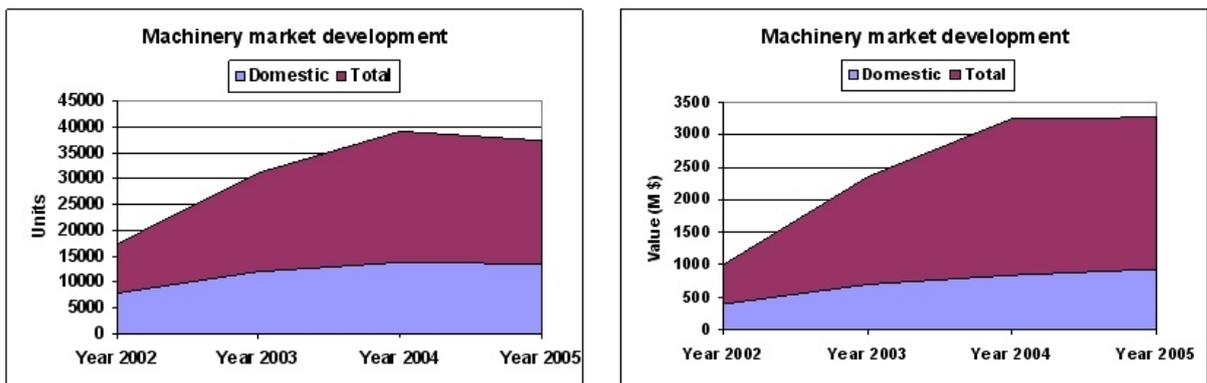


Fig. 13

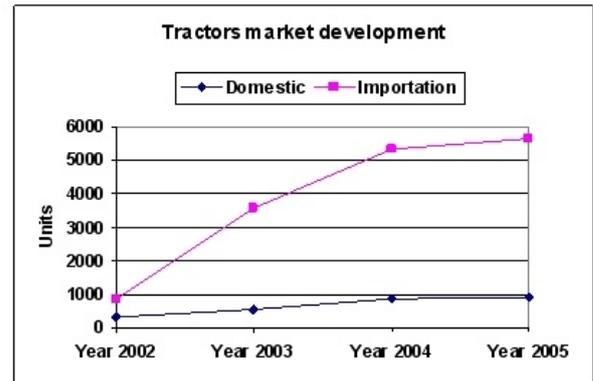
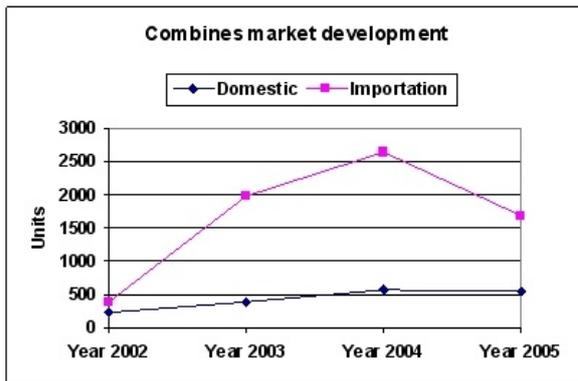


Fig. 14

The national industry is highly competitive in certain implements specifically designed for no till systems, such as seed drills with high working widths capable of operating with abundant surface residues. There are

also domestically-manufactured heads with high working widths, made from special materials such as aluminium, that are suitable for both national and imported harvesters (fig. 15 to 18).

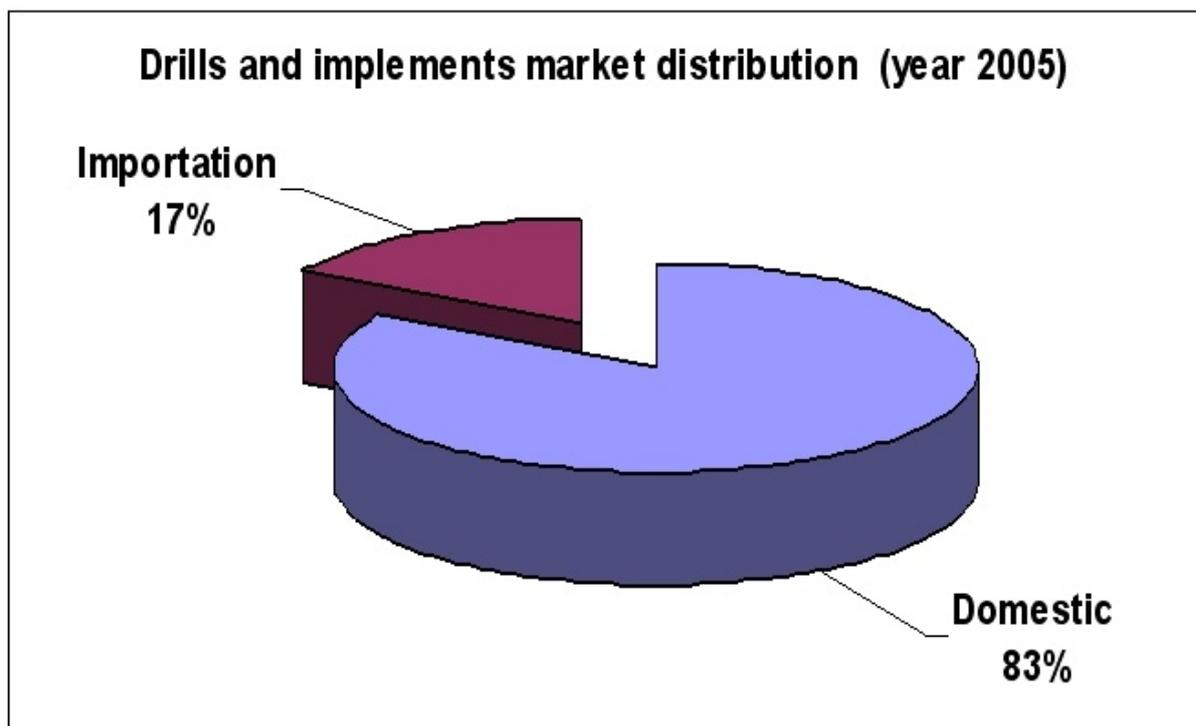


Fig. 15



Fig.16

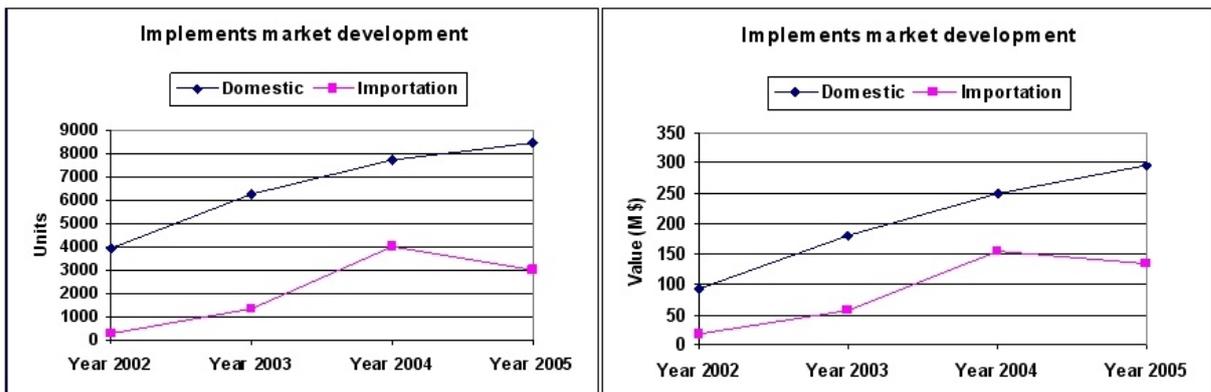


Fig. 17



Fig.18

There has been a drastic decline in the national production of tractors, with the disappearance of some of the companies which dominated 50% of the national market, as well as a decline in the national

production of combines. On the other hand, the national industry dominates the market for drills and sprayers, and that of harvest hoppers (fig. 19).

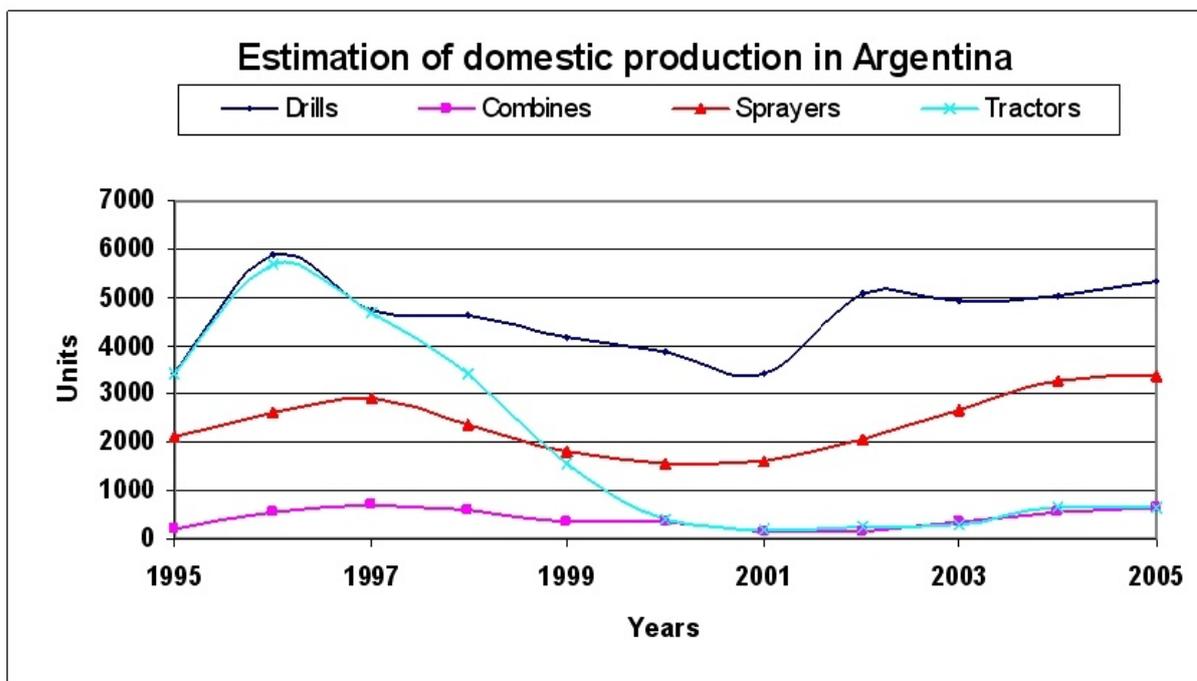


Fig. 19: Argentine market development (source: CAFMA)

Nearly 50% of the companies which manufacture agricultural machinery are situated in the province of Santa Fe and, within it, in the department of Belgrano (fig. 20 and tab. 9).

and less than 50 employees, account for another 30% (fig. 21 and tab. 10).

Tab. 9 – Domestic production

Manufacturers	n.
Machines	310
Components	345
Total	655
Workers employed	60000

Large companies with more than 120 employees and a turnover exceeding 15 million US\$/year account for 30% of the national market. Small companies, with a turnover of less than 5 million US\$/year

Tab. 10 - Market distribution and turnover

Type of company	Turnover (US\$)	No. of employers	Domestic market
Large	> 15	> 120	30%
Medium	> 5	70 - 120	40%
Small	< 5	< 50	30%

Manufacturers regional distribution

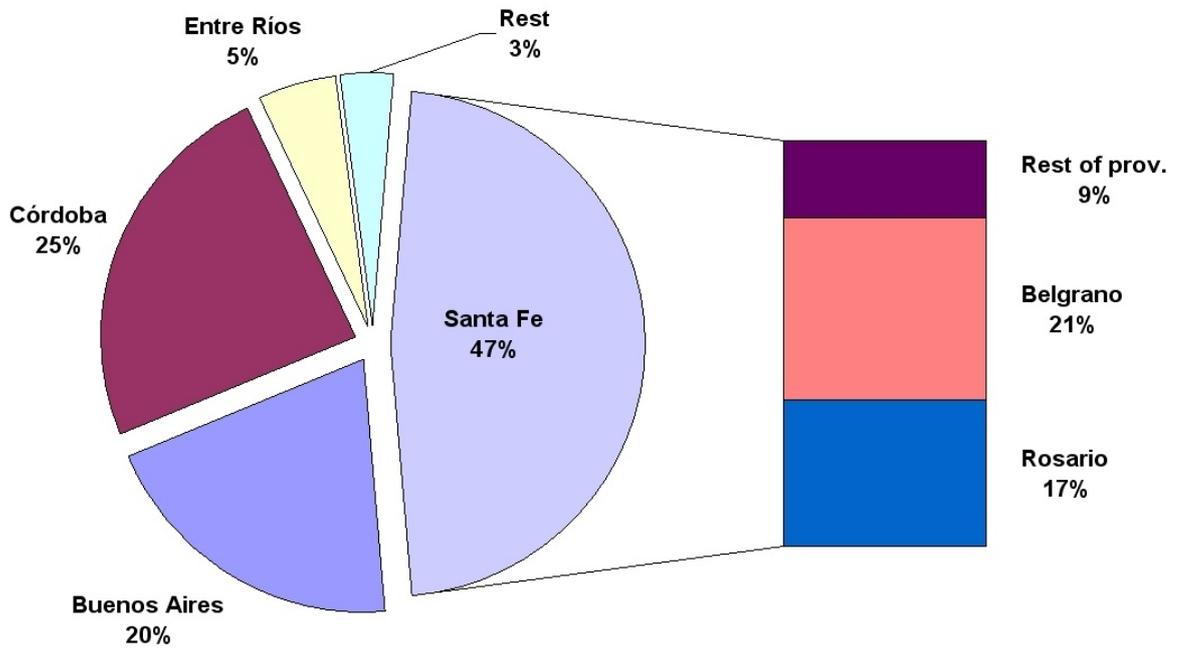


Fig. 20

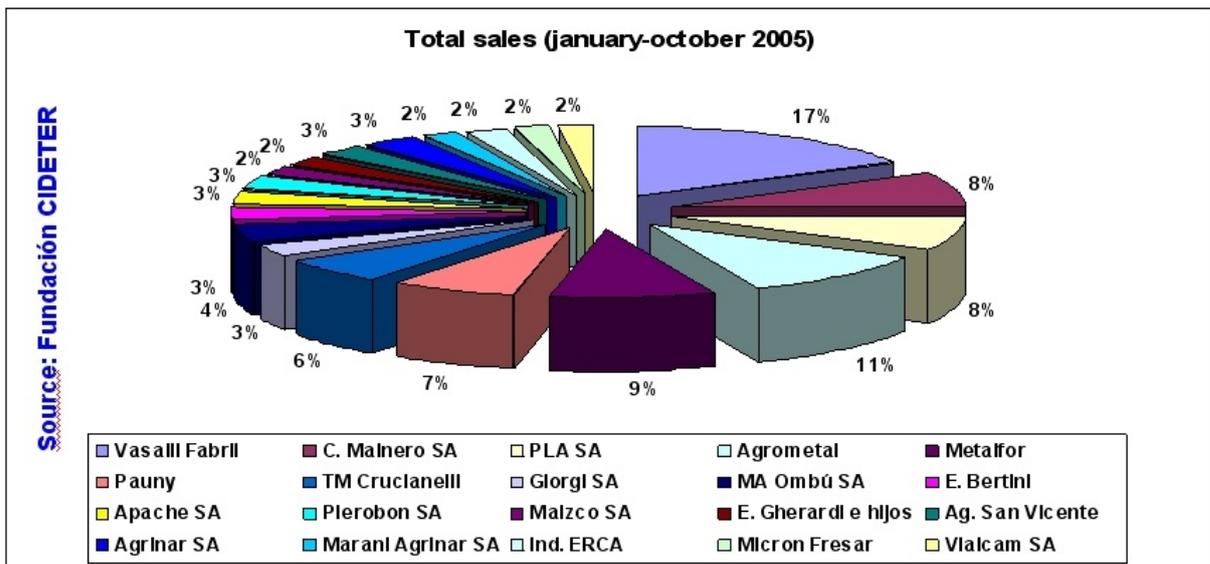


Fig. 21

The companies operating in the national market of tractors and harvesters, and the average characteristics of the products that

are put on the market, as shown in tab. 11 and 12 and fig. 22.

Tab. 11 – Market of tractors and combines (source: AFAT)

Period: Year 2005	Tractors		Combines
	Domestic M.	Exportation	Domestic M.
AGCO Argentina S.A.	2371		479
Agco Allis	984		242
Massey Ferguson	1387		237
John Deere Argentina	1630		706
Valtra Tractores Arg. S.A.	709		
CNH	913		383
Case	160		250
New Holland Argentina S.A.	753		133
Finning Argentina S.A.	38		4
Pauny S.A.	754	9	
Subtotal	6415	9	1572

Tab. 12 - Market of tractors and combines

	Tractors	Combines
Average sold horse power	126 CV	
Total sold horse power	413 798 CV	
Market share 4WD Tractors	77%	
Market share in MERCOSUR	87%	87%
Share in other markets:	13%	13%

Combines sales

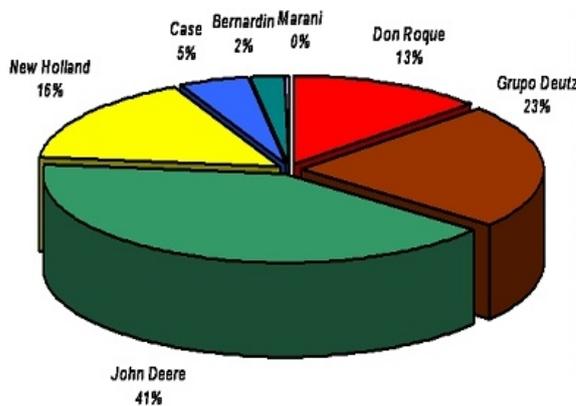


Fig. 22 (source: Fundación CIDETER)

For tractors, the market demand has shifted from a very simple tractor, of the 4WD same-size wheel type (fig. 23), toward a

tractor specifically designed for no till systems with the technical characteristics shown in tab. 13.



Fig. 23: View of a former simple tractor (4WD same-size wheel)

Tab. 13 – Tractor characteristics

- Power: 140 CV.
- 4WD transmission
- Simple Hi-Lo gearbox 2 or 4 stages powershift; step overlap between 6 -12 km/h
- Performance hydraulic system, with a total flow capacity of at least 100 L/min and pressure of 150 bar .
- Twin tyres or low pressure tyres with high flotation to reduce soil compaction
- High weight/power ratio (minimum: 55 kg/CV),
- User prefers engines without “common rail” (diesel oil)

- **No-till systems** reduce the tractor usage times to 15% of time of that of conventional tillage systems, suggesting that the tractor market may be stabilised for the time being.

The national industry is highly competitive in the market for drills and sprayers, and has the capacity to meet the national

demand for these implements as well as to export (tab. 14 and figg. 24 to 29).

Tab. 14 –Characterization of drills fleet (2006) (sources: Fundación CIDETER; INTA Manfredi)

Fine grain (47%)		Coarse grain (53%)	
Row spacing	17.5 – 19 – 21 cm	Row spacing	40 – 52.5 – 70 cm
Working width	from 3 to 7 m	Working width	from 3.5 to 15 m
Average	5 m	Wheat sowing	kit for 26 cm

Drills sales (january-october 2005)

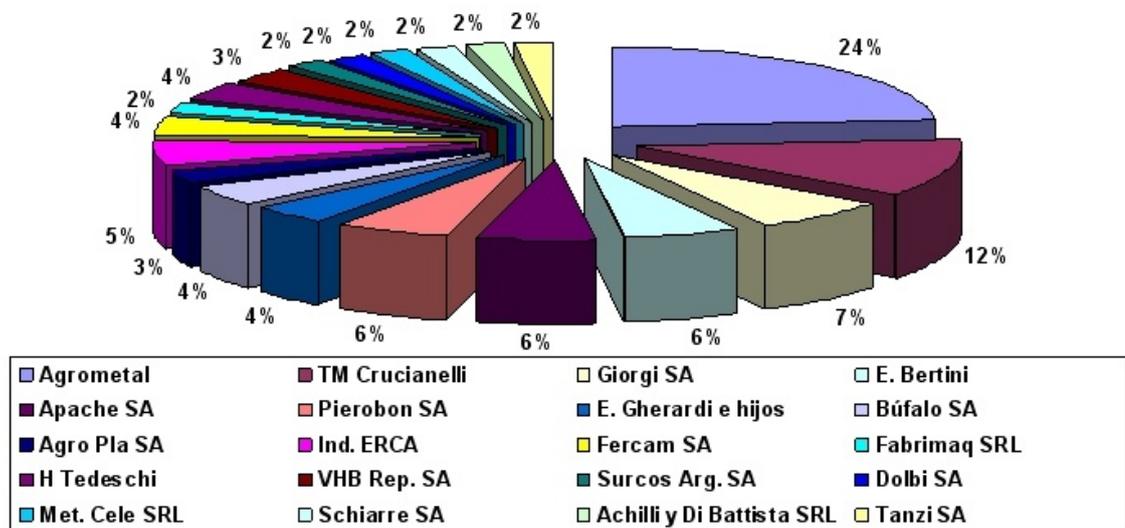


Fig. 24



Fig. 25



Fig. 28

Sprayers sales (january-october 2005)

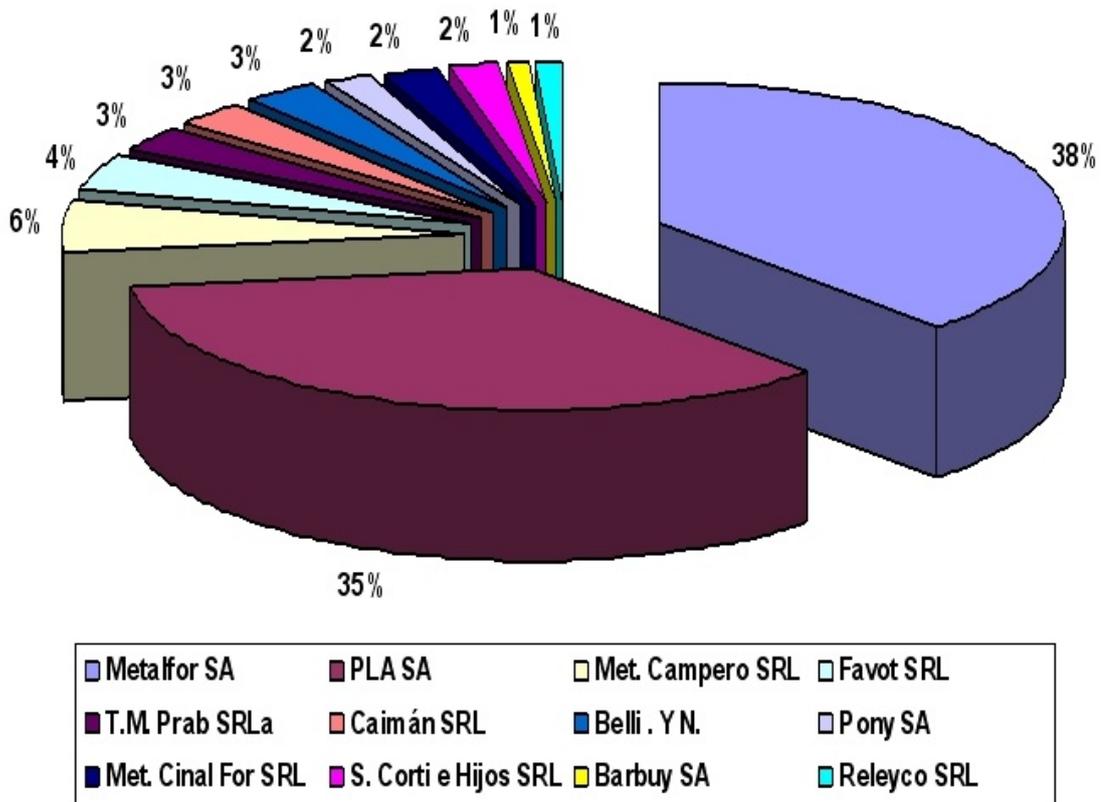


Fig. 29

Subsidies for the industry sector

- Subsidies are small and aimed at promoting the technological innovation of industries and their products, as well as at supporting industry associations of various types.
- **Agencia Nacional de Promoción Científica y Tecnológica** (FONTAR): National Agency for the Promotion of Science and Technology. Provides financing for research activities, technological development and modernisation, to groups of companies and other institutions linked to a particular region.
- **Proyectos Federales de Innovación Productiva** (PFIP 2006): Federal Projects for Productive Innovation. Promotes the creation and transfer of knowledge for addressing specific social and productive problems within a region.
- **ADIMRA.TICs** Aimed at metallurgical SMEs for improvement of their productivity through the deployment of information and communication technologies (max. company: 7000 U\$S).
- **Programa de apoyo a la Reestructuración Empresarial (PRE)**: Enterprise Restructuring Support Programme. Finances, through Non Refundable Contributions (ANR), up to 50% of the investments made by companies for hiring technical professional services to improve their competitiveness. (BID)
- **Fundación CIDETER**: Third party involved in the distribution of subsidies [33 M \$ - 2004-05].
- **Technological development of Argentine companies**
 - Decline in the importance of industries which manufacture tractors and combines.
 - Predominance of companies which manufacture drills, sprayers, components and spare parts for the domestic market.
 - The majority are family-run SMEs:
 - low participation of technicians and engineers, with reliance instead on “suitable” assemblies.
 - Assemblies employ components and accessories produced by local industries.
 - Products continually updated, but not on production lines.
 - Changes are based on experiences with customers or observation of the foreign market.
 - Sales networks supported directly by the companies, and not always exclusive.
 - Some market leading companies have R&D units with qualified staff that provide training.
 - Very little data flow among companies. The Fundación CIDETER attempts to promote it.
 - Companies are seeking to form associations with a view to exporting.

Marketing and import barriers

The national industry, especially for what concerns the market for drills and sprayers, is able to meet the demand of the national market in addition to devoting a small share of production to exports (tab. 15 and figg. 30 to 35).

The majority of imported seed drills come from Brazil, however they are low cost units. The highest export volumes are toward Uruguay. The trend is similar for sprayers. Regarding to self-unloading

hoppers, domestic production clearly predominates and exports are directed toward a variety of areas (fig. 36 and 37).

One of the most significant problems faced by Argentina's agricultural machinery industry is the trade imbalance with Brazil, as shown in tab. 16.

Tab. 15 – Exports and imports of drills (source: Fundación CIDETER)

■	Internal sales:	432 M \$
■	Imports:	12 M \$
■	Exports:	7 M \$

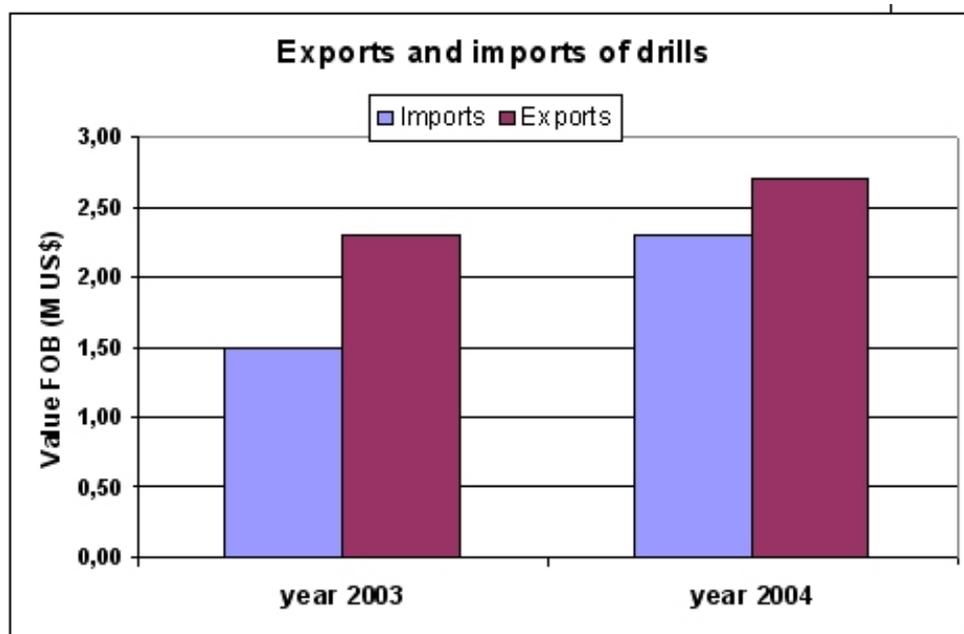


Fig. 30 (source: Fundación CIDETER)

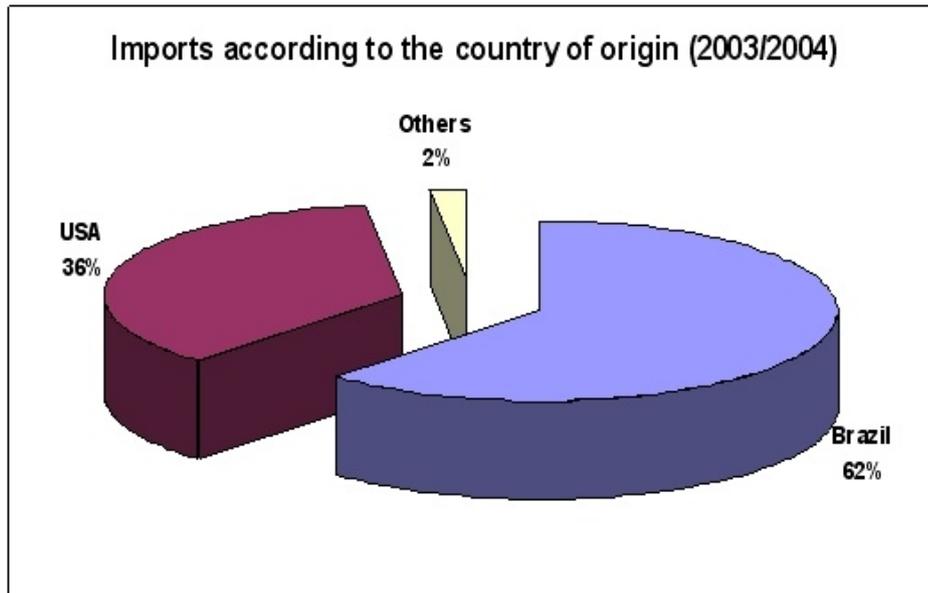


Fig. 31 (source: Fundación CIDETER)

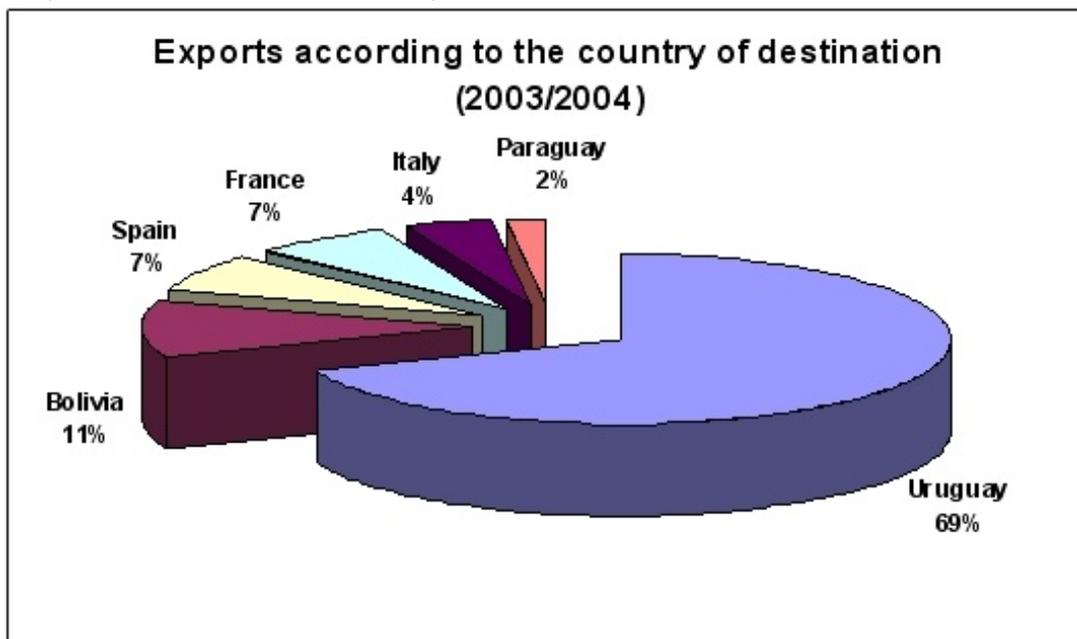


Fig. 32 (source: Fundación CIDETER)

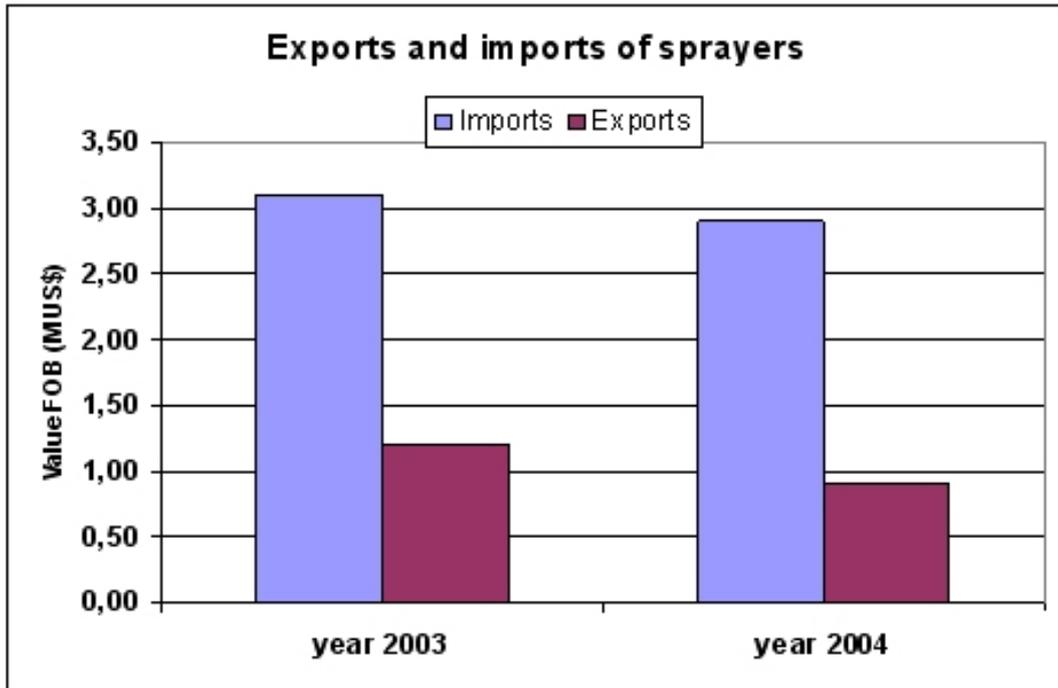


Fig. 33 (source: Fundación CIDETER)

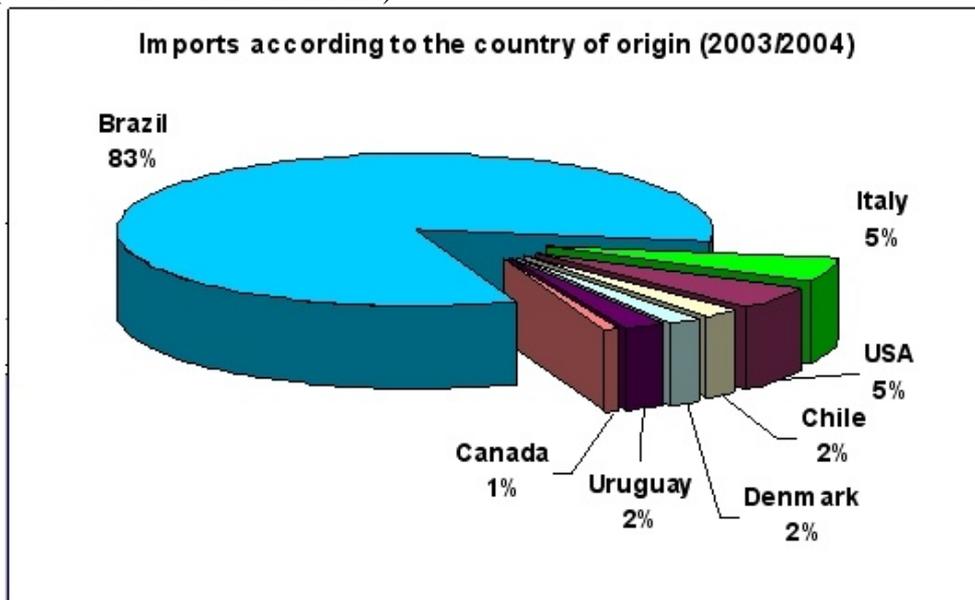


Fig.34 (source: Fundación CIDETER)

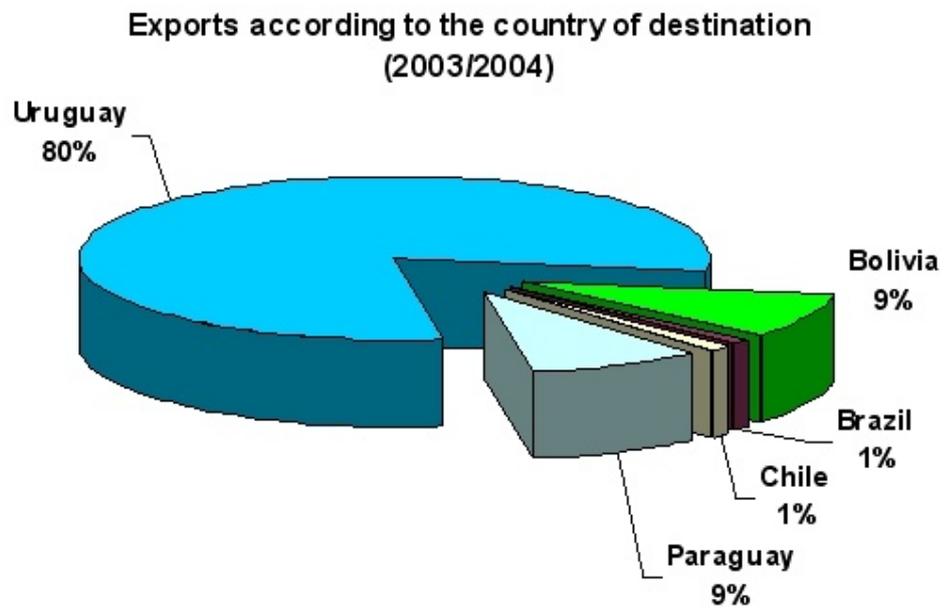


Fig. 35 (source: Fundación CIDETER)

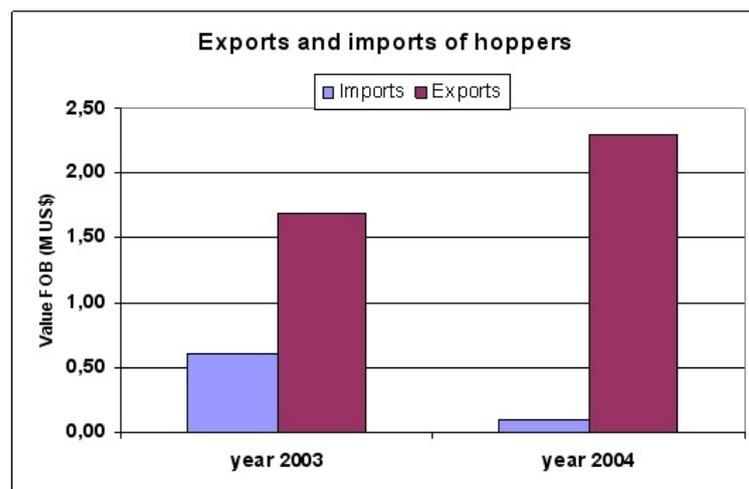


Fig. 36 (source: Fundación CIDETER)

Exports according to the country of destination

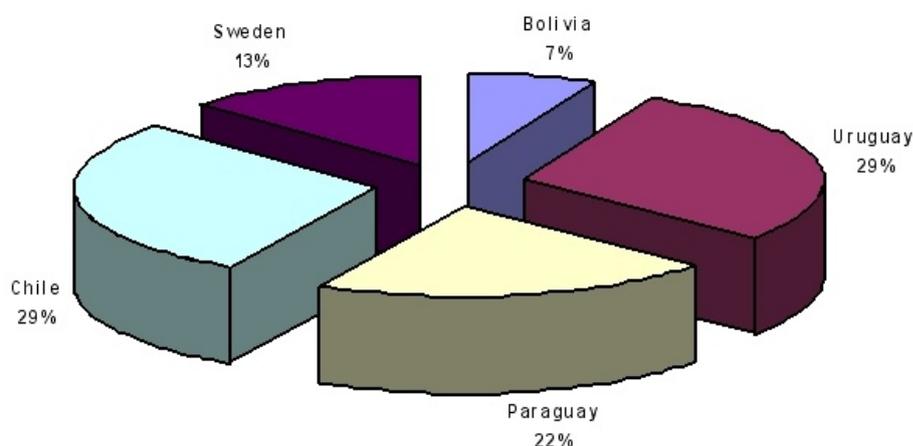


Fig. 37 (source: Fundación CIDETER)

Tab. 16 -Trade gap with Brazil Source: Fundación CIDETER

	Imports	FOB US\$	Exports	FOB US\$
		148,640,870		19,399,861
	Units	% Brazil	Units	% Brazil
Trucks	2 246	99.43	262	50.01
Trailers	339	83.38	59	20.39
Sprayers	1 786	96.48	131	15.64
Combines	760	85.54		
Ploughs	31	0.00	1	0.00
Harrows	116	99.95	9	0.00
Drills	108	93.28	87	0.00
Rotary cutters	2 964	2.22	270	0.00
Round balers	63	0.00	63	0.00
Graders	33	12.23	18	25.20
Mixers	1 664	12.03		
	10 110	91.64	900	40.04

Promotion of products in the domestic market

- Argentina's grain producing farmers have a high knowledge level.
- They customarily attend domestic and foreign trade fairs.
- "On field" demonstrations (dynamic).
- Rural association and CREA : demonstration field days.
- Specialised TV networks and Internet.

- Distribution based on dealers :
 - Legal with mechanical service (commission 15-20%)
 - Legal with factory feedback (commission 10-15%)
 - Mixed system with freelance sales (commission 4-10%)
 - Multi-brand dealer (commission 10%)

Customs and technical barriers

Counter to the general assumption, tariff barriers are higher between the three

members of MERCOSUR than they are toward the external markets (tab 17).

This represents an attempt to compensate the differences in production costs between these countries, and has had the following consequences:

- The creation of safety-related technical barriers has cut back on imports of poor quality machines.
- Difficulties encountered in starting up the system, which

could potentially damage the smaller Argentine companies.

The supports for exports are:

- VAT refund for exported machines, in the amount of 10.5%, as opposed to the 21% that is paid on purchase.
- Exemption of exports from Gross Income Tax (3% of the price of the exported product).

Tab. 17 – Import customs tariff

	Import customs tariff (%)		
	<i>MERCOSUR</i>	<i>USA</i>	<i>EU</i>
Machines			
Tractors	35	0	0
Combines	14	0	0
Headers	14	0	0
Balers	14	0	0
Mowers	18	0	0
Drills	14	0	0
Self-propelled sprayers	14	2	1.70
Spraying booms	16	2	1.70
Hoppers and trailers	35	0	2.70
Mixers	16	0	1.70
Components and spare parts			
Drill dispensers	14	0	1.70
Discs	14	0	0
Spraying material	14	0	1.70
PTO shafts and bearings	16	2.50	1.70

Conclusions and market trends

- The agricultural sector in Argentina is indeed efficient and competitive, and has developed its own production models (no-till systems).
- Specific targeting of the worldwide markets for grains, seed, vegetable oils and beef.
- Taxes applied to agricultural output exports are a primary source of state income (no state subsidies).
- Soybean output, for use in biodiesel, is expected to show strong growth.
- More intensive beef and milk production resulting from a natural reduction in pasture areas.
- The agricultural machinery market is determined by the use of direct sowing technology.

- The local machinery industry offers seed-drills, sprayers and tillage equipment to a small but demanding market.
- Most tractors and combines are imported, though national manufacturers are able to offer a small production for domestic demand.
- Other regional crops (such as peanut, sugar cane...) are mechanised using locally manufactured equipment.
- Reduction in tractor operating times arising from direct sowing technology; demand for reliable tractors equipped with hydraulic but no electronic components.
- SMEs manufacturing agricultural machinery face more barriers to entry into the global market.
- Manufacture of equipment is aimed at the humid agricultural system of the "Pampas" region. No interest in nearby crops with potential markets.
- Understaffed qualified R&D departments result in low competitiveness.
- Manufacturing processes, component standardisation and integration of safety at the design stage: assistance to the development of various companies over the past 10 years.
- The lack of agreements and systems for financing exports is hampering sales of machinery to other Latin American countries or regions with a lower relative growth rate.
- Road and labour safety regulations are some of the biggest barriers to the exporting of products to developed countries (in addition to patent limitations).
- The trade imbalance with Brazil's industry is jeopardising the local manufacturers.

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